UNIVERSITY OF TURKU
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DESIGN THINKING AS A SOURCE OF INNOVATION - A MICRO-FOUNDATION PERSPECTIVE

The case of IBM Finland

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1 INTRODUCTION

This thesis documents an investigation into the concepts of innovation capability and design thinking by means of human agency – the actions and interactions of individuals, which are placed in a business organisation as a setting. This chapter provides the background to the study by starting with an overview of the phenomenon to navigate the document, preceding an explanation for thesis aims, formulation of research questions, and then research structure. This chapter is composed of four sections. *First*, the background to the research and the research venues (see 1.1.) are introduced. *Following this*, the research purpose (see 1.2) will be discussed and research questions (see 1.3) framed. The structure of the research (see 1.4) is *then* outlined, concluding with a summary of the chapter (see 1.5).

1.1 The phenomenon

Innovation

Today's increasingly competitive business environment constantly puts large firms under incredible pressure to remain leading players. During the last decade, the linkage between innovation and firm performance has been at the centre of much attention. In this context, innovation has been widely considered the major fount of competitive advantage for firms (Tushman and O'Reilly 1996; O'Connor 2008; Crossan & Appaydin 2010; Govindarajan et al. 2011; Dess & Picken 2000; Lawson & Samson 2001). Numerous previous studies have made efforts to understand the "elusive black box", seeking the answer why some firms deliver better performance than others. Yet innovation is challenging and demanding due to its complexity and ambiguity (Benner & Tushman 2002; O'Connor 2008). This reality hinders firms from counting on analytical approaches which is supposed to allow firm to better the management activities in search of more efficient ways of development process (Wheelwright & Clark 1992), entailing the difficulty in achieving innovation goals (O'Connor 2008) or specifically in search of support for radical innovations in large companies (McDermott & O'Connor & 2002, 425).

Innovation capability

In contradistinction to the view of considering innovation as a process (how) or an outcome (what) (Crossan & Apaydin 2010), the capability perspective, which heavily draws on the resource-based view in which a firm is characterised with the possession given resources (Pralahad & Hamel 1990), holds that it is more plausible to portray innovation as a systematic approach that

accounts for building new knowledge and competitive advantage for a firm (Lawson & Samson 2001, 382; Börjesson & Elmquist 2011, 181; O'Connor 2008). In this logic, unique skills and capabilities which are hard to be duplicated or replaced lie behind the differences in performance of firms (Hamel & Prahalad 1994; Barney 1986; Barney 1991; Grant 1991). Accordingly, the competitive advantage of firms is far from purely based on new products or services themselves, but rather lies primarily in the competence to develop such the novelties (Prahalad & Hamel 1990; Schreyögg & Kliesch- Eberl, 2007), create new processes and systems (Lawson & Samson 2001, 384). In this sense, innovation capability is central to the capacity that allows a firm to build new knowledge and exploit new ideas (Assink 2006; Lawson & Samson 2001; Hatchuel et al. 2003; 2008) and is regarded as "*muscles for innovation*" and the "*preparedness*" of a firm (Börjesson & Elmquist 2011, 174).

Multiple definitions of innovation capability

In a review of the literature on innovation capability, it appears that the concept has variation in interpretation and been criticised for being too abstract and general while there is little discussion on how a firm can develop it in reality. Whereas most researchers conceive of innovation capability as particular areas of a firm by drawing upon a resource-based view, such as disruptive innovation capability (Assink 2006), capability of process innovation (Frishammar, Kurkkio, Abrahamsson, & Lichtenthaler 2012), the success of radical product innovation (Slater, Mohr, & Sengupta 2014), or dimensions of capability to innovate in the context of knowledge-intensive service, some other scholars take a holistic view on the organisational aspects of innovation capability (for example, Lawson & Samson 2001; O'Connor 2008).

The concept is, nevertheless, mostly conceptual. In a more detailed term, empirical research on how innovation capability can emerge, be built, sustained, developed, and grow over time is rather rare (Van de Ven, Angle, & Poole 2000, 4; Börjesson & Elmquist 2011, 174), in which there are a few exceptions (for example, Börjesson & Elmquist 2011; Ellonen, Jantunen, Kuivalainen 2011; Börjesson et al. 2013). Furthermore, the notion of innovation capability as a systemic concept involving all identifiable interdependent elements (O'Connor 2008, 326) has been criticised for being vague and general (Shreyögg & Kliesch-Eberl 2007, 916). A related consideration is that Felin and Foss (2005, 441) point out:

> *"to fully explicate organisational anything – whether identity, learning, knowledge, or capabilities – one must fundamentally begin with and understand the individuals that compose the whole, specifically their underlying nature, choices, abilities, propensities, heterogeneity, purposes, expectations and motivations".*

That is, studies on the concept at a lower, rather than the organisational, level need further investigations to explore the "*black box*" by means of understanding the component parts. In other words, it is proposed that there is an untapped research venue of the mechanism for building innovation capability from the micro-foundation perspective.

Design thinking

The past half a century has witnessed the evolution of design, success drawn from it, and its expansion beyond its original exclusive field to a wide range of other disciplines. In the context of firms' great thirst for competitive advantage, design thinking, which conveys a broader sense going beyond the professional design discipline, is increasingly gaining interest in management discourse. Design thinking is characterised as a portal for innovation, a human-centered approach which includes multi-principles, deriving inspiration from designers' practices (Johansson-Sköldberg, Woodilla, & Çetinkaya 2013). The concept emerges as an alternative approach to innovation (Bessant & Maher 2009; Martin 2009; Gemser & Leenders 2001; Ward et al. 2009; Filipetti 2011; Beckman & Barry 2007; Seidel & Fixson 2013). The fundamental idea of this design-driven logic is that people from different disciplines can replicate the practices of designers in terms of their mentality and working routine, and integrate such practices into a wide range of fields, such as multidisciplinary teamwork, spurring innovation, working out strategy, new product development (for example, Brown & Katz 2011; Brown 2009; Holloway 2009) (Brown 2009; Martin 2009; Kimbell 2011; Johansson-Sköldberg et al. 2013). This writer argues that the hallmarks of design thinking embodying in its logics and related practices, principles, and methods can provide a mechanism enabling a firm to achieve organisational ambidexterity, or manage the co-existence of explorative and exploitative innovation.

Design thinking has been, nonetheless, generalised by series of successful business stories (for example, Kelly 2011; Brown 2008; Brown 2009) in the shape of perceptive anecdotes and standardised practices that other firms may replicate in their organisations (Johansson-Sköldberg et al. 2013). In other words, design thinking is marketed by its proponents as a straightforward prescriptive process while the setting or individuals, or even how to deal with the existing organisational structure and process are ignored (Rylander 2009). Such a linear approach is inadequate (Liedtka 2015, 937). As a result, the shortage of empirical foundation leads to the difficulty of theorising and linking the concept to theoretical grounding (Johansson-Sköldberg et al. 2013; Hobday, Boddington, & Grantham 2012; Kimbell 2011). The research demystifies how design thinking is placed in organisational contexts is necessary (Carr, Halliday, King, Liedtka, & Lockwood 2010). This study aims at partly providing new insights into design thinking in relation to developing innovation capability of a firm by taking the micro-foundations view.

In summary, increasingly fierce competition triggers firms' seeking for the *"elusive black box"* of innovation to sustain the competitive advantages. Although innovation capability has drawn the attention of scholars in the management discourse for decades, the immaturity of empirical studies on how such competence can be built and developed is recognised, particularly at the individual level. In that content, despite the fact that the notion of design thinking emerges as a viable approach to innovation and is supposed to be promising, it seems plausible that further enquiries are demanded to explore its ability to enhance innovation capability of firms in an organisational setting. This study contributes to the discussion on design thinking as a facilitator to innovation capability by bridging the two concepts together via the adoption of a micro-foundation perspective. Accompanying the purpose and research questions, a qualitative single-case study approach is adopted and draws on the data which is gathered via semi-structured interviews and observation to produce an account of the phenomenon.

Having concerned with the background for the study in general, including the relevant concepts and research spaces, the subsequent section will present the research purpose.

1.2 Research purpose

This empirical study aims to unravel some of the mysteries surrounding how innovation capability which is backed by design thinking functions from the view of micro-foundations. In light of previous research on the role of innovation and how innovation capability can be built at a general level in relation to the competitive advantage of firms, it is logical to shine new light on these debates through an examination of constituent components of such concept.

With reference to the design realm, design and its implications have been going far beyond the design context. Practitioners from different areas are interested in and have tried to learn how designers think and work, and integrate such principles into business settings. In the setting of management discourse, design thinking is characterised as a human-centered approach in the form on process, tool, mindset, etc. to innovativeness and become prominent in the discipline recently.

Furthermore, when design thinking is adopted throughout innovation projects, it will formulate given certain routines to approach problems among team members which allow them to conduct with less cognitive effort and with minimum decisions making. On the other hand, due to the nature of such projects germane to innovation, creativity, turning ideas into opportunities, creating new knowledge, etc. are constantly required. Hence this research seeks to elucidate how innovation capability can be developed with the facilitation of design thinking as an approach from a micro-foundation perspective as an overarching purpose. In simple terms, drawing upon design thinking, this study attempts to closely examine how individual interactions produce innovative outcomes,

ultimately contributing to innovation capability of a firm. Because of such a major objective, a specific case of IBM Finland is adopted and portrayed.

The following advantages justify the selection of IBM Finland as the case company. *First,* tying design thinking to such an empirical context in which the concept is deployed on a company-wide scale is promising to provide further insight into the practical implications of the findings. *Second*, as the research project is carried out in Finland, it comes out to be highly logical to tie the empirical part to the same country. By doing so, it makes much more sense to possibly capture practices at the local business, resulting in raising the quality of the research. *Third*, with respect to the Master thesis work scale, the selection of collaborating with a case company geographically close seems more viable because it significantly eases the research implementation in consideration of time consumption, defining the trustworthiness of raw data, and communication efficiency by face-to-face interaction. Figure 1 visualises the scope of this research project.

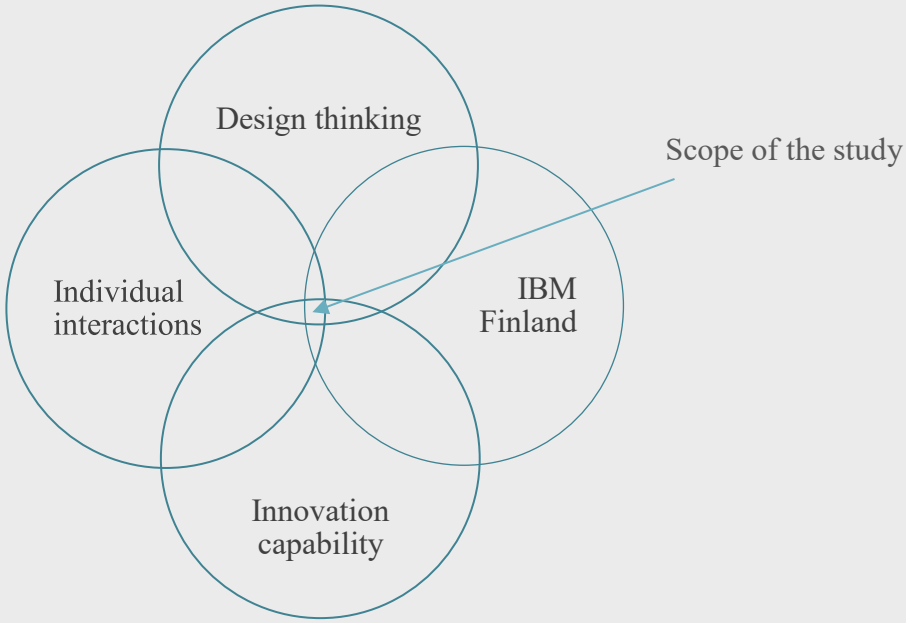

Figure 1 Scope of the study

In addition, the research is also guided by two sub-objectives to systematically understand the individual activities in relation to the organisational level. The sub-objectives of this study include

i. To better understand how the routines configured at the individual level relate the high level of a firm, and
ii. To scrutinise the paradox in innovativeness projects in terms of efficiency of what has been known and exploring what is unknown to the firm.

Whilst the first sub-objective is pivotal in clarifying the mechanism that allows routines which are shaped among individual members of a team can enhance the innovation capability at the organisational level, the second sub-objective deals with examining the challenge of balancing the two conflicting requirements in terms of exploitation and exploration. It is believed that such sub-objectives will go a long way towards being conducive to suggestions in terms of practicality in an extant setting. The research project assumes that design thinking is conducive to the development of "muscles for innovation" (Börjesson & Elmquist 2011, 174) of a firm which originates from the activities of individuals. If such empirical evidence could be proved via this study, design thinking is much likely to gain much more attention of practitioners due to its solid empirical background and sustain its own role in the management world.

The research to some extent simultaneously accomplishes a dual aim: (i) to address the research gap in relation to innovation capability by exploring the interrelation between the individual and firm level aspects of innovation, and (ii) simultaneously empirically confirm the contextualised perception of design thinking. As a result, this study can add to the discussion through an empirical understanding of innovation capability and design thinking from both an academic and practitioner point of view.

This section has detailed the major aim of this study as well as and its two sub-objectives. In addition, the justification for the adoption of IBM Finland case has also been included in this part. The following section will place emphasis on identifying the research questions, which draws on the research venues, by linking the germane concepts.

1.3 Research questions

By linking the concept of innovation capability, micro-foundations, and design thinking together, the research questions of this study draw upon the suggestions on possible research opportunities, recommended research venues combined with the personal interest in a given perspective. To better understand how innovation capability may be built, developed, and deployed by adopting design thinking principles, this thesis aims at investigating the relationship between the two concepts in relation to organisational competences. That is, the purpose of this study is to unravel some of the mysteries surrounding how innovation capability which is backed by design thinking functions from the view of micro-foundations.

First, little empirical research on how a firm can develop innovation capability which is constructed on the organisational level can be found in practice (Van de Ven, Angle, & Poole 2000, 4; Börjesson & Elmquist 2011, 174). In addition, it is suggested that capabilities should be started from the point that places emphasis on individuals composing the whole (Felin & Foss 2005, 441).

By doing so, organisational-level outcomes (macro level) are likely to be well explicated because they involve individual actions and interactions (micro level) (Abell, Felin, & Foss 2008, 494; Foss 2011, 1414-1415). Considering the such research venues pertain to building innovation capability at the micro-foundations level, therefore, leads to the major research question:

RQ: How does innovation capability actually function at the micro-foundation level?

Furthermore, design thinking as an emerging concept that denotes a multidisciplinary, human-centered approach to innovation inspired by designers' practices in the management realm (Kelley & Littman 2001; Brown 2009; Martin 2009; Kimbell 2011; Johansson-Sköldberg et al. 2013). Design thinking is promising in terms of bringing "breakthrough ideas" (Brown 2008) to firms, and enable firms to reach ambidexterity – balancing between exploration and exploitation, or administration and invention (Martin 2009). Design thinking is, however, characterised in the form of perceptive anecdotes and standardised processes that other firms may replicate in their organisations (Johansson-Sköldberg et al. 2013) in the absence of the setting or individuals, or even how to deal with the existing organisational structure and process (Rylander 2009). In other words, further examination into how design thinking is utilised in organisational settings are necessary (Carr, Halliday, King, Liedtka, & Lockwood 2010; Johansson-Sköldberg et al. 2013). This author is personally keen on design thinking and takes the concept as a perspective investigating its relation to innovation capability. Furthermore, the research adopts micro-foundations coming in the manifestation of members of a team working on innovation straightforwardly points to the interactions of individuals in such the group of people. This, therefore, entails the sub-question:

SQ: *How do individuals produce innovative outcomes on the firm level by performing actions guided by design thinking?*

Answers to the research questions will be brought mostly by the informants from semi-structured interviews and observations at the case company, and then reflected to the extant theoretical groundings. By doing so, the study explores the concepts in an organisational environment, and build a novel understanding of design thinking in relation to the mechanism of innovation capability development.

This section has been concerned with identifying the main research question in this study. That being: *How do innovation capability actually function at the micro-foundation level?* Furthermore, in order to better understand how design thinking can enable individuals to reach innovative outcomes, a sub-research question has also been framed: *How do individuals produce innovative outcomes on the firm level by performing actions guided by design thinking?* These questions guided

this case study research, then provided a mechanism to construct and conceptualise the qualitative findings. The next part will briefly outline the structure of this research work.

1.4 Research structure

This section aims to summarise the five chapters that constitute this study.

Chapter 01 – Introduction provides a background and context of the study, namely the purpose and scope of the research. It also identifies the research questions, followed by outlining the contents of the work.

Chapter 02 – Literature review covers a review on a range of research on the relevant concepts in question is undertaken in order to formulate a solid background, a frame of reference and critically contemplate the issues under investigation in this research. Specifically, it identifies multiple interpretations and perspectives on innovation capability, and design thinking across design discipline and management-oriented discourse. Also, the micro-foundation is also presented as a perspective explicate the development of organisational innovation competence. Within this context, it is argued that while innovation capability and design thinking are characterised in a simplistic and general manner with a scarcity of empirical evidence in organisational settings. This starting point provides a research venue based on which this study is framed.

Chapter 03 – Research design provokes a detailed discussion on the methodological approaches and research strategies that underpin the study. *First*, the chapter commences with the research methodologies. *Second*, case study as a research strategy is informed with a consideration of its theoretical background, preceding a justification being also presented. After that, the motives for selecting a case company are explained while the background and research procedures are provided, followed by the description of data collection methods of semi structured interviews and site observation, and data analysis methods. *Then* the chapter is concluded by an overview of considerations for research quality in terms of trustworthiness.

Chapter 04 – Empirical findings presents the findings of the research across this case work. The results are constructed and analysed under four themes which emerge in Chapter 02. Those being, *individuals, processes and interactions, individual learning to innovation capability,* and *organisational ambidexterity*. These four themes are contextualised and informed by details of actions expounding on how innovation capability is built and developed, and the interrelation between the individual interactions and aspects of innovations by means of human agency, which is

guided by design thinking principles. Then the findings are conceptualised in two areas: how innovation capability functions mediated by individuals in the given context. These will then facilitate the discussion in the next chapter to afford insight into the concepts in practice.

Chapter 05 – Discussion and conclusions further articulates and synthesises research findings and discussions in reference to innovation capability development and design thinking, corresponding to answering the research questions. These are then considered in comparison with relevant literature to seeks for critical discussion and communicate a rich portrayal of how innovation capability is built and developed, and the role of design thinking is such the process. When it comes to the conclusion, it discusses how the study is conducted against the purposes, followed by interpretations of research results and knowledge contribution to provide holistic insights into the issues in question. After that, the implications are drawn for both practitioners and scholars, and further research agenda suggested.

Finally, this research work ends with the whole research summary, bibliographic references and appendix. Having summarised the chapters in this research, the following section will summarise the current chapter.

1.5 Chapter summary

This chapter has made an outline of the background to the study. It provides an overview of the phenomenon with relevant concepts, followed by the research aims, identifying the research venue to pursue that particularly leads to phrasing the research questions as the core of the current research. This chapter also further offers a brief overview of the contents and presents a summary of each chapter, aiming at enabling the readers to navigate through the research document. The following chapter will explore a review of the extant literature on a range of concepts related to the topic under investigation.

2 LITERATURE REVIEW

This chapter is concerned with a literature review of related concepts to formulate a solid background, entailing providing an insight into extant knowledge of innovation, micro-foundations, and design thinking with sub-categories following each main concepts. In a more detailed term, this chapter provides a detailed focus on the functioning of innovation capability to which design thinking methodology is an approach for innovation within the organisational context. It also further critically discusses how innovation capability and design thinking are perceived in practice and their interplay. As briefly noted in the previous section, whereas innovation capability gives every appearance of being vague and general (Shreyögg & Kliesch-Eberl 2007, 916) due to limited empirical insight into practice (Van de Ven et al. 2000, 4; Börjesson & Elmquist 2011, 174), design thinking has been called for further empirical grounding because of its immaturity in practice and academic circles (Carr, Halliday, King, Liedtka, & Lockwood 2010; Kimbell 2011, 301; Johansson-Sköldberg et al. 2013, 131). For this reason, this chapter explores how the latter is mobilised for the purpose of developing the former by means of human agency, or micro-foundations perspective.

The review on literature is divided into two three main categories as follows under which related concepts as sub-categories are discussed.

- Innovation (see 2.1): A detailed focus on *innovation, innovation capability, dynamic capability,* and *ambidexterity*. Specifically, ambidexterity is drawn on as one of the four main themes guiding the research process at the later phase.
- Micro-foundations (see 2.2): Current understanding of micro-foundation as the heart expounding on social science, consisting of how and why it should be taken into account. In addition, its relation to routines and capabilities is also mulled over. Particularly, this section identifies three major themes, namely *individuals, processes and interactions,* and *individual learning to innovation capability,* which are combined with the theme of ambidexterity discussed in the previous section structure the data collection and analysis, then the findings and discussion sections.
- Design thinking (2.3): A detailed examination of discourses on design thinking (as a way of working, as an approach to problem-solving, and as part of theory management), portraits of design thinking, and its linkage to innovation.

This chapter will continue with bridging the concepts (2.4) by summarising and drawing together the major elements in the literature in association with *innovation capability, micro-foundations as human agency,* and *design thinking*, then highlight the key arguments for the current study towards the purpose which has been set out, and identify the four principal themes guiding the research.

2.1 Innovation

2.1.1 Innovation as a concept

This concept tends to imply multiple sense of meanings and is subject to multiple interpretations. This can be well explained by the variety of discourse stream on different levels (Johansson & Woodilla 2009, 67), methodologies and theoretical grounding of research adopted when the notion is formulated (Cruickshank 2010; Crossan & Appaydin 2010), Baregheh, Rowley, & Sambrook 2009)

The research of "*innovation*" can be traced back to Schumpeter (1911 in German, English version in 1983) who constructed the "*Theory of Economic Development*" in which innovation is perceived from an economic view as any invention that is economically beneficial, including *a new product, process, or method of production; a new market or source of supply; a new form of commercial, business, or financial organisation*. Closely following Schumpeter, Thompson (1965, 2) early defines that: "*Innovation is meant the generation, acceptance and implementation of new ideas, processes products or services*". This definition appears to be simple and looks into three phases, which is quite similar to the definition of West and Anderson (1996): "*Innovation can be defined as the effective application of processes and products new to the organisation and designed to benefit it and its stakeholders*". These definitions share the similarity that it only considered innovation when a firm promotes and put an innovative idea into practice and prove its success, or effectiveness, or until such idea has created economic value. In this logic, whether or not an idea innovative can only be recognised when its tangible form as an outcome comes into play.

Taking an unlike view pointing to forms of innovation in a series of action including three attached phases, Kimberly (1981, 108) refines innovation as: "*There are three stages of innovation: innovation as a process, innovation as a discrete item including, products, programs or services; and innovation as an attribute of organisations*".

There are a number of other scholars who direct the focus towards the degree of novelty and the context in which idea is seen innovative. A notable example of such view is Van de Ven (1986, 592) who claims that *"As long as the idea is perceived as new to the people involved, it is an 'innovation' even though it may appear to others to be an 'imitation' of something"*. This seems to be embraced by Schreyögg and Kliesch-Eberl (2007, 923) suggest that "*innovations are defined as the creation of any sort of novelty*" which *"...means the creation of novel problem-solving patterns".*

Mascitellli (2000, 180-181) notes that scholars have made the concept more unclear by using pairs of adjectives to portray innovation, such as evolutionary/ revolutionary, sustaining/ disruptive, continuous/ discontinuous, and incremental/ radical. Later her propose to adopt the term "breakthrough innovation" *"to represent any creative and original action by individuals or project teams that enables firms to capture at least temporary monopoly profits or that results in a significant increase in market share"*

Definitions of innovation from different discipline have also been recognised. This can be illustrated briefly by Du Plessis (2007, 21) who places emphasis on relating knowledge management as a discipline to innovation and states: *"Innovation as the creation of new knowledge and ideas to facilitate new business outcomes, aimed at improving internal business processes and structures and to create market driven products and services. Innovation encompasses both radical and incremental innovation".*

Taking a different view, Tidd, Bessant, and Pavitt (2005, 66) describe innovation as *"a process of turning opportunity into new ideas and of putting these into widely used practice"*. This definition appears to miss out the character of whether an idea being placed in practice or being prevalently used, or effective, regardless of types and degrees of innovation. Put simply, it places a focus on the process in which a firm carries out a series of actions to push forward an innovative idea. Even if the results achieved are unintended,

The above discussion has illustrated the diversified interpretations of innovation from multiple disciplines. While being aware of the different discourses of innovation, such as the one attributed to technology area (for example, Abernathy & Utterback 1978; Mensch 1979; Verganti 2006), or a special discourse of open innovation, from the view of Johansson and Woodilla (2009), emanating from research and development practices, and computer science (for example, Chesbrough 2003; von Hippel 2001), this author intentionally misses them out to sustain the focus of the study. This study mostly adopts the concept of innovation proposed by Tidd, Bessant, and Pavitt (2005) which focus on idea implementation, rather than the result of such activity, and conveys a broad sense of meaning and not only refers to idea or products or services, but also processes, methods, models, organisational structure and external relations, or any combination thereof while neglecting evaluating the character of novelty or commonality of an idea, for instance.

2.1.2 Innovation capability

Widely gaining the attention of scholars in different areas, innovation capability has been considered an approach to foster firms' competitive advantage in the increasingly fierce environment (Calantone, Cavusgil, & Zhao 2002). While the majority of researchers draw the concept on a

resource-based view, there are some other scholars pointing to the organisational aspects of innovation capability.

There is a significant number of scholars that look at innovation capability from a resource-based view which argues that a firm can be better at performance and more sustainably competitive over others due to exploiting firm-specific resources which are considered valuable, rare, and difficult to be substituted or imitated (Barney 1991; Peteraf 1993). Innovation capability has been discussed for years with wide variations of focus on the notion, for example, development of disruptive innovation capability (Assink 2006), how manufacturing firms can strengthen the capability of process innovation (Frishammar, Kurkkio, Abrahamsson, & Lichtenthaler 2012), the success of radical product innovation (Slater, Mohr, & Sengupta 2014), or dimensions of capability to innovate in the context of knowledge-intensive service.

Romijn and Albaladejo (2002, 1054) consider innovation capability to be *"the skills and knowledge needed to effectively absorb, master, and improve existing technologies, and to create new ones"*, whereas Assink (2006) specifically draws attention on disruptive innovation capability and defines it as "the internal driving energy to generate and explore radical new ideas and concepts, to experiment with solutions for potential opportunity patterns detected in the market's white space and to develop them into marketable and effective innovations, leveraging internal and external resources and competencies". It seems that these definitions refer to innovation capability as the intangible aspects of firm (knowledge, skills, ideas) in nature and place emphasis on building processes, products, and technologies.

According to Lawson and Samson (2001, 384), innovation capability is described as *"as the ability to continuously transform knowledge and ideas into new products, processes and systems for the benefit of the firm and its stakeholders"*. It is argued that innovation capability draws upon the knowledge that allows a firm to exploit resources, and acts as an agent synthesising and linking both mainstream activities (efficiency) and new business stream (creativity), or new-stream innovation of a firm. In a similar vein, Koc (2007, 375) suggested innovative capacity as *"the continuous improvement of the overall capabilities and resources that the firm possesses to explore and exploit opportunities for developing new products to meet market needs*".

There is a different viewpoint which holds that as organisational capabilities have been portrayed as the reflection of historical experiences, organisational learning which points to the incremental development of a given way of combining resources is central to developing the capabilities for innovation. Although coming into a wide range of application, organisational capabilities are shaped only via the effective reaction to given novel challenges or unpredictable events in the past tackled by particular types of constellation. (Schreyögg & Kliesch-Eberl 2007, 914, 916.) This approach places emphasis on the critical role of successful learning and internal knowledge trans-

ferring mechanism, external collaboration, management system facilitating the learning and experimentation (Börjesson & Elmquist 2011, 173) and internal integration of individual expertise (Grant 1996a). In this logic, capability development for innovation should be seen as a process that is manageable, can be designed, and guided (Schreyögg & Kliesch-Eberl 2007; Börjesson & Elmquist 2011, 173; Grant 1996a). This research project embraces this point of view which seems more appropriate in the sense that building, developing, and managing innovation capability of a firm is viable and process-based.

2.1.3 Dynamic capability and innovation capability

This section is concerned with a minor review on dynamic capabilities and its relation to innovation capability. While dynamic capabilities tend to be difficult to be brought to actionable managerial decision making, innovation capability may be developed independently from the active intervention of dynamic capabilities.

Dynamic capability

Because of the challenges of turbulent environments that requires managers to respond fast in terms of decision making and action (Carlsson & El Sawy 2008), dynamic capabilities are proposed as the means that enables firms to deal with such situations (Pavlou & Sawy 2011, 240). Dynamic capabilities are described as *"the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments"* (Teece, Pisano, & Shuen 1997, 517). This concept is central to the abilities that allow firms to revisit with the resource base in the form of either 'reconfiguring' or 'refreshing' extant resources, and 'creating' new ones (Ambrosini & Bowman 2009, 29). Due to the feature of "revisiting", dynamic capabilities bring flexibility to the firm to be corresponding to dynamic and changing external environments (Felin & Foss 2009, 162). These capabilities are deemed dynamic in the way that they have the ability to have an impact on static competences, and have been characterised as second-order capabilities as such (Danneels 2011, 3, 17; Danneels 2002, 1097).

A review of the literature on dynamic capabilities points out the weaknesses of this theory in terms of recognition, articulation of characteristics, and measurement as a result, giving rise to difficulties study, development, and evaluation. *First*, there is a criticism that dynamic capabilities may even be unmanageable and hard to achieve in managerial actions (Grant 1996a), causing practitioners not even recognise the state of existing of dynamic capabilities in reality (Pavlou & Sawy 2011, 240). In a similar vein, Itami (1987) and Winter (2003, 991) challenge the thinking of

whether dynamic capabilities actually exist in practice. Moreover, the lack of a tool that can effectively address the measurement of such capabilities is recognised (Nerkar & Roberts 2004, 781). *Second,* there is another notion that the component parts of dynamic capabilities fail to be precisely pointed out. Instead, the existence of dynamic capabilities is accounted by approximate assumptions. (Galunic & Eisenhardt 2001.) In a more detailed term, among various resources within a firm, it appears impossible to specify the ones accounting for the effective outcomes. This can be explained by the *ex post quality* of an identification process - the success of the firm can be attributed to the resources which are then assumed invaluable while the failure can invariably be claimed to the lack of a given capability or capabilities. It is also argued further that the system of resources in which its own part complements each other; in this sense, individual part is prone to be insignificant. Furthermore, the values of resources are subject to change over time, which may turn such valuable resources into a rigidity regardless of the stable resource itself. (Lawson & Samson 2001, 380.)

The weaknesses of dynamic capabilities as such result in immeasurability, and difficulty of placing it in actionable managerial decision making. That is, the poor understanding of the theory leads to the hindrance to study replication and further development of the concept (Lawson & Samson 2001, 380).

Dynamic capabilities and innovation capability

Further to the above discussion on innovation capability in the previous section, this part sheds light on the relationship between "*dynamic capabilities*" and "*innovation capability*".

Dynamic capabilities are dominantly picturised at a general level covering all aspects of an organisation, in which innovation capability is conceptualised as the *"most important component factor"* of *dynamic capabilities* as such (Wang & Ahmed 2007, 39). Yet there is another view which holds that innovation or the management of innovation acts as an organisational competence on its own and can be developed separately (Lawson & Samson 2001; O'Connor 2008). In this logic, it is argued that some firms possess more advantages in exploiting new ideas or novelty, which can be attributed to an innovation capability (Assink 2006; O'Connor 2008; Hatchuel et al. 2003, Lawson & Samson 2001). *Innovation capability* as such is characterised as the preparation during the process of building and developing *"muscles for innovation"* of the firm (Börjesson & Elmquist 2011, 174). Specifically, *"capability development comes close to a chain of reactions triggered by an initial event, thereby establishing a capability trajectory. Capability development takes time and the specific way in which time has been taken (i.e., the intensity, frequency, and the duration of social interactions) is relevant for the gestalt of a capability"*. (Schreyögg & Kliesch-

Eberl 2007, 916). Whereas adaption, changes, and accumulative learning account for the development of capabilities, this reconfiguration process which is often deemed as an incremental one (Zollo & Winter 2002, 341) does not necessarily require dynamic capabilities' involvement to mediate the outcomes (Helfat & Peteraf 2003, 998). In other words, innovation capability may be enhanced and developed independently from the intervention of dynamic capabilities.

2.1.4 Ambidexterity

Management scholars propose that *exploration* and *exploitation* are the critical elements of innovations (March 1991; Andriopoulos & Lewis 2009, 696; Raisch, Birkinsha, Probs, & Tushman 2009). Either of such organisational behaviours is, nevertheless, adequate (March 1991). Ambidexterity points to the ability of an organisation to simultaneously pursue both explorative and exploitative innovation (Raisch et al. 2009, 685; Junni, Sarala, Taras, & Tarba 2013), or manage the two tensions (Andriopoulos & Lewis 2009, 696). Similarly, Tushman and O'Reilly (1996) propose the same point with incremental and radical innovation. Ambidexterity embodies itself at both individual and organisational level (Raisch et al. 2009, 688).

Exploration activities are characterised by *search, variation, risk-taking, experimentation, play, flexibility, discovery, and innovation* (March 1991, 71; He & Wong 2004, 481). On the one hand, this behaviour places a focus on generating new knowledge and experimentation seeking variation and novelty (Andriopoulos & Lewis 2009, 696), and develop options which lead to radical innovations that can meet the needs of emergent customers or markets (Benner & Tushman 2003, 243, 248). In other words, explorative activities are likely to deliver larger performance variation, entailing substantial success (He & Wong 2004, 481). On the other hand, pursuing this activity only, nonetheless, increases the risk of falling in a "failure trap" (Gupta et al. 2006), or being equal to destructive (He & Wong 2004, 482).

Exploitation implies organisational behaviours which are portraited by *refinement, choice, production, efficiency, selection, implementation, and execution* (March 1991, 71; He & Wong 2004, 481). On the one hand, such the function focuses on extant competencies, technologies, and paradigms, seeking efficiency and improvements, honing and expanding existing knowledge, entailing innovation (Andriopoulos & Lewis 2009, 696). As a result, it allows firms to address the needs of existing customers or markets (Benner & Tushman 2003, 243) whilst gain advantages in variation and cost reduction, enhancing control, and execution (Junni et al. 2013, 299). On the other hand, the dynamics of reducing variation can, however, hinder disruptive innovation and responsiveness to new customer segments (Benner & Tushman 2003, 240), engendering the risk of obsolescence and of falling in a "success trap" (Andriopoulos & Lewis, 695-696).

Organisational ambidexterity scholars propose that an organisation's long-term success and competitive advantage are contingent upon its ability to explore new possibilities (*exploration*) and exploit existing competences (*exploitation*) (March 1991; Levinthal & March 1993; Junni et al. 2013; Gibson & Birkinshaw, 2004). In other words, firms should pursue and strategically engage in both exploration and exploitation simultaneously to leverage sustained performance (for example, He & Wong 2004; Raisch et al. 2009; Gibson & Birkinshaw, 2004; Birkinshaw & Gibson 2004), or develop dynamic capabilities (Benner & Tushman 2003, 238).

The literature on this stream demonstrates that there are multiple perspectives that are adopted to place different focal research on ambidexterity, such as organisational learning, organisational structure formulation, organisational behaviours, and technological innovation. March (1991) places the lens of research on explorative and exploitative learning of organisations. Holmqvist (2004) further expands this stream with an examination on the interplay between the processes of inter-organisational learning and intra-organisational learning based on the dynamics of exploration and exploitation. Adopting the angle of organisational structure design, Tushman and O'Reilly (1996) argue that firm can simultaneously explore and exploit with the establishment of separate subunits, expanding the work of Ducan (1976) from the same angle which suggests constantly shifting the firm structures to be consonant with its business strategies. Raisch (2008) further empirically analyses the settings in which three types of organisational structures are implemented, namely temporal separation, structural separation, and parallel structures. Gibson and Birkinshaw (2004) take the view of organisational behaviour and propose the path to balance exploratory and exploitative activities via contextual ambidexterity. In this view, individuals are enabled to have the flexibility to balance between the two conflicting demands for adaptability and alignment in terms of their resources. From another perspective, O'Reilly and Tushman (2013) regard *sequential* ambidexterity (Ducan 1976), *structural* ambidexterity (Tushman and O'Reilly 1996), and *contextual* ambidexterity (Birkinshaw & Gibson 2004) as the three main approaches to reach ambidextrousness. Benner and Tushman (2003) further link the concept of ambidexterity to incremental innovation and radical innovation in the technology area.

In line with the view of considering capability development as the process based on successful knowledge acquisition, accumulation, and management (Schreyögg & Kliesch-Eberl 2007; Börjesson & Elmquist 2011) as discussed above, this study adopts the view of ambidexterity to point to organisational learning and innovation as the outcomes of design thinking which are carried out via courses of actions of individuals as the focus.

2.2 Micro-foundations

2.2.1 Micro-foundations

Micro-foundations as a concept

"Micro-foundations" is not a new concept which is concerned with the notions of *"reduction"* or *"decomposition"* in science and with "methodological individualism" in the social science (Felin, Foss, & Heimeriks 2012, 3). This concept emerged in the 1960s on discussing how to relate micro- to macro-economics by economics scholars (for example, Leijonhufvud 1968; a review in Janssen 1993). This notion is also a topic of debate in philosophy and sociology regarding if individuals or collectives should primarily explain social phenomena (for example, Coleman 1964; Lazarsfeld & Menzel 1970; Popper 1957; for an overview, see Udehn 2001). (Felin, Foss, & Heimeriks 2012, 4.)

The notion of "*micro-foundations*" is still in debate due to the misconceptions, multiple uses, and denotations for the term (Barney & Felin 2013, 3). To illustrate the point, micro-foundation in Bingham's (2010) view draws heavily on the constitution of component parts and simple rules in environments which are dynamic (cf. Eisenhardt & Martin 2000) whereas according to Gavetti (2005), micro-foundations is mostly related to transferring process from fundamental-level aspects, such as learning and cognition, to the organisational level. The micro-foundations view places emphasis on understanding *"...specifically the origins, creation and development, reproduction and management of collective constructs such as routines and capabilities"* (Felin et al. 2012, 1351).

Foss (2016, 117) takes a more holistic view and describes micro-foundation as "*heuristic that collective/ aggregate/macro outcomes (for example, organisational performance) and formations (for example, institutions) be explained in terms of the actions and interactions of lower level entities, typically (but not necessarily) individuals*". This definition is built upon the general explanation model of social science proposed by Coleman (1990) (Figure 2). The diagram in Figure 2 denotes the interactions between macro and micro level, which explain the mechanism how social science occurs. It could be that the macro-level points to organisational whereas the micro-one is that of individuals. By this model, the linkage explicating interactions among levels may exist between macro–macro (Arrow 4) and macro–micro (Arrow 1), micro–micro (Arrow 2), and micro–macro (Arrow 3). Furthermore, it is argued that explanations of the outcomes in social sciences, either a macro-level phenomenon or a link between macrophenomena, should be placed by means of the Arrow 1, Arrow 2, Arrow 3, or any combination thereof, but not ruled out by the

Arrow 4 alone (Abell, Felin, & Foss 2008, 491) because macro-level entities on the social domain that are capable of taking actions or dispositions seem unviable (Cartwright 1989). This can be well reinforced by the argument that "*…to fully explicate organisational anything – whether identity, learning, knowledge or capabilities – one must fundamentally begin with and understand the individuals that compose the whole, specifically their underlying nature, choices, abilities, propensities, heterogeneity, purposes, expectations and motivations"* (Felin & Foss 2005, 441). It, therefore, appears necessary to pursue an investigation into the actions of individuals and their returning values which may be attributed to the constitution of routines.

In this manner, it is argued that the model can well account for the interrelation between the lower (micro) and higher (macro) level of firms.

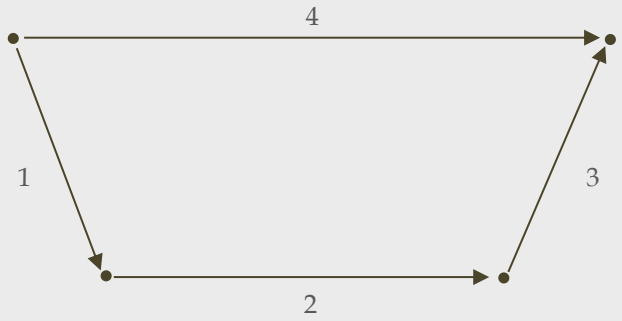

Figure 2 A general model of social science explanation (Coleman (1990).

Why micro-foundations

The underlying argument in favor of placing the focal research on fundamental level which has been under-researched is that it is prone to draw out rewarding implications (Felin & Foss 2005, 448). There are three reasons accounting for the significance of micro-foundations, namely alternative explanations, managerial intervention, and fundamental causes and predictability (Foss 2010, 14-15).

First, due to the fact that macro-level is likely to leave out fundamental phenomena which are constituted by individual behaviours, alternatives to explanations are still viable. Whereas the capability view places the emphasis on the collective-level heterogeneity in routines and capabilities, it is argued that such character can also be found at lower-level, or individual heterogeneity (Felin & Hesterly 2007, 210), particularly when individuals self-select into specific organisations (Stern 2004). Felin and Foss (2005, 444) argue that since routines and capabilities are not anchored in

individual as the fundamental, they can be practically comprehended as anything on the macro level.

Second, as the heart of strategic management is to build and maintain the competitive advantage of firms. In this logic, the intervention of management executives is highly demanded. This most likely touches upon and targets fining-tune the micro-level since managers can find little on the higher-level of, for instance, capabilities. (Foss 2010, 15). This is supported by Collis (1994, 144) who argues that organisational capabilities have been criticised for being vague due to the problem of infinite regress, entailing the inability to predict and explain for sustainable competitive advantage.

Furthermore, according to Coleman (1990, 3), placing the analysis on the components constituting an organisation is much likely to be *"more stable and general"* than on the macro-level. Furthermore, explanations involving individual interactions not only enable an understanding of causality of the system's outcome, but also draw on the ability of foresight to prescribe the future, which is a crucial point in the management realm.

The above rationales formulate a solid grounding in terms of the crucial role of micro-foundation perspective in this study.

2.2.2 Routines, capabilities, and micro-foundations

The links between routines and capabilities are theoretically viable while the differences in fundamental level or micro-foundations level account for the variance of routines and capabilities. This engenders the motive for further research on micro-foundation to explicate the mechanism of routines and capabilities.

Routines

Nelson and Winter (1982, 97) conceptualises "routines" as the *"skills of an organisation"* and as *"a repetitive pattern of activity in an entire organisation"*. Routines are described as a learned and repetitious interactions that are someway patterned, and may or may not be in the manifestation of fixed sequential individual actions. Such actions and the contents thereof are considered organisation-specific – firm A chooses to do different things from Firm B (Cohen, Burkhart, Dosi, Egidi, Marengo, Warglien, & Winter 1996; Dosi, Nelson, & Winter 2000; Becker 2004). It is criticised that although the idea of routines has gained significant attention of scholars (for example, Nelson and Winter 1982), there is still immatureness of the concept in terms of, such as, how it relates to capability, and how routines and capabilities are constructed (Abell, Felin, & Foss

2008, 493-494). In other words, actions that are taken at individual level (for example, routine action or non-routine action) suggest to be revisited together with the payoffs pertain to such actions. This will serve as a premise to ascertain the individual actions' constitution of routine. (Felin, Foss, & Heimeriks 2012.)

Routines, capabilities, micro-foundations and their relationships

Abell, Felin, & Foss (2008, 494) put it that *"A firm can be described as possessing the capability to realise a routine to the degree that it can repeatedly internalise a pattern of individual level external productivity effects".* They propose the notion of a firm as an averaging mechanism which can be explicated in terms of *"a principal-agent setting with one principal and a number of agents that cooperate in a team"* (Alchian & Demsetz 1982, cited in Abell, Felin, & Foss 2008, 495). The major argument of this proposition is that firms are unable internalise the entire "*micro-complexity of external effects"* in the absence of information, necessitating the process of averaging the individual input productivities (Abell, Felin, & Foss 2008, 495). This is in accord with the notion that routines take the role in facilitating the coordination of dispersed, tacit knowledge (Kogut & Zander 1992; Cohen et al. 1996; Dosi, Marengo, Bassanini, & Valente 1999) which implies the impossibility to fully centralise knowledge in the management team or in a documentation manner. Based on this suggestion, the modelling of micro-foundations by means of routines can be illustrated in Figure 3. Following this logic, the organisational phenomena can be explicated by the mechanism by Arrow 1, Arrow 2, Arrow 3, or any combination thereof and/or Arrows 1a and 3 whilst Arrow 4 can be a *"shorthand explanation"* (Abell, Felin, & Foss 2008, 498).

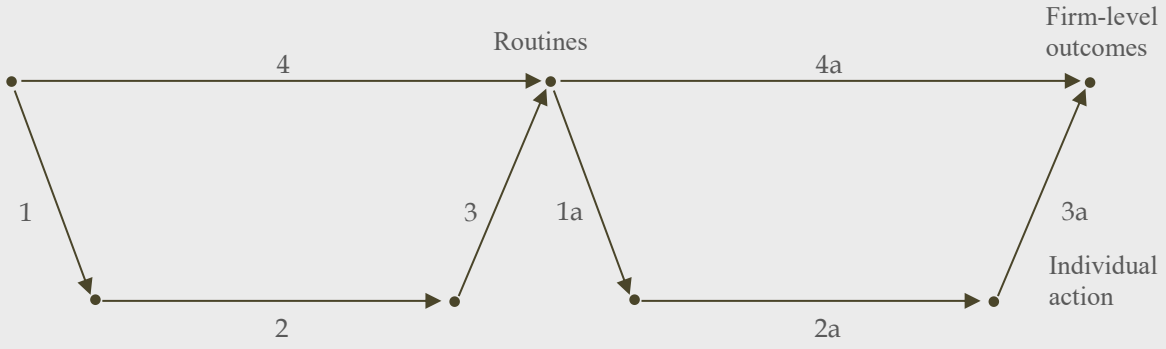

Figure 3 Explaining routines and explaining by means of routines (Abell, Felin, & Foss 2008, 494)

One may question how routines relate to capabilities. *"Organisational capabilities"* are described as *"a high-level routine (or collection of routines) that, together with its implementing*

input flows, confers upon an organisation's management a set of decision options for producing significant outputs of a particular type" (Winter 2000, 983; Winter 2003, 991). This definition points to the behaviour that is recognised, learned, iterative, or almost repetitious, founded partly in tacit knowledge and implicitly. This notion considers the elements of learning, experience, resources, and routines as input ingredients to capabilities (Zollo & Winter, 2002). To put it simply, routines are deemed as capabilities while capabilities can also be composed of inputs such as experience and resources as contributory factors. Capabilities themselves are in association with gathering and combing resources (and other input ingredients) into actions (Dosi et al. 2000; Eisenhardt & Martin 2000; Makadok 2001; Winter 2003) as they find their theoretical grounding in resource-based view. Although such notion theoretically links routines and capabilities, the constructs of each concept may vary because of different manifestations and focus on different phenomena. Specifically, the variations of the two constructs are found in terms of the discussion on hierarchies and the characteristics of rigidity or flexibility (sequential series of actions versus flexible managerial discretion in execution). It is argued that different micro-foundations are responsible for the differences in manifestations of routines and capabilities. Further investigation in characterisation of micro-foundations is, therefore, crucial for the increased understanding of routines and capabilities. (Felin, Foss, Heimeriks 2012, 13.) This is in accordance with the rationales highlighting the role of research on micro-foundations in strategic management discussed in the previous section of this chapter.

2.2.3 Micro-foundations of innovation capability

Due to the diversity of explication about the phenomena, there is marked variation in the component parts making up overarching micro-foundations. *First*, the diversification which may imply explanatory consequences is manifested in what are sought to elaborate. For example, whether the different micro-foundations in investigating operational capabilities at the basic level and dynamic capabilities is germane. *Second*, the variations in a multitude of conceptually different processes that micro-foundations for routines and capabilities point to are likely to demands distinct micro-foundations to elaborate. It is, nonetheless, proposed that micro-foundations of routines and capabilities can be categorised in three focal areas, namely *(i) individuals, (ii) processes and interactions,* and *(iii) structure and design*. These facets which have vital implications for micro-foundations are not born in thin air, but rather embedded in reciprocal relationships or actions within a firm, for example individuals and processes, or among individuals. (Felin, Foss, & Heimeriks 2012, 13-14.) Due to the scope and relevance of this research project, it is limited to the investigation of the first two dimensions – *individuals,* and *processes and interactions*. This section has a

detailed focus on these two areas. Table 1 summarises the major characteristics of these two themes.

Individuals

When it comes to individual as a category of micro-foundations, undeniably, management papers have discussed the significant roles of individuals and their interactions concerned with explications of the heterogeneity, or diversity, and outcomes at the organisational level (for example, Madsen, Mosakowski, Zaheer 2003; Collins & Clark 2003; Mehra, Kilduff & Brass 2001). In addition, building upon *organisational behavioural theory* which considers a firm as a basic unit and predict its behaviours in terms price, output, and resource allocation via an organisational decision making process (Cyert & March 1963) and *psychology area* which points to cognitive biases originating from a number of heuristic principles associated with (for example, Tversky & Khaneman 1974), a plurality of scholars (for example, Gavetti 2005; Helfat & Peteraf 2010) have proven that individuals' cognition accounts for the dissimilarities in managerial and/ or firm's activities. Teece (2007, 1323) argues that individuals play an integral part in the process of sensing and seising opportunities as the bases of capabilities and routines. In a similar vein, whereas it is suggested that organisations should be simply understood as the articulation of individuals that constitute them (Felin, Foss, & Heimeriks 2012, 16), a group of such individuals substantially determine the behaviours and growth of a firm (for example, Felin & Hesterly 2007; Hess & Rothaermel 2011). This perspective, hence, embraces the notion that individuals are seen as the micro-foundations of routines and capabilities in different manners.

Table 1 Chacracteristics of the themes underlining microfoundations of capabilities

Themes		Established characteristics of individuals, and processes and interactions linked to microfoundations of capabilities
Individuals		- Heterogeneity (diversity) (Madsen, Mosakowski, Zaheer 2003; Collins & Clark 2003; Mehra, Kilduff & Brass 2001) - Variances of human agents, such as characters, personal beliefs and preferences, personalities, values, expertise, intelligence, conscientiousness, education, and industry experience (Molloy, Chadwick, Ployhart, & Golden 2011; Zenger 1992; Madsen et al. 2003; Felin & Hesterly 2007) - Individual cognition (Gavetti 2005; Teece 2007; Helfat & Peteraf 2010)
Processes and interactions	Processes	- Ostensive aspect (what routine is or routine in principle) and Performative aspect (operationalisation of routines in particular time and organisation) (Feldman & Pentland 2003) - Learning and knowledge accumulation process (Klepper & Simons 2000; Pisano 2000; Grant 1996a; Argote 1999)
	Interactions	- Formal interactions (Becker 2004; Srikanth and Puranam 2011; Henderson & Clark 1990; Hoopes & Postrel 1999) - Informal interactions (Becker 2004; Wilkins & Ouchi 1983; Lounamaa & March 1987) - Across organisations (Hoetker & Mellewigt, 2009; Mayer & Salomon 2006) - Within organisations (Reynaud 2005; March, Schultz & Zhou 2000) - Technologies supporting coordindation and learning (Tyre and Von Hippel 1997; Ashworth, Mukhopadhyay & Argote, 2004) - Surrounding of the interactions (Felin, Foss, & Heimeriks 2012; Rafaeli & Vilnai-Yavetz 2007)

Drawing from the behavioural theory, individuals who act as human agents in organisations make decisions rationally in a well-informed manner which is conditioned by cognition and beliefs. Furthermore, different goals and interests that individuals are pursuing may have an impact on such choices. (Felin, Foss, & Heimeriks 2012, 13.) Though routine as a fundamental unit of analysis is, nevertheless, deemed effective in association with an evolutionary economic view of

dynamics (Nelson & Winter 1982), there is a significant lack of focal attention on linking individuals' interests and cognitions in relation to organisations' actions and decision making in organisations (Gavetti et al. 2007, 524).

The individual heterogeneity is broadly appreciable (for example, Blumberg & Pringle 1982; Mowday & Sutton 1993) because it is regarded as human capitals which have crucial implications for firm's routines and capabilities (Felin, Foss, & Heimeriks 2012, 20). The variances of human agents are strongly evidenced in what they can provide the organisations manifested in characters, personal beliefs and preferences, personalities, values, expertise, intelligence, conscientiousness, education, and industry experience (Molloy, Chadwick, Ployhart, & Golden 2011; Zenger 1992; Madsen et al. 2003; Felin & Hesterly 2007).

Process and interactions

There are studies which examine the processes which are fundamental to routines and capabilities in multiple angles. While Felin, Foss, & Heimeriks (2012, 23) define process as "*a sequence of interdependent events*" and argue that such definition is in conjunction with the concept of routines, there are various facets of routines that have been proposed and differentiated, such as *ostensive* aspect (abstract idea of what the routine is or routine in principle) and *performative aspect* (actions of routines in particular time and organisation) (Feldman & Pentland 2003). Recently, whereas Pentland, Feldman, Becker, and Liu (2012) propose a model of four critical dynamic processes in routines, namely *formation, inertia, endogenous change,* and *learning* which coherently explain the dynamics at macro-level in association with their impact on firm's capabilities, research on how processes and sequences of events constitute capabilities and their development can also be found (for example, Salvato 2009; Maritan & Peteraf 2007; Zollo & Winter 2002). Particularly, from an evolutionary view, it is highlighted that processes of learning experience, industry knowledge, technology choices, and organisational past events are elemental to capabilities and practices (for example, Klepper & Simons 2000; Pisano 2000). In related research, Grant (1996a) and Argote (1999) takes a knowledge-based view and identify that the role of processes, individuals constituting an organisation and interactions are in close connection to the organisational level. Existing and emerging empirical studies have concluded that process-based consequences which are explained by individual interventions, and interactions among processes and individuals within a firm account for routines and capabilities (Maritan & Brush 2003; Pentland & Rueter 1994; Heimeriks & Duysters 2007).

Becker (2004) argues that interdependent event sequences are inclined by both formal (standardised operating procedures, rules, and conducts) and informal (norms, values, and experience) manners of interactions. *First*, a multitude of research has assessed a variety of formal processes

of coordination both across organisations (for example, Hoetker & Mellewigt, 2009; Mayer & Salomon 2006) and within organisations (for example, Reynaud 2005; March, Schultz & Zhou 2000). Particularly, drawing upon an empirical evidence from case studies, Srikanth and Puranam (2011) propose that three generic approaches to formal interaction processes, namely *modularisation, constant communication,* and *tacit coordination mechanism* are vital sources underlying organisational performance. Other research work also highlights how formal processes enable the articulation of organisational divergence in terms of teams, departments, individuals, and resources of knowledge from different functional departments (Henderson & Clark 1990; Hoopes & Postrel 1999). *Second*, a number of studies have also centered on informal forms of communication across different levels, such as culture aspect which is assumed to impact the interaction (Wilkins & Ouchi 1983), and influence of experiential learning (Lounamaa & March 1987).

As other two aspects supporting coordination, *technology* and *environment* (or *ecology)* have a role to play. With respect to the former, whereas Edmonson, Bohmer and Pisano (2001) especially draw on learning process at team level following the employment of new technologies in healthcare industry, Tyre and Von Hippel (1997) propose that problem-solving competence is resultant from individual coordination in relation to contextual technology. In accordance with this, it is argued that firm's outcomes can be enhanced by the adoption of technologies in the form of improving learning rates in financial service companies (for example, Ashworth, Mukhopadhyay & Argote, 2004).

When it comes to *ecology*, research has shown that a host of material artefacts at the workplace that individuals interact with, such as physical workspace have an effect on firm's capabilities and routines. Such items are believed to stimulate communication and reinforce individual behaviour (Felin, Foss, & Heimeriks 2012, 26-27.) or undermine routines at organisational level (Pentland & Feldman 2008). The effect of colour in material items is also examined in another research, specifically drawing upon the impact of staff emotion on an artwork (Rafaeli & Vilnai-Yavetz 2007).

Having discussed the literature on micro-foundations of capabilities, two themes underlining micro-foundations of capabilities are identified, namely *individuals,* and *processes and interactions*. The following section will be concerned with a review on design thinking pertaining to innovation.

2.3 Design thinking

The discourses of design thinking will be discussed in this section, establishing the foundation for this study. This section will start with an examination on the literature of design theory which

precedes the definition of design thinking as an emerging concept extended to other disciplines beyond the design context.

2.3.1 Design realm

Design has gained increasing interests of researchers for more or less four decades and been utilised in both scholars and practitioners in terms of how designers' methods, or design competences, are worked out (Johansson-Sköldberg et al. 2013, 123). The design theory can be traced back to Simon (1996) who takes the view on the science of design as a common area of any human activities regardless of domains and disciplines. The core focal concern of design is how things should be when they are put together, aiming to achieve a specific objective in harmony by adapting the inner environments to the outer ones. (Simon 1996, 114.) This stance is embraced by Buchanan (1992). Apart from observing the evolution of design from a pure commercial activity to an occupation, he takes a further step by looking at design as an art form in the technology setting in the form of the Wicked Problems Theory of design which draws on the work of Rittel and Webber (1973) to argue the typical wickedness characteristic of designers' problems with indeterminacy and that requires much creativeness in working out solutions (Johansson-Skoldberg et al 2013, 125). How design problems are defined often challenges the status quo or what has been institutionalised without obvious boundary with an aim to reach the root cause and offer a wider solution space (Lawson 2005, 58).

Together with the evolution of the concept, the focal research areas on design competences have been varied. For instance, while Buchanan (1992, 14) expresses the interest in better comprehending the problem-solving practice of designers and how they make sense of the argument for their decision making, Cross (1990) focuses on how designers know reflected in their abilities, and Lawson (2005) explores how they think. Recently, Jahnke (2013) studies the practice of making sense of meaning in designers' work.

2.3.2 Design thinking as an emerging concept

The term "*design thinking*" stems from industrial design, mostly used during the process of creating tangible objects. "*Design thinking*" which is characterised as part of designers' work was first used as a major term throughout the book of the same title authored by Peter Rowe (1987). Design thinking is, nevertheless, set and discussed no further from the context of original design of architecture and urban planning.

During the 2000s, a variety of scholars demonstrated their interest in capturing the meaning of design in terms of how designers think and work, and placing them in the business setting. In this manner, "*design thinking"* is portrayed as a portal for innovation, a human-centered approach which includes multi-principles, getting inspired by designers' thinking and work (Johansson-Sköldberg et al. 2013). In this environment, the fundamental idea of design thinking is that people from different disciplines can replicate the practice of designers in terms of their mentality and working routines, and integrate such practices into a wide range of fields, such as multidisciplinary teamwork, spurring innovation, working out strategy, new product development, (for example, Brown and Katz 2011; Brown 2009; Holloway 2009; Johansson & Woodilla 2009) (Carlgren 2013, 4-5). Those who embrace this stream include (i) experienced managers of the design company IDEO (Kelly & Littman 2001; Brown 2009), and (ii) scholars in the management world who had worked together with or gained inspirations from designers' practice (Boland & Collopy 2004; Dunne & Martin 2006; Martin 2007a, 2007b, 2007c, 2009, 2010, 2011).

The term "design thinking" is prone to cause confusion because the research on how designers or architectures work and particular processes which are placed beyond the design setting carries the same name. Thus, by emphasising the significance of what the perception of design thinking the firm reflects, and where and how the concept is contextually integrated, Johansson-Sköldberg et al. (2013) propose distinguishing the two disciplines by adopting the term *"designerly thinking"* and *"design thinking"*. While *"designedly thinking"* has its root in the design realm and synthesises the theoretical background and designers' practice from the view of academic design discipline, the latter is an emerging extension in the managerial area beyond the design context and draws on the motive that firms can learn, and replicate the practice of designers in terms of their working routine and mentality, without actually working in the field of professional design or being *"pure designers"*. Even though it has a shorter history, "*design thinking*" emerged in the management discourse as a straightforward concept to design and has grown at a faster pace compared to "*designerly thinking*" (Johansson-Skoldberg et al. 2013, 127).

Design thinking in particular is proposed to be categorised into three discourse origins in the management discipline as:

i. way of working by IDEO (Kelley 2001; Kelley 2005; Brown 2008; Brown 2009) – focusing on the generalised practices as a process of design company for innovation and design work,
ii. approach to indefinite problems proposed by Roger Martin – dealing with bringing an innovative approach and essential skills to practicing managers (Dunne & Martin 2006; Martin 2009), and
iii. part of theory of management (Boland & Collopy 2004a).

(Johansson-Skoldberg et al. 2013.)

(Table 2 summarises the three major discourses of design thinking explicating via its roots.)

To serve the research purpose, this study adopts the view of Johansson-Sköldberg et al. (2013) because it provides the clear roots of discourses on the concept in question. Furthermore, to maintain focus of the research, this study excludes the emphasis on the former (*designerly thinking*) whereas leaving spacious room for discussion on the latter stream of discourse (*design thinking*) which is adopted throughout the work. Following that, the terms of *"design thinking methodology, design thinking approach, design thinking practices and principles, design thinking practices, principles, and rules",* and *"design thinking principles*" are interchangeably employed in the current study to refer to the same concept or its nature.

Table 2 Comparison of the Three Discourses of Design Thinking in the Management Realm (Johansson-Skoldberg et al. 2013, 130)

Originator	*Audience*	*Discourse Character*	*Academic Connections*	*Relation to Practice*
IDEO design company (Tom Kelley & Tim Brown)	Company managers (potential customers)	IDEO success cases (written for managers)	Grounded in experience rather than research Connections to innovation research	Kelley: How 'we' (IDEO) do design thinking Brown: how anyone can use design thinking
Roger Martin (2006; 2009a; 2009b)	Educators (academics & consultants) Company managers	Success cases from production companies used to illustrate theory development (managerial thinking)	Grounded in cognitive science & management science Builds on planning theories ('wicked problems')	How successful production companies do design thinking How 'any' company (manager/individual) can do design thinking
Richard Boland & Fred Collopy (2004)	Academic researchers & educators	Short essays where established (management) scholars apply their theoretical perspective to the design area	Grounded in individual researchers' own theoretical perspectives Inspired by Gehry's architectural practice or contact with design	Design thinking as an analogy & alternative

The following section will depict the portrays of design thinking from multiple schools of thought.

2.3.3 Portrays of design thinking

This section aims at a review on how design thinking has been portrayed from a multitude of perspectives.

Design thinking takes its source from academic grounding within the discipline of design. Recently, the term is increasingly adopted as a management-based offering. Due to the concept's situation in a larger social and political setting, the relevance of design in a larger social and political setting has a tendency to stray as the concept is conditioned by the managerialist framework (Kimbell 2011, 293).

Design thinking is a vague concept which is subject to multiple interpretations and context-dependent (Johansson-Skoldberg et al. 2013, 132; Kimbell 2011, 287). Even though the notion of design thinking is heavily promoted and determined by its proponents (Kelley & Litman 2001; Brown 2008; 2009; Dunne & Martin 2006; Martin 2009), there are a variety of scholars taking different angles on the concept, leading to various ways of how design thinking is picturised. Descriptions of design thinking are subject to what aspects of design thinking are highlighted and such focal areas are believed to be nonconflicting (Hassi & Laako 2011, 10). Table 3 summarises the portrays of design thinking in the literature on design thinking in which each portray covers a set of major approaches or elements of design thinking.

Table 3 Portrays containing different elements of design thinking in management discipline (adapted from Hassi & Laakso, Miko 2011, 6/14)

A prescriptive process	Methods and practices	Particular mentalities	Thinking styles	Application in specific areas
Non-linear process Kelley and Littman (2001) Brown (2008) Brown (2009) Stanford d.school (2009) IDEO's (2015)	**Human-Centered Approach** Dunne & Martin (2006) Beckman & Bary (2007) Brown (2008) Lockwood (2009) Porcini (2009) IDEO (2015)	**Cognitive discipline** Martin 2007	**Abductive reasoning** Dunne & Martin (2006) Martin (2009)	**Problem-solving technique to innovation** Brown (2008) Liedtka & Ogilvie (2011) Jahnke (2013)
	Visualisation Kelley (2005) Jungigner (2007) Brown (2009) Rylander (2009) Ward, Runcie, & Morris (2009) Liedtka & Ogilive (2011) Stanford d.school (2013)	**Personality profile** Brown (2008) Dunne and Martin (2009)	**Holistic view/ System thinking** Holloway (2009) Dunne & Martin (2006) Fraser (2009)	**Devising business strategy** Holloway (2009)
	Prototyping Coughlan & Prokopoff (2004) Fraser (2007) Holloway (2009) Liedtka & Ogilive (2011) Stanford d.school (2013)		**Integrative thinking** Martin (2007a) Martin (2007b) Brown (2008) Brown (2009) Sato (2009) Martin (2010)	**Organisation change and development** Sato, Lucente, Meyer, & Mrazek (2010) **Culture** Martin (2011) **Creativity** Kelley and Kelley (2013)

A prescriptive iterative process

This category comprises of series of particular actions. Perhaps the most typical portray of design thinking is a process which involves multidisciplinary individuals of a team formulation in search of innovative answers to challenges in organisations. This tangible form is commonly popularised by Kelley and Littman (2001), Brown (2009) and Stanford d.school (2009) – a collaboration between IDEO and Stanford University.

Following the description of the term, design thinking is described as a generic process that targets reaching innovation outcome (Kelley 2001; Stanford d.School 2009) or "a system of overlapping spaces" (Brown 2009, 20/215). Brown (2009) and IDEO's (2015) model consists three stages, namely *inspiration* (understanding people and their situations, expectations, etc.)*, ideation* (generating ideas and recognising opportunities, preceding testing refining offerings) and *implementation* (bringing solutions into practice). Although it is not explicitly demonstrated in the mode, Brown (2009) and IDEO's (2015) generally embrace a more detailed six-phase technique (Figure 4) proposed by Stanford d.School (2009), including (i) understand the preconditions of a problem, (ii) observe and reflect users' behaviours and interactions to develop empathy for them, (iii) define points of view by providing insight suggestions to cause changes, (iv) ideate multifarious ideas, followed by (v) learning fast via different forms of prototypes with short iteration, and (vi) test by gathering feedback to distinguish effective from ineffective solutions, and possible move back and forth to reformulate solution or even problem.

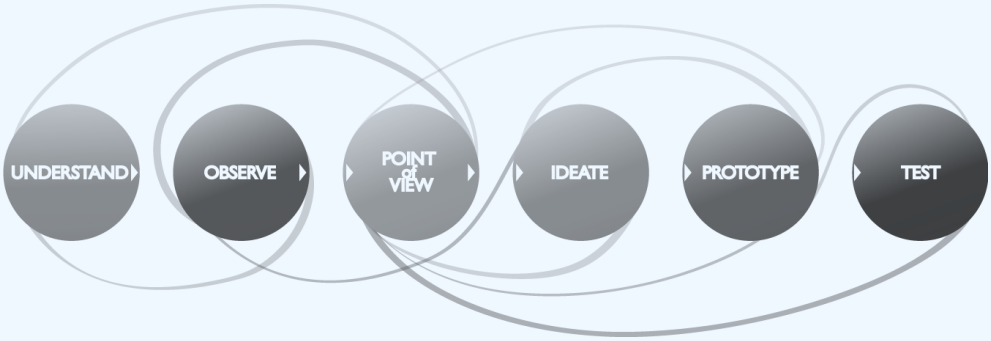

Figure 4 Steps in a Design Thinking Process (Stanford d.School 2009)

Despite the difference in terms of how the process is presented in terms of terminology and the number of steps, design thinking appears to be in line with the design process in the design realm, which "*nearly always begin with analytic phases of search and understanding, and end with synthetic phases of experimentation and invention"* with analytic phase, and ends with the phase of implementation (Owen 1993, according to Beckman & Barry 2007, 27).

It is emphasised that this approach should not be misunderstood as a complete linear procedure, but rather an iterative one because design thinking is a process of exploration in nature (Brown 2009, 20/215; IDEO 2015, 11) and practitioners can move back and forth among different stages and even with different order to have an insight into customers and their scenarios. At this point, it is criticised that the implication of this approach, for instance seeing design thinking as an exploratory process, fails to anchor to academic groundings though it is in the traditional design research (Kimbell 2011, 294).

Methods and practices

The "method or practice" category refers to modes of procedures or a tangible approach to an issue or ways of working, specific activities, and usage of particular tools. A number of tangible methods are included in relation to design thinking, in which a human-centered approach, visualisation, and prototyping are the most prominent techniques.

First, it is perhaps *human-centered approach* that is the most notably underlined by Brown (2008, 87; Brown 2009, 35/215) - *"putting people first"* ultimately targeting *"converting need into demand"*, by adopting ethnographic and observational methods to seek meaning-based and implicit needs (Beckman & Bary 2007, 33; Dunne & Martin 2006, 519). This view is consistently corroborated and emphasised by a number of other scholars in terms of a deep understanding and developing empathy for people or users (for example, IDEO 2015; Dunne & Martin 2006; Lockwood 2009; 14/374), particularly both explicit and tacit needs of customers (Holloway 2009, 51). Porcini (2009, 12) goes far beyond "understand" by attributing design thinkers falling "in love" with their customers to exceed their expectations with the manifestations of such love.

Second, visualisation is called the *"mother of all design tool"* that enables to envision possible alternatives into images (Liedtka & Ogilive 2011, 61/221), or express ones' thought in media rather than words or symbols (Brown 2009, 11/215). It is supposed to be the dominant sensemaking mode of design thinking (Rylander 2009, 6). There is a commonly shared practice of having blank walls of project or brainstorming rooms to make sense of ideas and their linkage in the form of sketch boards, maps, pictures, etc. (for example, Brown 2009; Liedtka & Ogilive 2011; Stanford d.school 2013; Kelley 2005). In doing so, from a design perspective, ideas are commonly shared and discussed (Junginger 2007, 60) and understanding is hastened by articulating ideas (Ward, Runcie, & Morris 2009, 80).

Third, closely intertwined with visualisation, prototyping mode is an iterative and tangible approach that formulates solutions. Prototyping may take any forms that permit the interaction with users, such as post-it notes, a gadget, a role-playing activity, or even a storyboard. (Stanford

d.school 2010, 8/11). Prototypes are considered actionable forms of ideas to test and refine assumptions, and learn from mistakes (Liedtka & Ogilive 2011, 46-47/221), or artifacts to manifest ideas in terms of providing "clarity and transparency" on working out possible solutions (Holloway 2009, 51) by exploring a what-if concepts with zero risk (Fraser 2007, 73). The cycle of iterative development should be rapid or short (Holloway 2009, 51; Stanford d.school 2010, 9/11; Ward et al. 2009, 81; Lockwood 2009, 69/374). Furthermore, going beyond the meaning of idea formulation and demonstration, prototyping allows *"to experience a possible future in tangible ways"*, and have an insight into the alternatives in terms of multiple dimensions, such as physical products or setting, enactment process, service experience, etc. in relation to firms' infrastructure and business plans (Coughlan & Prokopoff 2004, 191, printed in Boland & Collopy (eds.) 2004a).

Particular mentalities

This category of mindset points to the mental attitude towards problems or state of situations. The tethering of a specific task and a particular grouping of cognitive processes that serve various functions (French II 2016, 674). Based on this logic, there is a strong connection between a cognitive discipline described by Martin (2007b; 2007c) and concrete mentalities characterised by Brown (2008) and IDEO (2015) particularly in line with brainstorming technique. Brown (2008, 87) ascribes a number of mindsets to design thinkers under a personality profile which consists of *empathy, integrative thinking, optimism, experimentalism,* and *collaboration*. Whereas design thinkers are described as sympathetic people and "*can imagine the world from multiple perspectives*" and "*observe the world in minute detail*" towards innovation, they are also optimistic about the potential solution under unrelenting pressure, experimental by framing questions and facing constraints in "creative ways", and eager for multidiscipline collaboration to deal with complexity (Brown 2008, 87). Particularly regarding optimism, Dunne and Martin (2009, 513) who are fascinated by the absolutely positive mindset of designers argue that constraints are trivial because there is invariably an answer to a problem.

Thinking styles

Thinking styles point to *"the ways in which people use or exploit their intelligence as well as their knowledge"* (Grigorenko & Sternberg 1995, 205). The *"thinking style"* category comprises dimensions which are closely related to cognitive styles or information process. A number of scholars depict the characteristics of design thinking as different thinking styles, namely *abductive reasoning, holistic view,* and *integrative thinking*.

Abductive reasoning is *"the logic of what might be"* whilst deductive and inductive are the logic of what should be and what is, respectively (Dunne & Martin 2006, 513). Abductive logic is

a pivotal methodology of design thinking. Its importance is recognised based on the demand for gaining insight into users and shifting the focus from what must be to enquiring into what could be, aiming at novel possibilities and opportunities (Fraser 2009, 64). That is, abductive logic allows a design thinker to claim "*What is something completely new that would be lovely if it existed but doesn't now?*" (Dunne & Martin 2006, 514), challenge the extant elucidation, and "*infer possible new worlds*" (Martin 2009, 63/167). Strategically, it should play a coequally critical role as induction and deduction (Martin 2009, 66/167).

Second, *holistic view* is framed as a "360º" understanding of the problem in multiple dimensions, such as both explicit and tactic needs of users/ customers, the end-user's environment, social factors, market adjacencies, and emerging trends, etc. With this approach in mind, design thinkers are in search of tackling the right questions by expanding the extant boundaries with the involvement of multidisciplinary teamwork. (Holloway 2009, 51). Interchangeably, *"system thinking"* is concerned with addressing a design or management problem by taking into account the whole structures, patterns, or events rather than isolating, which entails enriching the "*understanding the impact of changes in one component on the others, and on the system as a whole*" (Dunne & Martin 2006, 518, 520). Whilst system thinking, from the view of Fraser (2009, 58), plays an integral part in business design which is derived from the most favorable payout of design thinking, it is conceived as the synthesis between "external form" and "internal functionality", for instance, the mix of "holistic vision and specific attention to detail", aiming at the homogeneity between organisational goals and functional departments (Ward, Runcie, & Morris 2009, 79).

Furthermore, *integrative thinking* is another character of design thinkers which points to the capacity to move beyond trade-off approach, recognise all striking, even opposing, facets of a problem towards the formulation of a novel solution (Brown 2008, 87), or a better model which covers all elements of opposing alternatives and is surpassing either one or the other (Martin 2007c, 13/152; Martin 2007b, 1). In a similar vein, design thinking in essence is regarded as the balance of firms' economic benefits and values offered to customers throughout the cycle (Sato 2009, 43; Sato, Lucente, Meyer, & Mrazek 2010, 47) or reliability and validity accordingly as the primary tensions (Martin 2007a, 6-8; Martin 2010, 41), intuitive and analytical decisions (Sato et al. 2010, 47; Martin 2010, 41), exploration and exploitation (Martin 2010, 39-40), and the integration of multiple standpoints, namely business, technology, and human (Brown 2009, 162/215),

Specific areas of application/ Application in specific areas

This portrait points to different purposes or different roles to play of design thinking. In management-oriented literature, design thinking is characterised as a problem-solving technique to innovation, stemming from Simon's conception of design (Jahnke 2013, 37), or an all-purpose

approach to multidisciplinary problems in which people are in the heart (Brown 2008), or a systematic approach in this regard (Liedtka & Ogilvie 2011). In line with such a generic approach, design thinking is adopted in a wide range of applications, for instance in devising business strategy mediated by prototypes (Holloway 2009), organisation change and development (Sato, Lucente, Meyer, & Mrazek 2010), culture which is integrated into the DNA of organisations in which design thinkers facilitate a design-driven process and act as innovation catalysts (Martin 2011). When it comes to creativity, Kelley and Kelley (2013, 33-34/240) emphasise its role in accelerating and preserving creativeness culture via supporting systems. Furthermore, design thinking is recognised as an enabler of personal development in organisations, for example enhancing abductive reasoning which sees and deals with constraints as a stimulator for challenge and excitement (Dunne & Martin 2006, 513). In a similar vein, design thinking also boosts creativity confidence in the personal regard (Kelley & Kelley 2013).

2.3.4 Design thinking and innovation

There have been a number of academic researchers who place their keen interest in looking for a different way to structurise innovation with intent to bringing design into management debate, such as Beckman and Barry (2007), Bessant and Maher (2009), and recently Seidel and Fixson (2013).

Simultaneously, getting inspired from the practices of designers, a number of management scholars and practitioners also seek to link design and innovation. For example, *"design-driven"* approach which is proposed by Verganti (2009) provides a detailed description of a meaning creation process that likely entails radical innovation. Also, innovation which is picturised in the C-K theory (Hatchuel & Weil 2003; Le Masson, Weil, & Hatchuel 2010) as a joint-expansion of and moving back-and-forth between *"concept"* and *"knowledge"* in the form of fours operator, namely C -> K, K -> C, C -> C, and K -> K. For this reason, there can be little doubt that such trend entails the increasing change of design role in a broader view beyond its initial aesthetics and principles.

Accompanying the growing interest in design, design thinking emerges as a phenomenon in management research during the early 2000s. Design thinking as an emerging concept has also drawn remarkable attention of experienced managers and academic scholars. In this context, it is characterised as the approach to innovation which takes inspiration from the practices of designers and is constituted by multiple disciplines with humans' concerns in the heart. This idea is broadly advocated by a number of academic researchers and experienced executives, including Kelley & Littman (2001), Brown (2009), Martin (2009), Johansson and Woodilla (2009), Kimbell (2011; 2012), and Johansson-Sköldberg et al. (2013).

The core idea of design thinking in this stream is that multidisciplinary people, regardless of their backgrounds, can learn from the practices of designers in terms of their mentality and working routines and integrate them into a wide range of fields, such as multidisciplinary teamwork (Seidel & Fixson 2013) and cross-functional collaboration (Cruickshank & Evans 2012), innovation enhancement (for example, Kelley & Littman 2001; Brown 2009; Martin 2009), strategy formulation (Holloway 2009), and new product development (for example, Perks, Cooper, & Jones 2005; Chiva & Alegre 2009). It is argued that the hallmarks of design thinking in the terms of its logics and related practices, principles, and methods can provide an organisation with critical resources to reach organisational ambidextrous behaviour, or balance the concurrence of explorative and exploitative innovation.

Little empirical evidence can, nonetheless, be found on how design thinking is adopted in practice and its role in organisations, especially how it can play as a contributing factor to enhancing innovation capability although the concept has drawn the attention among a variety of scholars and practitioners. *First*, well-informed observers know that the absence of academic conceptualisation of design thinking engenders the situation in which the concept is subject to multiple interpretations and conceptions. For instance, design thinking is strongly associated with the impact of management consultants. IDEO design company (Kelley 2001; Kelly 2005 and Brown 2008; Brown 2009) and Stanford D-school – a cooperation between IDEO and Stanford, conceive the notion as a prescriptive process including ready-made steps that "everybody could do it", or Roger Martin – Former Dean of Rotman School of Business (Dunne & Martin 2006; Martin 2009; Martin 2011) as a cognitive approach to indeterminate organisational problems. For this reason, Johansson-Skoldberg et al. (2013, 121) argue that:

> *"We do not believe that there is a unique meaning of 'design thinking', and accordingly we should not look for one. Instead, we look for where and how the concept is used in different situations, both theoretical and practical, and what meaning is given to the concept."*

Second, it is believed that the role of design professions, contexts in which design thinking can be integrated, or the impact on the individual level are left out when their anecdotes of success are generalised. Furthermore, there is still a gap between design scholar anchor (designerly thinking) and design thinking which precludes the clarity between the two notions. That is, design thinking is marketed by its proponents as a straightforward process while the setting or individuals, or even how to deal with the existing organisational structure and process are ignored (Rylander 2009). Liedtka (2015, 937) puts it that such a linear approach is inadequate. Sam Ladner (2009) also notes that *"Design is attractive to management because it is a depoliticised version of the well-known socio-cultural critique of managerial practices."* (Ladner 2009, cited by Kimbell 2011, 293).

In other words, it is observed that design thinking finds itself undertheorised and understudied in organisational settings, precluding it from gaining a scholar grounding. The investigation of the relationship between the academic discourse of design thinking and that one in management could be seen immature. This standpoint is explicitly accepted by Carr, Halliday, King, Liedtka, and Lockwood (2010), Kimbell (2011, 301), Cruickshank and Evans (2012), and recently Johansson-Sköldberg et al. (2013, 131). From this perspective, Johansson-Sköldberg et al. (2013, 121, 131) argue that design thinking is seen as a hyped concept among scholars, subsequently constituting a fad in management discipline. Ultimately, the notion of design thinking is prone to "die" due to its poor scholar base. In other words, in the absence of the intersection of grounded theory and practice, or a satisfactory synthesis between design and management literature (Kimbell 2011, 286), design thinking is likely to be a hype (Johansson-Sköldberg et al. 2013), or even a "failed experiment" (Nussbaum 2011). As a result, the immature empirical foundation leads to the difficulty of theorisation and linkage of the concept to the theoretical grounding (Johansson-Sköldberg et al. 2013; Hobday et al. 2012; Kimbell 2011).

For this reason, this empirical study of firms' integrating design thinking in their routines allows the researcher to comprehend the concept of design thinking in a contextualised setting, leading to how it is adopted in practice related to enhancing innovation capability of a service firm. There have been several germane studies that are recently carried out. The settings are, however, limited. This research project targets contributing to the critical theoretical and empirical gap concerning design thinking in relation to developing innovation capability of the firm. Better comprehension of the role of design thinking in innovation work on the individual level can, therefore, be achieved.

The following section will further articulate the underlying arguments from the previous. It then synthesises and links the concepts together with an aim to account for their interrelation towards the purpose and research questions in this study.

2.4 Bridging the concepts

Innovation and ambidexterity

A crowded competitive business environment triggers firms to search for the ways to be of constantly better performance. In this context, innovation which is deemed as a sustainable source allowing firms to gain competitive advantage become increasingly critical (Tushman & O'Reilly 1996; O'Connor 2008; Crossan & Appaydin 2010; Govindarajan et al. 2011, Dess & Picken 2000; Lawson & Samson 2001). That is, innovation is assumed to explicate what lies behind the competitive advantages of a firm.

Management researchers further argue that while exploration and exploitation are vital components of innovations (March 1991; Andriopoulos & Lewis 2009, 696; Raisch et al. 2009), an organisation needs both explorative and exploitative innovation to pursue better performance and long-term success (Raisch, Birkinsha, Probs, & Tushman 2009, 685; Junni, Sarala, Taras, & Tarba 2013). At that point, organisational ambidexterity which is concerned with the competence to simultaneously manage such two tensions (Andriopoulos & Lewis 2009, 696) is considered pertinent when it comes to innovation.

Innovation and innovation capability

Though there have been significant research efforts that are placed on the concept, innovation is difficult to be reached due to its multiple interpretations and complexity (Benner & Tushman 2002; O'Connor 2008), leading to the difficulty in achieving expected innovations (O'Connor 2008) and breakthrough outcomes, particularly in the contexts of large firms (Dougherty & Heller 1994; O'Connor & McDermott 2004; Leifer et al. 2001).

It is argued that it is not new products or services themselves that enable firms to gain competitive advantage, but rather the ability to develop such new products or services (Pralahad & Hamel 1990; Schreyögg & Kliesch- Eberl, 2007), or create new processes and systems (Lawson & Samson 2001, 384). Innovation capability, therefore, centers on the competence that a firm can generate new knowledge and exploit new ideas (Assink 2006; Lawson & Samson 2001; Hatchuel et al. 2003; O'Connor 2008). It is argued that capability is developed as an outcome of the process of successfully tackling past new challenges or unexpected events in multiple aspects (Schreyögg & Kliesch-Eberl 2007, 914, 916), or learning, and knowledge internalisation, transfer and management (Börjesson & Elmquist 2011, 173).

This argument, therefore, leads to the point that links capability view and innovation as a concept. That is, innovation capability development is regarded as a manageable process which primarily lies in the knowledge absorption capacity of organisations.

Innovation capability and micro-foundations

Innovation capability, nonetheless, appears conceptual, vague, and general (Shreyögg & Kliesch-Eberl 2007, 916) because there is a lack of empirical ground lying behind how such capability can be built and developed (Van de Ven, Angle, & Poole 2000, 4; Börjesson & Elmquist 2011, 174). It is argued that organisational capabilities should be expounded by the fundamental level. In other words, individuals and their interactions that constitute the whole should be illuminated to better understand what is generalised at the organisational level as outcomes. (Felin & Foss 2005, 441.) For this reason, the perspective of micro-foundation is adopted to provide a detailed account of how innovation capability is built, sustained, and developed by means of the activities, interactions, and communications of individuals that compose a firm. With respect to the interrelation between the individual (micro) and firm (macro) level, the model of social science proposed by Coleman (1990) is employed to expound on the phenomenon.

Innovation capability, micro-foundations, and design thinking

Design thinking which draws on a human-centered, multidisciplinary approach from design realm emerges as a portal for innovation in the management world (Johansson-Sköldberg et al. 2013). The promise of design thinking is far-reaching applications in a multitude of areas, such as multidisciplinary teamwork, spurring innovation, working out strategy, new product development (Brown 2009; Martin 2009; Kimbell 2011; Johansson-Sköldberg et al. 2013). In particular, design thinking allows firms to reach the balance between exploration and exploitation (Martin 2009) Whereas design thinking is, however, labeled and generalised by its proponents through successful anecdotes as a straightforward and prescriptive process, how design thinking is implemented in organisational context is left out (Rylander 2009), which is deemed insufficient (Liedtka 2015, 937) to theorise and link the concept in relation to theoretical grounding (Johansson-Sköldberg et al. 2013; Hobday et al. 2012; Kimbell 2011).

The rationale behind the adoption of design thinking in this research is, therefore, threefold. *First,* it explains the activities and interactions of individuals, or micro-foundation perspective, pertaining to working out innovative offerings. That is, design thinking principles shed light on how individuals (lower level) are guided to take what actions towards building innovation capability (organisational level). Subsequently, design thinking methodology determines how the em-

pirical findings are constructed and framed. *Second,* in consideration of organisational ambidexterity in relation to innovation as above discussion, it is suggested that firms should embark upon both explorative and exploitative behaviours in search of sustained performance (He & Wong 2004; Raisch et al. 2009; Gibson & Birkinshaw, 2004) or long-term success (March 1991; Levinthal & March 1993; Junni et al. 2013; Gibson & Birkinshaw, 2004). Since design thinking is conceptualised as an approach to resolve this paradox (Martin 2009), it is plausible to empirically expand the understanding of how the incorporation of design thinking principles actually guide individual interactions to steer the path to a balance of the tensions. *Third*, due to the lack of evidence of contextual employment, design thinking that is placed in organisational setting via the use of individuals can add empirical foundation to the discussion on this concept, and then strengthen its position in academic circles.

Drawing the concepts together, the overarching underlying argument within this study is that the key to understanding innovation capability development is to place the focus on and illuminate the interactions and activities of individuals that compose the whole, in which design thinking principles account for how such interactions and what activities are performed. To elucidate the inquiry at hand, this study adopts two aspects underlining micro-foundations of innovation capability, including *individuals,* and *processes and interactions* (Felin, Foss, & Heimeriks 2012, 13-14) (see section 2.2.3) as the major themes to examine. As discussed previously, the current study, moreover, pursues two sub-objectives: (i) to gain new insights into the interrelation between the individual and the high level of a firm, and moving beyond that (ii) to broaden understanding of the paradox in of innovation projects in terms of exploiting what has been known and exploring new knowledge to the firm. For this reason, two other themes are employed to effectuate the aims, namely *individual learning to capability* (Schreyögg & Kliesch-Eberl 2007; Börjesson & Elmquist 2011) (see section 2.2.2), and *ambidexterity* (March 1991; Andriopoulos & Lewis 2009, 696; Raisch et al. 2009) (see section 2.1.4). There are, thus, four cardinal themes are identified, namely *individuals, processes and interactions, individual learning to capability,* and *ambidexterity*. Since design thinking is employed to enlarge upon the individual interactions, the four themes are drawn together and compared to the aspects of design thinking in relation to innovation (see Table 4), which will structure this research work.

Having systematised and linked the concepts, followed by the highlight of the paramount argument in relation to the study and the identification of four primary themes which serve as the framework for this research, the following section will summarise the whole chapter.

Table 4 Micro-foundations of capabilities compared to the establised aspects of design thinking pertaining to innovation

Themes		Established characteristics of individuals, and processes and interactions linked to micro-foundations of capabilities	Established aspects of design thinking pertaining to innovation
1. Individuals		- Heterogeneity (diversity) (Madsen, Mosakowski, Zaheer 2003; Collins & Clark 2003; Mehra, Kilduff & Brass 2001) - Variances of human agents, such as characters, personal beliefs and preferences, personalities, values, expertise, intelligence, conscientiousness, education, and industry experience (Molloy, Chadwick, Ployhart, & Golden 2011; Zenger 1992; Madsen et al. 2003; Felin & Hesterly 2007)	- Multidisciplinary participants (Kelley & Littman 2001; Brown 2008; Brown 2009; Stanford d.school 2009; IDEO's 2015; Liedtka, 2014) - Particular mentalities, such as optimism, empathy, experimentalism (Brown 2008; Dunne and Martin 2009).
		- Individual cognition (Gavetti 2005; Teece 2007; Helfat & Peteraf 2010)	- Cognitive discipline (Martin 2007)
2. Processes and interactions	Processes	- Ostensive aspect (what routine is or routine in principle) and Performative aspect (operationalisation of routines in a particular time and organisation) (Feldman & Pentland 2003)	- Prescriptive process (Kelley & Littman 2001; Brown 2008; Brown 2009; Stanford d.school 2009; IDEO's 2015)
		- Learning and knowledge accumulation process (Klepper & Simons 2000; Pisano 2000; Grant 1996a; Argote 1999)	- Iterative learning based on the constant evaluation and feedback from the users via the prototypes (Brown 2009; IDEO 2015; Liedtka & Ogilive 2011; Holloway 2009; Ward et al. 2009, 81; Lockwood 2009)
	Interactions	- Formal interactions (Becker 2004; Srikanth and Puranam 2011; Henderson & Clark 1990; Hoopes & Postrel 1999) - Informal interactions (Becker 2004; Wilkins & Ouchi 1983; Lounamaa & March 1987) - Across organisations (Hoetker & Mellewigt, 2009; Mayer & Salomon 2006) - Within organisations (Reynaud 2005; March, Schultz & Zhou 2000) - Technologies supporting coordindation and learning (Tyre & Von Hippel 1997; Ashworth, Mukhopadhyay & Argote, 2004)	- Methods and practices for interactions: + Human-centered approach (Dunne & Martin 2006; Beckman & Bary 2007; Brown 2008; Lockwood 2009; Porcini 2009; IDEO 2015) + Visualisation (Kelley 2005; Jungigner 2007; Brown 2009; Rylander 2009; Ward, Runcie, & Morris 2009; Liedtka & Ogilive 2011; Stanford d.school 2013) + Prototyping (Coughlan & Prokopoff 2004; Fraser 2007; Holloway 2009; Liedtka & Ogilive 2011; Stanford d.school 2013)
		- Surrounding of the interactions (Felin, Foss, & Heimeriks 2012; Rafaeli & Vilnai-Yavetz 2007)	- Separated space (room) for interactions equipped with big blank walls or boards (Brown 2009; Liedtka & Ogilive 2011; Stanford d.school 2013; Kelley 2005)
3. Individual leaning to capability		- Learning, experience, resources, and routines (Zollo & Winter 2002)	- Multidisciplinary participants (Kelley & Littman 2001; Brown 2008; Brown 2009; Stanford d.school 2009; IDEO's 2015; Liedtka, 2014), and experimentalism (Brown 2008)
		- Gathering and combing resources (and other input ingredients) into actions (Dosi et al. 2000; Eisenhardt & Martin 2000; Makadok 2001; Winter 2003)	- Collaboration (Brown 2008; Cruickshank & Evans 2012) and teamwork (Seidel & Fixson 2013)
4. Ambidexterity		- Balance of explorative learning and exploitative learning (March 1991)	- Abductive reasoning (Dunne & Martin 2006; Martin 2009), Integrative thinking (Martin 2007a; Martin 2007b; Brown 2008; Brown 2009; Sato 2009; Martin 2010), and Holistic view/ System thinking (Holloway 2009; Dunne & Martin 2006; Fraser 2009).

2.5 Chapter summary

This chapter has undertaken a review on the foundations and perspectives of innovation capability, design thinking, micro-foundations and their elements. In the management discourse, innovation capability has been called for further insight into practice in terms of how to build, sustain, and develop, especially at the lower level, rather than the organisational one. Simultaneously, design thinking as a concept which originates from the design realm and emerges as a portal for innovation finds itself immature and needs further empirical confirmation to have a solid ground in the scientific community. Multiple interpretations and ranging of descriptions of the innovation capability and design thinking are also recognised. Micro-foundation as a perspective is adopted to provide a detailed account of how the former is built by means of the latter which provides a mechanism guiding individual interactions and activities.

Overall, there can be little doubt that innovation capability and design thinking are portrayed in a vague and general manner. Such limitations lead to the formulation of a framework guiding this research project. The aim of this research centers on the investigation of how innovation capability is developed with a focus on the individual level while simultaneously explicating the use of design thinking by such individuals in a business setting. As a result, the current case work seeks to contribute to the literature via an empirical understanding of innovation capability and design thinking from both an academic and practitioner point of view.

This section has further articulated and bridged the concepts to put forward the argument underlying this case work. In light of the research purpose, four cardinal themes have, furthermore, been identified and embraced to construct this research work, namely *individuals, processes and interactions, individual learning to innovation capability,* and *exploration and exploitation (ambidexterity)*. The research design that underlines the current research work will be explored in the following chapter.

3 RESEARCH DESIGN

This chapter presents the choice of methods utilised within this research work. This study addresses the main research question: *How does innovation capability actually function at the micro-foundation level?* and a sub-question: *How do individuals produce innovative outcomes on the firm level by performing actions guided by design thinking?* Practically, the adopted methodology is conditioned by the type of information expects to be gathered and valuable for the investigation of the study. In other words, the selected methodology and methods will serve the purpose of collecting the required data to fulfill the questions in this research.

First, the chapter will commence with the discussion of methodology selected to fit the current setting and the methodological choice of mono-method qualitative research. The research design is *then* outlined, including justifications for opting for a case study approach, the grounds for the case selection, and methods of qualitative data collection and data analysis. After that, the trustworthiness and quality considerations for the current study are presented.

3.1 Research philosophy and methodological choice

Research philosophy (also known as *research paradigm*, or *philosophical assumptions*) and research method are two crucial issues that a researcher needs to decide on. It is believed that the latter is secondary to the former concerning the significance as it is steered by the former in nature. In other words, the system of basic belief and worldview, or the nature of the world, conditions not only how the research is undertaken (the choice of method), but also the understanding of what the subject matter under investigation is (research philosophy) (Guba & Lincoln 1994, 105).

3.1.1 Research philosophy

Research philosophy refers to the ways in which the world is viewed (Saunders, Lewis, & Thornhill 2009, 108; Burrell & Morgan 1979, 1). It is argued that the approach to social science is underpinned by four sets of assumptions, namely *ontology, epistemology, human nature,* and *methodology* (Burrell & Morgan 1979, 1) which underpin the research strategy and methods (Saunders et al. 2009, 108). It is further stated that *ontology* and *epistemology* are the two pillars of research philosophy (Saunders et al. 2009, 109).

Ontology points to the essence of reality or the assumption in relation to the nature of the phenomena under study (Saunders et al. 2009, 110); it concerns whether reality is of objective nature

– exists and constructed in the outside world – or whether it is in truth the product of human consciousness (Burrell & Morgan 1979, 1). In other words, there are two alternative views of the social world in this respect, namely *objectivism* and *subjectivism*, which expand focal research to different directions. Whilst the former inclines social theorists towards the general and universal analysis of relationships and regularities, leading to expounding on the reality, the focal area of the latter construct is placed on an explanation for individual creations of the social reality as a consequence of perceptions and actions of humans, seeking for meaning, uniqueness or distinction. (Burrell & Morgan 1979, 2-3.) In contrast with the assumption of *objectivism* which holds that managerial aspects and structures are rather similar in all business settings in terms of function, *subjectivism* represents the position that social phenomena are under constant alteration or state of revision which is stimulated by social interactions predicated on the details of the situation, or social construction (Saunders et al. 2009, 110-111).

Epistemology, in contrast, is concerned with what makes up of the acceptable knowledge (Saunders et al. 2009, 112) and is related to the base of knowledge, engendering the issues of how knowledge is acquired and the understanding is promulgated (Burrell & Morgan 1979, 1). The central questions of epistemological essence are, for example, what forms knowledge may take - a real and tangible essence, or is in fact a softer, more spiritual and subjective nature -, how to ascertain what is "true" or "false", or how we know what we know is "true" or "false". Actually, the obtained knowledge which is determined whether true or false is subject to a given epistemological view or assumption. While it is, on the one hand, argued that knowledge can be gained as the product of an accumulative process, there is another school of thought which sustained that knowledge is seen as a subjective enterprise which points to the personal experience. (Burrell & Morgan 1979, 1.)

In close association with the issues of *epistemology* and *ontology*, *human nature* is another separate set of assumption which draws attentions to the relationship between humans and their surroundings. There are two conflicting views which contend with reasoning the control of one over the other. Some social theorists argue for the notion of human beings as the "products of the environment" and being determined by the surroundings (determinism). There is, however, another view which maintains that humans take an active role in creating the external circumstances (voluntarism) (Burrell & Morgan 1979, 2.)

The sets of assumptions of *epistemology, ontology*, and *human nature* are prone to steer researchers towards different methodological choices, entailing the distinctive approaches to acquire social knowledge (Burrell & Morgan 1979, 2). One may raise a concern which philosophy outweighs the other. It is argued that different philosophy seeks to answer different types of research questions or complement different types of research in nature. (Saunders et al. 2009, 108-109.)

In line with these ways of thinking of research philosophy, there are four philosophical stances, namely *positivism, realism, interpretivism,* and *pragmatism*. *Positivism* takes a philosophical standpoint of natural researchers who place focal research on the observable social phenomena, leading to generalities as a result. *Realism* holds the stance that reality exists independently from the human mind or knowledge about their existence, and can be interpreted via social conditioning in a context-based manner. While *interpretivism* upholds the notion of social construction, or humans as details of situations and interpretation based on own sets of meanings and being subject to change, entailing the need for understanding the differences among humans, *pragmatism*'s philosophical view is that research question accounts for the most critical consideration of a study, in which both observable social phenomena and subjective meanings can result in acceptable knowledge. (Saunders et al. 2009, 113-119).

The current research maintains a *subjective* outlook and philosophical stance of *interpretivism* on the social world. This point of view is tenable because the study assumes that humans, in essence, are capable of actively shaping the outside environments towards their expectations or intents based on the understanding of social construction of social reality. As a consequence, alterations which underpin the growth as a prerequisite are viable. Considering a business setting, this stance allows organisations to seek positive changes, entailing evolution, which is accounted by humans as the details of social situations. On a bigger frame, it is emphasised that just as a transformation of the status quo is viable to a firm, so too can other business organisations vigorously change towards in a positive manner. This study, in addition, aims at nuancing the discussion of how innovation capability is built, which places focal attention on the individual level. The "how" inquiry, therefore, devotes attention not only to an intricate and comprehensive explication, but also to the motives which lie primarily in the set of meanings.

This section has discussed a number of *research paradigms* and defined the philosophical stance underpinning this research work. The following part will address the methodological choices that are employed in the current research.

3.1.2 Methodological choice

In the company of research paradigm, research method is another major methodological decision facing researchers. As the research is carried out in relation to dealing with primary empirical data, whether quantitative or qualitative methods should be adopted as a methodological approach need to be defined. Either selected methodological decision may be shaped in accordance with any research paradigm (Saunders et al. 2009, 106) and aims at accurately understanding the subjects of study (Malhotra & Birks 2006, 132).

The two approaches are different in terms of pre-defined objectives and emphasis and mostly implemented under the distinct procedure; whereas quantitative research deals with numerical data and produces quantifiable outcomes, the qualitative method specifies narrative or textual interpretations of the phenomena without statistics. They all, however, share a great deal in common in terms of scientific principles and overlap each other in some respects. (Neuman 2014, 16-17.) For that reason, they are not mutually exclusive, but rather complement one another to allow the researchers to reach data enhancement and condenser (Ragin 1994, 92) and gain insight into the research problem (Creswell 2010, 19). Qualitative study typically centers on meanings (Vanderstoep & Johnston 2009, 165) or demanding processes of making sense (Saunder et al. 2009, 484) whilst quantitative research places emphasis on structures and relationships and patterns of data (Saunders et al. 2009, 414).

Proponents have discussed for years in search of the legitimacy of the characteristics of qualitative study. Though a wide range of qualitative approaches are recognised, the conveyed core characteristics of qualitative inquiry are commonly consented by authors, such as Creswell (2013), Hatch (2002), Marshall and Rossman (2011), Flick (2009), etc. This writer adopts these attributes of qualitative research as the criteria for judging the appropriateness of the selected method.

First, whilst inductive logic seems more prominent, deduction approach is also adopted in qualitative inquiry. In other words, *a complex mixture of inductive and deductive reasoning* represents qualitative research (Hatch 2002, 10; Creswell 2013, 67/493; Rossman & Rallis 2012, 10). *Inductive research* starts with empirical evidence in search of generalising assumptions in the form of abstract concepts and theoretical relationships to formulate or confirm a theory. The study which is determined by *deductive direction,* in contrast, aims at validating or testing the applicability of a theory based on a pre-defined theoretical framework to work towards empirical affirmation. (Neuman 2014, 69-70; Saunders et al. 2009, 61; Rossman & Rallis 2012, 10.)

Since this dissertation adopts a general theoretical framework of social science explanation to point out the relationships among innovation capability, human activities, and design thinking principles, it can be categorised as deductive research. Howbeit, that major aim of this research project is not only merely to legitimise the framework, but also capture empirical data to unravel some of the mysteries surrounding design thinking in relation to innovation capability on the individual level. In this logic, the research inherently sets an inductive direction which may complement the grounded framework based on the empirical investigation. In case the empirical evidence is inconsistent with the theoretical framework, the latter might prove its superior practices and serve as the guidelines for better practices in the firm.

Second, whereas conventional quantitative methods rely on various instruments, such as from scales, tests, to other measuring devices, *researchers themselves* in qualitative study play as in-

strument for principal data collection in a number of different ways, such as document examination, behaviour observation, or interview (Hatch 2002, 7; Creswell 2013, 67/493; Rossman & Rallis 2012, 8). The empirical section of this study is predicated on observation and semi-structured interviews in which the writer himself engages in the social empirical environment to make sense of reciprocal actions and intentions of the subjects of study. Thus, the second attribute is satisfied.

Third, researchers interact with individuals and observe their behaviours in *a natural setting* – their own environment, as the ways to gather information in qualitative research (Creswell 2013, 67/493; Hatch 2002, 7; Rossman & Rallis 2012, 8). This study sets out to investigate how individual activities in relation design thinking build up innovation capability and reach ambidextrousness. The case company is adopted with an attempt to examine the truthfulness of related concepts in a natural occurrence manner without maneuvering the empirical setting. Hence this criterion is fulfilled.

With respect to the *fourth* characteristic, qualitative researchers adopt *multiple methods for gathering empirical data*, subject to the setting and researchers' knowledge (Hatch 2002, 7; Creswell 2013, 67/493; Rossman & Rallis 2012, 9; Flick 2009, 16-17). This study adopts observation and semi-structured interview as the methods for data collection, which are combined with pertinent documented materials as a triangulation technique to enhance the quality of the work. These data collection methods, therefore, appear to be in association the criterion in question.

Fifth, being subject to change or *emergent design* is referred as the next feature of qualitative inquiry in terms of research progress and plan throughout the process (Creswell 2013, 68-69/493; Hatch 2002, 9-10). In this study, the research design was modified in multiple areas, for example, the problem statement, research framing, data collection method, the selection of case company, and even the number of interviews to gather data. Such alteration serves the purpose of better filling the research space and quality whilst the subject matters are sustained.

Sixth, researchers pursuing qualitative research tend to take a holistic justification for a phenomenon under study in the forms of multiple perspectives, related elements, and a bigger emerging frame (Creswell 2013, 68-69/493; Rossman & Rallis 2012, 9). In reflecting to this study, it seeks to frame a bigger picture of research in relation to innovation capability and design thinking by adopting human agency perspective. In other words, it places emphasis on a better understanding of how design thinking can facilitate and guide individual interactions to enhance innovation capability in a case company.

Based on the above-discussed line of reasoning, it can be concluded that the current research work is shaped by a qualitative direction in essence.

This section has discussed the methodological choice for a mono-qualitative inquiry of this research. The following part will have a detailed focus on the research design, being composed of a research strategy, the selection of a case company, and techniques of data collection and analysis.

3.2 Research design

The aim of this section is to present details of research strategy of a case study, the methodological setting and the selected methods of data collection and analysis, followed by the justifications for the adoption of such methods. In line with the purpose and research questions, a qualitative single-case study approach is employed while the data is gathered via semi-structured interviews and observation to produce an account of the phenomenon.

3.2.1 Research strategy

So as to provide an insight into the mechanism in which how design thinking enhances innovation capability by means of individual interactions, this exploratory qualitative research work is reported by case study approach which is "*a research strategy that focuses on understanding the dynamics present within single settings*" (Eisenhardt 1989, 534).

It is argued that case study plays as an empirical inquiry which *"investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident"* (Yin 1994, 13; Yin 2014, 2) and subject to multiple sources of data (Welch, Piekkari, & Paavilainen-Mäntymäki 2011, 743; Easton 2010, 119) and *"confronting theory with empirical world"* (Welch et al. 2011, 743). Consequently, it allows researchers to move closer to theoretical construct and underlining a convincing argument compared to broad empirical data (Siggelkow 2007, 22-23). By "demonstrating a causal argument about how general social forces shape and produce results in particular settings" (Walton 1992, 122), the role of case study in building new knowledge, especially experiential knowledge (Stake 2005, 444) has been recognised in a vast array of domains (Yin 2014, 4). Case study method which is one approach to qualitative research can well serve the purpose of either drawing an analogy and/or distinction between cases or gain deeper insight into a phenomenon. This research project perhaps draws upon the latter approach with the empirical data built on a single case, the business organisation being IBM in Finland.

Merits of case study

The consideration of the upside of and conditions for a case study provides justification for the selection of case work as an approach. Concerning the merits, *first,* case study exploits the advantages of retaining a holistic and perspective the reality and understand complex social phenomena via capturing the characteristics of, for example, behaviour of small groups, organisational and

managerial process, performance, international relations, and the maturation of industries (Yin 2014, 4; Yin 1989, 14). This reality entails the popularity of case study in management realm due to its ability to crumble and picturise the complicacy and hard-to-grasp aspect in management area in an approachable, vivid, personal and realistic manner (Eriksson & Kovalainen 2008, 116-117; Saunders & Lewis 2012, 117). *Second*, case study-based research as an example itself allows investigators to make logical sense of causal relationships among variables in a more direct way and get closer to theorisation than the research of lager-sample empirical study (Siggelkow 2007, 22).

In respect of the conditions for a case study, Yin (1989, 16-20; 2014, 9-12) argues that to deem this research strategy, there are three major criteria in relation to *types of research question, the level of researcher's control,* and *the contemporaneousness of events in research*. *First*, case study is able to well respond to the questions of "why?" and "how?" (Yin, 2003, 5; Yin 2014, 10; Easton 2010, 119). Specifically, it is useful to adopt case study approach when the linkage between practice and theory is still unexplored (Benbasat, Goldstein & Mead 1987; Breslin & Buchanan 2008; Cavaye 1996; Yin 1994). In the current study, the main research question of "how" is raised, which implicitly points to the "what" individuals do to reach innovative outcomes by utilising design thinking as an approach when little empirical research on the role of design thinking in building innovation capability can be found. This study which is exploratory and explanatory in nature, therefore, favours the adoption of case study as a likely strategy. *Second*, the degree of control over behavioural events and the extent of focus on contemporary events are also the criteria for choosing a case work. In this research, the researcher cannot play a part of or condition the behaviours in question in which individuals interact with each other during the time span of innovation projects because such behaviours rely on past events which are either informed by the interviewees, or actors involved, or from the secondary fount of information chosen by the research rested on given criteria. Thus, these conditions seem to be met for selecting a case study.

Single case study

Although the case is usually rich in contexts or backgrounds, or diverse activities which tend to draw the attention of qualitative researchers (Stake 2005, 449), this research projects adopts a single-case study as an intensive approach in consideration of the aim of the study, constraints of time, resources, and work scale of a Master's thesis. There can be little doubt that the value of small-sample research is in its discussion in multiple disciplines (Siggelkow 2007, 20). Among the five rationales arguing for the use of a single case study to enhance its significance, namely *critical, unusual, common, revelatory,* or *longitudinal* case (Yin 2014, 51-53), perhaps the second one that represents an extreme or unique occurrence is mainly justifiable and has particular significance for this research. This view is also embraced by Siggelkow (2007, 20-21) who argues that

as long as it is a "talking pig" – full of illustration and yield a conceptual insight, the case can be a powerful representative. With this in mind, this case work is supposed to explore new relationships among theories and simultaneously challenge the extant ones (Dyer & Wilkins 1991, 614), entailing its contribution to knowledge in the form of confirmation, challenge, or extension of the theories (Yin 2014, 51), or provide more venues for further investigation as well as establish the limits of generalisability (Stake 2005, 460). Specifically, it explores the development of innovation capability via the individual interactions in a special setting of a consulting firm in practice.

Single case study and generalisability

Justifying the validity of case study, even though generalisability seems implausible and holds a different logic due to the adoption of a single-case study in the research (Easton 2010, 119), there is still an important caveat related to learning originating from the case. *On the one hand*, when it comes to the nature of theorising from case study, it is an iterative process in most of the phases (Easton 2010, 119; Yin 2014, 149; Eisenhardt 1989, 546; Drongelen 2001, 507; Easton 2010, 119), which is deemed the unique flexibility of this approach (Easton 2010). Due to such salient characteristic, the research questions and possible constructs in case work, which should be regarded as tentative (Eisenhardt 1989, 536) and are conditioned by emerging collected materials, are subject to change, leading to the modification of research strategies, data collection and analysis methods and tactics to match adapted research questions and phases of the process (Drongelen 2001, 503). This can be well explained by the intricacy of issues in research. In this context, qualitative researchers are prone to make a strategic decision on what aspects, or how much, or how long such complexities should be placed under a study. Consequently, in search of a different purview, they centre on such complexities which embody the ordinary practices in a natural setting to limited abstracts, which stick firmly to particular academic disciplines. In such cases, generalisability appears unlikely though it is not an intrinsic intent. (Stake 2005, 448). *On the other hand*, notwithstanding the impossibility of generalisation in a single case study in particular and the minor role of reliability in qualitative research in general (Cresswell 2010, 22), there is still room for reserving the richness of contextual social knowledge. Since not all research is oriented towards generalisability (Feagin, Orum, Sjoberg 1991; Simons 1980) at this point, case work may well serve the research strategy that looks for meanings in the form of adequately concise descriptive narrative of experiences and actions of humans (Stake 2005, 450; Dyer & Wilkins 1991, 616; Welch et al. 2011, 747). To put it simply, that understanding of the features of a case itself should not be neglected; otherwise, negative effect may occur (Stake 2005, 448).

With a view to this project, there are a few empirical studies investigating the issues of design thinking in relation to innovation capability whereas simultaneously taking the individual activities

into account. In light of that, the exploratory nature of this single case is presumed to build an empirically grounded consideration for future research in the form of extending the enquiry to other cases to the point which reaches the theoretical saturation and is able to validate the observation and generalise the findings. In addition, the research is likely to bring readers the vicarious experience via conveying the narrative description of the whole process. On a bigger frame, the research project might offer both experiential knowledge and knowledge transfer via a single case study (Stake 2005, 454-456), looking at the function of innovation capability backed by design thinking surrounding the activities of individuals. In short, therefore, there is plausibility to frame a setting on condition that the collection of empirical data can be maximised, targeting answering the research quandary while ensuring pertinent and adequate evidence to support the findings.

To reflect upon the research strategy, the case-study design chosen for this research is pertinent because the aim is not to produce new knowledge serving generalisability, but to offer the readers an insight into the past happenings and vicarious experience with empirical data which resonate with the them in an experientially manner (Stake 2005, 450), engendering theorising and seeking better understanding (Eriksson & Kovalainen 2008, 122). Although the investigation starts with preliminary research questions, it is unintended to deny the rich and contextualised description of the case work. Such description is expected to shed light on its idiosyncrasy emerging throughout gathering and analysing the empirical data, going along with the corresponding theoretical framework. By doing so, it can be ensured that theory generation is "side by side" with theory confirmation or expansion (Eriksson & Kovalainen 2008, 120, 127).

Drawing upon the above-discussed rationales, the current research is framed to seek a holistic understanding of how behaviours of individuals can contribute to developing innovation capability by utilising design thinking principles as the guideline, which is placed in a particular business setting of IBM Finland. The following section will address the justification for the selection of the case company.

3.2.2 Case company

Identifying a case is perchance another challenging aspect of qualitative research (Creswell 2013, 123/493). There are motives concerned with methodology and practicality, conceptual, and geographical reasons for selecting the case. *First*, with a view to the methodological and practical rationale, as a case work takes the role of conditioning the level of generalisability (Eisenhardt 1989, 537), it is pivotal to recognise the significance of precisely selecting a case to acquire a deep and holistic understanding, which is hard to be found in other organisations (Siggelkow 2007, 20; Easton 2010, 119). Whilst the chosen case work should afford an opportunity to yield new and

intensive learning for researchers, it should also consider the availability of time resources determining the research (Stake 2005, 451-452) as well as the feasibility to explore the topic area (Bogdan, & Biklen 1997, 56). *Second*, when it comes to conceptual justification, it points to the perception of the concept in the management realm. Specifically, design thinking should be placed under discussion beyond the professional design discipline, namely business setting. *Third*, since the case-based research is conducted in Finland, it holds a logic of making much more sense to possibly capture practices at the local business, resulting in raising the quality of the research. Whereas considering the Master's thesis work scale, the collaboration with a case company geographically close appears more viable because it significantly eases the research implementation in consideration of time consumption.

In line with the aim and research questions and the above discussion on the methodological and practical, conceptual, and geographical rationales, this study is built upon an exploratory qualitative single-case study research at IBM Finland, which claims to have been implementing design thinking in innovation work at a company-wide level for years. IBM Corporation which is a global firm with more than 370,000 employees provides a wide array of products (both software and hardware) and services in five core segments, namely *cognitive solutions, global business services (GBS), technology services and cloud platforms, systems,* and *global financing* (Reuters, 2018). IBM Corporation has been an exponent of design thinking in various forms for approximately two decades and becomes the most cited firm associating with the concept (Forrester Consulting 2018, 7) with the largest scale of implementing design thinking practices to deal with problems (Lohr 2015).

Back to 2012, there was a significant mind-shift with an aim *"to rethink and reimagine"* the IBM's customer journey. Not so long after that, a design studio was established in Austin, Texas as part of the firm's $100-million project focusing on building a massive design organisation in 2013 with a recruitment plan for 1000 designers (Kolko 2015, 6). Following this, Phil Gilbert who was the president of a startup IBM acquired then was appointed as the general manager of design, preceding the employment of several hundreds of designers. After that, CEO and executive managers have been through training on design thinking with different intensive programs and time spans. With design thinking identified as the lodestar of the organisation, the training teams supplied springboards for further learning and adoption as design thinking practices and reached out for support and knowledge transfer. (Lohr 2015). *IBM Design Education* was established to provide training to engineers, product managers, marketers, and executives, etc. on the practice of Design Thinking, such as how to think like a designer (Yudelman 2016). By doing so, Design Thinking is leveraged on the company-wide scale internationally across a diverse portfolio of products and services, which enables IBM to help its clients achieve positive outcomes in the form of cost reduction, speed increase, and better design solution (Forrester Consulting 2018, 1).

The background of the case company seems to meet the criteria for an appropriate case. The history of design thinking at IBM in brief has provided the context for the environment in which this case study was carried out. In Finland in particular, the Global Business Services (GBS) unit of IBM Finland focuses on the consulting business which majorly provides problem-solving services related to information technology, digitalisation, digital services and application development, user experiences and interactions, organisation transformation, change management, the application of AI, blockchain technology, etc. With these service areas, design thinking plays an integral part as the main approach adopted in developing the services. (IBM 2018.) Since the interviewees have been working at IBM Finland, they majorly respond from a consultant's perspective. In other words, design thinking is mostly adopted in the context of addressing concerns of IBM Finland's clients and educate them in utilising the tools in their own work, internal problems or seeking for innovations for its clients.

3.2.3 Data collection

Qualitative interviews are the primary data collection, combined with observations across the research, the corporate materials, and publications by third parties as the secondary sources. The earlier choices of the investigation strategy, research topic and the availability of desired data will condition the technique for acquiring data (Myers 2013, 119). In exploratory research, ethnographic studies (observations), qualitative interviews, or a combination thereof is recommended (Edmondson & McManus 2007, 1162). In case study and ethnographic research work in particular, interview is argued to serve as a vital fount of information (Hammersley & Atkinson 2007, 102; Yin 1994) because it enables the interviewers to approach various responding perspectives with insight into events and actions (Hammersley & Atkinson 2007, 102) while leaving the room for the interviewees to describe the phenomenon they expose to with flexibility in their answers (Brinkmann 2014, 1008). This view is also embraced by Mason (2002, 225) that

"Interview methodology begins from the assumption that it is possible to investigate elements of the social by asking people to talk, and to gather or construct knowledge by listening to and interpreting what they say and to how they say it"

Moreover, while the researcher should evade considering data collection method as the means which mechanically or logically turn research questions into interview questions (Maxwell 1996, 74; Maxwell 2013, 136/285), the interview questions must be driven by *what* the researcher asks

the interviewees to gather materials that will address the research questions (Eriksson & Kovalainen 2008, 79). In other words, these two areas should be deemed separate in a research design.

For those reasons, in accordance with the research strategy, topic, and the available access to data, multiple perspectives were gathered via qualitative semi-structured interviews with open-ended questions, which regarded as the primary source of data. Primary sources point to the data that is unpublished and gathered through a direct approach to people or organisations (Myers 2013, 119). Qualitative inquirers assume that "they can get closer to the actors' perspective through detailed interviewing and observation" (Wilson 2014, 16).

Furthermore, it is also suggested to utilise multiple sources of data to ensure the high level of the construct validity and reliability of the evidence in interpreting the information (Yin 2014, 118, 122). Semi-structured interviews are, therefore, mixed with direct observations, and secondary sources in the form of corporate materials, and third- party publications to exploit the distinct advantage of such combination in gaining in-depth understanding (Hammersley & Atkinson 2007, 102; Edmondson & McManus 2007) which provides a methodological justification.

Direct observations which provides observational evidence are believed to impart additional information about the topic being studied and communicate important case characteristics to outside observers (Yin 2014, 114-115). In this study, the observations were conducted in the form of paying visits to the working places where design thinking is adopted as the way of working at IBM Finland.

Secondary sources of data point to the existing empirical work which may provide relevant information for the study but does not necessarily serve the same purposes. When secondary data are adopted, attention of the researcher should be drawn on the original purpose of such materials to assess their values. (Eriksson & Kovalainen 2008, 126.) This research also utilised IBM Corporation's materials, such as PowerPoint presentations, internal and public publications, web pages and third-party publications which were looked into closely before the interviews.

Combining primary and secondary sources of data, and direct observations are called triangulation. This process refers to the utilisation of multiple perceptions of an issue to clarify meaning, verifying the repeatability of observation or interpretation (Stake 2005, 454). Triangulation is likely to help the researcher substantiate any insight by the respondents and identify contrary evidence as carefully as possible (Yin 1989, 89; Yin 2014, 120). In addition, this study also takes into consideration the dilemmas on using interviews as data collection technique, which methodologically challenges the interpretation of what interviewees say and what practitioners actually do, and then researchers to put perspectives into such behaviours (Dexter 1970, 15). These issues point to the paradox of (i) what the interviewees reflect from their perspectives throughout the interviews in the absence or with the presence of the third person compared to what they may say in other situations, (ii) the impact of the interviewer on the interview via the choice of what is and is not

relevant, (iii) the issue associated with the place of interview (Hammersley & Atkinson 2007, 110, 116, 118). It is suggested that an attempt can be made to minimise the intended effect on the quality of interviews by reflecting upon the issues in question, adapting the research questions accordingly, following some structuring or format of the interview, and carrying out the interviews on the interviewees' territory to make them relax, possibly resulting in the insight into their sense of themselves and their world view. Furthermore, such issues also have an impact on this researcher to view design thinking in a less instrumentalist manner. Table 5 summarises different types of data, the description of the sources, and the objectives for data collection.

Table 5 Sources of data collection

Source of data	Data type	Description
Interviews	Four semi-structured interviews with the practice leaders and highly knowledgeable practitioners at IBM (Transcripts totaling 23 pages of A3 size, in font 11.)	Interviewee 1: Ville Siren - Practice Group Leader, IBM iX - 10.06.2018, IBM Finland, Helsinki Office - 2-hour interview - English Interviewee 2: Petri Hyysalo - Digital Experience GTM Finland, IBM iX - 07.11.2018, IBM Finland, Helsinki Office - 1.5-hour interview - English Interviewee 3: Danilo Laurindo Pinto - Senior Consultant - Talent & Engagement, Cognitive Process Transformation, IBM Services - 07.11.2018, IBM Finland, Helsinki Office - 1.25-hour interview - English Interviewee 4: Matilda E. Lundqvist - Managing Consultant - Talent & Engagement, Cognitive Process Transformation, IBM Services - 13.12.2018, IBM Finland, Helsinki Office - 1.5-hour interview - English
Observations	Field observations of the workplace where people use design thinking as the way of work, covering the case's context	
Corporate material	- IBM's handbook, public and internal publications, and power point presentations - Web pages	The materials were either provided by the Interviewee or selected by the researcher. These materials comprise official information about IBM Design Thinking, its detailed description, its application, and its advantages.
Publications by third parties	- Videos and articles about IBM Design Thinking' - Newspaper and magazine reports.	Some material sources were suggested by the interviewees while there are some others selected by the researcher.

Data organisation

To keep collected data manageable and facilitate the data analysis phase, it is suggested to formulate a structure of the interview (Gerson & Horowitz 2002, 204; Mason 2002, 231). In this study, a theme-based interview guide (see the Appendix) is adopted. *Individuals, processes and interactions, individual learning to innovation capability,* and *exploration and exploitation (ambidexterity),* which are introduced as the main areas of the theoretical framework discussed in Chapter 2, act as the major interview themes.

While Figure 5 demonstrates the main purpose and sub-objectives of this study via the general model of social science explanation proposed by Coleman (1990), Table 6 presents the operationalisation model that summarise the key aspects this study wishes to address in the form of themes and key concepts that enables the study to answer these problems. It also depicts a theoretical draft of the mechanism framework this study targets to develop. This model helps the researcher familiarise with the collected qualitative data (Braun & Clarke 2006), resulting in the advantage in speeding up the preparation step that enables the thematic analysis phase later on by discarding the irrelevant background data or thoughts.

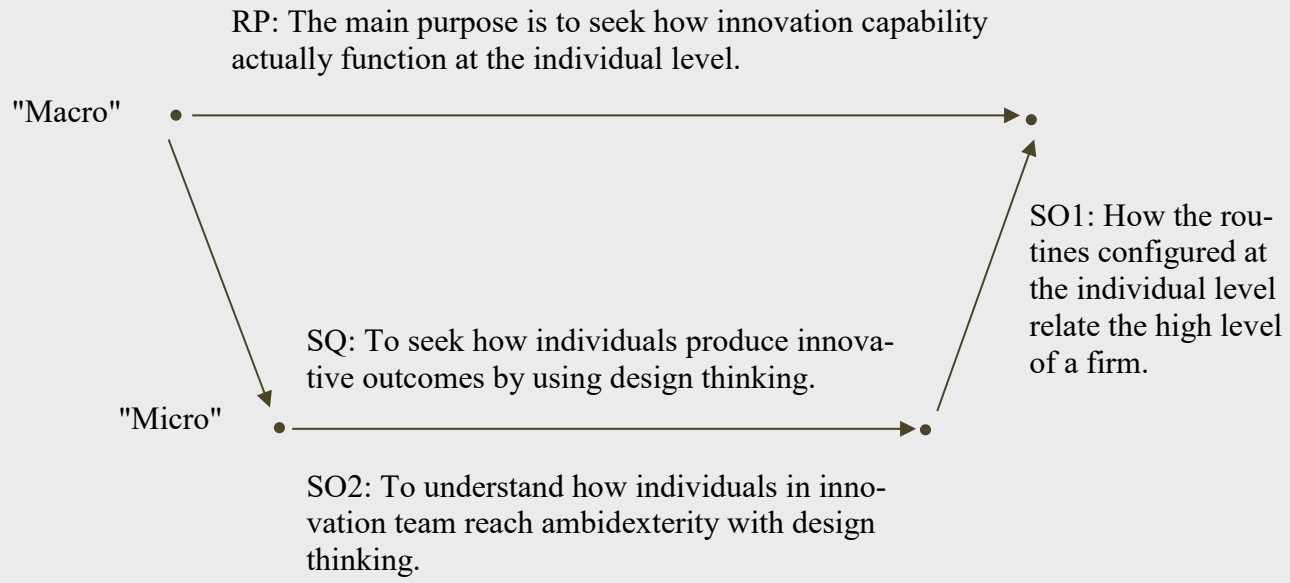

Figure 5 Summary of research purpose and sub-objectives (adapted from the general model of social science explanation (Coleman 1990)

Table 6 Operationalisation model denoted in themes

Research quandary	Sub-questions	Theme	Concept	Interview questionnaire
RQ: How does innovation capability function at the micro-foundation level?	*SQ1: How do individuals produce innovative outcomes on the firm level by performing actions guided by design thinking?*	Individuals	*Behavioural foundations* - experiential and learning-related aspects of rationality - *explore and exploit*	1. What kinds of team members are selected for the innovation team? (background, experience, abilities…) 2. What do individuals do to achieve the innovative out-comes? 3. Under what procedures/ process do team members carry out innovative projects? 4. How individuals form their own routines towards design thinking/ innovation?/ What do individuals do to form a routine of innovation by using design thinking? 5. How do individuals interact with each other to work out innovative results? 6. How do individuals balance between maximising what has been known and seeking for what is new/ innovation? 7. How this overall generates routinised processes for innovation? 8. How these routines are connected to other individuals and their routines?
		Processes and Interaction	*Methods of coordination*	1. How do you describe "design thinking" at IBM? 2. What is the role of DT in producing innovative out-comes? 3. How to ensure that members of a team follow given processes in the same way throughout projects? 4. How does process of design thinking harmonise with other internal processes?
			Technology and ecology	5. How does technology support the interactions of individuals?
	SQ2: How can routines formed at the individual levels relate to the organisational innovation capability?	Individual level to organisational level	*Experience accumulation*	1. How does IBM encourage individuals to try new experience to learn new things towards innovation?
			Knowledge articulation	2. How does IBM help individuals learn from each other?
			Knowledge codification	3. How is new knowledge acquired by individuals transferred to other teams or other projects?
	SQ3: How can the ambidexterity activities be achieved?	Exploration and exploitation	*Differentiation and integration*	1. In IBM, do you separate such activities in different units or enable both in the same unit? 2. How design thinking helps balance/ maximise "exploitation" and "exploration" activities?
			Individual and organisational level	3. At what level such activities/ both exploration and exploitation can be found? Company or individual level? If at individual level, how can it be used to benefit the company?
			Static or dynamic view	4. To pursue both "exploitation" and "exploration" activities, do you consider it is a fixed/ static process or configuration, or reconfigure your activities to meet changing de-mands over time?
			Internal and external process	5. Do you outsource any activities of exploration and exploitation?

3.2.4 Data analysis

Analysing data aims at yielding new finding and provide an insight into the research subject by assigning data sets real meaning (Rossman & Rallis 2012, 262). This is deemed both an iterative (Rossman & Rallis 2012, 262) and sequential process (Miles, Huberman, & Saldana 2013, 32/341). Data analysis in qualitative research takes the researcher a significant effort related to a spiral of activities, involving *organising data sets, reading through the database, coding and categorising themes, representing the data,* and *interpreting them* (Creswell 2013, 67/493), or in a simpler process concerning with *data condensation, data display,* and *conclusion drawing/verification* (Miles et al. 2013, 31/341).

Interview data analysis

Among multiple approaches to processing data, thematic analysis is a rather common tool used during carrying out qualitative study. This method is helpful in processing and analysing the quality data collected through interviews (Bogdan & Biklen 1997) and adopted to capture critical patterns or themes emerging from the data (Braun & Clarke 2006, 79), leading to allowing the researcher to be aligned with the research questions by referring to and inferring collected data from the defined theoretical framework (Aronson 1994, 4/5). Such themes which may be inductively identified from the collected data or drawn from literature can be discovered on either the manifest level (directly recognisable from the data) or latent (implicit) level (Boyatzis 1998, 4–5). In other words, data will be analysed on the basis of being open and axial coding (Strauss & Corbin 1998), excerpted from the interview transcripts from which keywords will be extracted, followed by being sorted based on the defined themes, making thematic statement and generating a report.

Due to the exploratory nature of this research via interviews, thematic analysis is supposed to be suitable (Bogdan & Biklen 1997). *First*, this method enables the researcher to establish the connection between the linkages between theory and collected raw data, which are useful in drawing inferences from data by reflecting them to the extant literature (Aronson 1994, 4/5). *Second*, the approach allows to exploit a massive amount of complex data sets a in systematic manner, which entails the better responsiveness and precision in analysis (Boyatzis 1998, 4–5; Braun & Clarke 2006, 5), and support the interpretation that can cover various aspects of the research topic in question (Braun & Clarke 2006, 6). Additionally, thematic analysis is used in this research because of its perceived flexibility and richness in processing data (Braun & Clarke 2006, 5). Since four themes have been identified and draw upon in designing the empirical research (see Chapter

2), it appears plausible that such themes may also serve as the starting point for the analysis process. Based on these themes, it permits the researcher to handle a large amount of qualitative data.

Thematic network

This research adopts the thematic network proposed by Attride-Stirling (2001) as the major approach backing the thematic analysis. Thematic network refers to the way that categorises a thematic analysis of qualitative data sets in different levels with an aim to aid structure and depict these themes Attride-Stirling (2001, 388). With this method, raw data is organised into *basic themes* (the most basic or lowest-order characteristics found in the data), *organising themes* (middle-order theme grouping themes of similar characteristics into clusters, or the main ideas), and global themes (the highest-level theme categorising sets of organising theme to formulate an argument or viewpoint, and collectively make sense of the lower-order themes), enabling the systematisation and richness in exploring the data. (Attride-Stirling 2001, 387–389, 402).

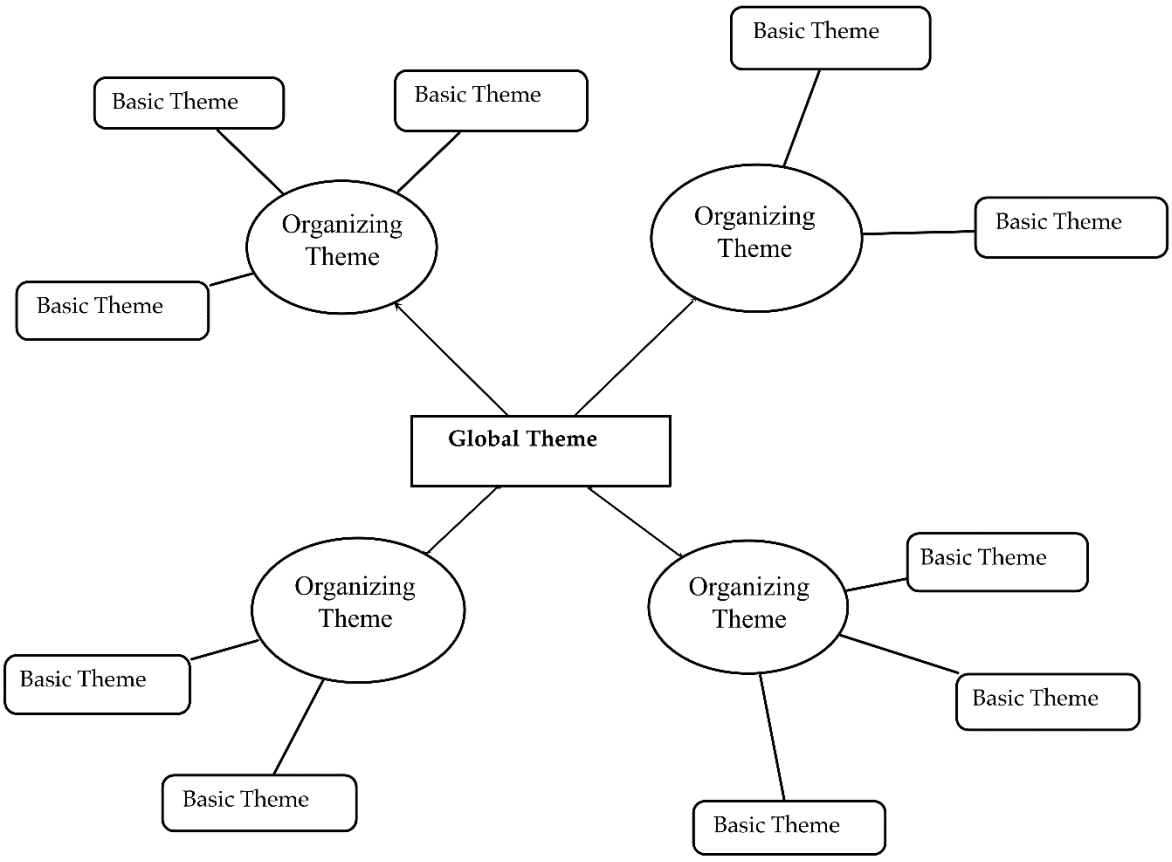

Figure 6 Structure of a thematic network (Attride-Stirling 2001, 388)

A thematic network (see Figure 6) is developed starting from *basic themes* being identified, then basic themes being categorised under *organising themes*, preceding organising themes being grouped under *global themes*. Thematic networks are illustrated in the form of a web-like map which neglects the hierarchy of themes; it is, however, far from placing emphasis on the starting or ending point of an argument or rationalisation. Instead, it purely serves the purpose of breaking up text and enables to find explicit rationalisations and implicit signification of data. In other words, thematic network merely acts as a tool for analysis in an interpretive manner while the real analysis lies in how such networks are described and patterns are recognised. After that, themes and the emerging patterns pertain to the thematic network are then described and referred to theoretical assumptions in order to address the research quandary. (Attride-Stirling 2001, 389–390, 393–394.)

Even though this study starts with four key themes (see Chapter 2) as the framework for empirical research, thematic networks are adopted as a tool that helps categorise the gathered interview

data. As thematic networks approach from the basic themes, this research work aims at capturing and representing these networks as they emerge from the textual data. The global themes are supposed to reflect a version of such major themes because the key themes are adopted as the interview framework. By using these four global themes (*individuals, processes and interactions, individual learning to innovation capability,* and *organisational ambidexterity*), the raw data is categorised for analysis.

Process of thematic analysis

The analysis process was carried out primarily during and carefully after the interview. After being conducted, the interview was noted, documented in the form of a transcript of several congregating pages, and recorded with the permission of the interviewee. Such documentations will be utilised as it can facilitate the data analysis process. Reading the transcripts helps the researcher formulate the holistic view of the topic in question, preceding the creation of analytic categories and concepts. Then the focuses can be recognised in the form of repetitive categories, which is followed by data being re-examined to define the factors that result in the foci. Throughout this process, the findings can be reflected to the current literature. (Horowitz & Gerson 2002, 216–217.) After that, raw data was scrutinised, sorted out, and grouped as per the emerging categories, preceding the emerging themes being discussed in relation to the empirical data and theoretical findings as well. The information that is related to each other is depicted in an interaction model which explains how individual interactions and activities can formulate innovative outcomes in relation to the innovation capability of the company. The research findings combined with discussion were presented to reinforce the theoretical model (Chapter 4). Based on the final research findings, conclusions were withdrawn while both practical and theoretical implications were examined and further research venues were suggested. The principles backing the process of analysis, and the principles of thematic analysis in particular are reflected in the trustworthiness of the study which comes in the next section.

3.3 Trustworthiness

Qualitative research, also referred to as *naturalistic inquiry*, places research endeavors on explicating the behaviours and experiences of particular groups of people in their natural social and cultural settings in which they are engaging (Owen 2008, 547; Amstrong 2010, 880). This exploratory research work draws on the interviews, observations, and other sources of materials to gather data, which reflects the characteristic of a naturalistic inquiry in essence.

In the absence of a clear-cut bounding line between the naturalistic researcher and people under investigation, a given impact of the former on the context which is either implicit and explicit is recognised. That is, researcher and informants in their setting are in an interdependent relationship which is likely to condition observations and findings. (Owen 2008, 547.) This issue, therefore, appeals for an approach to ensure the objectiveness which separates the former's personal experience or interest from the test subject, entailing constituting the validity of research findings. Criteria for evaluating the validity in research work is, in fact, a widely debated topic due to different paradigms adopted, the plethora of methods adopted for data collection and analysis (Lincoln, Lynham, & Guba 2018, 215; Lincoln, Lynham, & Guba 2005, 192). The notion of validity threats and how it can be addressed is a pivotal issue in qualitative work (Maxwell 2013, 164/285). Particularly in qualitative study, validity is assigned under different labels, such as *trustworthiness, authenticity, plausibility, goodness, verisimilitude,* and *credibility* (Creswell & Miller 2000, 124, 126). Along similar lines, it is argued that qualitative work is of procedures to prove its validity which is distinct from that of quantitative approaches (Maxwell 1992, 280). For that reason, the current study adopts the term "*trustworthiness*", which might be used interchangeably with *"validity"*, as well as the framework proposed by Lincoln and Guba (1985) to evaluate its quality as an alternative notion to the above discussion.

Trustworthiness refers to the persuasion of research findings, which draws upon arguments, invoked criteria, and questions under investigation, resulting in drawing the attention of audiences, or compelling them to take the results into consideration (Lincoln & Guba 1985, 290). Trustworthiness criteria developed by Lincoln and Guba comprise *credibility, transferability, dependability, and confirmability*, which are followed by a set of techniques to address the issues in question (Lincoln & Guba 1985). These terms are used to alternate *internal and external validity, reliability,* and *objectivity* as the usual positivist criteria (Denzin & Lincoln 1994, 14; Denzin & Lincoln 2018, 57).

First, *credibility* points to methodological procedures and sources which aim at the achievement of a high degree of consistency between investigators and the informants in terms of research design, the selection of research participants, and data analysis (Jensen 2008, 138). In other words, credibility is linked to the familiarity of the researcher with the topic, the observations in relation research categories, and the agreement of other researchers on claims that are made (Eriksson & Kovalainen 2008, 294). Germane techniques that are suggested by Lincoln and Guba (1985) are *prolonged engagement, persistent observation, triangulation, peer-debriefing, negative case analysis, referential adequacy,* and *member checking*. Due to the relevance and scope this research, the first three techniques are underscored and were employed.

Prolonged engagement is associated with the adequate time that the researcher spends to learn the "culture", testing for misinformation, and building trust (Lincoln & Guba 1985, 301). On carrying the current case study-based research, the researcher has engaged with design thinking for approximately a year by following the news by means of subscribing to newsletters, reading related blogs about design thinking in general and IBM Design Thinking in particular to keep pace with the latest news on the topics, taking online training courses provided by IBM, trying putting IBM Design Thinking methodology into practice in two innovation camps, paying a visit to IBM Finland office, and taking part in design thinking workshops to observe its processes and characteristics in actions. These activities are much likely to enable the qualitative investigator to comprehend better the culture, practices, contextual application, and scope of application of design thinking in innovate projects, entailing the opportunities to evade misinformation which can be introduced by distortions either of the self or of the respondents during the interviews. When it comes to trust building, the author has had the contact with IBM Finland's interviewees via a lecturer at my university. To some extent, trust in this regard was established via a social recommendation by the reliable actor. The engagement had, therefore, been unextended to the interactions with the respondents until the interviews were conducted. This could be an advantage since overidentifying with the respondents does not exist in defiance of prolonged engagement with the topic in discussion.

Persistent observation is concerned with the relevance and prominence of situational characteristics and elements. That is, whilst *prolonged engagement* allows the inquirer to achieve the scope dimension, *persistent observation* addresses depth facet of the issue being pursued. (Lincoln & Guba 1985, 304.) Not only is the current study of high level of demand for being able to capture the general or abstract level of unfolding aspects of the same issues in relation to building innovation capability by means of the utilisation of design thinking, it also aims for being concrete enough to scrutinise the individual interactions and communications to understand the phenomena. For this reason, follow-up and undocumented questions during the interviews were posed most of the time to clarify particular issues emerging during the discussions, leading to garnering insights into such knowledge areas.

The third technique under this category is *triangulation* which addresses the dimensions of findings and interpretations to enhance the credibility (Lincoln & Guba 1985, 305). Although triangulation is conventionally characterised as a metaphor pointing to multiple operationalism or convergent validation and employed to describe multiple techniques of data-collection in relation to a specific concept or construct (Lune & Berg 2017, 14), the notion of triangulation which refers to various *data collection methods*, multiple *methodologies*, different *theorie*s, a number of *researchers*, or any combinations thereof, is added to literature of qualitative research discussion (Denzin 1978, 292). In other words, Lincoln and Guba (1985, 305) conceive similar points in terms

of *sources, methods, investigators,* and *theories*. It is argued that triangulation is not a self-directing technique to enhance validity due to methods' biases and sources of invalidity, such as interviews, questionnaires, and documented materials, but rather how to deal with such biases in specific manners matters (Maxwell 2013, 169/285). It is, therefore, suggested that triangulation should be utilised with due caution to reinforce trustworthiness in the form generating more evidence in accordance with the major claims (Seale 1999, 475). Along similar lines, triangulation is not meant for confirming findings from an approach by those from another one, but rather, it helps the researchers seek "broader, deeper, more comprehensive understandings" of what is pursued (Denzin 2018, 784). Among the various types of triangulation, namely *data triangulation* (time, space, and person)*, theoretical triangulation* (multiple perspectives)*, investigator triangulation* (more than single observer)*,* and *methodological triangulation* (Denzin 1978, 295), this qualitative study mostly puts the first two sub-types in use. Specifically, with respect to the former in addition to semi-structured interviews with four employees who have been working and using design thinking for years as the primary source of data, IBM Corporation and IBM Finland's documented materials, such as handbook, public and internal publications, slide decks, information on the website, combined with videos and articles about IBM Design Thinking, newspaper and magazine reports published by third parties were also utilised to expound the phenomena in this case. As for theoretical triangulation, while the study placed more research effort on taking the micro-foundation perspective to explain how innovation capability functions as an overall umbrella, it also took into account the conceptions of dynamic capabilities and routines designed to better understand the interrelation among the concepts, in line with accounting for the main inquiry.

Second, *transferability* is concerned with the degree of similarity between a study, either parts or the entire of it, and the others in different research settings to yield the connection between the findings (Eriksson & Kovalainen 2008, 294). Working hypothesis accompanied with particular settings in terms of time and context underline naturalistic inquiry, which is unlike the statements of external validity expected by conventionalist. Consequently, whether contextual empirical findings are transferable is largely contingent on the readers based on their own judgement on the similarity between the setting, albeit the endeavour for thick description provided by the naturalist. (Lincoln & Guba 1985, 316) For this reason, the current study informs the details of actors, context, time, and processes in the interest of the thick description for the reader to contemplate if the transferability of the empirical research findings is plausible. In addition, this study also specifies the conceptual boundaries with an endeavour to sustain the consistency aligned with data collection and analysis. This researcher suggests that the findings are possibly transferred to similar contexts that are characterised by dynamic and high-velocity-of-change environments and in favour of constant learning as a portal to innovation.

Third, *dependability* devotes attention to providing the readers with information of the process of how the research is carried out to assure its logic, traceability, and documentation (Eriksson & Kovalainen 2008, 294). This criterion is also concerned with the change and variation of the research setting, which stimulates the researcher to be aware and track such the varieties (Jensen 2008, 209). It is argued that there would be no validity in the absence of reliability while no credibility without dependability (Lincoln & Guba 1985, 316). This qualitative research provided an explication for the research construct and processes in terms of how research questions are framed by the linkage of multiple concepts, the selection of philosophical perspective underlying the research, which are in line with the methods for gathering and processing data. Furthermore, since it is the evidence, not the methods, that make threats to trustworthiness implausible (Maxwell 2013, 161/285), the interviews were fully recorded and transcribed, allowing the findings to be traceable and documented, or, that is, making an inquiry audit achievable.

Fourth, *confirmability* centres on the clarification of the relation between research findings and interpretations, making it easily understandable (Eriksson & Kovalainen 2008, 294) and allowing an audit trail to be possible (Lincoln & Guba 1985, 319). Within the scope of this study, while the visual models of the interrelation between the individual and organisational level guiding the research was integrated and excerpts from data collected were provided in the form of direct quotation, interview-related information, such as questionnaire, interview recordings in electronic form, written notes, transcripts of interviews, and contact emails are made available for consultation. These supposedly enable the reader to trace and judge the trustworthiness of this research work.

This section has discussed, evaluated, and reflected the quality of the current research through a number of trustworthiness criteria proposed by Lincoln and Guba (1985), including *credibility, transferability, dependability,* and *confirmability.* The following section will summarise the whole chapter.

3.4 Chapter summary

This chapter has presented the approaches in terms of research philosophical stance, methodological choice, and research design. The current research work is informed and founded within the philosophy of interpretivism and subjective outlook, and grounded within the strategy of case study. Site observation, semi-structured interviews and documented material analysis were used for data collection across an exploratory case study that investigated the development of innovation capability by means of individuals who employ design thinking in practice as an approach within an organisational setting of IBM Finland. In addition, the techniques of thematic data analysis and data processing were described, preceding an evaluation of the quality of this

study through a set of trustworthiness criteria to construct the meaning from the data, namely *credibility, transferability, dependability,* and *confirmability.* The next chapter will provide a detailed account of the research findings from this study.

4 EMPIRICAL FINDINGS

Since this study sets out to analyse individual interactions which incorporate design thinking principles as an approach in order to shed light on innovation capability as a result of such process, this chapter places emphasis on bringing forward the empirical data collected for that purpose. The empirical findings are sorted out under the pre-formulated themes which have been identified, synthesised, and summarised in the operationalisation model (see Table 7). Such model further partially takes the role of an interview guide to gather data and define its relevance.

This chapter presents a circumstantial account of how innovation capability is built in practice at IBM Finland under four themes which have been established to demystify the idea of microfoundations constituting innovation capability, namely *individuals, processes and interactions, individual learning to organisational capability,* and *ambidexterity.* These themes comprise the main sections of this chapter. *First*, the aspect of individuals is presented which includes the diverse composition of individuals forming a team in relation to design thinking. *Second*, the detailed account of the implementation of design thinking process and interactions among team members towards innovations is introduced as an iterative procedure based on specific rules and principles guiding the individual activities. *Third*, the transfer of learning from the individual level to firm level via an internal knowledge management system is considered. *Fourth*, the approach to ambidextrous learning is illustrated by naïve interrogation question, integration of project stakeholders, especially end users with their real context, and infinite learning loop from feedback and experimentation. *Finally*, the findings are further articulated and conceptualised towards the research questions. The findings are summarised in Table 7 comparable to the identified themes in the previous sections. These form the base for the conceptualisation of the findings to formulate a general concept towards the research inquiry in comparison to the literature in the following chapter.

Table 7 Summary of findings compared to the identified themes pertaining to innovation

Themes		Established characteristics of individuals, and processes and interactions linked to micro-foundations of capabilities	Established aspects of design thinking pertaining to innovation	Findings from the case company
1. Individuals		- Heterogeneity (diversity) (Madsen, Mosakowski, Zaheer 2003; Collins & Clark 2003; Mehra, Kilduff & Brass 2001). - Variances of human agents, such as characters, personal beliefs and preferences, personalities, values, expertise, intelligence, conscientiousness, education, and industry experience (Molloy, Chadwick, Ployhart, & Golden 2011; Zenger 1992; Madsen et al. 2003; Felin & Hesterly 2007) - Individual cognition (Gavetti 2005; Teece 2007; Helfat & Peteraf 2010).	- Multidisciplinary participants (Kelley & Littman 2001; Brown 2008; Brown 2009; Stanford d.school 2009; IDEO's 2015; Liedtka, 2014) - Particular mentalities, such as optimism, empathy, experimentalism (Brown 2008; Dunne and Martin 2009). - Cognitive discipline (Martin 2007)	- Diversity in points of view, backgrounds, years of work experience, functional departments, cross-industry - 4 to 6 persons per team. - Understanding of design thinking processes.
2. Processes and interactions	Processes	- Ostensive aspect (what routine is or routine in principle) and Performative aspect (operationalisation of routines in a particular time and organisation) (Feldman & Pentland 2003). - Learning and knowledge accumulation process (Klepper & Simons 2000; Pisano 2000; Grant 1996a; Argote 1999).	- Prescriptive process (Kelley & Littman 2001; Brown 2008; Brown 2009; Stanford d.school 2009; IDEO's 2015) - Iterative learning based on the constant evaluation and feedback from the users via the prototypes (Brown 2009; IDEO 2015; Liedtka & Ogilive 2011; Holloway 2009; Ward et al. 2009, 81; Lockwood 2009).	- Prescriptive process which can be used for multiple purposes and complementary to other internal corporate aspects (*Understand, Explore, Prototype* and *Evaluate*). - Iterative learning process based on feedback, prototype, and evaluation.
	Interactions	- Formal interactions (Becker 2004; Srikanth and Puranam 2011; Henderson & Clark 1990; Hoopes & Postrel 1999) - Informal interactions (Becker 2004; Wilkins & Ouchi 1983; Lounamaa & March 1987). - Across organisations (Hoetker & Mellewigt, 2009; Mayer & Salomon 2006). - Within organisations (Reynaud 2005; March, Schultz & Zhou 2000). - Technologies supporting coordination and learning (Tyre & Von Hippel 1997; Ashworth, Mukhopadhyay & Argote, 2004). - Surrounding of the interactions (Felin, Foss, & Heimeriks 2012; Rafaeli & Vilnai-Yavetz 2007).	- Methods and practices for interactions: + Human-centered approach (Dunne & Martin 2006; Beckman & Bary 2007; Brown 2008; Lockwood 2009; Porcini 2009; IDEO 2015). + Visualisation (Kelley 2005; Jungigner 2007; Brown 2009; Rylander 2009; Ward, Runcie, & Morris 2009; Liedtka & Ogilive 2011; Stanford d.school 2013). + Prototyping (Coughlan & Prokopoff 2004; Fraser 2007; Holloway 2009; Liedtka & Ogilive 2011; Stanford d.school 2013). - Separated space (room) for interactions equipped with big blank walls or boards (Brown 2009; Liedtka & Ogilive 2011; Stanford d.school 2013; Kelley 2005).	- Physically gather (face-to-face) in a "Third space" during workshops (participants from different organisations) on a close, collaborative, self-reflective manner. Virtual participation as a last resort with the support of technology to facilitate the communication. - Interactions and activities are led by the experienced in design and design-related activities (design thinking facilitators) - A variety of tools supporting the interactions (for example, Hopes and Fear, Stakeholder Map, Scenario Map (As-is/ To-be), Big Idea Vignettes, Prioritisation Grid). - Rules to comply with during interactions (for example, Less Talking, More Writing; Less Writing, More Drawing; Yes, And…, etc.) - Environment for interactions: separated room with a big wall or board, computer with internet connection to access web-based interaction tools to coordinate with virtual participants.
3. Individual leaning to innovation capability		- Learning, experience, resources, and routines (Zollo & Winter 2002). - Gathering and combining resources (and other input ingredients) into actions (Dosi et al. 2000; Eisenhardt & Martin 2000; Makadok 2001; Winter 2003).	- Multidisciplinary participants (Kelley & Littman 2001; Brown 2008; Brown 2009; Stanford d.school 2009; IDEO's 2015; Liedtka, 2014), and experimentalism (Brown 2008) - Collaboration (Brown 2008; Cruickshank & Evans 2012) and teamwork (Seidel & Fixson 2013).	- Individual learning and personal development: Experiential learning with experimentations, documented resources and materials, awareness and encouragement to utilise design thinking. - Periodical trainings, hackathon events, trial-and-error working environment, access to the latest technologies. - Peer learning and knowledge transfer: weekly workshops, seminars, and sharing lessons-learned sessions, mentoring and coaching.
4. Ambidexterity		- Balance of explorative learning and exploitative learning (March 1991).	- Abductive reasoning (Dunne & Martin 2006; Martin 2009), Integrative thinking (Martin 2007a; Martin 2007b; Brown 2008; Brown 2009; Sato 2009; Martin 2010), and Holistic view/ System thinking (Holloway 2009; Dunne & Martin 2006; Fraser 2009).	- Hypothesis-driven approach ("what if" question), engaging relevant stakeholders (holistic perspective), redefining problems, reflecting on prior-knowledge, prototyping, and evaluation

4.1 Individuals using design thinking

4.1.1 Team composition

"The more diverse, the better…" (Hyysalo, discussion 07.11.2018)

Representation of different points of view is the main criteria for team composition (Siren, discussion 10.06.2018; Pinto, discussion 07.11.2018; Hyysalo, discussion 07.11.2018). The interviews revealed that design thinking is primarily adopted in workshops when people gather for discussions under innovation projects which aim at addressing complex problems and extensive challenges with the scale varying from unit level to corporate level, and may last for about three months to two years. These projects are staffed by multidisciplinary teams and led by experienced people from IBM Finland. While a workshop should consist maximum of 20 participants, teams are ideally composed of 4 to 6 members (Pinto, discussion 07.11.2018) who are in close collaboration with each other to obtain given outcomes (Siren, discussion 10.06.2018; Pinto, discussion 07.11.2018; Hyysalo, discussion 07.11.2018). Members in association with design thinking are unlikely to work to in the same team as a whole though there could be a few identical cross-functional teammates over different projects (Siren, discussion 10.06.2018; Pinto, discussion 07.11.2018).

All innovation efforts are driven by the needs of diversity which is one of the core principles of IBM design thinking, namely *(i) a focus on user outcomes, (ii) diverse empower teams, and (iii) restless reinventions* (IBM 2017, 2). The diversity of points of views in conversations that reflects a strong engagement of people is denoted in the form of skills (for example, subject matter expert), different departments or disciplines (such as customers, finance, sales and marketing, technology, logistics, design, and decision making), and various levels or years of working experience (though the fundamental understanding or background of what is in discussion ensure to be mastered) (Pinto, discussion 07.11.2018). On a bigger frame, the teams can be considered to consist of three general groups of people: *seniors* (who mainly supervise), *juniors* (who learn by doing), and *vendor team* (who is from IBM Finland to facilitate the design thinking activities.)

"Then if we think of a wider scope, I think those are kind of the same structure which is still applicable: (i) a couple of seniors supervising (bringing their knowledge, solutions, business, and they are able to discuss with the clients and getting the best out of the clients as well), (ii) the

juniors are learning what (by) doing, and then (iii) design thinking vendor team – we try to facilitate the customer in such the way that we figure out what is needed to start building the new solutions. So that requires some kind of facilitation capability. (Hyysalo, discussion 07.11.2018)

Moreover, because the Global Business Services (GBS) unit of IBM Finland deals with consulting projects, the participation of people from the clients, clients of clients, and sponsor users is a must (Siren, discussion 10.06.2018); otherwise, *"if you don't focus on the users who you are building for, you don't get it right!"*. It is usually required as many people from the client's side as the ones from IBM (Hyysalo, discussion 07.11.2018). Such framing teams in a multidisciplinary manner majorly targets (i) better understanding the problems in question, (ii) looking at the problems through multiple unusual lenses in search of different insights, and (iii) widening the scope of what's imaginable by bringing to the discussions experience, methods, and models of different areas (Siren, discussion 10.06.2018). The exact backgrounds to be picked, level and number of participants, departments, etc. are, nevertheless, conditioned by the essence of problems at hand or the ambition level of a project, "*for example whether it is content-oriented to improve the current status… whether is a new technology that you try to get in, then you need to need people from the technology side to see how it can turn to a business proposition..."* (Hyysalo, discussion 07.11.2018).

4.1.2 Design thinking facilitators

Apart from those who bring the contributions to design thinking workshops in terms of multidisciplinary knowledge, and experience, facilitators of such events have a critical role to play. Facilitators associated with design thinking are those who have experience in the design thinking process and expertise in making values out of it. These people take charge of initiating and leading design thinking activities on the teams to reach intended outcomes for their users. The facilitating team who possesses facilitation capability and is from the vendor side (IBM Finland) usually include one master facilitator and some other facilitator assistants to guide smaller groups of discussion. (Pinto, discussion 07.11.2018.) Furthermore, being good at handling and guiding a large group, these people are predominantly characterised as the ones who constantly stay neutral throughout the activities. This could be a challenge since humans have a tendency to start providing ideas on seeing people try to solve a problem. One interviewee is, therefore, of the view that:

"…strong facilitation by someone neutral; someone is not involved deeply in the problem… or quite far away from the situation." (Pinto, discussion 07.11.2018.)

Facilitators maintain their roles of being in the driver's seat, guiding groups of discussion, in a structural manner without interrupting the focused creative process until participants reach a situation of *"Ok! This is the final product for today. What do we do with this?",* then they can raise ideas (Pinto, discussion 07.11.2018). At the end of the workshop, it is the whole team that reaches a conclusion as a working result while the facilitators help summarise the major points and achieve the consensus among teammates. This is fairly vital because the workshop's key outcomes are much likely to be implemented by those who involve and then take responsibilities of what has been discussed and proposed. (Pinto, discussion 07.11.2018; Hyysalo, discussion 07.11.2018.)

4.1.3 Routines towards innovation

Virtually, the routine towards innovation backed by design thinking is achieved via in-depth and rigorous pieces of training with various purposes targeting different groups of people with different roles. Employees who are working at IBM Finland can be categorised into two groups: *(i) people who use design thinking as a way of working mostly for projects,* and *(ii) others who are encouraged to use design thinking more frequently and understand the methodology as a whole*.

Both groups of people are expected to read related materials and educated about design thinking with certain practices to develop relevant skills, such as methods and tools associated with design thinking, and facilitation, in the form of both face-to-face and online training courses.

Specifically, people belonging to the former group who may have trainings organised in Germany or the United States are usually vendor teams from IBM Finland and going to become "subject-matter experts" (or domain experts) who are in possession of a deep understanding of a topic, particular process, function, technology, machine, or material or type of equipment. These employees are the ones who directly interact with clients, take charge of leading projects as a whole, and facilitating the design thinking process. (Siren, discussion 10.06.2018.)

The latter may include clients or clients of clients and some others from IBM Finland, who are required to be aware of what they are expected during design thinking stage that they are included. This classification is also urged to adopt the methodology far beyond such the design thinking projects on being informed about the values of the methods. (Pinto, discussion 07.11.2018; Hyysalo, discussion 07.11.2018.) For example, it is suggested that the methods and principles could be embedded it in daily work or other projects by starting with users as the center, removing bias with more listening and discussions, etc. (Pinto, discussion 07.11.2018). The most prominent aspects to the novice at design thinking are the mentality of mutation, iteration, and user-orientation over the design thinking process. In this case, showcases and training are exercised to

illustrate and instruct the inexperienced while they gradually make sense over time. (Siren, discussion 10.06.2018; Hyysalo, discussion 07.11.2018.)

4.2 Processes and interactions

4.2.1 Process

At the project level, after it has been kicked off, the vendor team from IBM Finland starts planning as the first phase to collaborate with its clients to define the problem statement, targets, specify the focus and function-related issues, such as key stakeholders, users, outcomes, team expectations, and defining the agenda. Though the *intended outcomes* are typically the combination of new processes, tools and behaviours, the type of innovation that the project will yield may not be determined in the first instance. In respect of the *team or participants*, how it is composed is based on the nature of the problems in question. This issue is mainly discussed in the previous section in this chapter. The *agenda* particularly will define multiple phases which are closely connected to some given objectives. It is the roadmap that guides the evolution of the project by giving the team the objectives of a range of different activities. (Siren, discussion 10.06.2018.) While this roadmap should be flexible to structure the sprint and gather new concepts or solutions throughout the process, what non-negotiable is the expected outcomes of each stage that are actually the contributions of people involved (Pinto, discussion 07.11.2018). With the involvement of clients, they are required to take some training sessions provided by IBM vendor teams on different stages of design thinking and the holistic plan. Doing this is to transform the clients' assumption about design thinking which is far from simply about posting notes on the wall (Siren, discussion 10.06.2018).

When it comes to design thinking as the focus of this study, the process of IBM Design Thinking (Figure 7) is highly constructed and well-defined which provides guided steps of the design thinking process, namely *Understand, Explore, Prototype* and *Evaluate*.

Figure 7 IBM Design thinking process

Design thinking process

Understand

The non-linear process starts with a deep understanding of users or the target groups to gather the input to personas and the summary of the users' as-is experience scenarios and the identification of pain points that they experience, or what they think, how they feel, what they see, hear, and say. At this phase, the business design and engineering team members are in collaboration with its clients and/ or clients' users or sponsor users to gain priceless insights into the problems at hand.

Sponsor user is one of the Keys, as the third component of IBM design thinking, which include *Hills* (▲), *Playbacks* (■), and *Sponsor users* (●). The *Keys* are adopted to get aligned stakeholders in the form of complex teams around a shared common understanding of the problem to create empathy with the users, and define the most important user outcomes to achieve (the *Hills*), preceding reflecting together in a safe space to give and receive criticism which is followed by getting *Sponsor users* involved to ensure that the real users, rather than imagined needs are targeted to close the gap between assumptions and reality. (Siren, discussion 10.06.2018.) The Keys primarily target scaling design thinking practices to complex problems which are supposed to be dealt by complex teams (IBM 2017, 4).

"Sponsor users can also be brought to the design process. That is the time for feedback, comments, questions. So everybody gets aligned their mindset on what has been done, assess

whether this is a right or wrong approach. Sponsor users' role is very very important." (Siren, discussion 10.06.2018)

To create empathy, cross-functional team are engaged in defining the problems or learning about the *Sponsor users* (●) in their contexts or situations and the whole landscape, uncover their needs, that target to be resolved with the design challenge. In doing so, it allows to develop a background of knowledge, understand, and create empathy to develop the solution at the later step. A couple of tools could be utilised to gather such the information, such as *Focus groups, Surveys, User interviews, Contextual inquiry, Day-in-a-life Diary, etc.* which lead to possible deliverables, such as *Customer/ User personas, Empathy map, etc*.

Based on the knowledge and the voice of the users or customers, a concise and unique problem formulation is made, which is closer to the real needs of people or problems they are dealing with. Consequently, the design challenge is reviewed to evaluate if it is heading towards it. Gathering enough information makes the teams become instant-experts on the subject, entailing the gaining invaluable empathy for the people that the design challenge is targeting. This stage is about making sense of the situation in question, preceding planning ahead. Following that, the next steps for refining the challenge or goal statement are planned, which is called the *Hills* (▲). For instance, an example of a Hill is that "*I want the client to be able to book a flight (online) within 30 seconds*" (Siren, discussion 10.06.2018). *Hills* (▲) are big, but attainable, problems and outcomes are aimed at, rather than a list of feature requests.

Explore

"Ideas come first…" (Siren, discussion 10.06.2018)

Exploring via ideation is perhaps the most well-known phase of design thinking which are usually executed during workshops. To articulate a clear outcome statement, a great number of widely divergent and creative to-be opportunities are explored, conveyed in a concrete form in order to identify possibilities. At this point, the quantity of ideas is more appreciated than judging the quality or feasibility. People may start with watching a number of new videos from different industries which demonstrate technologies in use. This is believed to feed the learning and input for the teams' thought. (Hyysalo, discussion 07.11.2018.)

Throughout this exercise, the team most of the time starts with silence, captures and writes down the main points on sticky notes and post to the wall or a big board before coming to discussion session (*Playbacks* (■)). Every team member participating has a maker and a pad of sticky notes. In addition, workshops' participants are also encouraged to visualise their ideas by sketch-

ing, if possible, rather than writing. This is presumed to accomplish different purposes and benefits. *First*, it allows people to carefully think, provide a perspective, and condense their ideas in a couple of words or pieces of drawing. *Second*, it helps avoid the dominance of those who keep talking and eradicate the hierarchy among the participants, then everyone's voice could be equally heard and taken into consideration (Siren, discussion 10.06.2018; Pinto, discussion 07.11.2018).

After that, ideas are remixed to discuss, clustered in quest of patterns, preceding being converged to determine the strongest ideas. This is called *Playbacks* (■) which means to align the team, stakeholders, and clients around the values to be delivered. In the meantime, unrealistic and unexpected ideas that lack impressive quality are removed, preceding the determination of how a solution is developed.

Prototyping

"*Prototyping is something that brings the ideas to life, in other words, moves from ideas to concrete artefacts..."* (Siren, discussion 10.06.2018)

Following the possibilities being explored based on facts and understanding, quality ideas are brought into the real world by developing prototype concepts. Prototypes are simply to serve the purposes of communicating, sharing ideas or perspectives quickly, and keeping learning and testing ideas, and gathering feedback. These working models of ideas which usually take a paper form for speed and are inexpensive are, therefore, unnecessarily perfect because they can be iterated multiple times. Following that, the teams continue the process with the delivery mode, preceding actually developing the solutions by people from different disciplines which are conditional on the shared goals. (Siren, discussion 10.06.2018.)

Evaluate + Playback

Subsequently, the prototypes will be reviewed with the larger team and tested with end-users or customers (*Playbacks* (■)). Based on gathered feedback and insights from the usage metric and real needs, the designs are iterated when necessary to make it suited to the user and more seamlessly integrated with the existing situation. At any phase, those who work with the design thinking all embrace that solutions are subject to change and expected to fail fast. In other words, iteration as a loop is imperative to gain the insights. (Siren, discussion 10.06.2018.)

On running a new system or service, every outcome is simultaneously measured and tracked for further improvements because the solutions are developed based on feedback and new learning. One should also note that with design thinking approach, the development process gives every indication to be iteratively endless. (Hyysalo, discussion 07.11.2018.)

Design thinking process in relation to other internal processes

There is not any convergence between design thinking process and other internal processes which are developed for certain scope of work. That is, design thinking has no impact on other internal processes. Specifically, since IBM Finland has been focusing on innovation processes, or mobile application projects as a consulting business, the methods in association with design thinking are mainly employed at the design phase. (Siren, discussion 10.06.2018.) The methodology of design thinking could be, nonetheless, adopted in different areas internally, for example, relationship management process, to have better preparation and develop empathy (Hyysalo, discussion 07.11.2018). Design thinking is perceived as a key mindset for enabling innovation. It will, however, not bring into play the practical values in the absence of other variables in the company, such as an open culture, involvement of all levels in discussions, etc. (Pinto, discussion 07.11.2018).

4.2.2 Interactions

While the process of design thinking as a whole defines specific steps to be gone through, design thinking tools, methods, and principles which are adopted to guide the activities are mainly embedded and implemented in design thinking workshops, in which relevant people interact with each other. Tools and methods that are associated with design thinking guide the activities among members towards innovation which is perceived as problem-solving whereas principles act as the mindset for teammates on collaborating (Siren, discussion 10.06.2018). The level of innovation of projects is, nevertheless, contingent on the ambition level of outcomes which are defined in the first instance (Hyysalo, discussion 07.11.2018).

Set of tools for discussion could include, but not limited to *Hopes and Fear, Stakeholder Map, Scenario Map (As-is/ To-be), Big Idea Vignettes, Prioritisation Grid, Needs Statements, Storyboarding, Assumptions and Questions, Feedback Grid, and Experience-based Roadmap* (IBM 2017, 26-46), and for prototyping such as Invisionapp.com and marvelapp.com/POP/ (Siren, discussion 10.06.2018). Whereas diversity in perspective is essential to the success of design thinking enactment, selecting the right tools for the right circumstances is another pivotal aspect (Siren, discussion 10.06.2018; Pinto, discussion 07.11.2018; Hyysalo, discussion 07.11.2018).

Workshop is an indispensable part that combines design thinking methods, tools and the flourishment of mindsets, participants' perspective and energy. These workshops target fulfilling different purposes, such as innovation, iterative improvements for existing products and services,

team alignment, shared understanding, and agreement on co-creation with users, etc. (Siren, discussion 10.06.2018). Such the purposes can be regarded as different ambition levels to achieve for a given project (Hyysalo, discussion 07.11.2018).

Rules of communication

"Let's write first, then we open up for discussions!" (Pinto, discussion 07.11.2018)

Workshops are made up of multiple activities which are formed by the expected outcomes and the suitable tools, requiring individuals to interact with the others in various ways based on strict principles (Pinto, discussion 07.11.2018). On interacting with each other, the stakeholders start with mastering the rules of communication and interaction throughout the activities. These principles include, but are not limited to:

- Less Talking, More Writing **-** Ideas or main points are captured on sticky notes, then posted on the wall before being discussed.
- Less Writing, More Drawing - The teams are encouraged to sketch ideas to avoid multiple interpretations.
- Quantity Over Quality - Negative attitudes can shoot down potential and quality ideas without difficulty. A large number of ideas should, therefore, be firstly generated and posted on the wall, then discussed and distilled at the later phase.
- Make Every Voice Heard - Everyone has a Sharpie® marker and has a pad of sticky notes to contributes ideas, allowing everyone's ideas to be valid.
- Inclusive, Whole-Team Approach – Decisions are not made without the involvement of stakeholders who will act on the outcomes. Everyone participates to fill the gaps!
- Stay Focused On Your Users – teammates tell stories about users to keep them at the center of discussions.
- Yes, And… - Team members are pushed to build ideas further based others', rather than dismissing them (IBM 2017, 23). In other words, the focus is placed on what expects to be achieved while the feasibility, for instance the technical sides, could be looked into closely at the later phase. This is the major rule guiding how people interact with each other." (Siren, discussion 10.06.2018.)

Means of interactions and technology

As the interactions among teammates who are co-located mainly occur during workshops, face-to-face communication in the form of text, sketch, then verbal discussion and reflection are

prominent. In this case, interestingly one interview holds a view that a big wall or board and working with Post-it notes are believed to stimulate the interactions rather than adopting applications on a computer which is presumed to kill creativity due to its limitation in terms of how information is input. Furthermore, the technologies themselves are far from the case of creating creativity; it is the matter of how they are utilised and make sense in given situations. (Hyysalo, discussion 07.11.2018.)

In some projects, if there are members who are distributed in different locations, the role of technology then brings into play. After stakeholders are defined and virtual teams are established for a given project, the process of design thinking is implemented in a similar manner compared to how conventional teams proceed. The adoption of technologies to facilitate the communication is, nevertheless, mandatory. How team members interact with each other is, therefore, slightly different since a number of tools are employed. Various tools associated with communication towards design thinking serve different purposes, such as *Mural* which is a web-based virtual whiteboard that lets teammates capture plans and ideas, or *Slack Enterprise*, a messaging app offering a wide range of integrations with other tools and services along with powerful search. Although working in a geographically dispersed team is not so easy and fast as face-to-face discussions combined with sticky notes, these collaboration tools enable to engage teammates from different locations and simultaneously allow to have dialogues and the exchanged ideas documented. (Siren, discussion 10.06.2018.)

Roles of design thinking

The interviews revealed that design thinking at IBM which is useful and able to deliver a number of advantages is perceived as a set of tools conditioning the way of working (Siren, discussion 10.06.2018; Pinto, discussion 07.11.2018), bringing values to non-experienced members in terms individual development, a framework for problem-solving in a team manner (Pinto, discussion 07.11.2018) and a mindset with users at the central position though it is not a miracle (Pinto, discussion 07.11.2018; Hyysalo, discussion 07.11.2018).

First, as characterised by an interviewee, the biggest difference when design thinking is adopted is that it triggers and enhances collaboration among teammates, enriches self-reflection and self-organisation, arouses the curiosity of people from disciplines to learn new things from each other. Furthermore, it is undeniable that design thinking approach provides a highly structured way for innovating, starting with understanding the problems of target users, then keeping focused and constantly being on the right track while it allows the evasion of unnecessary aspects. (Pinto, discussion 07.11.2018.) It is, however, far from the truth that the employment of design thinking methodology will automatically result in innovative outcomes if the embodiment of experienced

designers, skillful facilitators, and how acquired knowledge is taken used are missing, and the goals are undefined (Siren, discussion 10.06.2018). In other words, on the one hand, design thinking provides the tools and mindset for innovation. On the other hand, expertise is of the utmost importance to put such the tools into action and create values (Hyysalo, discussion 07.11.2018).

Second, design thinking is deemed to be an enabler of personal development. It increases the level of commitment and motivation of teammates, making them more active and more likely to put projects forwards since they have an opportunity to be listened and bring their own ideas into reality (Hyysalo, discussion 07.11.2018; Siren, discussion 10.06.2018). That is, design thinking encourages the ability to take risks, put forward ideas, unlocking creativity potential among employees because the working environment facilitates its employees to try new ideas at any time. That is, employees at IBM Finland are seen to be indulged with a high level of freedom and encourage to try and learn new things. Another consideration is that it aligns people from different hierarchy and work experience levels in organisations with close interaction and collaboration (Siren, discussion 10.06.2018).

Third, the advantage of design thinking is also portraited in the form of a mindset of "can-do" attitude and align multiple perspectives with creating innovation (Siren, discussion 10.06.2018).

4.3 Individual learning to capability

IBM Finland creates an environment focus on *learning new things, learning among employees,* and *knowledge transfer* across departmental and national boundaries.

Learning new things

Learning new things towards innovation is supported by a number of activities which are sponsored by different organisational units frequently to involve those who share common interests, such as hackathons in certain areas, and periodical training sessions (monthly and yearly) (Siren, discussion 10.06.2018). On these occasions, employees physically gather in a place and work with colleagues that they do not usually interact with and go through common problems. Such the events can be organised on a local or global scale. (Pinto, discussion 07.11.2018.) In addition, learning spirit is also embedded in the firm's value of "*Essential*" which draws upon the attitude towards being knowledgeable about the extant world and seising the megatrends, leading to the application of such knowledge into tackling current problems. Those who want to innovate at IBM Finland, such as an employee possessing an idea are, therefore, fully supported, encouraged to implement, and bring the idea into the world in multiples forms, such as prototype and demo.

In line with this, trying the latest technologies, such as cognitive tool powered by AI, is another aspect of self-learning at IBM. (Siren, discussion 10.06.2018.)

Learning among employees and knowledge transfer

Learning among employees which is mainly driven by information and experience sharing can take different forms and occur in both formal and informal manners, which are supported by a wide selection of tools. Workshops, seminars, and sharing sessions are set up weekly on Thursday. These activities aim at learning directly from colleagues at different levels from multi-disciplines and various locations all over the world. Simultaneously, a number of *internal online communities*, or *"chapter"* on a smaller scale, discussing particular topics, such as AI, design thinking, IoT are also developed. Such online interactions target helping colleagues learn from each other easily and straightforwardly about particular fields or areas, and keep informed of the trendy issues. (Siren, discussion 10.06.2018.) Moreover, apart from informal sharing via daily communication, mentoring and coaching are highly appreciated internally which are applicable to co-located colleagues who are seeking new knowledge. Learning with mentors or coaches is promoted in the form of observation, discussion, and putting knowledge into practice promptly. (Pinto, discussion 07.11.2018; Lundqvist, discussion 13.12.2018.)

Knowledge transfer may take the forms of either face-to-face sharing or via intranet portal. In respect of experiential learning, such as concepts, client-specific cases, or lessons learned, knowledge can be shared via conference meetings, workshops, and seminars (Siren, discussion 10.06.2018; Pinto, discussion 07.11.2018; Lundqvist, discussion 13.12.2018). When it comes to the latter, areas of expertise are documented, saved, managed, and shared internally via an internal organisation network which is developed based on the extant network structure, facilitating employees in accessing organisational information and expertise on a keyword or topic base. Specifically, "Lighthouse" portal at IBM serves as a knowledge management enabler, or repositories of the firm's knowledge, in which a credit or grading system is embedded, allowing employees to rate the quality of writing or materials. (Siren, discussion 10.06.2018.)

IBM's employees are also offered opportunities for job rotation and trying different job areas or changing clients to work with after a number of years. Hence what they have learned from experience can be applicable to new settings and shared with new colleagues. (Siren, discussion 10.06.2018.)

4.4 Ambidexterity

Throughout the design thinking process, a variety of practices and principles allow team members to integrate both exploration and exploitation towards innovations. Concurrent with the clients, the teams working at IBM Finland start with defining the expected outcomes, constraints, followed by going through a process with particular phases in which design thinking is simultaneously deployed.

At the phase of *understanding*, team members start with simplistically questioning, such as *"What if we change it around?... "What if we remove this part? Why do we need it?"* (Siren, discussion 10.06.2018.)

Such the "naïve interrogation" enables team members to question fundamental assumptions about the services or products, or part of them, and reframed the problems at hand by subverting definitions which are particularly industry-based. Following that, the team takes one more step to place the problem in a broader socio-cultural context which poses tensions on the problem. By doing so, while naïve questioning helps destabilise the norms that underpin the preferences for exploration, such interrogation retains the ability to balance existing competencies with seeking new opportunities or possibilities. Consequently, it leads to new insights from a different angle and followed by an ongoing conversation with stakeholders:

"Yeah! We never thought of that because we are so deep into the problem; we only see it from our point of view!" (Siren, discussion 10.06.2018; Hyysalo, discussion 07.11.2018; Pinto, discussion 07.11.2018.)

In addition, with the participation of stakeholders as a common tenet of human-centered design, a shared experience, understanding and common interpretations relevant for problem definition are sought. The involvement of relevant stakeholders, such as IBM Finland vendor team, clients' subject matter experts, and especially end-users, in their contexts allow team members to obtain a greater sense of real experience, goals, and real world in the form of what end-users *"think, feel, and say"* (Siren, discussion 10.06.2018).

"I would say that it would be the biggest challenge in the project if you don't get clients participated." (Hyysalo, discussion 07.11.2018)

This situational immersion takes the role of challenging the status quo and precipitate *"what if"*-type conversations that aim to balance between what is known and what unknown in a particular setting by taking into consideration the perspectives of relevant individuals. The contextual analysis also supports the team in investigating the heritage, which results in better exploration.

"*The team tries to understand what is actually new in a given context, for instance, an idea can be old to a company, but innovative for this company or industry."* (Siren, discussion 10.06.2018)

As a result, the outcomes constitute not only functions on request, but also the meanings and unarticulated or latent needs, which can address the problem as a whole. At the point, innovation is considered situational.

When it comes to the *exploring* phase, IBM Finland vendor team frequently interacts with clients to leverage specific issue-related inputs such as user or customer research, and to ensure that the expected innovation could be integrated within an expanded manner. Simultaneously, IBM Finland team members examine the stock of internal resources, such as prior knowledge in terms of past implementation of similar projects, that can be utilised to stimulate ambidexterity. More importantly, however, this practice places emphasis not simply on reiterating experience and acquired knowledge, but rather on expanding it by adding new features or better construction that does not clash with existing ones, revisiting or highlighting the extant areas of the clients' operation that had previously been undervalued or ignored. (Siren, discussion 10.06.2018)

Following the contextual immersion, problem defining covers a broader investigative frame seeking to define potential possibilities.

"When we solve (a) problem, we create a scenario axis and start looking at and define what kind of problems they are as it states a bigger step." (Siren, discussion 10.06.2018)

Not only is a holistic perspective kept in multiple stakeholder aspects, but also in capability area in terms of recognising key aspects to be addressed for the extant services or operational processes while seeking to identify new opportunities to reinforce their position and create more values.

"Having a sense of vision for the future helps you connect with your users, and hills (a Design Thinking practice) helps to put that into words" (Pinto, discussion 07.11.2018)

These practices are to ensure the resulting outcomes to satisfy clients' needs without scarifying the variations or new options for the future. Then, solution development can achieve greater exploration based on deep understanding mediated by the investigations of capabilities and possibilities.

After that, prototyping and evaluation which are highly intertwined activities enable the teams to take a further step of addressing "what if" type questions to bring ideas into simple tangible forms and maintain learning iteration.

"If you think you have a good idea, you can start making your prototype, check it out with your users, how they like it, see if it actually solves something." (Siren, discussion 10.06.2018)

By these two activities, the vendor team can apprehend problems and take possible solutions into close consideration via iterative trial-and-error learning with the involvement of end-users and other project stakeholders.

4.5 Finding conceptualisation

The major aim of this study is to seek understanding of the development of innovation capability with a focus placed at the individual level when design thinking in the form of approaches and practices of professional designers is employed. Putting forward the results, it is highlighted that the project-based approach appears prominent towards innovations. In addition, since IBM Finland acts as a consulting firm, this provides a rather unconventional setting which is formulated by a vendor team from IBM Finland and a group of people from its clients. At that point, design thinking guides the activities and interactions of individuals within such an inter-organisation.

At the general level, the empirical findings conceptually suggest that innovation capability is developed in a project-based manner in which people from two organisations formulate a new convergent space, or a *"third space"*, or an *"interorganisation"* that is relatively separate from the working environments that those people are originally from. Figure 8 illustrates this finding. The *"third space"* which is constituted by the those who are project team members from the two firms during the timeline of projects does not necessarily point to a physical room or space, but rather an abstract notion in which a fairly new culture, new way of working, collaboration among rather new team members, etc. are built. In this space, innovations occur.

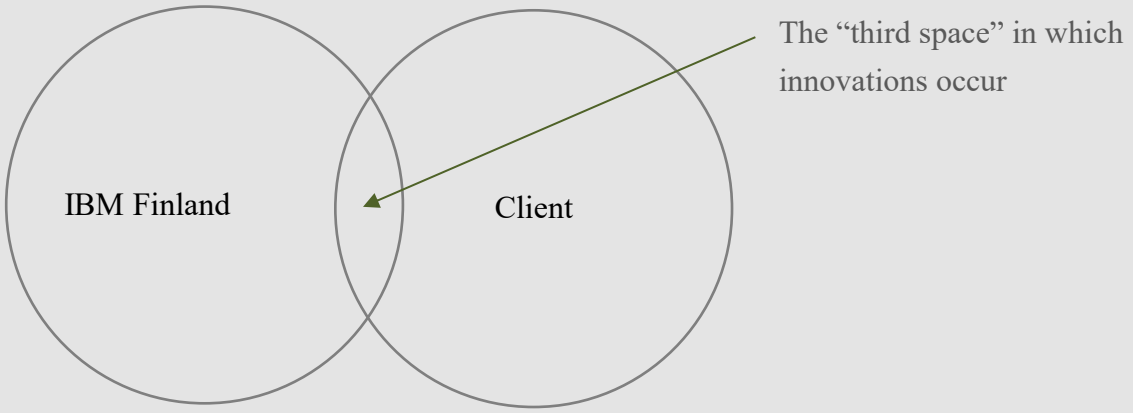

Figure 8 The “third space” in which innovations occur

At that lower level, the IBM Finland’s vendor team facilitates and accelerates the principles, process, rules, and practices of design thinking methodology whereas members from both organisations integrate such the practices and are steered towards the possibilities in the interest of addressing the challenges at hand. In this environment, design thinking methodology governs the interactions and communication of the team members. In other words, design thinking provides a mechanism which allows a group of people to reach innovative outcomes, namely “what if” type questions, experimentation, iterative learning by moving back and forth among the steps of the process. It is also indicated that design thinking tools could be conducive to not only building new offerings, but also improving the current internal process, or services.

Furthermore, when it comes to design thinking as a concept, it is worth noting that design thinking methodology itself seems unlikely to serve as a self-acting resource of innovation. That is, the embodiment of expertise which allows to generate values or new offerings by incorporating design thinking principles greatly matters.

Taking the routine view, there is no doubt that IBM Finland as the vendor side seems to do little at the organisational level while at the lower level, the individual actions are responsible for the accumulative learning, leading to the development of innovative outcomes, and then innovation capability over time.

4.6 Chapter summary

This chapter has detailed on the research findings in relation to how design thinking methodology is employed to yield innovations in a special business context which is established by the collaboration of vendor team from IBM Finland and a group of people from its client. The results are presented under the four themes that have been identified in the previous chapter, namely *individuals, processes and interactions, individual learning to organisational capability,* and *ambidexterity*. Drawing the findings together, the results highlight that project-based innovation is a noticeable approach and innovations as the results of the interactions and activities of individuals guided by design thinking methodology occur in the "third space" which is formulated by people from different firms.

The next chapter will further discuss the findings reflecting to the corresponding literature as the theoretical base.

5 DISCUSSION AND CONCLUSIONS

This chapter includes three main sections. *First*, it will discuss the research findings based on the four themes identified in comparison with the literature related to design thinking in relation to resulting innovation capability. *Following this*, the research questions will be addressed. *Finally*, the conclusion section will present the claim of contribution to the body of knowledge, followed by the discussion on the implications for practitioners, limitations, and an agenda for future research.

5.1 Discussion

5.1.1 Individuals

The findings related to *"individuals"* as the first theme underscore the aspect of a team composition and hence their collaboration or interactions. Whereas the former points to the fact that people who deploy the process to create values, not the processes, matter most, the latter places focus on the collaborative work among individuals, or teamwork effort.

It is well known amongst innovation management researchers that the heterogeneity of individuals is deemed as human capitals (Felin, Foss, & Heimeriks 2012, 20). Particularly, individuals are likely to offer a contribution to an organisation based on their personal values, experience, education, conscientiousness (Molloy, Chadwick, Ployhart, & Golder 2011; Zenger 1992; Madsen et al. 2003; Felin & Hesterly 2007). In a discussion on design thinking pertain to innovation, it is criticised that the embodiment of experienced designers has been neglected, entailing the perception of design thinking as simply a toolbox that is taken out of context (Johansson-Sköldberg et al. 2013, 131). It is questioned that whether methods in the design realm and relevant characteristics are exclusive to qualified designers, or also conducive in non-design settings (Kimbell 2011, 300). Likewise, Liedtka (2015) highlights the issue of "who designs" to distinguish designer, architect or engineer from people from the non-design background as a core element of design thinking. In a related study, Cross (2006) states that *"these abilities are highly developed in skilled designers, but I suggested that they are also possessed to some degree by everyone"*.

The empirical case of IBM Finland in this study can add to this discussion. The interviews point out that design thinking methods, principles and practices are embedded in workshops as a method beyond design context to engage individuals from multiple backgrounds towards innovation. It appears that the values generated from the implementation of design thinking are unlikely to lie in

the methods themselves, but rather the facilitation or training to the novice which is led by those who have the expertise, reputation in the subject matters, or what they have achieved. That is, the role of field-specific knowledge through the participation of subject matter experts, individual interactions and team activities is indispensable. This seems to be parallel to the "embodied knowledge" in relation to skilled designers (Johansson-Sköldberg et al. 2013, 129). In a more detailed term, such the knowledge *"resides in experts and its application is customised in real time based on clients' needs"* (Sheehan 2005, 54). In a similar vein, what was found in this research accords with the previous works which suggest to place a performative perspective on design thinking, rather than considering design thinking as a direct element of contribution to innovation (Carlgren 2016, 20).

While diversity is perhaps the most crucial element of the practices which can yield innovations based on multi-disciplinary knowledge combination (Gupta & Shalley 2006), individual interactions and collaboration across such the diversity, or social focus, are at the heart of the approach, which seems to be absent from earlier theories in design discipline (Liedtka 2015, 927-928). Stakeholders from multiple disciplines forming teams engage in practicing design thinking, collaborate, get aligned, and share common understanding to tackle the problems at hand throughout design thinking process. This notion has been repeatedly highlighted by the proponents of design thinking concept in practice (Kelley & Littman 2001; Brown 2008; Brown 2009; Kelley & Kelley 2013) as well as management scholars (Dunne & Martin 2006; Sato, Lucente, Meyer, & Mrazek 2010; Liedtka 2015), and notably upheld and adopted in research on the application of collaboration as the core of design thinking methods in novice multidisciplinary teams (Seidel & Fixson 2013). As a result, divergence in perspectives, functions, and experience bases is much likely to lead to improving the creativity of individual responses (Boland & Tenkasi, 1995; Somech & Drach-Zahavy 2013).

Thus, the key finding under this theme suggests that the focus should be placed on the industry expertise, individual interactions in a collaborative team when design thinking practices are deployed. It can be argued that this finding can respond to the call for a more sustained discussion of the design thinking concept by adding more empirical evidence to articulate the concept in a given setting (Johansson-Sköldberg et al. 2013, 129).

5.1.2 Process and interactions

The second theme points to design thinking process which guides individual interactions. Its finding centers on the iterative normative steps which reflect the major characteristics of design thinking practices at IBM Finland and hence how individual communications occur.

Previous research has pointed out that large firms keep facing the challenge of finding ways to sustain its ability to innovate based on routines and processes (Nelson & Winter 1982; Tidd & Bessant 2009; Bessant, Öberg, & Trifilova 2014). Apart from the roadmap to conduct an innovation project, the prescriptive process of design thinking towards resulting innovation found under this theme seems to be relevant in this regard and consistent with the model of Kelley (2001), Brown (2009) and IDEO (2009) and Stanford d.school 2009), albeit some modifications. It appears that the process is customised and reflects a unique version of IBM Design Thinking. Despite how it is portrayed, the fundamental idea is, nevertheless, practically rather similar: start with understanding (the relevant issues or the prerequisites, such as users, technologies, market, constraints etc.), then exploring the possibilities (to address the multiple parameters), preceding prototyping and learning from feedback. Though the process of IBM Design Thinking is composed of a series of related activities, it mainly emphasises a number of principles or mindsets, namely user-focus (empathy), openness to ambiguity, possibility exploration, visualisation, and prototyping. These predominant characteristics share similar points that are described by Carlgren (2016) and Liedtka (2014).

What is curious about this result is that the Keys (including Hills, Playbacks, and Sponsor Users) as a practice is designed to specifically deal with complexity in the real world in terms of complex problem and complex teams. Even though types of innovation may not be identified in the first instance, the concrete practice, for example, the Hills, enables teammates to get aligned with the shared expected outcomes based on the statements that are declared in the first place. This design-related approach may yield its fitness to innovation as it suggests how to embrace complexity (Bruce & Bessant 2002). One unanticipated finding was that design thinking methods are prone to be complementary to other internal processes and applicable in other areas of the firm though the adoption of design thinking across functions has posed challenges to organisations due to a conflict in terms of culture, resources, clashes with linear, efficiency-oriented processes (Carlgren, Elmquist, & Rauth (2016b). This result may be explained by the fact that design thinking is adoped from the consulting perspective of the GBS unit of IBM Finland. That is, process-based knowledge could be considered the major means of business which is far different from that of, for example, a manufacturing firm which deploys a wide range of processes.

Interaction among individuals is another aspect under this theme. Individual level has been called for further studies to illuminate and explicate a host of managerial phenomena, such as learning, knowledge, and capabilities (Felin & Foss 2005, 441). Furthermore, it is argued that such explanations that draw upon the component parts of a firm are more stable and general (Coleman 1990, 3). The result of how teammates communicate with one another in this study is supposed to nuance this debate. When design thinking is embedded in workshops, individual activities are strictly guided by the principles, methods or techniques, and practices (or rules) which condition

how team members communicate although there is ample room for creativity and exploration. Simultaneously, a number of tools are utilised serving different purposes or intended outcomes (Liedtka 2014). Though design thinking practices could well function regardless of its application to co-located or virtual teams, it is preferably deployed in a face-to-face manner. In other words, people physically gather in one place and have face-to-face communication, discussion, and reflection which is seen as the gold standard of interaction (Clark & Brennan 1990; Kiesler, Siegel, & McGuire 1984; Rutter 1987; Short, Williams, & Christie 1976). When virtual collaboration is, however, essential because team members or clients are geographically distributed, technology comes into play to facilitate work coordination (Kiesler & Cummings 2002). As a whole, it is found that practices of design thinking stimulates collaboration among individual (Seidel & Fixson (2013), provides a framework for problem-solving that practitioners can move back and forth (Brown 2009).

5.1.3 Individual learning to capability

The third theme's findings are concerned with how routines are individual level interrelate with organisational capabilities. It is argued that capabilities of a firm are a result of a learning process over time (Schreyögg & Kliesch-Eberl 2007; Lynn et al. 1996). Thus, effecting mechanism for managing, sharing, and transferring knowledge internally and with external firms are necessary to be innovative (Börjesson & Elmquist 2011, 173). The result highlights both informal learning on a daily basis which lies primarily in close proximity and face-to-face communication among team members and formal forms and activities, such as workshops, seminars, mentoring, and coaching. On the top of that, online sources of material, which reflect concepts, case-based learned lessons, are shared via the intranet portal from different branches of IBM in the world and discussion forums are also crucial learning channels. These forms of capturing, sharing, and transferring knowledge with the help of technology are parallel to both codification (knowledge is carefully codified and stored in databases and made available to everyone) and personalisation ("knowledge is closely tied to the person who developed it and is shared mainly through direct person-to-person contacts") strategies (Hansen, Nohria, & Tierney 1999). What emerges is that a credit or evaluation system to rate the quality of materials is deployed to stimulate the documentation activities by employees. This aspect shares the same point to the credit given for knowledge capturing mediating in support activities of knowledge management as a whole (Soliman & Spooner 2000).

5.1.4 Ambidexterity

Findings in theme four draw on the path that organisational ambidexterity can be pursued by adopting design thinking methodology. Design thinking is proposed as a process of exploration in nature (Brown 2009, 20/215; IDEO 2015, 11), or particularly a cognitive process that allows business organisations to reach consistency and replicability (Martin 2009, 30/167). In a similar vein, it is asserted that "design thinking seeks to create new possibilities and to choose among them, not merely to solve problem… the solution represents invented choice, rather than discovered truth (Liedtka 2004, 196). The findings under this theme nuance this discussion by shedding light on what concrete activities taken by individuals or attributes of design thinking allow the balance between exploration and exploitation.

First, during interactions among individuals guided by design thinking methodology, one of the practices of design thinking is asking the question of "what if" (Liedtka 2014) to challenge the state of affairs and exploring the possibilities towards what *might* be (Martin 2009). Such the "naïve question" and possibility exploration are the foundation of abductive thinking, allowing the creation of new knowledge and insight into the issues at hand (Kolko 2010, 20). *Second*, part of the design thinking process is to make prototypes, carry out experiments, or test and validate the proposition and then gather feedback, forming an iterative learning process with the involvement of different stakeholders. This is in accordance with the notion of building capabilities via the process of knowledge acquisition (Schreyögg & Kliesch-Eberl 2007; Lynn et al. 1996). *Third*, the involvement of different affected individuals, such as end users, technology, market, etc., into a discussion pertaining to the problem reflects a holistic perspective of design thinking practice, placing a focus on understanding multiple parameters, forming a specific setting in a systematic manner to a problem. Altogether, this result confirms that design thinking provides the mechanism allowing organisations to reach the achievement of ambidexterity.

5.2 Answers to the research questions

This study set out to explore how innovation capability is built and developed by taking the micro-foundation perspective to examine and design thinking as an approach. Two research questions have been framed to guide the work. It especially seeks to respond to the major inquiry: "*How does innovation capability actually function at the micro-foundation level?*" which is given a more detailed account on the design thing that guides the behaviours of individuals by the sub-question of "*How do individuals produce innovative outcomes on the firm level by performing actions guided by design thinking?*".

Design thinking pertaining to innovation

The most striking finding is, perhaps, that innovation capability of the firm is developed in a project-based manner. A possible explanation for this might be that the GBS unit under IBM Finland is a project-oriented business which specialises in management consultancy. While the vendor team from IBM Finland possess a methodology to understand the problems better and know-how to address them, its clients are confronted by such the problems. This, therefore, provides an idiosyncratic setting in which innovation projects in general and the interaction part are undertaken based on the collaboration of IBM Finland and its clients and/or its clients' clients.

What is curious about the result indicating how innovation capability functions at the micro-level is that the participants of a project from different firms gather physically and/or occasionally virtually to notionally formulate a "*third space"*, or an *"inter-organisation*" (see Figure 7) which is comparatively separate from their original workplace environments. In such the environment, new routines of interactions, communications which are backed by design thinking methodology are established and settled into by the contributors who define the agenda, and investigate the nature of and frame the problems. As a result, new offerings are launched or novel solutions with contextual respects are put forward as the outcomes of such the patterns of behaviours which are led by the vendor team, who masters the design thinking practices and tools.

Explanations via routines of individuals

With respect to the role of design thinking throughout the innovate process, it is found to notionally condition the actions of individuals in general. Looking at the issue from the routine perspective, design thinking methodology itself was found to be parallel to the *ostensive* facet of routine whereas its employment or implementation appears to closely related to the *performative* aspect.

When it comes to the *ostensive* aspect, design thinking methodology is likely to be associated with an abstract notion or the perception of how to implement things in a proper manner (Feldman & Pentland 2003). *First*, aspects of design thinking, such as process, approach, practices, tools etc. are unlikely to enjoin team members or assign specific participators to accomplish particular tasks in a timely and/or organisation-specific manner, but rather a notional means that orient contributors' observation, attention to a course of actions to implement in principle whereas keep them involved and share a part of the overarching project. At that point, design thinking leaves the room for multiple interpretations which lie primarily in the subjectiveness in understanding from diverse backgrounds or perspectives, such as colleagues at IBM Finland and participants from its clients (Feldman & Pentland 2003, 101). *Second*, though numerous courses of actions are pointed to in

dissimilar situations under design thinking methodology, such as incremental or radical innovation, types of technologies to be adopted as an expectation from the client, or the complexity of a project, there are no given patterns of behaviours are fully specified in terms of who, when, and where in the absence of the vendor team.

That is, the methodology in question itself stays open for the *performative* part of routine to be implemented whilst it provides a mechanism for operationalisation (Blau 1955, 23). It should be noted that design thinking as an *ostensive* facet would seem to possess tacit component which is embedded in the creation of value from its integration (Cohenand & Bacdayan 1994). To put it another way, while design thinking gives every indication of being equally accessible for organisations or individuals, the embodied expertise is indispensable to prove merits as the outcomes. At this point, the performative aspect comes into play. Under a project, specific participants at specific times when they participate in will be defined. Consequently, such humans' interpretations of their behaviours to make sense of the ongoing events are recognised (Giddens 1984; Orlikowski 2000), entailing the variation and divergence in actions. The design thinking vendor team, therefore, to some extent improvises their performance when design thinking methodology is put into practice due to varying settings in terms of clients, demands, project timeline, resource availability etc. In other words, there is a certain amount of variation in the deployment of design thinking which is conditioned by the performers' accommodation and improvisation. (Feldman & Pentland 2003, 102.) This can well explain the *performative* aspect of design thinking. Coming into alignment with the extant management literature on design thinking, this finding is not only consistent with the argument of Johansson-Sköldberg et al. (2013, 131) that the embodiment of professional designers should not be paid no attention to, but also in support of the notion that design thinking should be regarded as contingent sets of practices that are deployed by experienced designers and those who adopt designers' activities (Kimbell 2011, 287). On a bigger frame, the *performative* aspect can clarify the situation that by adopting the same methodology, firms learn how to resolves challenges in a rather different manner on the basis of their own setting, entailing the variations in how design thinking is characterised (Johansson-Sköldberg et al. 2013, 132).

When it comes to how collective outcomes at the firm level as the source of changes are achieved, it is shed light by the interaction or synthesis of such *ostensive* aspect and *performative* aspects of organisations while either part alone is adequate to understand organisational routines (Feldman & Pentland 2003, 95). In this case, further internal and external activities are performed by colleagues from not only IBM Finland but also IBM around the globe, such as lunch talk, periodical seminars, documented lessons learned, trainings for clients, workshops with clients and tackling their problems etc. to synthesise knowledge and put the principles into actions though design thinking as a methodology has been documented and public for almost all types of audiences globally. These interactions generate a manageable process of accumulative learning via

knowledge transferring mechanism, combined with the internalisation of knowledge via collaboration, ultimately entailing the development of innovation capability as the outcome (Schreyögg & Kliesch-Eberl 2007; Börjesson & Elmquist 2011, 173; Grant 1996a). In other words, innovation capability is built via a knowledge-based process of the accumulative learning which is supported by design thinking. It is argued that design thinking should be looked at from the performative perspective (Carlgren 2016, 20). This study, nevertheless, further suggests that both *ostensive* and *performative* perspectives and their interaction should be placed on the concept to extend the understanding of design thinking in relation to innovation capability as the collective outcome.

When capability view which centers on organisational, or macro-level is adopted, the role of the lower, or micro-level inclines to be excluded from the discussion. At this point, micro-foundations is much likely to allow to shed light and take humans and their behaviours into serious and closer account in order to explain the outcomes at the higher level of firm. Individual consideration is, therefore, regarded as part of the capability. It is clear that how the ideas of innovation and design thinking methodology that specifically provides resources and a mechanism to enable reach ambidexterity translate into actions that lie in the individuals, particularly in this case, the interactions and behaviours of people from different organisations while organisational capabilities materialise at an organisational level. By adopting the general model of social science proposed by Coleman which has been discussed in this document (see 2.2), it expounds on what occurs at both macro- and micro-levels and how the interrelation of such two levels is established: organisational level and inter-organisation or the "third space" which is constituted by people from different firms, which both are presupposed by the interactions of individuals.

In brief, it can be observed that the organisation practically does little about implementing the project or produce new offerings. Instead, the individual behaviours from multiple disciplines and organisations which may take varying patterns lie behind the course of actions, particularising the routines among such the group of people, accumulating knowledge, confront and address the problems, and introduce innovations.

Design thinking and ambidexterity

It is found that design thinking can be employed to serve as the driver for both radical and incremental innovation since the ultimate goals of utilising design thinking set out to address the challenges or problems while centering on human demands or experiences. In other words, since design thinking is problem-driven and user- or human-centered, it could account for both incremental and radical innovation types mediated by exploitative and explorative learning.

On addressing the problems or seeking for new alternatives, the salient challenges facing the participants are to properly understand the problems in a wider sense and then be in pursuit of

alternatives to tackle the problems based on the what has been known. The findings highlight that "what if" type questions, or "naïve interrogation" to explore new possibilities, learning from the stakeholders resulting in new insight from different angles, and experimentation in the form of prototyping are the heart of reaching ambidexterity at the individual level. The type of "what if" question adopted during the ideation seems to be result-oriented, rather than the status quo. In other words, "what if" question is a hypothesis-driven approach in which possibilities are sought for (Liedtka 2014b, 927). The "what if" questions seems to be parallel to the exploration of "what might be", the prerequisite of abductive reasoning which promotes to yield new learning and insight (Martin 2009, 31/167; Kolko 2010, 20).

The engagement of sponsor users and other relevant stakeholders allow to gain new knowledge. Users, their feedback, and other stakeholders provide a better and deeper understanding of the problem and the constraints since they discuss from their point of view which is closely related to the settings established around them. Consequently, in consideration of relevant users' needs in a wider context which is summarised in the word "empathy", the problem is reformulated by moving the focus of attention away from the definition of proof which is usually industry-based, and instead placing it in a wider space of what could be (or possibilities) from a rather holistic perspective which prepares the ground for solutions to be proposed in a wider setting. This eventually provides new knowledge that may not bed occupied yet. Following that, the experimentation in the form of prototyping at low cost combined with constant feedback and modifications in close collaboration with the clients or users initiate the iterative learning. In other words, the trial and error, or heuristic learning is prominent in this regard.

Drawing together, reflecting on the prior knowledge, or what has been known (exploitation), in conjunction with the possibilities harmonising with the requirements or a variety of parameters from stakeholders in their context (exploration), opportunities which consolidate the possibilities among the constraints are recognised. At this point, ambidexterity is achieved at the individual level from the learning perspective. From another perspective, the conjunction of knowledge across disciplines tends to yield innovations (Gupta, Smith & Shalley 2006, 700).

Further articulating the insights from this study, a simple graphical model in Figure 9 is proposed to summarise the findings.

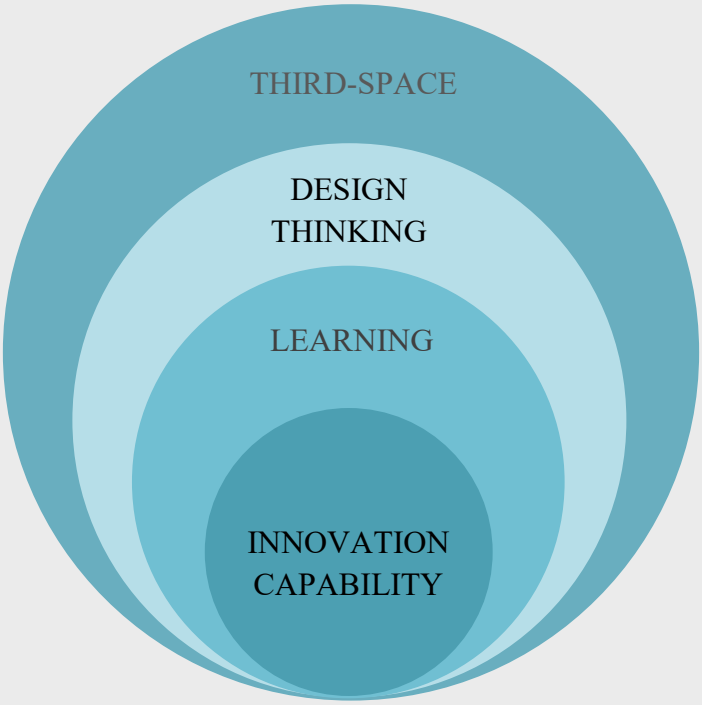

Figure 9 An illustration of the interrelation between innovation capability and the deployment of design thinking

The model denotes how innovation capability is developed over time by means of the ambidextrous learning obtained by individuals when design thinking is employed in the environment of an inter-organisation ("third space") within a project timeline. In other words, individuals from different organisations gather in a "third space" and formulate relatively new routines to approach problems which are mediated by design thinking methodology, entailing ambidextrous learning and ultimately resulting in innovation capability over time.

Design thinking, ambidexterity, and dynamic capability

The finding under this study also indicates that the practices and principles of design thinking in relation to innovation capability development via ambidextrous learning seems parallel with dynamic capability.

The first aspect of reconfiguring the internal and external competences to trigger changes**,** *on the one hand***,** steers organisations towards innovations and the capabilities that are expanded to reinforce such the behaviours towards new possibilities (exploration). This issue can be well illustrated by the endeavors that IBM Finland in particular and IBM Corporation in general have

devoted in the far-reaching innovative employment of the latest technologies in multitude areas in the interest of resolving new problems at scale, such as the application of AI-based robot microscopes in monitoring water as the most crucial natural resource, or quantum computing in tackling problems that used to be unsolvable due to high level of complexity and in search of an alternative to the conventional machines, and the conjunction of crypto-anchor and blockchain in tracing product originality against counterfeiters (Addicott 2018). These attempts place IBM Finland in a good position in proffering high values to its consulting clients.

On the other hand, the other dimension is to adopt the whole prevailing system to the novelty and exploit its merits due to in new situations (exploitation). In order to grasp mega-trends which are nascent, a wide array of internal approaches have been simultaneously employed at IBM Finland to facilitate the new learning of the employees, and then to adapt to and be in readiness for new challenges, such as "go-ahead workplace" allowing and encourage people to put their ideas into reality, culture of sharing tacit knowledge, knowledge exchange platform, online learning resources, etc.

Drawing together these two aspects synchronously, ambidexterity comes into play. How ambidexterity can be achieved are possibly well observed when it comes to the coordination of a project with clients within the "third space". The clients raise and define what they may expect or are in search of help from IBM Finland to better understand what they are in need within the areas that they are non-expert in, such as digitalisation of the current business model, or incorporation of AI in the form of chatbot to enhance customer experience and promote customer engagement. Based on such expectation, with design thinking as one approach to innovation and part of consulting projects, the clients are far from being proffered proposals to start from scratch, but rather exploiting the current resources that are available from both sides to develop further based on the current running system and accommodate the novel elements into such the status quo. On the global scale, design thinking can serve multiple purposes and is adopted in numerous aspects, from client engagements to creating new products or services.

In consideration of dynamic capabilities, it is concerned with two dimensions: one is *to produce changes* (or generate novelty), and the other is *to adapt the changes to the existing system*; both behaviours aim to influence and transmute the static competences, ultimately to respond to the rapidly changing environment. Although it has been argued that innovation capability can be either the most critical component of (Wang & Ahmed 2007, 39) or independently developed from the intervention of dynamic capabilities (Helfat & Peteraf 2003, 998), the finding under this study found that the practices and principles of design thinking in relation to innovation capability development seems to qualify for dynamic capability for reasons. *First*, based on the above discussion, neither do the vendor teams from IBM Finland merely rely on design thinking methodology nor in preference to collaborate with a given number of specific people due to their particular

competences to work out innovations. But rather, innovative outcomes are produced with the variation of different humans, varied settings in a rather similar way or with common practices to create new learning in the form of new offerings or solutions. *Second*, since the aspects of dynamic capability is either to create or to adapt to changes, design thinking methodology associated with innovation capability to reach ambidexterity seeks for changes or improve the status quo.

5.3 Conclusion

"to fully explicate organisational anything – whether identity, learning, knowledge, or capabilities – one must fundamentally begin with and understand the individuals that compose the whole…" (Felin & Foss 2005, 441).

The major purpose of this study was to shed light on how innovation capability functions from the micro-foundation perspective and design thinking as an approach. Specifically, the current qualitative case study devotes attention to answering the research inquiry: "*How does innovation capability actually function at the micro-foundation level?*" and a sub-question of "*How do individuals produce innovative outcomes on the firm level by performing actions guided by design thinking?*". The principal line of reasoning underpinning this study is that the critical approach to illuminate innovation capability is to place research endeavor on and provide a detailed account of interactions and activities of individuals that are the constituents of the whole, in which design thinking principles are incorporated to elucidate how such interactions and what activities are involved in.

The framework established within this study has reflected the approaches that IBM Finland has pursued towards exploiting its potential innovation competences. It specifically draws attention to the vital role of knowledge-based and design-driven strategy as the means by which IBM Finland becomes an innovative firm. The findings indicate that innovation capability development is no difference from the process of accumulating, managing knowledge and put it into circumstantial use in conjunction with constantly absorbing and internalising new knowledge via experimentation, engaging different material stakeholders into place, which are the consequences or outcomes of individual interactions and activities during a project timeline. In other words, the results point to the crucial importance of ambidextrous learning which, on the one hand, exploits what is known in quest of efficiency or far-reaching application of such knowledge while exploring new possibilities in search of opportunities and gain new knowledge, on the other hand at the individual level. The knowledge-driven approach towards innovation is a fruitful path in which multidisciplinary individuals and their expertise are at the heart of capability.

In such context, design thinking methodology which is led and deployed by the experienced in engaging design practices, principles, tools, and rules is suggested to guide how such interactions and activities of individuals are performed. That is, though design thinking is found to be of multi-purposes and at multiple levels of application, it is undeniable that a design-led facilitator or master of the design-related activities to generate values is perhaps a must.

5.3.1 Academic contribution

This study has reflected upon and bridged a variety of concepts and perspectives in relation to innovation capability, namely innovation, dynamic capability, ambidexterity, micro-foundations, routines, and design thinking. Such multiple perspectives and theories have been incorporated as a qualitative theoretical framework to direct the current research, which has been then tested against empirical evidence. Due to this process, the literature review on these concepts purveys a verification of previous findings. Further articulating the research findings and discussions in the previous sections, a number of academic contributions in terms of both confirmation and extension of understanding could be recognised. The rationales behind the claim of academic contribution in this study could be fundamentally drawn upon "combining disparate concepts in new ways to investigate a conventional issue", concurrently providing the new understandings of existing issues (Trafford & Leshem 2008, 141), or extending the understanding of the extant theories on a solid and reasonable grounded standpoint (Whetten 1989, 494). Specifically, this research addresses the current issues concerned the development of innovation capability by means of the employment of design thinking drawing attention to the interactions and activities of individuals.

First, the primary contribution lies in the finding that innovation capability could be developed based on a project-based approach. In more detailed terms, the participants of a project from different organisations form an inter-organisation or a "third space" in which they conduct courses of actions under relatively new routines that are guided by design thinking methodology. Furthermore, as one of the two sub-objectives, the current study has further provided the empirical ground on how design thinking practices can address the paradox of organisational ambidexterity at the individual level– the balance between exploiting firm's extant knowledge and exploring new possibilities to gain new knowledge. In this respect, the hypothesis-driven or "what if" question type approach, experimentation, and iteration of learning are central to the path to ambidexterity at the individual level. To this author's best knowledge, the current research is one of the few ones that link the concepts ambidexterity and design thinking (for example, Martin 2010; Beverland, Wilner, & Micheli 2015; Zheng 2018) towards innovation.

Second, in management literature, capability perspective has been criticised for being vague and at the high level, entailing the difficulty in conducting empirical studies (Schreyögg & Kliesch-Eberl 2007). Since innovation capability is of complexity, the limitation of purely placing focal research on the macro-level appears to fail to fully provide a detailed account of how the collective outcomes at the firm level can be achieved while the role of individuals in pursuing courses of actions is omitted. It is, therefore, plausible to revisit innovation capability at the twofold level of interpretation. This study has provided empirical evidence of individual interactions and activities that put forward an explanation for innovation capability at the firm level. Drawing on the underlying argument that is *"to fully explicate organisational anything – whether identity, learning, knowledge, or capabilities – one must fundamentally begin with and understand the individuals that compose the whole…"* (Felin & Foss 2005, 441), this study contributes to the discussion on capability by responding to the call to take a micro-foundation perspective, or focus attention on the individual level in terms of their activities and interactions to expound on innovation capability via the framework of micro-foundations in relation to innovation capability on the basis of both theoretical and empirical grounds. It, moreover, takes a step further in scrutinising and providing deeper insights into the interplay between the higher (organisational) level and lower (individual) via the mechanism of how social science phenomena advances (Coleman 1990). In other words, this conceptual linkage which has been tested by the empirical finding helps better understand how the individual configurations in associated with routines relate to capability at the firm level. In a more detailed term, it is pointed out that the behaviours of managing accumulative learning and knowledge transferring process via collaboration and internalisation that pave the way for the interplay between two levels can better understanding of a complete picture of innovation capability development from a knowledge-based perspective.

Third, when it comes to the management discourse on design thinking specifically, it has been criticised that how design thinking is deployed in a firm setting is neglected (Rylander 2009), which entails the situation that linear approach is inadequate (Liedtka 2004, 937) to link the concept in relation to theoretical anchor (Johansson-Sköldberg et al. 2013; Hobday et al. 2012; Kimbell 2011). In a similar vein, it has been called for research in association with centering on design thinking in organisational contexts (Carr, Halliday, King, Liedtka, & Lockwood 2010). Though there have been discussions on this issue in which design thinking is deployed in large firm setting in the industries of healthcare, software, consumer products, consumer electronics, and finance (Carlgren 2013; Carlgren, Elmquist, & Rauth 2014b; Carlgren 2016), this study responds to the call by the investigation of design thinking in the special setting of a consulting business in the IT industry as a showcase. That is, this case work has moved from a generic explication of design thinking to a particular illumination of its application in the context of an IT consulting firm, which

enables a detailed examination of expert knowledge, and individual and team activities and interactions that generate the values from the adoption of design thinking methodology.

Fourth, dynamic capabilities are deemed immature and difficult to be further developed (Lawson & Samson 2001, 380) due to the fuzzy assumptions on the concept (Galunic & Eisenhardt 2001) and impermanent valuable resources over time (Lawson & Samson 2001, 380). It is further argued that innovation capability can be developed independently from dynamic capabilities due to the incremental reconfiguration process (Zollo & Winter 2002, 341; Helfat & Peteraf 2003, 998). The current study has linked the concepts of dynamic capabilities, innovation capability, and ambidexterity. In a more detailed term, the findings under this study has also pointed out that the mechanism that design thinking provides to reach ambidextrous learning in search of building innovation capability appears to be parallel with dynamic capability.

5.3.2 Implications for practitioners

Apart from the scholarly contributions, the research findings from this study also have practical implications for managers. On a general level, it is suggested that implications of the findings from this study could be considered for similar contexts that are characterised by dynamic and rapidly changing environments towards constant learning as a portal to innovation

First of all, there is, on the one hand, no doubt that this research can provide managers and practitioners at IBM Finland with a more holistic view and approach on the adoption of design thinking. Specifically, the current study could serve as a source of understanding that shifts from a certain way of expressions or interpretations of design thinking to the scholar perspective which formulates the topic in a more constructive and overarching manner. On the other hand, due to a lack of an academic anchor, design thinking is described as a management fad (Johansson-Sköldberg et al. 2013, 121, 132), which likely makes managers hesitant to employ it in their business. With respect to a wider audience beyond IBM Finland, the results may, therefore, provide managers with a better understanding of the concept and then a source of guidance to the context-specific application of design thinking methodology. Additionally, since it is found that the merit of design thinking is difficult to prove (Carlgren, Elmquist, & Rauth 2016b), it may also hinder managers from widely accepting it. This study has corroborated how design thinking tools and practices facilitate practitioners to reach ambidexterity from the view of learning. For that reason, the wider audience of managers could better understand and apply the concept into exploiting and exploring knowledge related to innovation. The investigated linkage between design thinking and ambidexterity may, furthermore, point out the merit of employing design thinking with more reliability since ambidextrousness which provides a strategist's, system thinker's or decision-maker's,

rather than a designer's, perspective has been finding its academic ground in management discourse for decades.

Second, when it comes to the findings from this study in particular, the implications could be conducive to other similar settings of project-based business in relation to innovation. The results indicate that innovation occurs in the "third space" in between two or among even more than two organisations within a project timeline, entailing the change or adaptation of changes to the existing systems once problems are resolved or new offerings introduced. Project-based business which is considered a business strategy (Ajmal, Helo, & Kekäle 2010) has been discussed for more than two decades in different industrial settings, such as consultancy and marketing (Alvesson 1995), film production (DeFillippi & Arthur 1998), architectural practice (Winch & Schneider 1993), construction (Gann & Salter 1998), or complex product systems, such as energy stations, aircraft engines, civil airliners, telecommunication systems, etc. (Davies & Brady 2000; Hobday 1998, 2000; Prencipe 2000; Prencipe & Tell 2001). In Finland in particular, this strategy seems to be executed by numerous large firms and project-based organisations also take the major role (Artto & Kujala 2008, 473). The implications under this study are, therefore, deemed significant for project-based business in terms of employing design thinking pertaining to innovative outcomes which are much likely to be beneficial in a rather similar manner.

Third, the findings under this research could also have implications for educators. There is a reality that research implications for managers or business practitioners tend to have an influence on business educational institutions. In other words, design thinking increasingly gains more interest of managers, leading to the situation that business students are expected to gain relevant competence. In this context, business schools may consider widely deliberating courses in relation to design thinking approach. (Dunne & Martin 2006, 512.) This research indicates that innovation capability is developed via the accumulative learning, experimentation, collaboration and knowledge management process which are facilitated by design thinking methodology. Particularly, design thinking practices and tools are empirically confirmed to allow individuals acquire new knowledge through the discovery of new possibilities while exploiting what has been known to gain merits via resources and mechanism provided by the proper employment of design thinking. Although it is called for far-reaching adoption in the MBA curriculums, design thinking application in educational context seems still immature (Dunne & Martin 2006, 512). The embeddedness of design thinking methodology in relation to ambidexterity and innovation, therefore, may be conducive to management educators in the form of integrating such topics into courses under management curriculums.

5.3.3 Limitations and future research venues

Dynamic capabilities are argued to be a reservoir of competitive advantage while there are other views which either doubt the existence of such capabilities or question if they are born or made (Winter 2003, 991). Based on the finding from this study, it is argued that dynamic capabilities should be perceived as a conceptual construction that is different from one organisation and the others in relation to developing a higher level of capacity to innovate which hinges on the strategies pursued and environmental settings (Lawrence & Lorsch 1967; Woodward 1965). This study found that innovations occur in the "third space" that is notionally formulated by the participants from the vendor side who leads the design thinking practices and the client side who looks for new offerings or solutions to resolve the challenges or dilemma. This study shows that innovation capability is a knowledge-based development process while absorptive capacity points to an ability "*to recognise the value of new, external knowledge, assimilate it, and apply it to commercial ends*" (Cohen & Levinthal 1990, 128). As is evident, the vendor side gain merits the most within the "third space" on deploying design thinking methodology in consideration of the future applications whereas the benefits to the customer side seem to be fairly limited for reasons. It is, however, argued that on condition that an organisation possesses an absorptive capacity, it is likely to spur innovations. In other words, one may raise the question of whether design thinking methodology pertaining to innovation is conducive to firms beyond such the "third space", especially the client sides. It is, therefore, suggested to investigate the post-effects of design thinking related to the capability to innovate beyond such the inter-organisation.

This study is limited within the scope of vital practices, principles, and tools related of design thinking that guide the activities and interactions of individuals towards building innovation capability, excluding from the cultural aspects pertaining to the employment of design thinking. Since culture dimension has an inclination to influence how interactions occur (Wilkins & Ouchi 1983), it would be fruitful to investigate the integration of design thinking from a cultural perspective or cultural code of conducts that lead employees' innovation practices. Specifically, design thinking is embedded in the culture level of a firm in which its processes are design-driven and serves as the catalyst for innovative behaviours (Martin 2011).

Furthermore, the possible negative effects of design thinking are still neglected. A set of theoretical propositions are proposed to link between individual cognition and decision-making in consideration of design thinking as an approach to help decision-makers mitigate the individual cognitive biases. (Liedtka 2015.) It is, therefore, reasonable to empirically examine the behaviours of cognitive bias mitigation in practice.

6 RESEARCH SUMMARY

The focal area of this research was how innovation capability is developed via human agency. In order to address the main objective, this study took the view of micro-foundations and specifically investigate how individuals interact with each other in teams to work out resulting innovations. Design thinking was deemed to be a promising means of innovation. Via its processes, principles, and methods, design thinking methodology was assumed to facilitate and guide individual interactions, entailing the yield of innovative outcomes.

This exploratory qualitative study which was reported by case study approach set out to explore the activities of individuals in terms of their interactions and communication by means of design thinking towards innovations at IBM Finland as the case company. In addition, two sub-objectives were also established (i) to better understand how routines which are formed at individual level pertain to capabilities at the organisational level, and (ii) to scrutinise the tension of striving for a balance between the pursuit and acquisition of new knowledge and maximising the use of past knowledge. Based on such purposes, the research work began with the formulation of a theoretical framework which placed a focus on individual interactions which are guided by design thinking practices. Furthermore, the interrelation between individual and organisational levels was found relevant to shed light on how the latter is developed by means of the former, which is combined with better understanding how the co-existence of exploring new opportunities and exploiting what is already known can be achieved.

The empirical study was composed of interviews which were steered by the pre-formulated theoretical framework. Four interviews were conducted at the office of IBM Finland as the main data collection method, which was combined with documented materials and site observation as the secondary source material. The interviews were recorded and later transcribed. The themes under the preliminary framework were adopted to guide the conversations during the interviews. At the later phase, data were processed, organised, and made meaning by means of thematic analysis. After that, thematic network as a data analysis tool was employed to facilitate the interpretation of data and drawing the conclusion.

In general, the major purpose of this research work was accomplished by scrutinising the individual level via a framework of micro-foundations in relation to innovation capability on the basis of both theoretical and empirical grounds. The empirical findings addressed a number of implications. *First*, while innovation is seen as the approach enabling firms to sustain its competitive advantage, individual level (micro) should be the starting point and at the central focus towards innovations or new offerings, ultimately contributing to building organisational capability. In this context, design thinking practices act as a catalyst to trigger the activities and interactions of individuals in a design-driven manner. It is, furthermore, indicated that although design thinking is

seen as a way of working due to its broad applications across functional areas, it requires a design-led facilitator or master of the design-related activities to generate values. *Second*, innovation could be spurred in a project-based approach by which a "third space" is formulated by people from different firms and led by the experienced from the vendor side. *Third*, the framework reflects the approaches that IBM Finland has pursued towards exploiting its potential innovation competences. It further draws attention to the vital role of knowledge-based and design-driven strategy as the means by which IBM Finland becomes a more innovative firm.

The study contributes to the extant body of knowledge by bridging the concepts of innovation, innovation capability, micro-foundations, routines, and design thinking in a specific corporate setting. Even though this research is informed by a single case work as an intensive approach that is limited in terms of generalisability, the theoretical findings could achieve more universal implications since the research is framed in a large quandary. The present investigation has not been able to consider the whole aspects in relation to innovation and the application of design thinking in practice, entailing leaving spacious room for future research endeavors.

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APPENDIX

QUESTIONNAIRE FOR THE STUDY ON DESIGN THINKING PERTAIN TO INNOVATION AT IBM FINLAND

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- The observation part was made from 10.00 to 13.15 on 10th February, 2017;
- The interview part was conducted from June to December, 2018.

Introduction: Design thinking has been described as a human-centred approach to innovation. This study starts with the assumption that when design thinking is used throughout innovation projects, it will form given working routines to approach problems among team members which allow them to conduct with less cognitive effort and minimum decisions making. The research focuses on *the activities and interactions of those individuals* who use design thinking to produce innovative outcomes/ solutions. For this reason, the primary question of the interview is *"What do individuals who use design thinking do to produce innovation?"* which will be expanded further with detailed questions under different themes as follows.

Theme 1: Individuals/ Members of a team

1. What kinds of team members are selected for the innovation team? *(criteria to compose a team)*
2. What do individuals do to achieve the innovative outcomes? *("innovation" concept, individually, together, & with clients)*
3. Under what procedure/ process do team members carry out innovative projects? *(general process; with/without clients)*
4. How individuals form their own routines towards design thinking/ innovation?/ What do individuals do to form a routine of innovation by using design thinking? *(role of IBM also)*
5. How do individuals interact with each other to work out innovative results? *(rules, means of communication…)*
6. How do individuals balance between maximising what has been known and seeking for what is new?
7. How does this overall generate routinised processes for innovation?
8. How these routines are connected to other individuals and their routines?

Theme 2: Processes and Interaction

1. How do you describe *"design thinking"* at IBM? *(mindset, a miracle tool, or else)*
2. What is the role of design thinking in producing innovative outcomes? *(how DT helps innovate)*

3. How to ensure that members of a team follow given processes in the same way through-out projects?
4. How does process of design thinking harmonise with other internal processes? *(relationship, match, conflict)*
5. How does technology support the interactions of individuals? *(local team, global team)*
6. How different are the interactions between members when design thinking is used?

Theme 3: From individual routines to organization routines

1. How does IBM encourage individuals to try new experience to learn new things towards innovation?
2. How does IBM help individuals learn from each other?
3. How is new knowledge acquired by individuals transferred to other teams or other projects?
4. How does IBM take use of the innovative routines for the future?

Theme 4: Exploration and exploitation

> *(There are usually two major activities that an innovative firm does: one is to execute the known procedures (**exploitation**) and try to maximise their benefits, and the other is to look for changes to better the current procedures (**exploration**). **Ambidexterity** happens when a firm pursue both **exploitation** and **exploration** at the same time.)*

1. Do you separate such activities in different units or enable both in the same unit?
2. How design thinking helps balance/ maximise "exploitation" and "exploration" activities?
3. To pursue both "exploitation" and "exploration" activities, do you consider it is a fixed/ static process or configuration, or reconfigure your activities to meet changing demands over time?
4. Do you outsource any activities of exploration or exploitation?

Thank you very much for your kind support!

Sincerely yours

Nhan Thanh Nguyen