

FUNDAÇÃO GETULIO VARGAS
ESCOLA DE ADMINISTRAÇÃO DE EMPRESAS DE SÃO PAULO

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**INFORMATION TECHNOLOGY AND ORGANISATIONAL AGILITY: AN
EXPLORATORY STUDY OF THE INFLUENCE OF COGNITIVE CAPABILITIES ON
ORGANISATIONAL SENSE AND SEIZE DYNAMIC CAPABILITIES**

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Trabalho Aplicado apresentado à Escola de Administração de Empresas de São Paulo da Fundação Getulio Vargas como requisito para a obtenção do título de Mestre em Gestão para a Competitividade.

Linha de Pesquisa: Tecnologia da Informação.

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SÃO PAULO

2021

Garcia, Leandro Sanches.

Information technology and organisational agility : an exploratory study of the influence of cognitive capabilities on organisational sense and seize dynamic capabilities / Leandro Sanches Garcia. - 2021.

63 f.

Orientador: Otávio Próspero Sanchez.

Dissertação (mestrado profissional MPGC) – Fundação Getulio Vargas, Escola de Administração de Empresas de São Paulo.

1. Tecnologia da informação. 2. Processo decisório. 3. Capacidade executiva. 4. Desenvolvimento organizacional. 5. Cognição. I. Sanchez, Otávio Próspero. II. Dissertação (mestrado profissional MPGC) – Escola de Administração de Empresas de São Paulo. III. Fundação Getulio Vargas. IV. Título.

CDU 62::007

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Data de Aprovação:

_____ / _____ / _____

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AGRADECIMENTOS

Aos meus pais e todos os familiares, muito obrigado pelo apoio, pelo carinho e pela confiança em tudo que já vivenciei.

À querida Monique pelo apoio, carinho e força que me deu durante toda a caminhada do mestrado. Não tenho palavras suficientes para agradecê-la, muito obrigado por estar ao meu lado e me apoiar em todos os desafios que enfrentei nesse período.

À Maria Alice, que sempre traz luz e alegria às nossas vidas, luz que iluminou muitos momentos difíceis ao longo dessa jornada e me ajudou a chegar até aqui.

Ao professor Dr. Otávio Prospero Sanches pela orientação, contribuições no TA, profissionalismo e pela parceria ao longo dessa caminhada.

Aos professores Dr. Heverton Roberto de O. Cesar de Moraes e Dr. Marco Alexandre Terlizzi pela participação e contribuições na banca.

RESUMO

As organizações estão gradualmente se apoiando mais em inovações tecnológicas, como sistemas de informação, para garantir que gerenciem oportunidades e ameaças em seu ambiente. Isso destaca a importância das capacidades dinâmicas, como avaliar o contexto do ambiente e aproveitar oportunidades, que permitem às organizações gerenciar com eficácia novos desenvolvimentos em seu ambiente. Este estudo investiga a influência das capacidades cognitivas nas capacidades dinâmicas das organizações e, em última análise, avalia a influência desses componentes na agilidade organizacional. Quatro proposições são examinadas para garantir que o objetivo do estudo seja alcançado, incluindo a identificação sobre se há uma relação entre avaliar o contexto do ambiente e aproveitar oportunidades pode levar a agilidade organizacional. É realizado um estudo exploratório, que incluiu uma sessão de focus group com 7 participantes para obter uma visão mais abrangente das práticas organizacionais atuais dos participantes da pesquisa. Os resultados do estudo revelam que os tomadores de decisões nas organizações costumam usar 'hot cognition', como a aplicação da experiência ou conhecimento anterior, durante os processos de tomada de decisão. Além disso, a aplicação eficaz de elementos cognitivos foi identificada como uma das abordagens significativas para garantir que organizações permaneçam constantemente competitivas dentro de seus mercados. O estudo concluiu que existe, de fato, uma relação entre capacidades cognitivas, capacidades dinâmicas e agilidade organizacional. Portanto, considerando o panorama tecnológico atual em vários setores, as organizações precisam examinar suas abordagens atuais de tomada de decisão estratégica e determinar se há alguma limitação atual em suas capacidades dinâmicas.

Keywords: Cognitive Capabilities, Sense, Seize, Decision-Making, Organisational Agility

ABSTRACT

Organisations are gradually leaning more on technological innovations, such as information systems, to ensure that they manage unforeseen opportunities and threats within their environment. This highlights the significance of dynamic capabilities, such as sensing and seizing capabilities, which enable organisations to effectively manage new developments in their environment. This paper investigates the influence of cognitive capabilities on organisations' dynamic capabilities (i.e., sensing and seizing capabilities, and, ultimately, organisational agility). Four propositions are examined to ensure that the paper's objective is achieved, including identifying if there is a relationship between effective sensing and seizing capabilities and an organisation's agility. An exploratory study is conducted, which included a focus group session with 7 participants to gain a comprehensive insight into the current organisational practices of the research participants. The findings of the study reveal that organisations' decision-makers often use 'hot cognition', such as the application of previous experience or knowledge, during decision-making processes. Furthermore, the effective application of cognitive capabilities has been identified as one of the significant approaches to ensuring an organisation constantly remains competitive within its market. The study concluded that there is, indeed, a relationship between cognitive capabilities, dynamic capabilities, and organisational agility. Therefore, considering the current technological landscape in several industries, organisations need to examine their current strategic decision-making approaches and determine if there are any current limitations to their seizing and sensing capabilities.

Keywords: Cognitive Capabilities, Sense, Seize, Decision-Making, Organisational Agility

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Chapter 1. Introduction

Organisational agility is regarded as a significant competence for ensuring that an organisation remains competitive within an ambiguous and turbulent industry landscape (Mathiassen & Pries-Heje, 2006). Previous studies have referred to organisational agility as being primarily concerned with supporting strategic-level tasks of sensing and responding to both organisational and environmental changes (Lee *et al.*, 2015; Roberts & Grover, 2012; Sambamurthy *et al.*, 2003), however, an earlier study has found that organisations with strong agility can generate revenues that are 37% faster with profitability that is 30% higher than those of non-agile companies (Wang *et al.*, 2014). Thus, it is important that organisations constantly strive to be agile. However, to be agile, organisations have to incorporate various factors and processes effectively. The inability to achieve this could limit agility and impact organisations' performance within their market.

Tallon & Pinsonneault (2011) mention some of the factors that impact organisational agility as cognitive limitations, information technology, sensing, and seizing capabilities. The empirical study by Kappelman *et al.* (2019) also highlighted that IT positively benefits organisational agility. Similar studies indicate that information systems and technology are significant tools for the strategic revolution of an organisation (Ravichandran, 2018; Irfan *et al.*, 2019; Karimi-Alagheband & Rivard, 2019).

Additionally, knowledge management systems have been highlighted as a factor that can aid organisations in managing their dynamic capabilities and improving organisational agility. For instance, in a study focused on how to develop dynamic capabilities using organisational procedures, Kaefer & Salchenberger (2013) suggest that knowledge management facilitates the 'sensing' of technological opportunities in an organisation's external environment. The scholars add that organisational learning enables organisations to easily identify accessible knowledge and determine the most suitable technologies that will improve their organisational practices.

Asides information technology and these aforementioned factors, the influence of interrelating factors like cognition and sensing capabilities on organisational agility have been the subject of several studies, particularly within the field of information systems and information technology (Ngai *et al.*, 2011; Roberts & Grover, 2012; Lee *et al.*, 2015). Indeed, it is suggested in previous literature that the lack of cognitive capabilities could have a negative impact on the

sensing and seizing capabilities of organisations, by creating cognitive inertia and, consequently, limiting organisational agility (Hodgkinson & Healey, 2011).

Particularly, Hodgkinson & Healey (2011) suggest that organisations that combine cognitive capabilities with their sensing processes will probably not experience cognitive limitations or cognitive inertia during decision making. Cognitive inertia is referred to as taking actions or making decisions based on previous opinions (Hodgkinson & Wright, 2002). Thus, this indicates that the effective application of cognitive capabilities during decision making can aid in preventing the reliance on previous (possibly outdated) approaches to managing an organisation's agility. Rather, organisations are able to overcome over dedication to such procedures, and apply current, innovative, approaches (such as IT innovations) to ensure they remain competitive within their markets.

Some earlier studies have examined how to integrate the perceptions about human psychology, such as cognitive reasoning, to enhance the foundations of various organisational theories (Bateman and Zeithaml, 1989; Schwenk, 1984). It is also noted that some early research has focused on 'sensemaking', and the cognitive means of sensemaking (Bartunek, 1984; Bougon *et al.*, 1977; Weick, 1969). Weick *et al.* (2005) discuss sensemaking in the organisational context, stating that organisational sensemaking involves an interplay between individual and group sensemaking, through conversations and artefacts. Weick *et al.* (2005) add that this interplay supports the comprehension of new situations and translation into actions. Thus, if an organisation's sensing capabilities are flawed, they could hinder its ability to respond accurately to internal and external environmental cues and, therefore, compromise its agility (Arvidsson *et al.*, 2014).

Nonetheless, very little is found in the literature on the relationship between organisational agility and other significant factors, such as cognitive capabilities, sensing, or seizing capabilities. Tallon *et al.* (2019) add that there is very little research on how the lack of effective cognitive capabilities can influence organisations' sensing and seizing capabilities. Thus, this is the gap in the literature that this study aims to fill, as current theoretical models have not effectively highlighted and detailed the relationship between the major constructs of this study.

This study is based on the proposition that it is important to investigate the influence of factors, such as cognitive capabilities, on sensing capabilities, seizing capabilities, organisational agility, and the prevention of cognitive inertia. This could aid in further enhancing organisations'

agility in today's IT-centric world. Particularly, in line with previous studies by Hodgkinson & Healey (2011) and Helfat & Peteraf (2015), it is suggested the implementation of cognitive capabilities can improve the dynamic capabilities (i.e., sensing and seizing capabilities) of an organisation, thereby improving its agility. The study's findings will be beneficial to organisations, industry experts, and other academics.

The research question will aid in expanding the current research subject by proposing a process perspective of organisational agility, coupled with key insights from the dynamic capabilities' theory:

RQ: To what extent do organisations who rely on cognitive capabilities effectively sense and seize opportunities in their environment, thereby improving their agility and avoiding cognitive inertia?

This question is inspired by Tallon *et al.* (2019), who studied the implications of IT-based organisational agility, and Hodgkinson & Healey (2011), who studied organisational agility based on the psychological underpinnings of dynamic and cognitive capabilities, respectively. In this regard, this study aims to collect artefacts and further support this with primary data collected from a focus group session. Based on the analysis of collected data, this study suggests that effective sensing can reduce the discrepancies in individuals' perceptions and potential cognitive inertia.

The study's objective is to critically analyse the relationship between cognitive limitations, sensing and seizing capabilities, and ultimately, process agility. To achieve this objective, a focus group session will be conducted with industry experts to obtain first-hand knowledge about the current applications of cognitive skills in organisational practices. The primary data collected during the focus group will be analysed to identify if there are any relationships between an organisation's cognitive capabilities, sensing and seizing capabilities, and ultimately, its agility. The findings will include a comparative analysis with existing literature, to highlight newly established relationships between these factors or corroborate previous conclusions in the literature.

This study contributes to the existing literature by initially conducting an exploratory analysis to identify existing cognitive limitations and how organisations eliminate such limitations. Subsequently, the potential influence of cognitive capabilities on effective dynamic capabilities, particularly sensing and seizing capabilities, will be evaluated. This study also contributes to the discipline of IS and the wider field of IT by enriching the literature on the relationship between

sensing & seizing capabilities, cognitive limitations, and agility. Moreover, by analysing issues regarding organisational agility from a process and psychological perspective, this study suggests that sensing and seizing capabilities are influenced by the cognitive capabilities of an organisation and its employees.

It is expected that this research will help in the stimulation of scientific investigation and the generation of additional information on organisational agility. This research additionally points out the requirement for practising organisational agility in order to improve organisational performance and success. Organisational managers should be able to use its findings for enhancement of organisational agility.

The rest of this paper is structured as follows. The second chapter includes an outline of the literature on sensing and seizing capabilities, dynamic capabilities, and agility theories. The third chapter describes the research design and methodology of the study, including the justification for selecting the qualitative research methodology. Subsequent chapters provide an outline of the data analysis process and the conclusion section of the research.

Chapter 2. Literature Review and Theoretical Underpinnings

This chapter provides an outline of the literature on the organisational agility, cognitive capabilities and dynamic capabilities in organisations.

2.1. Theoretical Concepts for Organisational Agility

The theory of organisational agility has been examined in different academic fields (Tallon *et al.* 2019). Thus, there are a plethora of definitions for agility originating from different theoretical backgrounds. This research paper adopts the definition provided by the studies of Sambamurthy *et al.* (2003) and Tallon *et al.* (2019). They define agility as “the ability to detect and seize market opportunities with speed and surprise” (p. 221). Agility theory posits that agility emerges from organisational reaction to the needs for change. Agility, rather than directly affecting success actually moderates the negative impact of the need for change on success (Wufka & Ralph, 2015). The dynamic capability model (Teece, 2005) and the resource and capability model (Rosenbloom, 2000; Winter, 2000) are also used as the theoretical foundation of this research.

According to Sambamurthy *et al.* (2003), agility is enabled by the options provided through digital processes and knowledge residing in IT resources. Conversely, if IT resources are limited or altered, the digital processes and knowledge capabilities are also distorted which, in turn, can harm agility. Moreover, Kappelman *et al.* (2017) argue that past IT decisions can hinder agility through the lack of flexibility or business alignment. In a more recent study, Kappelman *et al.* (2019) show the ever-increasing importance of the role agility plays for IT-enabled organisations, and how it facilitates significant investments in forward-looking technologies, such as analytics or cloud computing, which help organisations exercise agility.

Building on this understanding of agility, Tallon *et al.* (2019) create the link between organisational agility literature and IT by examining the IT-enabled organisational agility literature between 2000 and 2018. The authors find that enablers of organisational agility range from technology enablers, behavioural, organisational, and structural, to environmental enablers. Particularly, when considering the behavioural studies related to organisational agility, previous works have considered the relationship between management practices, information technology, and sensing/seizing capabilities (Richard *et al.*, 2012; Tallon *et al.*, 2019). According to Tallon *et*

al. (2019), conducting a scan of their external environment aids organisations with sensing threats or opportunities in their environment. Subsequently, decision-makers or managers must select their best response to such opportunities or threats, and if they will invest any resources to ascertain they manage them suitably. Nonetheless, the decision-making process is not clear-cut because the expenditure related to information systems or IT investments often require managers' intuition. Thus, this introduces the use of cognitive capabilities by managers, particularly when making decisions about their companies' performance and agility. Thus, as part of the viewpoint whereby agility is thought of strategically, Tallon *et al.* (2019) suggest the creation of an agile information organisation that would help avoid what Van Oosterhout *et al.* (2006) call agility gaps, caused by either excessive or insufficient agility.

Drawing on the work of Marchand *et al.* (2000), Mithas *et al.* (2011) highlight the significance of having an in-depth understanding of the connections between different factors of a firm's performance, and which factors serve as facilitators for enhanced performance. Other potential benefits include enhanced decision-making processes, as organisations are equipped with the required balance of knowledge and experience during their decision-making processes. Furthermore, organisations can easily sense opportunities and threats within their environment, and effectively manage such factors. This enables them to gain a competitive edge with their industry sector, through enhanced organisational agility (Hodgkinson & Healey, 2011). Thus, combining all these factors, it can be deduced that organisational capabilities influence organisations' performance, while information management capabilities provide an essential platform and facilitate the development of enhanced organisational agility (Mithas *et al.*, 2011).

Also considering the impact of cognitive capabilities on decision-making in organisations, the capability maturity model by Paulk *et al.* (1994) suggests that managerial systems are often related to cognitive functions in an organisation. Organisations constantly conduct processes, such as decision making, planning and innovative implementations to achieve their objectives. Organisations are constantly searching for new opportunities in their environment to ensure they remain competitive within their markets. Being able to effectively connect with their environment would ensure that such businesses can achieve these goals, while also enhancing their agility.

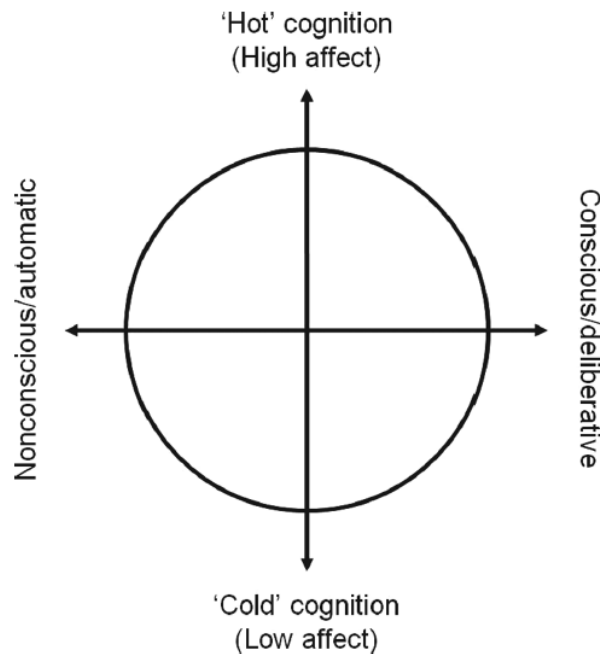
Furthermore, in their study on Psychological Foundations of Dynamic Capabilities, Hodgkinson & Healey (2011) introduced the terms 'hot cognition' and 'cold cognition'. The researchers proposed that organisations whose managers adopt 'hot cognition' (i.e., integrate

affective indicators and procedures focused on mental models and psychologically reassuring processes with their sensing practices) will probably not experience cognitive blindness or inertia, and can easily apply their dynamic capabilities to sense and seize opportunities in their environment. In contrast, organisations that adopt ‘cold cognition’ (i.e., mental models without psychologically reassuring processes) will probably experience cognitive inertia.

Hot cognition has been hypothesised as a condition of motivated reasoning, where the thinking of a person is shaped and influenced by his or her emotional condition; to simplify hot cognition is sensed by the emotion experienced by an individual. Cold cognition conversely represents the cognitive processing of information and data that is not influenced by and is independent of emotional involvement (Madrigal, 2008). Goel and Vartanian (2011) stated that hot cognition is likely to be associated with physiological and cognitive awareness, wherein an individual becomes responsive to diverse emotional factors. It could on many occasions be rapid and may thus result in biased decision making. Cold cognition, on the other hand, is likely to result in decisions that are based upon critical analysis and logic. The stimulus in such cognition should be emotionally neutral and the outcome is likely to be irrelevant personally to the individual; focusing on evidence before coming to a conclusion is an example of cold cognition (Madrigal, 2008). Research has revealed that entrepreneurs were reasonably adept with hot and cold cognition, Hot cognition helped them in quickly generating solutions, which could be associated with risk, whereas cold cognitive planning provided them with the ability to solve problems with considerable swiftness (Goel & Vartanian, 2011). Managers, on the other hand, did not appear to have cognitive flexibility and were thus less adept at generating solutions to challenges with the same amount of competence.

Hodgkinson & Healey’s (2011) cognitive model is shown in Figure 1 below:

Figure. 1 – The fundamental aspects of strategic cognition



Source: Hodgkinson & Healey (2011)

This figure specifically informs the differences between hot and cold cognition in terms of their conscious/non-conscious and deliberative/automatic factors.

2.2. Cognitive Capabilities in Organisations

Cognitive capabilities refer to the capacity for processing, comprehending and manipulating information, i.e., the ability for learning. Whilst the study of cognitive abilities has carried on for decades, the interest of researchers has focused on two specific themes, namely the structure of cognitive capabilities and the effect of differences of cognitive capabilities on outcomes (Hodgkinson & Wright, 2002). John Carroll (1993) analysed 400 datasets over several years to show that cognitive capabilities could be described by a hierarchical model with three levels, namely a single general cognitive ability factor, below which exists a small number of narrow abilities. These, in turn, sit on top of a large number of task specific abilities. There is also considerable data to show that differences in cognitive capabilities can considerably affect the

quality of decision-making processes and outcomes. High levels of cognitive ability certainly help in the making of better informed and more appropriate decisions than otherwise.

The concept of cognitive capability in organisations is drawn from the perspective of the Upper Echelon, which states that decisions made by senior executives affect strategic choices, actions and outcomes (Hodgkinson & Healey, 2011). These decisions are furthermore considerably influenced by organisational cognitive capabilities. Research has also shown that organisations that are in the process of change need higher levels of cognitive capabilities than others. Organisational capacity for change, in fact, mediates the influence of cognitive capabilities on organisational performance (Hodgkinson & Wright, 2002).

Strategic management research has often investigated the reasons for some companies to perform better than others. Hodgkinson and Clarke (2007) informed that cognitive capabilities could help in explaining the reasons for some organisations having better capabilities in the anticipation, interpretation and response to the demands of a changing and evolving environment than others. Cognitive capability is considered to be a key factor in influencing the ways in which organisations make strategic changes and adapt to dynamic situations (Carroll, 1993).

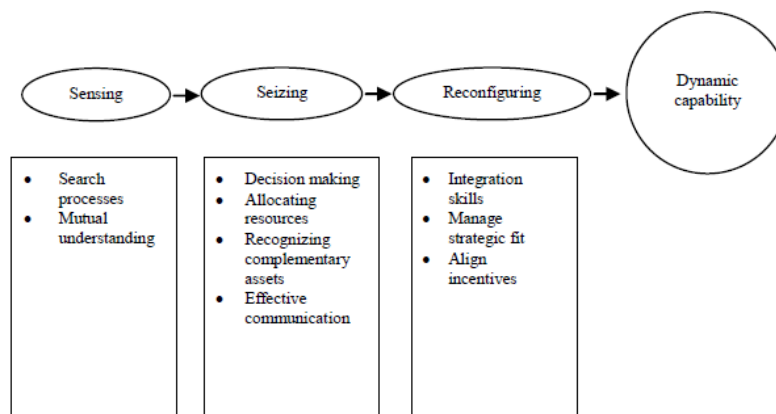
Cognitive inertia is associated with the tendency for the endurance of beliefs after their formation. Cognitive inertia specifically relates to the individual and joint tendency to depend upon familiar assumptions and display reluctance or the lack of ability to revise such assumptions, even when evidence tends to query their accuracy (Hodgkinson & Clarke, 2007). It constitutes a barrier to organisational change and influences managers in failing to update and change their comprehension of a situation even after the alteration of the situation.

2.3. Dynamic Capabilities and Sensing Capabilities

Central to agility is the sensing capabilities introduced by Teece (2007) to determine the pre-requisites of superior business performance. Teece (2007) defines dynamic capabilities as “the distinct skills, processes, procedures, organisational structures, decision rules, and disciplines – which undergird enterprise-level sensing, seizing, and reconfiguring capacities” (p. 1319). As previously mentioned, Teece (2007) suggested general dynamic capabilities, which are fundamental to the agility and economic strength of firms. These include the capability to sense opportunities and threats, to seize opportunities, and to subsequently restructure resources to

sustain a competitive advantage. Thus, sensing capabilities refer to conducting searches and studying technologies and the external environment of an organisation and being able to understand events in a specific environment or context (Hodgkinson & Healey, 2011). This includes market sensing capability representing the ability to determine new market requirements trends. On the other hand, seizing requires the use of valuable, dependable, investment decisions, including decisions on the best IT systems or information systems for an organisation (Teece, 2007). Lastly, restructuring capability refers to being able to constantly renovate an organisation in response to industry and technological developments, to ensure it remains agile and competitive. However, both, sensing and seizing capabilities can be influenced by cognitive limitations, which may result in an impairment of developing dynamic capabilities for the firm (Tallon *et al.*, 2019). This is further highlighted in the figure below:

Figure. 2 – Sensing, Seizing, and Reconfiguration Processes



Source: Kaefer & Salchenberger (2013)

As shown in Figure 2, sensing, seizing and reconfiguration are all interlined dynamic capabilities of an organisation (Kaefer & Salchenberger, 2012). Similarly, Teece (2018) contends that dynamic capabilities often facilitate the generation and seizing of value in organisations, through the creation of suitable organisational models.

Sharing a similar viewpoint to Teece (2007; 2018), Gavetti (2005) states that the capability to revise the psychological interpretations (i.e., cognitive charts or schemas) of an organisation's

decision in reaction to any developments within its external environment is a vital sensing ability. However, the dynamic aspect of the capabilities described in Teece's (2007) model is derived not only from the ever-changing environment, but also from the fact that they can be developed to "continuously create, extend, upgrade, protect, and keep relevant the enterprise's unique asset base" (p. 1319). This means that the cognitive processes of harnessing the capabilities of a firm include, but are not limited to, sensing capabilities, since they also include seizing opportunities and maintaining competitiveness.

Successful sensing also needs the growth of a mentally secure learning environment, which considers affective indications and in-built cognitions, while also facilitating premeditated processing (Brown *et al.*, 2015). Liang *et al.* (2017) state that intellectual orientation (i.e., the balance between organisational strategy and IT) and social orientation (i.e., the balance between business stakeholders and IT) do not have a direct influence on agility. Rather, the influence of intellectual orientation on agility is completely facilitated by apathy or cognition. Any potential dissension between groups and individuals should indicate the requirement to reconsider and merge conflicting understandings of strategic occurrences (Hodgkinson & Healey, 2011).

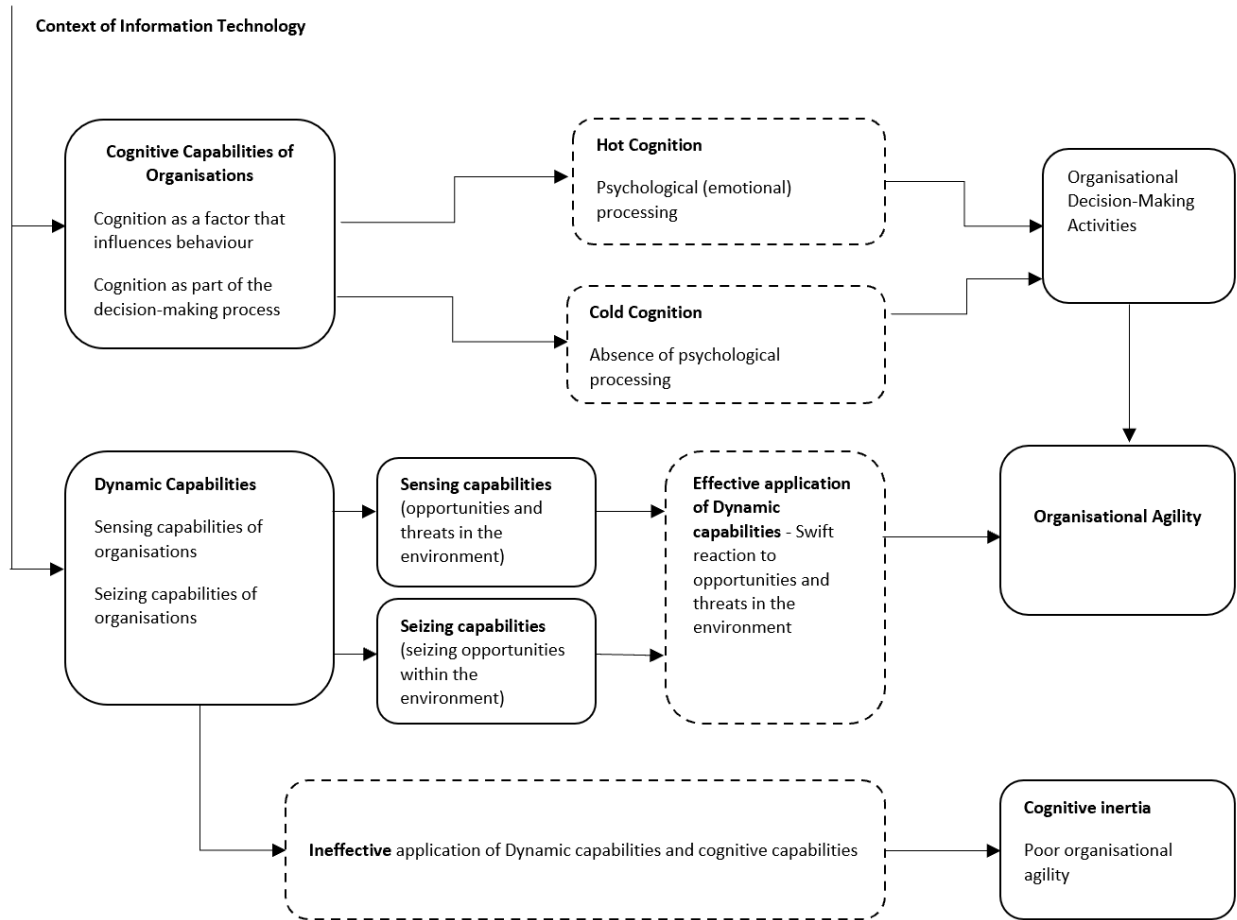
2.4 The Conceptual Model

Considering the micro-underpinnings of dynamic capabilities in various forms, Teece (2007) suggested that cognition aids in 'sensing', 'seizing', and 'reconfiguring' the elements of dynamic capabilities. Though Teece (2007) was focused on organisation-level activities for sensing and seizing, the researcher also recognises that managers' cognition influences the dynamic capabilities of organisations. Building on Teece's (2007) work, Helfat & Peteraf (2015) highlight that managers' dynamic capabilities can be classified into sensing, seizing, and reconfiguring elements, all of which play significant roles in enhancing an organisation's cognitive capabilities. Hodgkinson & Haeley (2011) also argue that dynamic capabilities depend on a combination of analytical skills and the capable use of cognitive developments, which allows businesses and decision-makers to harness their cognitive capabilities. On the other hand, according to Arvidsson *et al.* (2014), a business's inability to attain its strategic goals can be related to the lack of understanding of its IT-based imbalance or the lack of cognitive capabilities.

As already stated in the previous chapter, organisational agility has also been studied in relation to several factors. Firstly, considering the link between information technology and agility, previous studies have highlighted that there is a positive relationship between organisational agility and information technology. For instance, in a study on IT and Agility in the Social Enterprises, Richardson et al. (2014) concluded that an enterprise's investment in IT often results in a technological platform that supports improved agility. Other studies, such as the studies by Sambamurthy et al. (2003), Ngai et al. (2011), and Robert & Grover (2012), have also emphasised and debated the influence of information technology on organisational agility. With a different viewpoint, Tallon et al. (2019) suggest that the implementation of innovations like information technology is often influenced by a wide range of factors, including an organisation's sensing and seizing capabilities, as well as its cognitive capabilities.

These factors could provide an insight into why organisations cannot effectively adopt or react (sense and seize) opportunities in their environment. Considering these viewpoints, this study will analyse whether the effective application of cognitive capabilities can have a positive impact on an organisation's dynamic capabilities. Accordingly, this study's conceptual model has been derived from the proposed research objectives and analytical approach. It is illustrated in Figure 4 below:

Figure. 3 – Conceptual Model



In line with the conceptual model, the following four propositions are examined during the study:

2.4.1 The Influence of effective application of Cognitive Capabilities on Cognitive Inertia

Proposition 1: Organisations whose decision makers implement ‘hot cognition’ will probably not experience cognitive inertia, unlike others who adopt ‘cold cognition’.

According to Tallon et al. (2019), organisational agility is not a stand-alone feature. Rather, it is influenced by various factors, including IT capabilities and resources. Therefore, a feature of examining organisational agility is understanding that sensing is influenced by cognitive factors, notwithstanding the functionalities offered by IT. Another approach for integrating intuition with sensing capabilities include the design of decision-making processes to include the essential

combination of individuals with analytic and intuitive cognitive techniques (Hodgkinson & Clarke, 2007).

Hot cognition, which entails the use of emotion and other psychological processes, is likely to keep organisational managers aware and abreast of recent developments, thereby resulting in the avoidance of experiencing cognitive inertia or blindness. The adoption of cold cognition is, however, independent of any sort of psychological process with sensing practice and could result in the continuation of established ways of thought and thinking, even in a changed situation (Madrigal, 2008).

Indeed, in the current technological and infrastructural landscape, managers must understand that IT offers a wider range of capabilities, which could positively influence their organisational agility (Agerfalk et al., 2009). It is also possible to integrate intuition through sensing capabilities with the use of IT systems. However, this will require a review of the function of information technologies and how such technologies facilitate organisational processes (Teece, 2007).

2.4.2 The Influence of Cognitive Capabilities on Sensing and Seizing Capabilities

Proposition 2: The application of cognitive capabilities and emotional dedication to new investment opportunities are positively linked with improved sense and seize capabilities and, ultimately, organisational agility.

Psychological studies, such as the study by Gilovich et al. (2002), state that behavioural prejudices like over dedication to existing processes are often generated from natural processes. However, this suggests that organisations that are not ‘over dedicated’, but, rather, dedicated to their processes could experience improved dynamic capabilities.

Teece (2007) proved that two key psychological obstacles can weaken seizing capabilities. First, organisations should be able to examine opportunities and threats that are sensed in their environment using a quick, well-timed, and proactive approach. Secondly, to be able to effectively apply their seizing capabilities, organisations should be able to resolve undesirable preoccupations with current strategies, thereby preventing decisional prejudice, inertia, and strategic redundancy. However, in an earlier study, Henderson and Clark (1990) suggest that organisations tend to ignore

ground-breaking investment alternatives and prefer incremental upgrades to enhance their current competencies.

Considering the role of IT in dedication to new investment opportunities, Roberts & Grover (2012) discovered that an organisation's IT infrastructure can allow it to sense and react to customer demands efficiently, thereby improving its agility. Thus, the ability to sense opportunities and respond to change requires a certain level of data quality in addition to complex infrastructure. Tallon & Pinsonneault (2011) contended that an organisation's strategic IT positioning will influence its agility, and this relationship can be controlled by its IT flexibility. Accordingly, the factors that result in misunderstanding, oversight, and misrepresentation of environmental signals by strategic managers can also influence the decisions of managers who have the role of sensing the requirement for strategic transformation in their organisation.

Also, Frederick (2005) suggested a cognitive reflection evaluation that can be used to assess the level to which decision-makers use automatic or controlled processing when making decisions. The researchers discovered that managers who depend on controlled psychological processing (with higher cognitive thinking) are inclined to consider the potential revenues of implementing innovative developments, with lower levels of prejudices towards the risks of such projects. Similarly, Teece (2007) mentions that conquering prejudices often requires a cognitively modern and methodical process for decision making. Thus, controlled mental processing aids in reducing prejudices during decision-making (Helfat & Peteraf, 2015). Accordingly, Hodgkinson and Healey (2011) suggest that organisations that promote emotional dedication to new investment opportunities have a higher probability of seizing such opportunities in their external environment.

2.4.3 The Influence of Cognitive Limitations on Organisational Agility

Proposition 3: Cognitive limitations related to over-dedication to existing processes have a negative impact on sensing and seizing capabilities and, ultimately, organisational agility.

According to Hodgkinson and Healey (2011), a major prejudice that prevents this process is the potential increase of dedication, the inclination to expend a lot of resources to aid unsuccessful ventures and rationalise previous choices. Decision-makers also depend on

streamlined mental models to organise their opinions and understand their environment (Gary and Wood, 2011). Therefore, studies related to psychological factors have identified that insights, information processing, decision-making, challenge solving, opinion, and learning are influenced by cognitive depictions and sensed models of experience (Rehder, 2003; Anderson, 2015).

Wong *et al.* (2008) add that individuals who adopt reasonable thinking approaches (i.e., effortful, methodical thinking) are mostly inclined to this intensified feeling, as they experience the pressure for justification more strongly. Hodgkinson and Healey (2011) discuss an approach for resolving the underlying emotional origins of intensification (or escalation) and associated decision prejudices. For instance, encouraging negative effect during deliberations about reinvesting in an already unsuccessful process lessens escalation, as decision-makers lower their dedication to prevent potential disappointment and the concern related to the mounting expenses (Wong *et al.*, 2006). However, Hodgkinson and Healey (2011) propose that the higher the probability of a strategic decision maker's inclination to integrate relevant negative affectivity related to existing processes, the lesser the probability of being a victim of over dedication and the associated decision issues.

2.4.4 The Influence of Sensing and Seizing Capabilities on Organisational Agility

Proposition 4: Sensing and seizing capabilities positively influence organisational agility because organisation with sensing capabilities can effectively identify and react to opportunities and threats.

Organisational agility refers to the ability to detect and seize market opportunities with speed and surprise (Lowry *et al.*, 2016; Tallon *et al.*, 2019), an organisation's capability to sense changes within its environment, and respond quickly and effortlessly (Bradley *et al.*, 2012), or the level to which an organisation's IT capabilities aid in its search for strategic business prospects and opportunities (Tiwana & Kim, 2015). The studies by Haas (2006), Tong *et al.* (2015), and Jerkin *et al.* (2019) show how sensing and sensemaking processes can provide for the development and management of different support structures to help overcome sensing limitations and improve organisations' performance. Similarly, Park *et al.* (2017) suggest that technology, by itself, could be less impactful on sensing, decision-making processes, or organisational agility. Rather, the

researchers suggest the combination of technology with effective sensing of both organisational and environmental factors could have a beneficial influence on an organisation's agility.

Considering these propositions, this study proposes that the effective application of dynamic capabilities, particularly sensing and seizing capabilities, often results in improved organisational agility.

Chapter 3. Methodology

3.1. Research Method

This study adopts a qualitative research method based on the primary data collected from focus group discussions and subsequent analysis of discourse. This research method is selected because it facilitates the study of new constructs, which have not been studied comprehensively in previous research (Edmondson *et al.*, 2007; Venkatesh *et al.*, 2013). In their study on IT and the search for organisational agility, Tallon *et al.* (2019) has highlighted the subject of cognition as one of the new theories related to organisational agility, which should be further research in future studies. Accordingly, this study aims to develop this suggestion by conducting an additional evaluation of the research subject. Furthermore, according to Lee & Hubona (2009), qualitative research offers dependability and uniformity of findings, as it enables researchers to develop rich descriptions of their research area, conduct robust data collection processes, effective data analysis, and provide dependable data findings. Sensing capabilities are often interpreted using both the internal processes of an organisation and its environmental framework (Torres *et al.*, 2018). According to Hodgkinson & Healey (2011), a comprehensive qualitative analysis can be used to buttress large-scale studies, by highlighting the processes used by organisations that could either prevent or facilitate affective signs and cognition during sensemaking activities.

Therefore, the primary data related to this research area can be effectively collected using the qualitative research method (Edmondson *et al.*, 2007). Four propositions are constructed using rational arguments that are developed based on the propositions discussed in the study by Hodgkinson & Healey (2011). These propositions will be further highlighted in the next chapter of the study. Drawing from literature, this research highlights the need to develop a logical overview of the relationship between the research's constructs, and determine if there is, indeed, any relationship between features such as cognitive capabilities, cognitive inertia, sensing capabilities, seizing capabilities, and organisational agility. This research project accordingly aims to examine (1) the role of hot and cold cognition in cognitive inertia, (2) the utility of applying cognitive capabilities, along with the emotional dedication to new investment opportunities and their linkages with organisational agility, (3) the role of over dedication to existing processes in impeding organisational agility and (4) the use of sensing and seizing capabilities on organisational performance.

3.2. Data Collection

Primary data is collected using the data collection method known as the ‘focus group’. Qualitative focus group sessions aid in exploring the opinions, experiences, attitudes, and/or rationales of individuals on certain issues (such as factors that influence their sensing in this study) (Ochieng et al., 2018). Also, focus groups offer a researcher the opportunity to conduct less structured group discussions, which can be monitored, directed, and recorded (Ochieng et al., 2018). Furthermore, Butler et al. (2010) and Saunders et al. (2012) encourage the use of qualitative research methods like focus groups, as these methods facilitate the collection of thorough and valuable research data.

Seven respondents were chosen on the basis of their experience in the IT sector at the executive, technical and managerial level. The sampling method used was purposive in nature, as is commonly used in qualitative research. It was felt that information from seven carefully selected respondents would result in the required amount of data and would furthermore be quite manageable (Bryman, 2004).

The research’s objectives and questions are evaluated using the data collected through the selected data collection method. The focus group session will include 20 questions as form to guide de discussion, which are detailed in Appendix 1. Questions are grouped into 5 sections, including (1) participants’ background information, (2) the relationship between the effective application of cognitive capabilities and reduced cognitive inertia, (3) the influence of cognitive capabilities or limitations on sensing and seizing capabilities, (4) the influence of cognitive limitations on organisational agility, and (5) the influence of effective sensing and seizing capabilities on organisational agility. The questions are focused on measuring participants’ opinions about the research constructs and collecting information about their organisations.

Ethical issues were also considered during data collection. The identities of respondents of the focus group are kept confidential and undisclosed to third parties. The study ensures participants’ anonymity was maintained by eliminating any personal information or their organisations’ confidential information from the research data. Therefore, participants are renamed as Participants 1-7 to ensure anonymity. Also, the research participants are asked to sign a form confirming that they understand the study’s objectives and they will share their honest views. Their privacy is also considered during the study, and the collected primary data is treated carefully, with no information is disclosed to third parties.

3.3. The Focus Group Guide

An interview instrument was adopted to guide the focus group session. Questions were written using a checklist with a group of questions for evaluating each proposition. However, the questions were not limited to a strict or particular order. The research ensured that there was a sequence of questions that could be asked based on participants' response or discussions. Regularly, questions were asked that were applicable to participants' roles and their experience of making significant decisions in their organisations. Also, the interviewer continuously checked the set questions during the session, to ensure that none were overlooked or left unanswered. The complete process for the focus group discussion, from beginning to end took place over a period of 2 weeks.

The stages of the focus group guide are further listed below:

Stage 1: Share consent letters with focus group participants and ensure that they understand the objectives of the study prior to consenting to partake in the focus group session.

Stage 2: This stage entails asking participants to introduce themselves. Background information about their job role and length of experience is also collected during this stage.

Questions include:

- What is your role in your organisation?
- What is the decision-making process for your organisation?

Stage 3: The researcher reiterated the objectives of the project, and then the questions (focused on the aforementioned four propositions) are asked.

Stage 4: All participants are given a chance to express their opinions, and the researcher ensured that the discussions were not interrupted or paused during the session.

Stage 5: Based on focus group participants' responses, the interviewer asked sub-questions to ensure that answers were clearly understood and not ambiguous.

3.4. Interviewees' Profile

The focus group will comprise of 7 industry experts who can provide further insight into the research's objectives. These group of interviewees have been carefully selected due to their level of experience working in the IT sector. Participants had between 5 and 16 years of experience, and all participants were decision-makers in their organisations. This aided with gaining a

comprehensive insight into the decision-making process of their organisations, and how cognitive capabilities influence these processes. Companies in the information system sector have been invited to participate in the focus group session, and the study's sample is composed of IS stakeholders at the executive level, technical personnel, and management staff based on the researcher's network of professionals, and from a pool of other professionals who are experienced in similar fields. Evaluating organisational agility requires well-informed organisational experts who have gained enough business knowledge to correctly report on the influence of cognitive limitations on their organisation's agility. Dynamic capabilities (particularly sensing and seizing capabilities) are measured through the perceptions of IS stakeholders about how both individual and firm-level cognition affects the sensing and seizing capabilities of their organisation, and how these factors influence their organisation's agility.

The study's findings are structured to answer the research question and examine the research's propositions. Considering that the research aims to determine to what extent organisations who rely on cognitive capabilities effectively sense and seize opportunities in their environment, these group of interviewees were selected to ensure that the primary data collected will offer insight into how their organisation's decision-making process is conducted, and the resulting effect of any cognitive capabilities applied during such a process. Selecting interviewees from the information system sector is also relevant, as the study also considers the underlying impact of information technology on the highlighted factors. Therefore, the criteria for choosing respondents were to search for respondents who were both stakeholders of IS organisations, and who also have adequate knowledge about their organisations' decision-making processes. As a result, the participants were able to provide a comprehensive insight into the influence of cognition on sensing, seizing capabilities, and organisational agility, based on their practical knowledge about these research constructs.

Table 1 – Participants’ background information, including their roles and years of experience

	No of employees in the organisation	Market Sector	Country	Years of Experience	Participant’s Role
Cognitive Limitations, Sensing Capabilities, Seizing Capabilities, and Organisational	Focus Group				
	≥46,000	Financial Market	Brazil	13 years	Tech. Leader
	≥50,000	Information Technology	Brazil	5 years	Tech. Leader
	≥105,000	Biotechnology	Brazil	16 years	Group Product Manager
	≥9,000	Entertainment	Brazil	10 years	Tech Compliance Coordinator
	≥40,000	Financial Market	Brazil	10 years	Tech. Lead
	≥110,000	Biotechnology and Chemicals	Brazil	8 years	Product Insights Manager
	≥4,000	Information Technology	Brazil	10 years	IT Manager

3.5. Data Analysis

The relationship between the research’s constructs is evaluated using the data collected from the research participants. The inductive research approach is adopted, which entails the evaluation of data with relatively little or no pre-set theory, model, or framework (Burnard *et al.*, 2008). The primary data is examined using thematic content analysis, which is used to determine the relationships between variables and, thus, to test the study’s proposition. Particularly, the thematic content analytical method is used to assess the primary data, which is based on the grounded theory (Leech & Onwuegbuzie, 2008). Thematic analysis refers to the process of examining transcripts, finding themes within collected data, and using these themes to create inferences and conclusions. Both the primary and secondary data are evaluated concurrently, using five steps (Walsh *et al.*, 2019).

The data analysis process begins with the initial collection of primary data from a focus group session. The questions asked during the focus group session were initially pre-set in line with the study’s proposition, and this aligned with the created categories during content analysis. These categories are further discussed in the analysis chapter.

The focus group session is recorded, to ensure that all participants' discussions and opinions are captured accurately. Due to the current Covid-19 pandemic and its related restrictions, the focus group session is not conducted in-person. Rather, the session is conducted using an online tool for moderating focus group discussions, from the website - (<https://focusgroupit.com/>). The researcher posed questions to the group of respondents using this platform and subsequently recorded and monitored their discussions. All participants were asked an equal number of questions. The questions were classed into 5 sections. The first section asked questions about their background and subsequently, participants were asked questions based on this study's propositions. The first set of questions were focused on determining if organisations whose decision-makers implement cognitive capabilities can effectively prevent any form of cognitive limitations or inertia. Subsequent sections focused on the relationship between cognitive capabilities and sensing and seizing capabilities and, ultimately, organisational process agility (see Appendix for the focus group questions).

Upon completion of the data collection processes, the collected data is transcribed, while ensuring that participants' opinions are accurately written down. Subsequently, the researcher read the transcripts to be well versed with its contents and understand the primary data before the data analysis stage started. All participants' answers were also converged for ease of analysis, and to ensure a streamlined data analysis, since similar opinions could be grouped together. During this stage, the major themes of the research are developed. This includes the development of a thematic outline. Based on the research questions and propositions, the researcher codes the data using specific themes to ensure accurate analysis. Coding refers to the process of tagging similar data constructs. Subsequently, any redundant data is eliminated, while the identified themes are analysed to identify potential relationships between data constructs. Based on these themes, a thematic outline is created, and subsequently, the data is analysed using this outline. Lastly, conclusions are drawn based on the study's findings. The created data themes are listed in the next subsection.

3.5.1 Thematic Coding of Primary Data

Initially, the primary data is tagged by the researcher. This created data tags, with major themes including:

1. Perceptions about how the effective application of cognitive capabilities can prevent cognitive inertia.
2. Perceptions about the influence of organisations' cognitive capabilities/limitations on sensing and seizing capabilities.
3. Perceptions about the influence of effective sensing and seizing capabilities on organisational agility.

Chapter 4. Results and Discussion

The collected primary data from the focus group is coded and arranged into themes that align with the research question and propositions. Subsequently, these themes are evaluated and comparatively assessed with previous literature. The findings from the data analysis stage are further discussed in this chapter.

4.1 The Influence of Effective Application of Cognitive Capabilities on Cognitive Inertia

Proposition 1: Organisations whose decision makers implement ‘hot cognition’ will probably not experience cognitive inertia, unlike others who adopt ‘cold cognition’.

To further investigate the school of thought by researchers, such as Tallon et al. (2019), who suggest that organisational agility is not a stand-alone feature, the initial set of questions asked during the focus group session were focused on determining if decision-makers’ cognitive capabilities influenced their organisations’ agility, create cognitive inertia, which has a negative influence on sensing and seizing capabilities. The focus group participants had some influence in different decision-making processes in their organisations as shown in Table 2 below:

Table 2 – Participants’ Decision-Making Roles

Participants	Decision-Making Role
1	Decision on the operational flow of new products within the organization and the architecture of the software solutions
2	Software architecture, technologies and integrated solutions
3	Commission leadership team - Help the organisation to build the product strategy and vision across the several product teams
4	Every Employee can make up decisions without prior authorisation
5	Discussion of items feasibility added to BoW
6	Product analytics and metrics following the product vision set by the senior product management
7	Project decisions and people management

This study suggests that organisations that practice hot cognition often perform better and gain competitive advantages within their industry. When asked if, as decision-makers, participants

often apply their previous experience (a form of hot cognition) during their decision-making processes, most participants ($\approx 70\%$) indicated that they use their previous knowledge and experience when making decisions, with Participant 2 stating:

Participant 2: “Regarding previous experiences, I understand that I usually use this prior knowledge mainly to evaluate possible threats or software failures.”

This viewpoint aligns with those stated by Hodgkinson & Healey (2011), who propose that organisations that integrate intuition with their sensing capabilities can efficiently identify and react to opportunities and threats, unlike their counterparts who only depend on analytic processes. Furthermore, as to Sia *et al.* (2016) states, it is essential to identify the continuing trend of digital organisational transformation, and how IT capabilities influence such trends. Being able to combine their previous experience/knowledge with development within their market environment offers organisations the opportunity to develop a competitive edge within their industry. Other participants offered differing opinions. For instance, in response to the question regarding how often participants use their previous experience and knowledge about IT innovations when examining their organisation’s external environment, Participant 1, who has 13 years of experience working as a Tech Leader in a company within the Financial Sector, stated:

Participant 1: “Unfortunately, these moments are rare in my organisation, the focus of IT is seen only as to support the business and most projects aim only to support the current platform, being purely reactive to the market and regulatory environment. For the record, our leaders do not create barriers to innovations, but as we have a small team, daily tasks consume all of our time making us miss opportunities for innovation”.

This contradicts the initial proposition that the application of hot cognition (e.g., previous experience) during decision-making could aid in effective sensing and seizing of opportunities within an organisation’s experiences. Nonetheless, according to Conboy (2009), besides from considering how organisational agility can support IT innovations, it is also essential to consider how IT innovations can be used to improve organisational agility. Thus, a potential downside of not applying such innovations or cognitive capabilities during decision making is cognitive inertia, which includes the inability to effectively sense threats in an organisation’s environment, with a detrimental influence on an organisation’s performance (Tallon *et al.*, 2019).

Considering ‘hot cognition’, this study attempted to highlight the importance of cognition in organisational practices, particularly cognitive inertia. Accordingly, participants were

subsequently asked additional questions related to their decision-making process, to determine if their implementation of cognitive-related practices has aided in ensuring that they do not experience cognitive inertia, and swiftly sense opportunities and threats. Participants indicated that they encourage new ideas and innovative solutions from their stakeholders:

Participant 7: “Yes, this kind of initiative is one of the pillars of the organisation’s culture”.

And

Participant 3: “Absolutely, nowadays the organisations must think out of the box in order to come up with new business models and ideas”.

However, other participants expressed differing opinions, including:

Participant 5: “Yes, whenever we have to create new solutions that requires more development, we try to use new ideas to solve it. However, on most cases, due to time constraints as well pressure from business this isn’t possible”.

The majority of the focus group participants ($\approx 86\%$) also indicated that they quickly identify the value of technological innovations for already existing systems, with Participants 5 and 7 stating that they often use innovations to enhance existing systems and processes. On the other hand, ($\approx 14\%$) indicated otherwise, and according to Participant 2:

“Not very often, although we use previous knowledge in new projects, in existing systems we do not always have time to think about innovations”

When asked if participants resolve challenges and avoid cognitive inertia by adopting a ‘hot’ cognitive approach, most participants ($\approx 85\%$) stated that they often use both hot and cold cognition, while Participant 4 stated:

“I value hot cognition over cold cognition”

And Participant 3, who is a Group Product Manager with over 13 years working in a Biotechnology company, stated:

“It’s important to highlight that a real experience takes heed of distinguished scenarios and situations already witnessed. All in all, it has proven to be more useful than data given the predictability of the outcome”

On the other hand, some participants ($\approx 15\%$) indicated that they do not employ any form of hot cognition, and Participant 2 stated that:

“No. Decision making, especially for innovations, is preferable based on data”.

Some of these findings align with the findings by Teece (2007), who proposed that an organisation needs a cognitively advanced and methodical attitude to decision making, to ensure that it resolves any form of prejudices and perform successfully in its market. Therefore, effectively overcoming cognitive challenges, and applying appropriate sensing capabilities to organisational decisions would aid an organisation in improving its performance and maintaining a competitive edge within its market (Hodgkinson and Healey, 2011). On the other hand, the viewpoints by participants, such as Participant 1, are also similar to those expressed in an early study by Gilovich et al. (2002), who discovered that behavioural prejudices like over dedication to existing processes are often generated from natural processes. Based on this viewpoint, it can be deduced that an increase in over dedication and its associated challenges can have an adverse influence on organisational performance (Hodgkinson & Wright, 2002). This suggests that organisations' decision-makers need to implement more systematic information processing methods, which can be considered 'cold cognition'.

Nonetheless, as suggested by Hodgkinson & Clarke (2007), intuition can be integrated with sensing capabilities by designing decision making processes so that they have the necessary combination of individuals with rational and instinctive cognitive approaches. Primary information from the selected respondents on the efficacy of hot cognition on the improvement of organisational agility thus appears to be mixed.

4.2. The Influence of Cognitive Capabilities on Sensing and Seizing Capabilities

Proposition 2: The application of cognitive capabilities and emotional dedication to new investment opportunities are positively linked with improved sense and seize capabilities and, ultimately, organisational agility.

The focus group participants were asked how quickly they make decisions about the opportunities and threats in their organisation's environment. In response, the majority of the participants indicated that they swiftly make decisions about the best course of action to manage opportunities and threats in their organisation's environment, and that dedication to new opportunities offer a wide range of benefits. According to Participant 7:

“We aim to reach a tactical decision, which can be immediately implemented, as soon as possible, in order to not lose the opportunity window, while working on a strategic solution for the long term.”

Similarly, Participant 2, who has 5 years of experience working as a Tech. leader in an Information Technology company, states:

“For threats we need a quick decision-making process. For new opportunities the process is a little slower and more bureaucratic”.

These viewpoints align with those of Teece’s (2007), who mentioned that there are two key psychological obstacles that can weaken seizing capabilities. First, organisations should be able to examine opportunities and threats that are sensed in their environment using a quick, well-timed, and proactive approach. Secondly, to be able to effectively apply their seizing capabilities, organisations should be able to resolve undesirable preoccupations with current strategies, thereby preventing decisional prejudice, inertia, and strategic redundancy.

During the focus group session, participants indicated that the use of cognitive capabilities often aids in effectively sensing opportunities and threats in their environment, and seizing available investment opportunities, such as IT investments, to improve their agility. For instance, in response to the use of cognitive capabilities for sensing and seizing opportunities, Participant 7, who has over 10 years’ experience as a Manager in a Technological company, states:

“Yes, this would improve our capability to quickly respond to changes”.

And

Participant 2: “I believe that because it has many senior executives, decision making and identification of new opportunities is a natural process with a lot of use of ‘hot cognitive’”

Participants’ responses can also be used to answer this study’s research question: To what extent do organisations who rely on cognitive capabilities effectively sense and seize opportunities in their environment, thereby improving their agility and avoiding cognitive inertia? Based on the feedback from the focus group session, it can be deduced that the application of cognitive capabilities often has a positive influence on organisation’s sensing and seizing capabilities. These practical results align with the insights of the prospect theory by Kahneman & Lovallo (1993), who state that seizing innovative opportunities necessitates that managers overrule any existing dysfunctions related to decision making, and effectively commit to new opportunities. Hodgkinson & Healey (2011) mention that an aversion to innovations could be because organisations’ decision-

makers underestimate any changes, due to their subjective estimates of the probability of such innovative inventions being successful. Therefore, the decision to seize opportunities via tactical investments often requires sensing and analytical capabilities, which can be used by organisations' decision-makers to create investment alternatives and evaluate their revenue or potential (Helfat & Peteraf, 2015). Thus, the disparities in the cognitive capabilities of managers can influence how quickly they sense and seize new opportunities and threats. For instance, when asked if the use of cognitive capabilities aid organisations with swiftly sensing and seizing opportunities in their organisations' environment, Participant 3 states:

“Our organisation does use both models, however sense is more broadly used across the organisation”

This aligns with Liang et al.'s (2017) suggestion that intellectual orientation (i.e., the balance between organisational strategy and IT) and social orientation (i.e., the balance between business stakeholders and IT) do not have a direct influence on agility. Rather, the influence of intellectual orientation on agility is completely facilitated by apathy or cognition. Any potential dissension between groups and individuals should indicate the requirement to reconsider and merge conflicting understandings of strategic occurrences (Bassellier & Benbasat, 2004; Hodgkinson & Healey, 2011).

Primary information, confirms that the application of cognitive capabilities and emotional dedication to new investment opportunities are linked with sensing and seizing capabilities and organisational agility.

On the other hand, in their study on Chinese companies, Liang et al. (2017) argued that creating a balance between executives' shared vision for embracing organisational changes and their cognitive or intellectual predilections does not necessarily have any influence on organisational agility. Therefore, though effective organisational cognition improves decision-making in organisations, it is also essential that all decisions are shaped by effective interactions between business executives (i.e., decision-makers) and other stakeholders of their organisation.

4.3. The Influence of Cognitive Limitations on Organisational Agility

Proposition 3: Cognitive limitations related to over-dedication to existing processes have a negative impact on sensing and seizing capabilities and, ultimately, organisational agility.

The questions in the third section of the focus group session were focused on examining if the over-dedication to existing products could have a negative influence on an organisation's agility. Participants' responses in the section confirm this proposition, as they confirm that the reliance on certain procedures and rejection of potential new IT or information system opportunities could have an adverse influence on their agility and competitive performance within their industry. When asked if over dedication to existing processes could adversely influence their organisations' sensing and seizing capabilities, Participants 6 stated:

“I believe that some companies are so tied up in its process that they don't oversee either opportunities or threats getting closer”

while Participant 4 also agreed:

“Processes are meant to help in some specific task, however they should be easily retired once they are not effective”.

These findings align with other studies; for instance, in a study on behavioural decision making, Gilovich *et al.* (2002) identified prejudices like framing and arrogance as direct outcomes of perceptive processes. According to Roberts *et al.*, (2016), though the inability or avoidance of pursuing productive new ventures can result in major losses, which are even more detrimental than the blunders of unnecessary commission (i.e., the inclination to pursue new, eventually imperfect, processes), such errors are frequently as a result of too much dedication to current projects. Thus, to be able to seize new opportunities, organisations should discard or reduce their dedication to current projects (Teece *et al.*, 1997). As previously mentioned, the studies related to psychological factors have identified that insights, information processing, decision-making, challenge solving, opinion, and learning are influenced by cognitive depictions and sensed models of experience (Rehder, 2003; Anderson, 2015).

Similarly, Hodgkinson and Healey (2011) suggest that an approach for resolving the potential increase of dedication and associated issues is to involve decision-makers in more focused and investigative information processing. Teece (2007) also proposes that resolving prejudices generally requires a cognitively modern and well-organised method for decision making. Nonetheless, simply promoting reasonable and effortful information management can worsen the feeling of dedication and associated issues.

Additional questions were asked during the focus group discussion to determine if other factors, such as the potential risks of new/innovative implementations, could also result in over

dedication to existing processes. When asked if the awareness of the potential risk of implementing new technologies influence decisions about the implementation of new information systems or technologies in their organisations, participants indicate that they consider potential risks when making decisions about innovative implementations. According to Participant 2:

“Certainly, innovations attract a lot of attention but they need to be analysed carefully to mitigate the risk of new implementations”.

It is suggested in this study that the fear or perception about potential risks of new innovations could also result in over dedication to current processes. It is also evident from participants’ responses that cognitive limitations have an adverse influence on an organisation’s agility and performance levels. According to Participant 5:

“Yes, cognitive limitations can hinder an organisation agility/performance. For instance, too much information/changes happening concurrently, can cause team to constantly swap context on dangerous levels without being able to properly focus and hindering comprehension, solution development, testing quality”.

4.4. The Influence of Sensing and Seizing Capabilities on Organisational Agility

Proposition 4: Sensing and seizing capabilities positively influence organisational agility because organisation with sensing capabilities can effectively identify and react to opportunities and threats.

During the focus group session, participants indicated that a regular review of new opportunities to serve their customers with both existing and new technologies often results in an enhancement of their organisation’s performance. For instance, when asked if the regular review of new opportunities aids in improving their organisations’ performance, Participant 2 stated:

“Certainly, alignment between areas and understanding of new opportunities is a crucial factor”.

As previously mentioned, organisational agility refers to the ability to detect and seize market opportunities with speed and surprise (Lowry *et al.*, 2016; Tallon *et al.*, 2019). The study’s research question is reiterated as: “To what extent do organisations who rely on cognitive capabilities effectively sense and seize opportunities in their environment, thereby improving their agility and avoiding cognitive inertia?” In response to this question, it is deduced that an

organisation's practices of sensing and seizing opportunities often result in an enhancement of its competitive position within its market. Participants also emphasised that being able to sense opportunities often enables them to have improved visibility of their market and ensures that they quickly sense opportunities and threats that their competitors might not have identified. When asked the extent to which their organisation experienced improved agility because of its approach to sensing and seizing new opportunities, Participant 5 stated:

“Keeping a strong market presence and position on some business areas, despite the aggressiveness of the sector”.

And according to Participant 6:

“The product team has an aggressive growth target to meet, without such techniques probably that won't be feasible”.

Furthermore, the influence of IT and information systems on their dynamic capabilities (i.e., sensing and seizing capabilities) are highlighted. According to Participant 3:

“Yes, the organisation's product and services overly rely on these techniques to keep bringing innovation to its customers”.

The role of IT for sensing and seizing opportunities in their environment is also evaluated. When asked if IT aids their sensing and seizing capabilities, Participant 3 stated:

“The ability to anticipate emerging threats and opportunities is essential to the company's ability to navigate through volatile markets, tech uncertainties and unpredictable competitors.

The product teams usually identify opportunities through continuous product discovery and market research techniques (inside & outside), and afterward, bundle up these opportunities to IT to provide the technology review, such as implementation feasibility, scalability, and also the overall impact in the existing ecosystem”.

Other participants also indicated that:

Participant 5: “Partially. In some business areas yes, I can see improvements on competitive position, due to business actively engaging and seeking ways to sense and seizing”.

In line with these findings, the studies by Haas (2006), Tong *et al.* (2015), and Jerkin *et al.* (2019) show how sensing and sensemaking processes can help overcome sensing limitations, and improve organisations' performance. To evaluate the practical application of the findings from these previous studies, participants were asked if they conducted regular reviews of new opportunities in their environment (e.g., technological innovations) to serve their customers with

both existing and new technologies and if such activities improve their organisation's performance. Participants indicated that having a focus on customers can improve an organisation's performance; however, always keeping existing technologies, may impose a limit on it. When asked if the regular review of new opportunities aids in improving their organisations' performance, Participant 4 states:

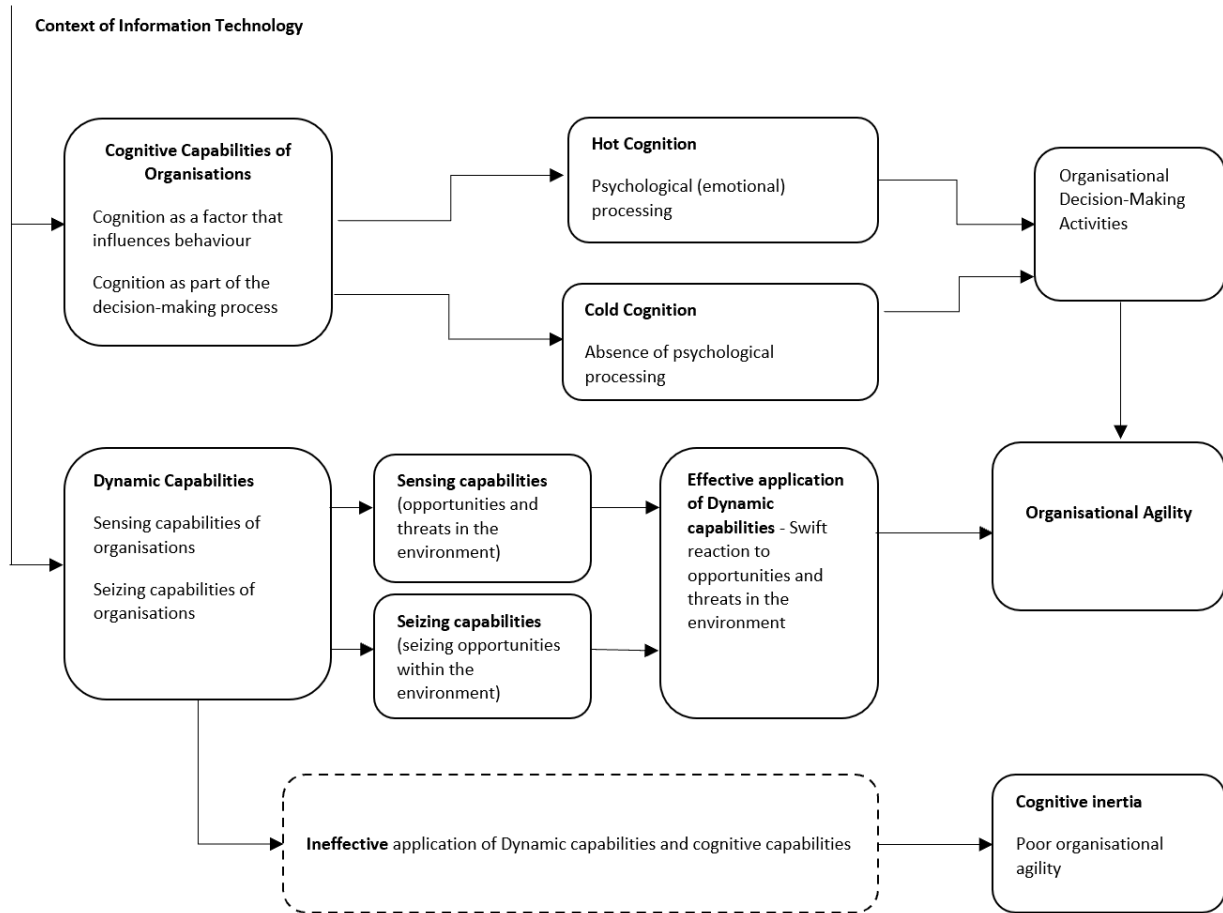
“Absolutely, whilst new technologies take time to get implemented and catch on, there is always room for improvements. We must look straight ahead, but not forget about what has brought the customers towards your product/service”.

Queiroz et al. (2018) also made similar findings and suggested the effective management of IT solutions, coupled with an underlying objective or ensuring that an organisation remains competitive within the current technological landscape, would have a positive influence on an organisation's agility. Generally, these studies suggest that organisational agility is influenced by an organisation's capability to effectively sense changes and seize opportunities, such as new IT resources and skills, within its environment. This study's finding implies that cognitive capabilities have a direct influence on an organisation's dynamic capabilities, and ultimately, on its agility. Furthermore, IT is a facilitator for organisational agility during unpredictable environmental circumstances. An organisation's capability to effectively sense what is taking place in its environment and react accordingly is dependent on how it conditions its decision-makers, and the processes employed during decision-making. Therefore, the adoption and application of information technology, combined with other factors (such as cognition) eventually elicits agility (Chakravarty et al., 2013).

All these propositions findings are also in line with already-established theories. For instance, The Social Cognitive theory of organisational management builds on the social cognitive theory, and suggests that organisational constructs such as cognition, behaviour, interrelate with environmental factors to determine an organisation's performance within its market (Wood & Bandura, 1989). Social cognitive theory suggests that learning takes place in a social context with a dynamic and reciprocal interaction between the person, environment and behaviour. It is composed of 4 processes, namely self-observation, self-evaluation, self-reaction and self-efficacy. Also, Lord and Maher (1991) state that the objective of cognitive science is to be able to predict behaviour. Similarly, Walsh (1995) suggests that an organisation's knowledge structure often

influences how it performs within its market. Schneider and Angelmar (1993) also share a similar viewpoint, as they highlight the causal relationship between cognition and organisations' performance. According to Schneider and Angelmar (1993), cognition can be regarded as a set of behavioural-based activities that are relevant to organisations' decision-making processes. Van Oosterhout et al. (2006) suggest that old IT functions and approaches could negatively impact an organisation's agility. Also, a previous study by Tiwana & Konsynski (2010) highlighted that agile decision-making procedures and incorporated features like cognition and information systems infrastructure often facilitate agility. Building on Schilling's (2000) modular systems theory, Tiwana & Konsynski (2010) suggest that IT agility facilitates the relationship between the modularity of an organisation's IT infrastructure and the effective alignment of such infrastructure with organisational objectives. These previous theories and findings align with this study and highlight the significance of examining the relationship between factors such as organisational agility and cognitive capabilities. It is seen from the analysis of primary information that proposition 1 does not appear to be validated in totality. Proposition 2, 3 and 4 are, however, validated from the opinions of the participants. Based on these findings, an updated conceptual model is shown in Figure 4, highlighting the relationship between the various factors examined during this study.

Figure. 4 – Updated Conceptual Model



Chapter 5. Conclusion

This study has been able to investigate the relationship between cognitive limitations, sensing and seizing capabilities, and ultimately, organisational agility. The findings have highlighted that, indeed, there is a link between the application of cognitive capabilities in an organisation and the effective application of sensing and seizing capabilities. This section discusses the practical and theoretical implications of these findings, as well as the opportunities for future research in this area.

5.1. Implications for Theory

This study demonstrates how certain fundamental strategic psychological tools, such as the use of affective indicators and mental models, when combined with cognitive capabilities, can be used for effective sensing and seizing processes in organisations. As observed from the study's findings, organisations' decision-makers need to understand the influence of applying cognitive capabilities to organisational processes. Particularly, there is a relationship between the effective application of cognitive capabilities and improved organisational agility. This is also relevant for the adoption of technological solutions, such as information systems or IT applications. Being able to apply cognitive capabilities (also referred to as hot cognition in this study) enables the effective sensing of technological opportunities within their environment, and improves their seizing capabilities, by reducing any potential over-dedication to existing processes.

5.2 Implications for Practice

Identifying these issues can be valuable, as it will aid industry experts and decision-makers to understand how they can manage changes in their external environment, which will facilitate the process of sensing, seizing in their organisations. Thus, this study has practical implications for organisational practices, as it highlights the current challenges encountered when conducting effective sensing and seizing of opportunities in organisations. It also provides an insight into how cognitive capabilities can be used as a facilitator for improving an organisation's dynamic capabilities. This is particularly applicable if cognitive limitations are found to have a negative influence on an organisation's agility.

Indeed, as evidenced by the results of the focus group session, decision-makers appear to be hesitant to adopt new innovative technologies or processes due to the potential failure of such implementations, which calls their personal decisions into questions. Thus, a cold cognition approach appears more appealing. Other participants from the study mention that they apply a combination of both processes to ensure success. This indicates the potential need for a two-stage approach for managing such decision-making processes. For instance, there could be an initial cognitive-based decision-making process, and subsequently, a more analytical approach. However, according to Damasio (1994), this approach has the risk of detaching rationale from emotions during decision-making processes. Thus, it is recommended that the essential tools used for planning and decision-making, when effectively integrated with a cognitive environment, can be applied to ensure organisational agility.

Furthermore, this study has significant implications for other related theories, such as agility and marketing theories. In the current era of unstable markets and industries, organisations must be able to effectively sense and seize opportunities within their markets and transform their organisations to remain competitive within their markets. Also, this study's findings show the significance of these dynamic capabilities on organisational agility and performance. Thus, its findings support existing theories, such as the dynamic capability model by Teece (1997; 2005) and the resource and capability model (Rosenbloom, 2000; Winter, 2000), who suggested that behavioural and cognitive factors support the capabilities that encourage organisational performance and learning. Similarly, Sambamurthy *et al.* (2003) suggest that agility is enabled by the options provided through digital processes and knowledge residing in IT resources. In line with these theoretical perspectives, this study highlights the significance of adopting cognitive capabilities to strengthen an organisation's dynamic capabilities and, ultimately, organisational agility.

Previous studies have also suggested various solutions, including behavioural and organisational theories for strategic tactics, which also align with the findings of this study. For instance, the studies by Kahneman & Lovallo (1993), Kahneman & Klein (2010), and Hodgkinson & Healey (2011) offering differing viewpoints, including effectively managing cognitive prejudices. Nonetheless, these suggestions appear to be centred on 'cold cognition', which includes a more analytic approach to information processing.

5.3. Limitations and Opportunities for Future Research

Though this study brings new insights, several other areas could be evaluated in future behavioural studies. Having uncovered existing gaps in the relationship between cognitive capabilities, dynamic capabilities, and organisational agility, future studies can consider how other key organisational dynamic capabilities, such as emotional dedication and meta-cognition, can influence an organisation's sensemaking and performance. For instance, one of the focus group's participants raised a question regarding the role of meta-cognition systems in organisations, and how such systems influence Artificial Intelligence-based innovative solutions in organisations. This also highlights the constant evolution of information technology, and the need for organisations to constantly update their processes and systems to remain competitive within their sector. Thus, future studies can consider the relationship between cognitive capabilities and IT agility of organisations. Particularly, there should be a clearer picture of the relationship between cognitive inertia and insufficient IT evolution in organisations.

The research undertaken has also considered the possible biases in assessing the influence of cognitive limitations based on perceptions. Such perceptions could cause a divergence from the real situation. Also, one of the limitations of this study is that the use of qualitative research methodology could introduce a researcher's bias. The researcher has attempted to avoid this limitation by ensuring that participants' opinions are not influenced by the researcher and analysing the primary data collected from unbiased participants. Nonetheless, though this study has placed a lot of focus on cognitive capabilities/limitations and their influence on organisational agility, future studies can conduct a more extensive and empirical review of this research subject by examining the influence of strong cognitive capabilities on organisations' agility and performance indicators.

5.4. Closing remarks

The study was conducted to investigate the influence of cognition and cognitive limitations on organisations' dynamic capabilities, including sensing capabilities, seizing capabilities, and organisational agility. Particularly, the research question answered during the study is: "To what extent do organisations who rely on cognitive capabilities effectively sense and seize opportunities in their environment, thereby improving their agility and avoiding cognitive inertia?" The

comprehensive review of previous literature offers the framework for answering this question, while also highlighting the existing gaps in the literature on cognitive capabilities and organisational agility. The study discovered that organisations who use cognitive capabilities often experience enhanced sensing and seizing capabilities. On the other hand, the lack of cognition during decision-making processes, as well as the over dedication to existing processes, often results in cognitive inertia. This could have a negative influence on organisations' effectiveness with seizing opportunities in their environments and, ultimately, their performance. Thus, the investigation of current cognitive capabilities and limitations can help organisations discover reasons why they have been slow to sense and seize opportunities in their environments, and subsequently, they can improve their current cognitive capabilities. Also, identifying the relationship between cognitive capabilities and effective IT agility is significant for organisations. A good grasp of the importance of IT agility and the effective application of cognitive capabilities could be considered essential factors in the current technological era. This study, therefore, reveals the existing relationship between organisational agility and cognitive capabilities. Nonetheless, it also raises additional questions that could be examined in future studies, such as the need to identify the relationship between cognitive mental models and other organisational constructs within organisations (e.g., organisational flexibility, practices, etc.).

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Appendices

Appendix 1. Focus Group Questions

Note: The questions for the focus group study are aimed at examining the relationship between cognition, sensing and seizing capabilities, and organisational agility. The study considers three sets of dynamic capabilities, which can be used to transform and improve an organisation's competitive advantage. These include 'sensing and shaping', which aid in choosing new major practices or new consumer sectors, thereby aiding with effectively managing developments and novel technologies in their industry. Secondly, organisations require 'seizing' capabilities, which aid in facilitating the procurement of new major distinctive resources and extension of collaborative networks. Lastly, organisations require the 'transformation' capability, to convert new consumer connections and marketing channels, thereby improving performance and agility (Cirjevskis, 2019).

Furthermore, in this study, 'hot cognition' refers to the procedures and tools that are supported and encouraged by psychological (emotional) processing. On the other hand, 'cold cognition' refers to the procedures and tools that are not supported or encouraged by any form of psychological processing.

Background Information

Q1. What industry/market sector does your organisation belong to?

Q2. How long have you worked for your organisation?

Q3. What is your role in your organisation?

Q4. What is the decision-making process for your organisation?

Proposition 1: Organisations whose decision makers implement 'hot cognition' will probably not experience cognitive inertia, unlike others who adopt 'cold cognition'.

Q5. How often do you use your previous experience and knowledge about IT innovations to evaluate your organisation's external environment for new opportunities or threats?

Q6. Do you encourage new ideas and innovations from the organisation's stakeholders?

Q7. How often do you quickly identify the value of technological innovations for already existing systems?

Q8. Do you always resolve challenges in your organisation by adopting a 'hot' cognitive approach?

Proposition 2: The application of cognitive capabilities and emotional dedication to new investment opportunities are positively linked with improved sensing and seizing capabilities and, ultimately, organisational process agility

Q9. How quickly do you make decisions about the best course of action to manage opportunities and threats in your organisation's environment?

Q10. Does your organisation use any cognitive capabilities or emotional dedication to effectively adapt to new IT-based or information systems' implementation?

Q11. Does the use of such cognitive capabilities aid your organisation to swiftly sense opportunities and threats and seize opportunities in its environment?

Q12. Does such reconfiguration and implementation of new innovations reinforce your current expertise of products and services, and improve your organisation's agility?

Proposition 3: Cognitive limitations related to over-dedication to existing processes have a negative influence on sensing and seizing capabilities and, ultimately, organisational agility.

Q13. Do you believe that being over dedicated to existing processes have adversely affected your organisation's sensing and seizing capabilities?

Q14. Does the awareness of the potential risk of implementing new technologies influence your decisions about the implementation of new information systems or technologies in your organisation?

Q15. Does such awareness of risks result in resistance to seize opportunities in your environments (e.g. the implementation of novel technological innovations)?

Q16. Do you believe that cognitive limitations, such as over dedication to existing processes, have a negative influence on your organisation's agility and performance levels?

Proposition 4: Sensing and seizing capabilities positively influence organisational level performance and agility because organisations with sensing capabilities can effectively identify and react to opportunities and threats.

Q17. Does the regular review of new opportunities to serve your customers with both existing and new technologies improve your organisation's performance?

Q18. Do your organisation's practices of sensing and seizing opportunities improve its competitive position within its market?

Q19. To what extent has your organisation experienced improved agility because of its approach to sensing and seizing new opportunities?

Q20. Do you have enhanced customer engagement and satisfaction due to your sensing and seizing capabilities?