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LEARNING TENSIONS – A MULTILEVEL MODEL OF ORGANISATIONAL LEARNING: AN EMPIRICAL STUDY

BY

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Abstract

There is a growing recognition that the study of Organisational learning needs to be considered across three levels of analysis: *individual, group,* and *organisational levels* (March, 1991; Nonaka and Takeuchi, 1995; Crossan et al., 1999; 2011). Given the potential of multilevel research to extend the boundaries of the understanding of the field, this thesis aims to address *how organisations learn as a multilevel system.* The answers to the research inquiry were drawn from both theoretical works and by conducting an empirical investigation.

To assist the investigation of the OL phenomenon in multilevel settings, a multilevel model of OL was proposed. The model provides analytical foci by specifying the learning tensions at the individual, group, and organisational levels. The model was employed in a case study of a Vietnamese public organisation, which had successfully undergone a business transformation. Through the contributions of this thesis, the author hopes to spark more interest in multilevel research of OL.

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I, Tri Nguyen, declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

Learning Tensions – A Multilevel Model of Organisational Learning: An empirical study

I confirm that:

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Abbreviations

AC: Absorptive Capacity

BSC: Balanced Scorecard

CSC: Central Sales Centre

DC: Dynamic Capability

GL-Influences: Group-level influences

GST: General System Theory

IL-Influences: Individual-level influences

KM: Knowledge Management

OL-Influences: Organisational-level influences

OL: Organisational Learning

OLKC: Organisational Learning, Knowledge and Capabilities

Chapter 1. Introduction

1.1 The problem

Against the background of an increasingly interconnected world due to rapid technological advancements and globalisation, business conditions are becoming more and more dynamically complex with a faster pace of change (Todnem By, 2007). Given the dynamic environment, many scholars argue that organisations need to capitalise on their knowledge capital and competencies to win in the short term, while at the same time innovating and renewing themselves to adapt for long-term survival (March, 1991; Crossan *et al.*, 1999; O'Reilly and Tushman, 2013). In that context, organisations are taking more interest in the field of Organisational Learning as it offers insight into the organisational adaptation and development of competitive advantages.

Before organisations can artificially influence learning to become a 'Learning Organisation' as advocated by many scholars (e.g., Senge, 1990; Garvin *et al.*, 2008), they need to understand how they are learning in the first place. Lavie *et al.* (2010) argue that different domains may have different sets of factors that influence learning processes. Therefore, it is crucial to investigate how organisations learn in their specific contexts and knowledge domains. In this respect, studies of 'Organisational Learning' (OL) have generated significant understanding over the years. The field of OL has started to give answers instead of asking questions (Bapuji and Crossan, 2004).

In the literature, various advanced theoretical frameworks are presented to address organisational learning and knowledge creation. For example, Nonaka and Takeuchi's (1995) SECI model describes how organisational knowledge is created; the multilevel 4I-framework by Crossan *et al.* (1999) identifies four dynamic learning processes that link the individual, group and organisational levels; and Argote and Miron-Spektor's (2011) OL framework describes how experience interacts with context to become knowledge through various learning sub-processes.

The development of theoretical OL frameworks is generally aimed at academic and research audiences. Because most frameworks intend to inspire,

enable insights and guide research development, they are abstract by nature. The problem is that abstraction may generate confusion for practitioners, thus making it difficult to adopt theoretical frameworks for investigating OL in specific contexts. The confusion in the OL literature is often reflected in its presence at different levels of analysis (Shipton, 2006): from the individual level (Argyris and Schoen, 1978), to the group and community levels (Brown and Duguid, 1999; Senge, 1999), and finally to the organisational level (March, 1991).

1.2 OL in multilevel research

Since its conception, the field of Organisational Learning (OL) has captured the interests of both practitioners and academic communities (e.g., Argyris and Schoen, 1978; Fiol and Lyles, 1985; Brown and Duguid, 1991; Huber, 1991; March, 1991; Nonaka and Takeuchi, 1994; Tsouka, 1996; Argote, 1999; Crossan *et al.*, 1999). Over five decades, OL has grown dramatically, and become a complex and diverse field, including studies of Organisational Learning, Knowledge and Capabilities (OLKC) (Easterby-Smith and Lyles, 2011).

Along with this impressive development, there is a growing recognition that the study of OL needs to be considered across individual, group, and organisational levels (March, 1991; Nonaka and Takeuchi, 1995; Crossan *et al.*, 1999). With the introduction of the multilevel 4I-framework, Crossan *et al.* (1999) informed the multilevel research agenda by providing the dynamic processes of OL that connect the individual, group and organisational levels. Although the 4I-framework has ignited the interest for multilevel research, only a few studies have utilised the framework to conduct empirical investigations of OL (e.g., Bontis *et al.*, 2002; Crossan and Berdrow, 2003; Berends and Lammers, 2010; Di Millia and Birdi, 2010). The lack of interest might stem from the substantial challenges that multilevel research presents: that is, to think both micro and macro (Kozlowski and Klein, 2000).

Another challenge may involve the difficulty to operationalise models such as the 4I-framework for empirical investigations. Without a means to support investigations of OL in real-life contexts, the potential usefulness of multilevel research and its related literature are limited for both practitioners and academic researchers. In a review, Easterby-Smith and Lyles (2011) note that we are still not clear how the intervening factors work or interact with one another, and under what circumstances they influence learning. Moreover, given that the patterns of

influential factors may vary across learning domains, each domain might need to be studied systematically to reach consistent conclusions (Lavie *et al.*, 2010). Because multilevel research can address learning flows and knowledge transfer both at and across levels, it has the ability to identify factors that influence learning processes. This highlights the needs for not only more multilevel studies, but also a means to support them.

1.3 Research aims and objectives

Inspired by the works of Crossan and colleagues (1999; 2011) and intrigued by the potential contributions of multilevel research, this thesis set out to conduct an empirical study of OL in multilevel settings. The research inquiry could be broadly scoped as *How do organisations learn as a multilevel system?* For the answer to be meaningful, the research scope should be limited to the ongoing themes of the OL field, i.e. how do intervening factors work, and what are their trigger mechanisms and circumstances (Easterby-Smith and Lyles, 2011)? In this context, the overall inquiry can be specified by two questions to represent the research objectives:

(1) *How does learning occur over time both at and across the individual, group and organisational levels?*
(2) *What factors influence the learning processes, their mechanisms and interactions, and under what circumstances?*

The answers to these questions could be drawn from both theoretical works and by conducting an empirical investigation. A multilevel model was proposed to assist the empirical study. The model development is based on the 4I-framework of Crossan *et al.* (1999) and the design principles of *Multilevel theory* (Kozlowski and Klein, 2000).

1.4 Structure of the study

The structure and chapter summary of this thesis is as follows:

The literature review, Chapter 2, begins with an overview of the historical development of the OL field, the need for multilevel research in OL, and the research aim and objectives. The development of a multilevel model starts by addressing the theoretical groundings, which are presented as epistemological and ontological challenges. The former concerns how the concept of learning can be

applied to organisations, and whether organisations are independent entities capable of learning. The latter raises the question of the nature of knowledge, and the extent of organisational knowledge. The way in which knowledge is treated affects how learning can be assessed at different levels. The discussion that follows examines theoretical concepts used in this study, including a definition of OL, a development theme, *Multilevel theory* (Kozlowski and Klein, 2000), and the 4I-framework (Crossan *et al.*, 1999).

Next, the theoretical concepts used in this study are discussed, including a definition of OL, a development theme, *Multilevel theory* (Kozlowski and Klein, 2000), and the 4I-framework (Crossan *et al.*, 1999). The definition of *OL* answers the questions of what OL is, and why it is important for organisations. The Multilevel theory section examines the rationale and key concepts of the multilevel perspective in detail to specify their theoretical implications and related design principles. The subsequent section reviews the 4I-framework of Crossan *et al.* (1999), followed by the propositions by Crossan *et al.* (2011) of the 4I-framework in the context of the multilevel theory.

Based on the operationalisation of the propositions by Crossan *et al.* (2011), the model development draws on the existing OL literature to specify the cognitive constructs of individual, group and organisational levels, so that cognitive development represents learning at the respective levels. The cognitive constructs provide the basis for identifying learning tensions, which may arise during a new learning cycle. Learning tensions occur as the results of organisations explore new things while simultaneously exploiting what has been learnt. Learning tensions are important for revealing the trigger mechanisms of influential factors that may only be manifested under specific circumstances.

Chapter 3, Methodology, provides discussions on the research philosophy, research approach, methodological choice and rationale for using the case study strategy. The research design section, case selection, data collection and data analysis techniques are considered, followed by a brief discussion of lessons learnt from the pilot case. The case is presented in Chapter 4 with data being analysed at the individual, group and organisational levels. The proposed multilevel model was employed to support the investigation of the OL phenomenon. In the concluding Chapter 5, contributions of the study are discussed with implications of the findings, research limitations, reflections, and suggestions for future research.

1.5 Conclusion and contribution

This thesis contributes to the literature in three ways. First, it enriches the theoretical landscapes of OL and multilevel research by presenting a multilevel compilation model of OL based on the principles of multilevel theory (Kozlowski and Klein, 2000) and the 4I-framework (Crossan *et al.*, 1999). By treating various organisational phenomena as learning tensions, they can be used coherently to explain how an organisation learns, as a multilevel system. Second, the investigation of OL in the context of business transformation has identified five influential factors, including their effects, trigger mechanisms and circumstances. The findings substantiate previous works on the construct of these factors. Third, this thesis contributes to methodological developments by employing the embedded/nested case method to study OL.

This research concludes by providing answers to the research objectives and a model to support investigations of OL in multilevel settings. By focusing on the learning tensions that may arise during the process of learning something new, it is possible to develop insights into the intervening factors. By reflecting on the model development and its usage in the case study, the researcher highlights its advantages and limitations to provide suggestions for future endeavours. Through this study, the researcher hopes to spark more interest in multilevel studies of OL, given its potential utility for both practitioners and academic researchers alike.

Chapter 2. Literature review

2.1 A brief historical development of Organisational Learning

When Cyert and March (1963) first referred to the term O*rganisational Learning*, they argued that organisations cannot plan out everything in advance; rather they have to adapt to the environment to survive. OL is the process that leads to an organisation's effective adaptation. Organisations learn by altering their behaviours and objectives in response to changes in the external environment, thereby achieving adaptation (Shipton, 2006). The notion that organisations can learn and its potential implications have caught the interest of both academic and practitioner communities alike; for example, Argyris and Schön (1978), Hedberg (1981), Daft and Weick (1984), and Fiol and Lyles (1985). In 1991, *Organisation Science* published a special issue for Organisational Learning, in which many works including those of March (1991), Huber (1991), Epple, Argote and Devadas (1991), Brown and Duguid (1991), and Simon (1991) set the agenda for future research.

Over five decades, the field of OL has grown tremendously and is no longer in its infancy (Bapuji and Crossan, 2004; Easterby-Smith and Lyles, 2011). Due to its broad conceptual nature, OL has been applied in various contexts to study other organisational phenomena, such as *Politics and Power* (e.g., Lawrence *et al.*, 2005), *Emotion and Emotional Intelligence* (e.g., Huy, 1999; Antonacopoulou and Gabriel, 2001), and *Leadership* (e.g., Vera and Crossan, 2004; Jansen *et al.*, 2009). Furthermore, the study of OL across disciplines and schools of thought had led to the divergence of the field. Currently, there are three main streams of research interest; these are *Organisational Learning, Knowledge and Capabilities - OLKC* (Easterby-Smith and Lyles, 2011).

Although *Knowledge Management* (KM) has always been a popular term in defining the field, approaches to the study of Knowledge Management are largely defined by two main paradigms – *Organisational Knowledge* and KM (Prieto and Easterby-Smith, 2006; Vera *et al.*, 2011). Studies of KM in the early days were often backed by industrial practitioners (Easterby-Smith and Lyles, 2011); their aim was to utilise knowledge as strategic resources using management processes that were supported and facilitated by modern technology (e.g., Grant, 1996; Alavi and Leidner, 2001; Alavi and Denford, 2011). In contrast, Organisational Knowledge, often backed by academics, takes on a more socio-centric approach in understand

the nature of knowledge and how it is created in organisations (e.g., Nonaka and Takeuchi, 1995; Argote 1999; 2005; Nonaka and von Krogh, 2009; Tsouka, 2011).

In recent years, the two perspectives have been combined into a hybrid approach to managing knowledge flows, e.g., creation, transfer, and acquisition, among others (Prieto and Easterby-Smith, 2006; Vera *et al.*, 2011). With the growing demand for research on the topic of innovation, the field of KM continues to witness impressive growth over the years. KM is sometimes considered a parallel research stream to OL. Some authors have argued that KM is a distinct discipline, mainly through the works of Nonaka and colleagues (e.g., Nonaka and von Krogh, 2009). However, this matter is controversial, and still under debate (Easterby-Smith and Lyles, 2011). Vera and Crossan (2005) argued that KM and OL are just different perspectives from which to study the same phenomenon.

The concept of *Dynamic Capabilities* (DC) was introduced by Teece *et al.* (1997). DC refers to a firm's ability to integrate and renew its internal and external resources, including intangible and tangible assets (e.g., finance, technical know-how, knowledge), to address and shape changing business environments (Teece, 2007; Teece and Al-Aali, 2011). Firms with DC can build and review their competitive advantages, thus remaining competitive and profitable in the long run. Winter (2003) views DC as the first-order capability to distinguish it from other zero-order operational capabilities. Learning is considered as the second-order capability, which gives rise to the first-order- (DC) and zero-order (operational) capabilities (Winter, 2003). The intimate links between OL and DC are widely supported in the literature (e.g., Easterby-Smith and Prieto, 2008; Teece and Al-aali, 2011; Vera *et al.*, 2011).

There is a growing interest in the concept of *Absorptive Capacity*, which is a perspective that lies between DC and KM, as several authors have looked at knowledge flows in the inter-organisational context. Absorptive Capacity is referred to as a set of processes (e.g., Zahra and George, 2002) or a firm's ability (Lane *et al.*, 2006) to recognise, assimilate and utilise external knowledge. Several empirical studies have shown support for the absorptive capacity and identified the mechanisms of knowledge transfer between firms (Jansen *et al.*, 2005; Easterby-Smith *et al.*, 2008; Rothaermel and Alexandre, 2009).

The study of *Organisational Learning* focuses on the learning process that encompasses cognitive and behavioural development (e.g., Argyris and Schoen,

1978; Crossan *et al.*, 1999), or only cognitive development while behavioural development is referred to adaptation (e.g., Fiol and Lyles, 1985). Studies that address the nature, implication and application of learning in organisations invoke a plethora of conceptual dichotomy, e.g., *single-loop and double-loop learning* (Argyris and Schoen, 1978); *adaptive and generative learning* (Senge, 1990); *exploration and exploitation* (March, 1991); *incremental and radical learning* (Miner and Mezias, 1996); and *first-order and second-order learning* (Arthur and Aiman-Smith, 2001).

Because learning intrinsically implicates (internal) change to adapt, the study of OL has been associated with many situations, such as organisational development and change (Cummings, 2008), strategic renewal (e.g., Crossan *et al.*, 1999); and organisational innovation (e.g., Alegre and Chiva, 2008; Liao *et al.*, 2008). Given the important role of learning, many studies, which target the practitioner community, tend to prescribe a positive notion of learning. Firms should aim to become a 'learning organisation' (e.g., Senge, 1990; 2014; Thomas and Allen, 2006; Garvin *et al.*, 2008). In contrast, the academic community studies the OL phenomenon in a descriptive manner. They recognise the role of OL but argue that organisations always learn and that learning can be dysfunctional (March, 1991; Miner and Mezias, 1996).

The development of the OLKC field continues to broaden our understandings with diverse perspectives and new concepts. While the field is flourishing with multi-disciplinary studies, there are many efforts to build a strong and robust theoretical foundation to support future development. Several authors have written critical analyses to establish the links and boundaries among the OL, KM and DC (e.g., Easterby-Smith and Prieto, 2008; Vera *et al.*, 2011). Some continue to support the theoretical development of their respective field; examples include Crossan *et al.*'s (1999) multilevel framework of OL, Tsouka's (2011) phenomenal view of tacit knowledge, Nonaka and von Krogh's (2009) tacit knowledge and knowledge conversion. Others have provided theoretical frameworks and models to support empirical investigations, such as Hoegl and Schulze's (2005) method for investigating KM, Easterby-Smith *et al.*'s (2008) process perspective of DC, and Argote and Miron-Spektor's (2011) framework for analysing OL.

2.2 Research aims and objectives

From the broad discussions of the theoretical landscape, OL always seems to be at the heart of the OLKC field. OL can be regarded as the underlying process that enables the development of dynamic capability (Winter, 2003; Teece and Al-Aali, 2011); OL also facilitates the acquisition of knowledge and practice of facts and skills (Vera *et al.*, 2011). In essence, OL is the means to achieve dynamic capabilities, organisational knowledge and other capabilities. In the field of OL, the researcher is drawn to the theme of *Multilevel research* through the works of Crossan and colleagues (1999; 2011); in particular, the multilevel *4I-framework* of OL by Crossan *et al.* (1999). Some authors posit that multilevel studies have the potential to advance or even unify the field (e.g., Kozlowski and Klein, 2000; Crossan *et al.*, 2011).

Shipton's (2006) systematic review of OL literature shows that the majority of studies focused on either the micro levels such as the individual and group (e.g., Argyris and Schön, 1978; Brown and Duguid, 1991; 2001; Simon, 1991) or the macro levels, such as organisational and industrial (e.g., March, 1991; Benner and Tushman, 2002; Greve, 2007; Harreld *et al.*, 2007). OL studies that span three levels of analysis are relatively scarce (e.g., Kim, 1997; Crossan *et al.*, 1999). There is only a handful of empirical multilevel research in comparison to the micro or macro studies (e.g., Bontis *et al.*, 2002; Jacobs and Coghlan, 2005; Schilling & Kluge, 2009; Di Milia and Birdi, 2010). Given a growing consensus that the study of OL phenomenon needs to be considered across the *individual*, *group* and *organisational* levels, many scholars have echoed the need for more empirical studies that span multiple levels; these include Gupta *et al.* (2006), Raisch *et al.* (2009) and Crossan *et al.* (2011).

Inspired by the works of Crossan and colleagues (1999; 2011), the researcher set out to conduct an empirical study of OL in multilevel settings. The overall research aim could be expressed in the question of *How do organisations learn as a multilevel system?* For the answer to be meaningful, the scope of the question should be narrowed down to the pressing issues of the OL field. In a review, Easterby-Smith and Lyles (2011) remark that despite our knowledge of OL, it is still unclear what the intervening factors are, when and how these factors work and under what circumstances they influence learning. In this context, the research inquiry can be broken down into two specific objectives, which can be expressed by the following questions:

1. *How does learning occur over time both at and across the individual, group and organisational levels?*
2. *What factors influence the learning processes, their mechanisms and interactions, and under what circumstances?*

The answer to these questions is drawn from both theoretical works and by conducting an empirical investigation. Given the objectives' scope, a multilevel model is proposed to assist the empirical study. The model is based on the 4I-framework of Crossan *et al.* (1999) and the design principles of *Multilevel theory* (Kozlowski and Klein, 2000). They not only provide theoretical foundations, but also help to address the philosophical challenges of multilevel study.

2.3 The challenges of multilevel study

There are ontological and epistemological challenges for the development of the multilevel model. The ontological concern involves the question of how the concept of learning can be applied to organisations, and whether organisations are independent entities that are capable of learning. These questions are crucial to multilevel study, where learning is investigated across the ontological dimension, at different levels of analysis. The epistemological challenge concerns a clear conceptualisation of organisational knowledge. Like two facets of the same coin, learning could be regarded as the process of knowledge acquisition. Studies, which use *knowledge* perspective to study the OL phenomenon, necessarily address the nature of knowledge. Although this study does not require a knowledge perspective, having a clear epistemological understanding is beneficial to the development of the multilevel model later on.

2.3.1 The ontological challenge

Fundamentally, learning is an individual-level process, which involves psychological changes, or mental activities (Kozlowski and Bell, 2008). Simon (1991, p. 125) stressed that *"all learning takes place inside individual human heads"* yet saying groups or organisations can learn implies that they have a conscious mind. Individuals, groups and organisations are different ontological entities (Cook and Yanow, 1996). Groups and organisations are not cognitive entities so they cannot learn in the sense that a human does (Foil and Lyles, 1985). There is always an inherent risk of committing reification fallacies if the multilevel model of OL is developed without paying attention to the ontological dimension (Berends *et al.*, 2003).

The ontological challenge brings forth the discussion of levels of analysis in both theoretical formation and empirical investigation. Earlier studies treated the term 'OL' as a metaphor of individual learning in organisational contexts, e.g., Argyris and Schön's (1978) *single- and double-loop learning,* Senge (1990)'s *fifth element,* Huber's (1991) *information processing and* Simon's (1991) *bounded rationality*. Individuals act as the agents of organisational learning (Argyris and Schoen, 1978). The literature of this era placed more emphasis on agency, e.g., rationality, choice, decision making, information processing, and others. For instance, Argyris and Schoen's (1978) influential work described OL in terms of *single-loop and double-loop* learning. The single-loop learning refers to the error detection and correction

without concerning the underlying governing values. On the other hand, double-loop learning occurs when the governing values are reviewed and changed, resulting in a new trajectory of error correction, in the essence of asking: *Did we do things right vs. Did we do the right thing?*

Followers of these theories focused on the micro level of analysis, i.e. individual and group. For individual learning to have an organisational impact, attention were directed to a set of key individuals, such as CEOs and senior managers because they have significant influences on the strategic decisions and, therefore, organisational learning. In the early days, single-loop learning was considered dysfunctional and unwanted. Hence, the argument for improving OL rests on helping these individuals recognise the governing values of their decision and actions (Argyris, 2002). Later on, the important role of single-loop learning in developing capabilities and achieving high performance was acknowledged (Miner and Mezias, 1996).

As the field has developed, there is growing recognition that OL is more than just individual learning in the organisational context (Brown and Duguid, 1991; March, 1991; Crossan *et al.*, 1999). Individual learning is important, but insufficient to describe OL (Kim, 1997). Research emphasis began shifting to the macro level, including the (group) organisational and inter-organisational levels; for instance, *exploration and exploitation* (March, 1991), *communities of practice* (Brown and Duguid, 1991), *strategic renewal* (Crossan *et al.*, 1999) and *organisational ambidexterity* (Tushman and O'Reilly, 1996). OL is conceived as something different from, yet functionally similar to individual learning. The content of learning, once learned, is embedded in organisational artefacts, such as products, culture, routines, and structure. (Crossan *et al.*, 1999).

To address OL as a phenomenon that spans multiple levels, the ontological challenge must be addressed. The model development needs a supporting theory that is capable of accounting for both micro and macro perspectives (Berends *et al.*, 2003). This study adopts the *Multilevel theory,* which is purposefully developed to integrate the micro and macro levels (Rousseau, 1985; House *et al.*, 1995; Kozlowski and Klein, 2000). In the OL context, Crossan *et al.*'s (1999) *4I-framework* provides four cross-level processes that connect the individual, group and organisational levels. Detailed discussions of the Multilevel theory and 4I-framework are provided in sections 2.5 and 2.6 respectively.

2.3.2 The epistemological challenge

The epistemological challenge raises the question of the knowledge nature. Given that different schools of thought hold different assumptions about knowledge, they had distinctive approaches to theory building. Chiva and Alegre (2005) identify four significant approaches; these are *Cognitive-possession, Social-process, Practice-based,* and *Learning-perspective*. The discourse of the knowledge in literature is divisive with various practical implications. It mainly involves the concepts of *tacit and explicit knowledge,* and their relationships (e.g., Cook and Brown, 1999; Chiva and Alegre, 2005; Nonaka and von Krogh, 2009; Tsouka, 2011). More details are provided as the researcher reviews each approach.

2.3.2.1 Cognitive-possession approach

The cognitive-possession approach is rooted in cognitive science, psychology, and mainly contributed to by the field of computer sciences and artificial intelligence. Knowledge is regarded as the continuous evolution of the "*data – information- knowledge*" continuum. Therefore, organisational knowledge is treated as an extension of an organisation's information, something that organisations possess – i.e. *knowledge-as-possession* (Easterby-Smith and Lyles, 2011). Organisations are viewed as a cognitive system. Knowledge is considered as a collection of representations of the world, or cognitive model. The world is a given entity, and the objective of a cognitive model is to generate the most accurate representation of this world (von Krogh, 1998). From this perspective, learning is, therefore, the improvement of the representation (Chiva and Alegre, 2005).

Influenced by the resource-based view and information management perspective, this approach treats knowledge as assets (or commodities) that are explicit, and capable of being encoded, stored and diffused (Easterby-Smith and Lyles, 2011). The main creator of knowledge is the individual (Grant, 1996). Advocators of this approach argue that managerial efforts should be concerned with realising the knowledge's value (e.g., Grant, 1996), given that the process of creating new knowledge is "*messy by nature*" and does not respond well to formal methodology (Birkinshaw and Sheehan, 2002, p. 77). Consequently, Knowledge Management, based on this approach, focuses on managing explicit knowledge. The KM activities may be named differently, but the most basic processes involve capturing, acquiring, storing, diffusing and applying knowledge (Alavi and

Leidner, 2001). These can be divided into sub-processes; for example capturing internal knowledge or acquiring external knowledge (Dalkir, 2011).

To a large extent, the cognitive-possession approach was criticised on a number of grounds. The objectification of knowledge separates knowledge from the human knower (von Krogh, 1998). When this happens, knowledge is arguably reduced to information. The over-focus on the technical side of knowledge management poses a risk of neglecting the more complex social aspect of the organisation (Easterby-Smith and Lyles, 2005). The assumption that knowledge can somehow be managed systematically is seen as inappropriate (Vera and Crossan, 2005). The management of knowledge often focuses on the explicit, neglecting the tacit form, which has more significant potential for competitive advantage but is harder to handle (Easterby-Smith *et al.*, 2000).

2.3.2.2 Social-process approach

The social constructivists argue that knowledge is socially constructed and cannot be separated from its knower (von Krogh, 1998; Nonaka and von Krogh, 2009). They assume that the functions of the cognitive model are not only limited to represent the world, but also to construct and create the world that is unique to each social actor (von Krogh, 1998). The functional assumption extends the definition of knowledge from mere representation to constructing reality, in other words, *knowledge-as-process*. This extended view embraces a broader definition of knowledge, in which "knowledge" (knowledge-as-possession) and "knowing" (knowledge-as-process) are two ends of a continuum (Nonaka and von Krogh, 2009).

Tacit and explicit knowledge were introduced by Polanyi (1962) and popularised in organisational science by Nonaka and Takeuchi (1995). Tacit knowledge is deeply rooted in actions tied to the senses, physical experiences and intuition, such as riding a bike, swimming, or wine tasting (Nonaka and von Krogh, 2009). Explicit knowledge is codified knowledge, which has been articulated and captured in writing, books and paintings, among other forms. In the literature, there is a range of conceptual dichotomy similar to tacit and explicit knowledge, but less popular, such as *know-what and know-how* (Chiva and Alegre, 2005), *sticky and leaky* (Brown and Duguid, 2001) and *declarative and procedural knowledge* (Rouse *et al.*, 1992).

The protagonists of this approach view that almost all knowledge has a tacit component and an explicit component (Nonaka, 1994; Leonard and Sensiper, 1998; Nonaka and von Krogh, 2009; Chuang *et al.*, 2013). Knowledge exists along a continuum that ranges from low tacit-ness (most explicit) to high tacit-ness (least explicit). Knowledge can be converted from tacit- to explicit knowledge, and vice versa (Nonaka and Takeuchi, 1995; Nonaka and von Krogh, 2009). Knowledge conversion is the underlying principle that facilitates knowledge transference, and ultimately, organisational knowledge creation (Nonaka and von Krogh, 2009). As a result, knowledge conversion has been focused on as the mechanism of transferring knowledge, and ultimately for creating new organisational knowledge (Nonaka and Takeuchi, 1995; Nonaka and von Krogh, 2009).

According to the *"Organisational knowledge creation theory"* (Nonaka and Takeuchi, 1995), organisational knowledge is created through four modes of conversion between explicit and tacit knowledge. These four modes are *socialisation, externalisation, combination and internalisation (SECI)* (Figure 1). During interactions, explicit and tacit knowledge will spiral along the ontological dimension, i.e. individual, group and organisational levels. Ideas and concepts are created at the individual level. Through cognitive and social interactions, they could be articulated, shared and justified to become organisational knowledge (Nonaka, 1994).

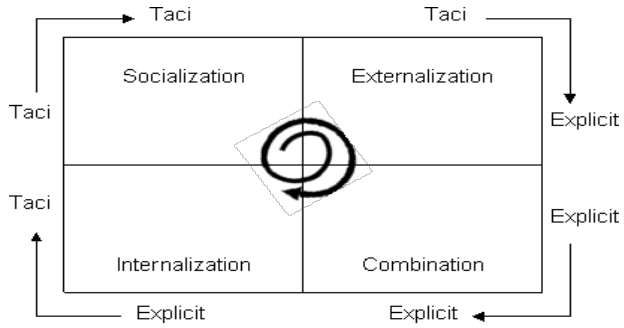

Figure 1 The SECI Process - Modes of Knowledge creation (adopted from Nonaka, 1994, p. 19)

2.3.2.3 Practice-based approach

The advocates of the practice-based approach hold a unique view on the epistemology of knowledge and its dimensions. In contrast to the constructivists, *knowledge* and *knowing* are not the two ends of a continuum. Rather, *knowing* belongs to an *epistemology of practice* (Cook and Brown, 1999), which is parallel to the traditional epistemology of possession (as of *knowledge*). This presents a shift of

focus from interactions with the world in our head to interactions with the things of the social and physical world. "*Knowing is to interact with and honour the world using knowledge as a tool"* (Cook and Brown, 1999, p. 398). This approach to defining the nature of knowledge has important theoretical and practical implications.

Firstly, it dismisses the notion of knowledge conversion (e.g., Nonaka and Takeuchi, 1995) by arguing that tacit and explicit knowledge are two distinct forms of knowledge (Brown and Duguid, 1991; Gherardi, 2009; Tsouka, 2011). Each form of knowledge can be useful as support in acquiring the other, but is not required (Cook and Brown, 1999). Secondly, if the competitive advantages are dependent on tacit knowledge, then the only way to transfer or generate tacit knowledge is through *practice*. The term "practice" refers to the coordinated activities of individuals and groups in doing their real work as it is informed by a particular organisational or group context. Finally, new knowledge (or innovation) is not created through the conversion of tacit to explicit knowledge, but rather when we use knowledge as a tool in creative ways when interacting with the social world (Tsoukas, 2005).

Tacit knowledge is always required to understand explicit knowledge (Tsoukas, 2005). Thus, sharing tacit knowledge (know-how) underlies the ability to circulate explicit knowledge (know-that). Consequently, people who share common practice are likely to have similar know-hows (Brown and Duguid, 2001). The need to share best practice and new ideas reveals the challenge of communication and coordination in the workplace (Brown and Duguid, 2001). Knowledge transfer is addressed in terms of *disembedding* and *re-embedding* knowledge (Giddens, 1990). For knowledge to be successfully dis-embedded and re-embedded, the similarity of embedding conditions at both ends of the communication is critical (Brown and Duguid, 2001). It is likely to fail if they are too different.

Advocates of this approach often criticise the over-emphasis on cognition in the OL literature (Cook and Yanow, 1996 Cook and Brown, 1999; Gherardi, 2009). They suggest a shift of focus from cognition to action: knowledge to *knowing*, and *learning-as-acquiring-knowledge* to *learning-by-doing* (i.e. practice). The practice-based approach offers an alternative solution to knowledge transfer, with practice as the mechanism. Organisations can facilitate communities of practice (CoP) where learning and knowledge come about, are exchanged, and are modified (Tsouka, 2011). In a broader context, this approach proposes that the organisation could be seen as a community of communities-of-practice (CoP) (Brown and Duguid, 1991).

2.3.2.4 Learning-based approach

The learning-based approach places emphasis on the learning process rather than on knowledge. The followers of this approach seek to optimise the use of knowledge by improving the organisation's ability to learn (Easterby-Smith and Lyles, 2011). Therefore, they are agnostic about the nature of knowledge, and often adopt a pragmatic view of organisational knowledge. Studies of this perspective recognise the importance of the human aspect but do not concern themselves over whether tacit knowledge can be converted into explicit knowledge. Knowledge is often described as declarative and procedural knowledge; or know-what, know-why and know-how (Rouse *et al.*, 1992). Many scholars seem to prefer alternative terms, such as *embedded learning*, *new learning* or *what has been learned* when it comes to addressing knowledge (Crossan *et al.*, 1999; Easterby-Smith and Prieto, 2008).

The concept of (organisational) knowledge is often invoked as a proxy to study OL. For example, March (1991) employed a simulation of organisational and individual knowledge to observe the effect of exploration and exploitation. In Argote and Miron-Spektor's (2011) theoretical framework for analysing OL, OL is depicted by a change in knowledge, which can be assessed by measuring context-specific experience. The following Table 1 provides a summary of the discussion so far about the four approaches used to address the epistemological challenge.

Table 1. Epistemological understanding of Organisational knowledge

	Knowledge Management		Organisational Learning	
Approach	Cognitive possession	Social process	Learning as practice	Learning-focused approach
Research domains	Artificial Intelligent, Machine Learning, Economics, etc.	Economic, Managements, Organisational Sciences, etc.	Organisational behaviours, Social Sciences.	Organisational Sciences, System theories, Organisational behaviours.
Perspectives	Knowledge can be possessed and managed. Emphasis is placed on cognitive and resources-based views.	Knowledge as possession and process, with emphasis on possession. Both cognitive and social perspective, mainly communication.	Knowledge creation is a social process. Emphasis is placed on social perspective, especially practice.	A pragmatic view of knowledge.
View on organisation	Cognitive systems	Knowledge creation systems	Community of Communities of Practice	Adaptive systems
Aims	Manage knowledge as resource, intelligent capitals.	Create new knowledge, innovation, competency.	Create new knowledge through the means of practices.	Maximise the efficient use of knowledge in organisations by improving learning.
Epistemological view	Knowledge is the representation of the real world. Knowledge is *explicit*.	Tacit and explicit knowledge are two ends of a continuum.	Tacit and explicit knowledge are two separate dimensions.	Knowledge can be embedded in artefacts and social relationships.
References	Grant (1996), Alavi and Leidner, 2001; Housel and Bell (2001), Dalkir (2012)	Nonaka and Takeuchi (1995),von Krogh (1998), Nonaka and von Krogh (2009)	Brown and Duguid (1991; 2000), Gherardi (2009; 2011), Tsouka (2011)	Cyert and March (1963), March (1991), Crossan *et al.* (1999; 2011)

2.3.3 Summary

Given several considerations, the researcher adopts the learning-based perspective of organisational knowledge to develop the multilevel model of OL. A pragmatic view of knowledge recognises that knowledge cannot be removed from the human knower (micro-level), and that knowledge can be embedded in social relationships, organisation infrastructure and artefacts (macro-level). The learning-based perspective is arguably more advanced than others regarding multilevel studies (Vera *et al.*, 2011), with a framework that links learning across levels (e.g., Crossan *et al.*, 1999) and a host of level-specific research that provides rich understanding of the development.

Also, this study has found that while other approaches have their merit, they are less appropriate for this thesis. For instance, regarding the social-process and practice-based approaches, although they recognise the multilevel aspect (e.g., Brown and Duguid, 1991; Nonaka and Takeuchi; 1995), their research agenda primarily focuses on the tacit knowledge and the issues of knowledge conversion (e.g., Nonaka and von Krogh, 2009; Tsouka, 2011). Conversely, the learning perspective has the advantage of capturing both tacit and explicit knowledge, without invoking their philosophical controversy. The researcher suspects that with learning as the means to obtain knowledge, it is inevitable that effective learning will lead to the better use of existing knowledge and, perhaps, knowledge creation.

In summary, the researcher has laid out the ontological and epistemological concerns which underline the development of the field in general and this study in particular. During the conversation, certain development choices are briefly addressed in response to both challenges, e.g., The *Multilevel theory* (Kozlowski and Klein, 2000) and the *4I-framework* (Crossan *et al.*, 1999). Before a detailed discussion of them takes place, it is crucial to understand these two questions: *What is OL?* And, *why learning is important for organisational study?*

2.4 Key concepts of the multilevel model

2.4.1 Definition of OL

What is learning? Learning is the fundamental process of the human being that involves cognitive change (Kozlowski and Bell, 2008). Fiol and Lyles (1985, p.811) define learning as "*the development of insights, knowledge, and associations between past actions, the effectiveness of those actions, and future actions*". March (2006) identifies learning as a feedback-based process, e.g., experiential learning; learning from others. In practice, the learning process cannot be directly observed and must be inferred from observable actions or observable changes in an entity's features, such as variances in performance, understanding or behaviours (Morgeson and Hofmann, 1999). Overall, learning can be described as a function of experience over time that results in a cognitive change (Fiol and Lyles, 1985; Argote and Miron-Spektor, 2011). The process of learning new things is typically depicted using a learning curve.

Based on the above interpretations, the general definition of *Organisational Learning* involves both a localised, feedback-based process and outcomes of cognitive development (Fiol and Lyles, 1985; Edmondson, 2002; March, 2006). Because this study places more emphasis on the process, the outcomes play a complementary role in studying the OL phenomenon. The cognitive change entails a wide range of changes, including new understanding and knowledge acquisition, behavioural variances, improved performance and or development of new capability.

From a multilevel perspective, OL is a multilevel phenomenon that begins at the individual level and emerges as different phenomena at the group and organisational levels (Chapter 2.5). While the phenomena are functionally similar, their contents are qualitatively dissimilar, because groups and organisations are not natural cognitive entities as is the case with the human being (Brown and Duguid, 2001) (Chapter 2.6). This thesis proposes that (a) individual learning results in mental model change (Chapter 2.7.1); and (b) group learning indicates the development of team mental models (Chapter 2.7.2), and organisational learning involves the development of organisational memory (Chapter 2.7.3). Individual mental models, team mental models and organisational memory are regarded as cognitive constructs at the individual-, group-, and organisational level respectively.

2.4.2 Tension between exploration and exploitation

Why is learning important for organisations? It is not only because learning is associated with performance, competitive advantages and capabilities (Easterby-Smith and Lyles, 2011), but also to enable it to adapt to the competitive environment for prosperity and survival (Fiol and Lyles, 1985; March, 1991). The OL discourse concerns the impact of the path-dependent learning process. Organisations are more likely to replicate a process (or attribute) if they construct their experience of such a process in the past as positive (March, 2006). Therefore, behaviour theorists suggest that organisations tend to exploit past success rather than explore new possibilities for future success (Cyert and March, 1963; March 1991; 2006, Levinthal and March, 1993). March (1991) delineates this tendency into two central processes, *exploration* and *exploitation*, which are essentially defined as:

"The essence of exploitation is the refinement and extension of existing competencies, technologies, and paradigms… The essence of exploration is experimentation with new alternatives" (March, 1991, p. 85).

March (1991) argues that in a dynamic environment, organisations need to strike a balance between exploration and exploitation to achieve persistent success. Organisations must exploit current capabilities to compete in the short term. At the same time, they need to ensure long-term sustainability by engaging in explorative activities, e.g., search or experiment (March, 2006). Balancing between exploration and exploitation is the key to prosperity and survival. The OL literature recognised that exploration and exploitation are both important for organisations (Gupta *et al.*, 2006; Lavie *et al.*, 2010; Crossan *et al.*, 2011; O'Reilly and Tushman, 2013). The argument has received support from both theoretical arguments and empirical evidence, e.g., Eisenhardt and Martin (2000), Ancona *et al.* (2001), Benner and Tushman (2002), Bontis *et al.* (2002), Feinberg and Gupta (2004) and He and Wong (2004).

It is, however, difficult to achieve this balancing task. The feedback mechanism of learning guarantees that organisations will systematically act toward imbalance. Due to its nature, returns from exploitation are often more favourable than returns from exploration (March, 1991). Positive experiences will reinforce the tendency to exploit and may drive out explorative activities. Learning could become dysfunctional, as organisations implicitly and explicitly make decisions that favour short-term profit over long-term survivability, lose sight of the big picture, and

overlook the lessons learned from failures (Levinthal and March, 1993). Alternatively, organisations may also find themselves trapped in a failure loop, in which exploration drives out exploitation. Failures in the search for new possibilities could lead to an increase in both frequency and magnitude of search activities (Levinthal and March, 1993).

The exploration and exploitation are paradoxical in nature. Depending on how they are interpreted based on different sets of assumptions, on the focal level of analysis, and on the context of analysis, one may arrive at different balancing mechanisms (Gupta *et al.*, 2006). Studies of *Organisational ambidexterity* support the idea that organisations could explore and exploit simultaneously, thereby achieving balance (e.g., Tushman and O'Reilly, 1996; He and Wong, 2004; Auh and Menguc, 2005; Jansen *et al.*, 2006). Given that organisations often operate simultaneously in multiple domains (e.g., sales, manufacturing), exploration and exploitation can be treated as distinctive but loosely-coupled activities (Gupta *et al.*, 2006). Ambidexterity could be achieved through structural separation design (Tushman and O'Reilly, 1996) or contextual design (Gibson and Birkinshaw, 2004).

In contrast, Lavie *et al.* (2010) argue that treating exploration and exploitation as independent activities risks underestimating their contradictory and trade-off characteristics. The distinction between exploration and exploitation is the matter of degree – thus, they should be conceptualised as two ends of a continuum (Lavie *et al.*, 2010). Gupta *et al.* (2006) suggest a balancing mechanism of sequential allocation of attention for studies honouring this conceptualisation. Given the incompatible nature of the processes, any attempt to do both simultaneously will achieve success in neither one (Chen and Katila, 2008). Rather than simultaneously, organisations should engagein exploration and exploitation in a sequential manner.

Empirical findings support both ambidexterity and sequential assumptions. For the ambidexterity assumptions, He and Wong's (2004) findings suggest that firms that engage in both exploration and exploitation perform better than firms that focus on only one activity. In another study, Fang *et al.* (2009) support the semi-structured design argument using simulation. They observe that a semi-isolated structure with a moderated degree of between-group linking can achieve the highest equilibrium performances, and also the best long-term learning outcome in most conditions. For the sequential assumptions, Winter and Szulanski (2001) examined replication as a strategy, and found that the replication process often involves the exploration phase, in which the business template is tested and refined.

The exploitation phase then follows with large-scale replication of successful attributes. A similar remark is concluded by Burgelman (2002) in a longitudinal study of Intel Corporation.

2.4.3 The theme of model development: Learning tensions

For the development of the multilevel model, exploration and exploitation are regarded as two ends of a continuum. This interpretation emphasises not only the trade-off nature between exploration and exploitation, but also the temporal aspect of learning. The patterns of the organisations engaging in enacting and completing a new learning cycle over time characterise the balance between exploration and exploitation. From this perspective, organisations always learn incrementally by exploiting current capabilities and knowledge base. They enact a new learning cycle, when they learn new things. Organisations transition from the period of exploitation to that of exploration.

During the exploration period, the need to explore new learnings while exploiting past learning generates *learning tensions,* which occur simultaneously at the levels of a nested system (March, 1991). OL literature supplies rich discussion of this tension at the strategic level; for example, exploration-exploitation (e.g., March, 1991; Crossan *et al.*, 1999; Gupta *et al.*, 2006; Lavie *et al.*, 2010). However, there is a lack of discussion about learning tensions at the group and individual levels. This raises the questions of *what are the tensions during the new learning cycle? What factors and conditions might trigger or resolve the learning tensions?*

Organisations must resolve the tensions to complete the new learning cycle. The key argument is that, in order to exploit, success must be first experienced by means of exploration (March, 2006). Successful exploration always precedes exploitation, and naturally becomes exploitation over time (Lavie *et al.*, 2010). It might seem that this transition is inevitable; however, this is not always the case. In a recent study, Berends and Lammers (2010) conclude that OL is a discontinuous process and can be dysfunctional. Resolving the learning tensions to complete a new learning cycle is challenging. Reality is filled with lessons of failure, in which organisations failed to complete their projects or transform their business.

In conclusion, by adopting the learning tensions as the underlying theme of the model development, this study upholds the trade-off and incompatible nature between exploration and exploitation. Such conceptualisations of OL fit squarely

with the 4I-framework and multilevel theory. The notion of learning cycle highlights the time dimension, which is important in both multilevel research and the study of OL (Kozlowski and Klein, 2000; Berends and Antonacopoulou, 2014). In addition, by identifying the learning tensions across levels, this study fills the theoretical gap in the OL literature. Figure 2 illustrates the conceptualisation of OL and its developmental theme.

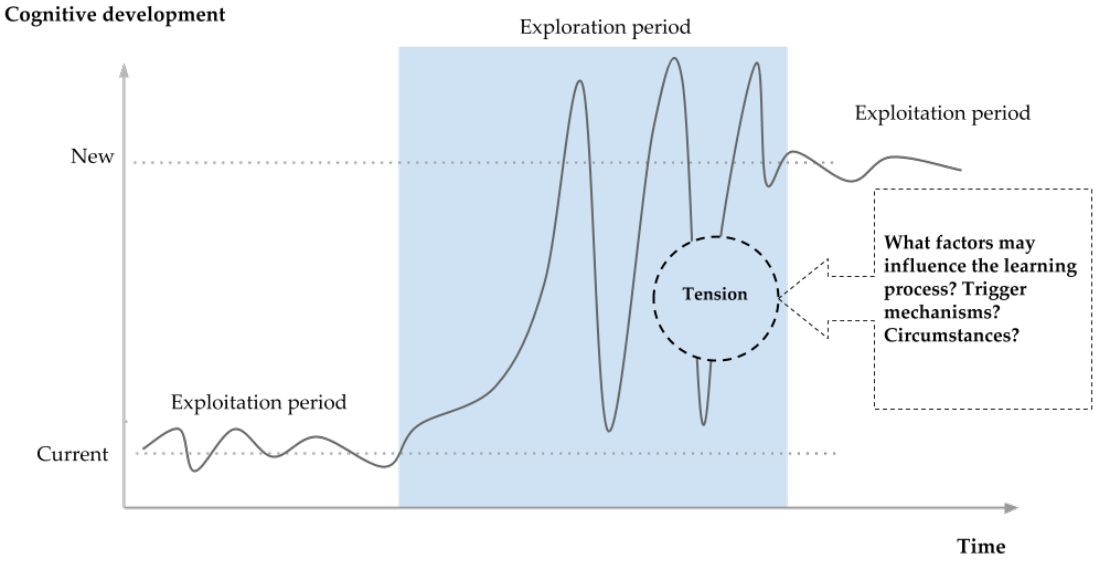

Figure 2 The conceptualisation of OL and learning tensions

2.5 Multilevel theory

The multilevel theory is developed over time by a number of influential works, such as Rousseau (1985), House *et al.* (1995), Klein and Kozlowski (1999), Morgeson and Hoffman (1999), Kozlowski and Klein (2000) and Hitt *et al.* (2007). These works are carefully articulated by Kozlowski and Klein (2000) to develop a guideline for researchers who are interested in pursuing this line of inquiry. This study follows the theoretical guidance provided by Kozlowski and Klein (2000) to design a multilevel model of OL.

The early efforts to conceptualise organisations as multilevel systems were mainly contributed by the interactionists, who studied organisational climate (e.g., Lewin, 1951; James and Jones, 1974; Glick, 1985). The central concerns were whether climate should be viewed as an objective property of the organisation, or as a subjective perception of individuals. The issue was settled as James and Jones (1974) distinguished psychological climate (individual level) from organisational climate (organisational level). Organisational climate is viewed as emergent properties of organisations (Kozlowski and Klein, 2000).

The distinction between psychological climate and organisational climate plays a significant role in developing the *levels* perspective and multilevel theory. The purpose of multilevel theory is to integrate the micro and macro perspectives, as studies that focus on one particular level of analysis are deemed as inadequate to explain organisational phenomena that span multiple levels (House *et al.*, 1995). The inquiry into multilevel perspective is not something new. It is a common trait of social sciences, including the field of organisational sciences (Rousseau, 1985). To understand the *multilevel* perspective, we first need to examine the *macro* and *micro* perspectives.

2.5.1 Macro and micro perspectives

In organisations, behaviours could be seen as a function of both person (P) and environment (E), with the nature of the combined effect, ranging from simple (e.g., additive, average) to complex (e.g., conjunction, disjunction) (Kozlowski and Klein, 2000): or (B) = *f*(P, E) (Tosi, 2002). Depending on the schools of thought, different disciplines emphasise either person (P) or environment (E), which guided the assumptions of their field (Tosi, 2002). These assumptions reflect how each

approach thinks about and studies organisational behaviours, resulting in *macro* and *micro* levels of analysis (House *et al.*, 1995; Tosi, 2002).

The macro approach is rooted in sociology and economics. It is interested in understanding organisational behaviours at the organisational and market level. The macro studies tend to focus more on the system, structure and environment parts of the model (a big E), while the person element is de-emphasised (Tosi, 2002). Macro studies seek to explain why organisations behave in certain ways or develop certain characteristics under the effects of the environments and structures (Tosi, 2002). They tend to treat individual's characteristics and processes like black boxes (House *et al.*, 1995).

For instance, studies of *organisational ambidexterity* assume that organisations can achieve the balance through structural separation design, and that individual will behave in accordance with the nature of their underlying structure (Tushman and O'Reilly, 1996; He and Wong, 2004; O'Reilly and Tushman, 2013). Thus, the emphasis is placed on the organisational structure and its conditions.

While it is necessary to study the influences of the environments, it is not sufficient to explain the OL phenomenon without paying attention to the lower levels of analysis. After all, organisations are comprised of individuals, and they play a central role in enacting organisational environments (House *et al.*, 1995). Individuals' cognitions, emotions and behaviours are the fundamental elements (or processes) that give rise to high-level social phenomena (Kozlowski and Klein, 2000; Crossan *et al.*, 2011).

The micro approach, rooted in psychology, is interested in understanding the thoughts, feelings, and actions of individuals (House *et al.*, 1995). Micro researchers tend to focus on the person or small group (big P) and less on the environment. For them, the environment is defined in terms of individual (or group) perceptions, such as perceived working climate, etc. (Tosi, 2002). Research conducted at the micro level tends to ignore social dynamics arising at higher levels of analysis, and how they shape individuals' thoughts, emotions and behaviours. Therefore, the micro perspective has been criticised for neglecting organisational systems, structures and procedures, which are suggested to shape and influence individual learning, as for example by Crossan *et al.*, (1999) and Kozlowski and Klein (2000).

The integrated theory of micro and macro perspectives was developed from the arguments that neither micro nor macro was adequate to explain social and organisational phenomena (House *et al.*, 1995; Kozlowski and Klein, 2000). By incorporating the multilevel perspective into the development of theoretical models, one might be able to understand more accurately the nature of phenomena in organisations (House *et al.*, 1995).

2.5.2 Multilevel perspective

The multilevel perspective treats the organisation as a multilevel system, which describes organisational entities in nested arrangements. Individuals are nested in groups, groups in organisational units, units in organisations, and so on (Hitt *et al.*, 2007). Each nested layer represents a *level*, which describes its entities qualitatively differently from other levels' entities (Hitt *et al.*, 2007). Therefore, the multilevel theory assumes that multilevel phenomena may have different meanings at each level (Klein *et al.*, 1999). The levels in a multilevel system should not be confused with the concept of hierarchical level – or echelon – which describes the ranks among the individuals, e.g., manager–staff relationship, etc.

The purpose of multilevel theory is systematically specifying relationships between phenomena at higher and at lower levels, thereby bridging macro and micro perspectives (House *et al.*, 1995). The links between different levels may be top-down or bottom-up, or both. Top-down processes describe the *contextual influences* of higher-level on lower-level, while bottom-up describes the *manner* in which lower-level properties emerge to higher-level phenomenon (Kozlowski and Klein, 2000). In other words, organisation influences individual behaviours (top-down) and individual behaviour affects organisation (bottom-up) (House *et al.*, 1995).

2.5.2.1 Top-down influence

By default, a nested system assumes that any level is always embedded in another level. The unit of analysis at any particular level is always influenced by higher-level contextual factors. Such influences are described as the cross-level top-down process. For instance, common organisational systems, such as processes, structure, and procedures, can be considered as the structural factors that precede organisational members. These antecedents tap into the individual's psychological process to shape their perceptions and behaviours according to the organisational

practices and value. The influences could be either direct or moderating (Kozlowski and Klein, 2000).

High-level contextual factors could have a direct impact on how lower-level units behave. An example of direct influence is culture, which determines the accepted patterns of employee interaction and work behaviour (House *et al.*, 1995). Staff may need to address their supervisor in a specific manner when interacting. For instance, soldiers must greet a higher ranked officer using military style as part of a culture that emphasises rank and chain of command. The moderating effect occurs when the organisational context affects the strength of the relationship between two lower-level variables. For instance, the relationship between employee's satisfaction and performance may vary across organisational context. In a working environment, where resources and autonomy are provided, a strong signal may be found between individual satisfaction and performance, and vice versa.

2.5.2.2 Bottom-up emergence

In work settings, individuals do not work in isolation; rather, they interact, while being exposed to common systems. During interactions, individuals exchange emotions, information and ideas. Over time, they may form consensual views of the group and organisation, such as culture and norms (Kozlowski and Klein, 2000). Individual cognition, emotion and behaviour are the elemental content that causes the emergence of higher-level phenomena through the means of their interactions (Kozlowski and Klein, 2000). Therefore, to understand a multilevel phenomenon, researchers need to consider not only the organisational and contextual antecedents but also the elemental content and how individuals interact.

Unlike the top-down influence, bottom-up emergence processes are far more complex and unpredictable because even small changes in individual behaviour or interaction can yield dramatic changes in higher-level outcomes (Kozlowski and Klein, 2000). For instance, one may find that individual cognitive ability affects individual performance, yet one cannot predict that a team with higher aggregated cognitive ability will necessarily perform better than another team. In other words, how low-level variables changes will affect higher-level outcomes are highly unpredictable.

Multilevel theorists address this issue with the process of emergence, spanning from *isomorphic composition* to *discontinuous compilation*, whereby interactions of lower-level entities over time give rise to phenomena that manifest at higher levels (Kozlowski and Klein, 2000; Kozlowski *et al.*, 2013). *Emergence* is the key concept of multilevel theory to bridge the micro and macro levels. Emergence allows aggregation of lower-level property to represent a property of the organisations, such as climate (Kozlowski and Klein, 2000, Crossan *et al.*, 2011). However, the property at the group and organisational levels may have different meanings than at the individual level.

2.5.3 Emergence

2.5.3.1 Emergence phenomena

Traditionally, there are two philosophical approaches to study phenomena, *reductionism* and *emergentism* (Clayton and Davies, 2006). Reductionism views that phenomena can be explained by their constituent parts. Anything, including system and phenomenon, can be reduced to its constituent parts. For instance, human thinking and consciousness can be described as patterns of signals between neurones. Although reductionism does not deny the existence of emergent phenomena, it implies the ability to understand those phenomena from their constituent processes. In other words, any phenomenon can be studied as the sum of its parts. Simon (1969) suggests that social organisations can be viewed as nearly decomposable systems. The linkages between subsystems are weakly coupled but not insignificant. Hierarchical systems have the near decomposability property. This suggests that we can learn a great deal about the organisation and its behaviours by studying its part while ignoring the whole.

In contrast, *emergentism* holds different views of phenomena. One is sometimes regarded as anti-reductionism, which views the emergent phenomenon as unique and holistic. There is a *qualitative novelty* in the nature of the phenomenon. There is a difference between emergents and resultants (Corning, 2002). While resultant is the sum of its parts, emergent is both *gestalt* and qualitatively different from its elements. Therefore, "*…the emergent is unlike its components in so far as these are incommensurable, and it cannot be reduced to their sum or their difference*" (Lewes, 1817-1878, p. 413 via Corning, 2002). The emergent phenomenon cannot be reduced to its constituent elements (Dansereau *et al.*, 1984).

An alternative view of emergentism comes from General System Theory (GST). The GST perspective attempts to understand how lower-level interactions give rise to collective phenomena at higher levels over time (Kauffman, 1994). Although it may appear to be reductionism, it is not so; this perspective is an effort to appreciate the full complexity of a system, its elements and their dynamic interactions over time (Kozlowski and Klein, 2000).

2.5.3.2 Composition and compilation process of emergence

The multilevel theory is developed from the GST perspective of emergence to study organisational phenomena. Kozlowski and Klein (2000) posit that emergence processes are characterised by the nature of elemental contributions (e.g., type, amount) and their combination rules. Given the numerous possibilities of elemental contribution and combination rules, there is a spectrum of emergence processes (Kozlowski and Klein, 2000). *Isomorphism composition* and *Discontinuity compilation* are the two extreme ends of this spectrum.

The composition process is based on assumptions of isomorphism, which draws a common line with the reductionism. It assumes that phenomena do *not* manifest distinctively at different levels of analysis. Thus, essentially having the same properties as they emerge across levels, any differences are negligible. This means that the individual contributions are similar for all in the collective (Kozlowski and Klein, 2000). For instance, team performance of a sales team could be considered to emerge mainly via the processes of composition. The sales team performance is the sum (or average) of its individual members' performance. We could predict the performance of the team, based on each individual's performance.

Compilation assumes a discontinuity form of emergence, which could be, arguably, identified with the *anti-reductionism* perspective. It describes that lower-level phenomena will become qualitatively different as they emerge across levels. This means that the type and amount of elemental content are different for all individuals in the collective (Kozlowski and Klein, 2000). For instance, the performance of a football team cannot simply be calculated using average or sum method, because the contribution of each of its team members is different. Failure on the part of any of the team members could critically affect the team's overall performance. The contributions of low-level entities are combined in a complex and non-linear manner. Thus, once the phenomenon had emerged, it is no longer reducible to the constituent parts (Hitt *et al.*, 2007).

2.5.3.3 Implications of emergence processes on collective construct

Composition processes assume that an emergent phenomenon follows relatively simple combination rules, such as addition or average, among others. The result is a linear relationship between constructs of the individual and collective levels. Collective constructs can be represented by simple aggregations of lower-level units. In contrast, compilation processes posit complex and non-linear combinations of diverse lower-level contributions (Kozlowski and Klein, 2000). In other words, the collective constructs are represented by something different than statistic descriptions of lower-level units (Mathieu *et al.*, 2008). Composition and compilation processes have different structural implications for the formulation of collective constructs. The former assumes constructs to have similar structure across levels of analysis, while the latter assumes a structurally dissimilar construct (House *et al.*, 1995; Kozlowski and Klein, 2000).

Although having different structural implications, both the composition and compilation assume the constructs' function to have similar causal outcome or effect across the levels of a nested system. This functional view assesses a construct's based on the construct outcomes (Morgeson and Hoffman, 1999). This means that if the constructs produce similar outcome at different levels of analysis, then the construct's function is similar. This allows similar constructs to be linked across levels (Kozlowski and Klein, 2000). Therefore, one can justify the notion of thinking, learning, and behaving at the collective level (Morgeson and Hoffman, 1999). By adhering to the Multilevel theory, the ontological challenge of the multilevel model could be justified if the development of the learning constructs satisfies the structural and functional requirements.

2.5.4 Anatomy of a multilevel study

The anatomy of a multilevel study can be described as the *level of theory*, *level of measurement* and *level of analysis.* The important point of multilevel study is that one should be careful of misalignment between the level of theory, measurement and analysis (Hitt *et al.*, 2007). Level of theory is the level at which the researcher develops theoretical concepts – a construct – of the multilevel phenomenon being studied. Focal units are level-specific entities, which the constructs are about (Hitt *et al.* 2007). The multilevel study develops theories that span multiple levels, and how they are linked to describe the phenomenon.

Before an assessment, the researcher must be able to identify the entities that are involved. Such requirement proves to be challenging in practice. For instance, determining individual unit is relatively simple; for instance, manager, worker, salesperson or leader, among others. However, such a task is more difficult at the collective levels. The challenges lie in the ability to recognise the boundaries between different collective units (e.g., dyads, groups, teams), and cross-level boundaries (e.g., exist at group level and enter organisation level) (Hitt *et al.* 2007). Although there are criteria to help distinguish one unit of analysis from another, there is no consensual view about this (Kozlowski and Klein, 2000; Hitt *et al.*, 2007).

Once identified, the entities – or units of analysis – must be analysed at their level using the data that are measured at that level. The individual-level construct should be assessed with individual-level data, and the same is the case for the group and organisational levels. There is often an undesirable confusion between the level of measurement and the level of analysis (Yin, 2009). For instance, the unit of analysis is the organisation, whereas the data collection sources may be from the individual people who work for the organisation. If the data gathered from the individual sources are about certain characteristics of the organisation, then the data's level of measurement could be considered as organisational level (Kozlowski and Klein, 2000). The reverse situation can also be true. If the unit of analysis is about individuals (e.g., salespersons, accountants), and the organisation provided their performance records, then the data's level of measurement can be regarded as individual data.

The collective-level construct could also be assessed with individual-level data, provided that the data are appropriately aggregated to represent collective-level construct properties (Hitt *et al.*, 2007). Kozlowski and Klein (2000) suggest that the collective unit has *global*, *shared* and *configural* properties. Global properties are observable and descriptive of collective units, such as team function, or team structure. Information could be gathered from individual data sources, such as expert informant or team leaders about certain characteristics of the organisation or teams. Shared and configural properties are properties that are derived from the aggregation of behaviours, cognition and characteristics of the individual members. The former – shared properties – follows the composition model of emergence, while the latter – configural properties – follows the compilation model.

2.6 The 4I-framework

In the development of the 4I-framework, Crossan *et al.* (1999) regarded OL as a means of achieving *strategic renewal* – the organisational level phenomenon – which emphasises the tension between exploring new knowledge while exploiting what has been learnt. The 4I-framework consists of four psycho-social processes, which connect four levels of analysis; these are *intuiting, interpreting, integrating* and *institutionalising*. Learning is conceived as a dynamic flow, which starts at the individual level, and flows naturally to the group and organisational level through interactions among the individuals. Once individual learning has become the group or organisational learning, it feeds back to the lower level(s), affecting how individuals think and act. The concurrent nature of these processes gives rise to a tension between new learning and what has been learned (Crossan *et al.*, 1999).

Level	Process	Inputs/Outcomes
Individual	Intuiting	Experiences Images Metaphors
Group	Interpreting	Language Cognitive map Conversation/dialogue
	Integrating	Shared understandings Mutual adjustment Interactive systems
Organization	Institutionalizing	Routines Diagnostic systems Rules and procedures

Figure 3 The 4I-framework: Learning/Renewal in Organizations: Four Processes Through Three Levels (adopted from Crossan et al., 1999, p. 525)

2.6.1 The 4I processes

Intuiting is defined as *"the preconscious recognition of the pattern and possibilities inherent in a personal stream of experience"* (Crossan *et al.*, 1999, p. 525). The intuiting process uniquely belongs to individuals, emphasising their central role in OL. This process describes the individual ability to detect patterns of similarity or differences when interacting with the environments. Learning always starts at the individual level (Nonaka and Takeuchi, 1995). Individuals translate their insights into

metaphors that make communication possible (Lawrence *et al.*, 2005). The use of metaphor compensates for the lack of language to describe new insights, by drawing inferences from other existing models (Nonaka, 1994). It provides a means for individuals and organisations to create and share understanding (Hill and Levenhagen, 1995).

New insights are made explicit through the *Interpreting* process, which occurs at both individual and group levels, and is *"the explaining, through words and actions of an insight or ideas to one's self and to others"* (Crossan *et al.*, 1999, p. 525). The interpreting process is bi-directional. Individuals discuss new ideas with others by actively building a dialogue to facilitate shared understanding (Senge, 1990; Nonaka and Takeuchi, 1995), thus spreading new ideas in the form of metaphor to other individuals. At the same time, shared understanding allows conditions for learning to occur: But whether individuals will learn depends on how they perceive new metaphors. Metaphors contain not only similarities or contradictions, but also emotive content, and are likely to evoke emotional responses (Hill and Levenhagen, 1995; Nonaka and Takeuchi, 1995). Individuals must struggle to assimilate contradictions and disruptions to their existing mental models. If the new metaphors are viewed as producing harm, then individuals may attempt to hold on to their previous mental models, and learning does not take place. In contrast, if metaphors are perceived as allowing for control and producing benefit, then excitement is evoked rather than stress (Hill and Levenhagen, 1995).

New mental models must often compete with the existing ones due to the ambiguous and contradicting characteristics of metaphor. To reduce uncertainty, group members take coordinating actions. They experiment with new ideas, create prototypes, or probe into new environments and observe responses. Feedback information provides the means to refine existing mental models or reject and accept new mental models (Hill and Levenhagen, 1995). For these reasons, actions might be preferred for learning to occur in ambiguous and highly complex domains, where rational planning and deductive analysis may not be helpful. Therefore, both communication and action are important to develop a shared understanding of the environments. At the same time, at the individual level, they stabilise newly formed mental models by removing doubts and uncertainty. This brings us to the definition of the third process, *Integrating - "the process of developing shared understanding among individuals and of taking coordinated action through mutual adjustment"* (Crossan *et al.*, 1999, p.525).

Through the *Institutionalising* process, learning that had occurred among individuals and groups is embedded into organisational artefacts, e.g., systems, routines, and structure, among others. (Crossan *et al.*, 1999). Shared consensus becomes policies, organised activities are routinised, and hierarchical relationships become structure. This process makes learning at the organisation-level distinct from the lower levels. Ideas transformed into organisational artefacts that are available for other members. If no verbal or written form of articulation is established, but is nevertheless recognised, organisational learning will remain implicit (Hill and Levenhagen, 1995). Others will have to interpret the pattern of behaviours, unspoken rules, informal but the right way of working. Once institutionalised, organisational learning becomes independent of any particular individuals. Conversely, learning remains at the lower level(s), and cannot be made readily available to other groups or individuals (Edmondson, 2002).

2.6.1.1 Empirical studies of the 4I-framework

Over the years, the 4I-framework has received recognition among the academic community. In a systematic review of the framework's usage, Crossan *et al.* (2011) revealed that the large portion of the citations was mainly referential. Although the 4I-framework has played a major role in igniting the interests of multilevel research, only several articles treated the framework as the foundation for empirical studies (e.g., Bontis *et al.*, 2002; Crossan and Berdrow, 2003; Berends and Lammers, 2010; Di Milia and Birdi, 2010), or theoretical building (e.g., Vera and Crossan, 2004; Lawrence *et al.*, 2005; Sun and Anderson, 2010). The following examples highlight empirical studies that adopted the 4I-framework.

For explanatory studies, Berends and Lammers (201) employed the 4I-framework to investigate discontinuities in organisational learning processes. Bontis *et al.* (2002) examine the relationship between learning and subjective business performance. The authors found positive links between learning at three levels of analysis and subjective business performance. In another empirical study, except for organisational level learning, Di Millia and Birdi (2010) did not find significant evidence to support the positive link between individual- and group-level learning to objective financial performance, and were therefore unable to establish a predictive link between individual learning and group learning to business performance.

In the above examples, the 4I-framework was employed directly as a means of enabling empirical investigation. However, it is arguably more advantageous to take a step further – for practical reasons. The 4I-framework is too abstract. In the recent review of the 4I-framework, Crossan *et al.* (2011) reveal the initial intention of the framework development, which was toward a unifying theory of OL. Given such intention, the development of 4I-framework necessitates a great deal of theoretical abstraction. The more abstract the concepts are, the more challenging it is to bridge the gap between theory and application.

For multilevel study, there is always a risk of misalignment between the level of theory, measurement and analysis (Hitt *et al.*, 2007). Take the *interpreting* process as an example. Since the interpreting process is presented at both the individual and group levels, it is challenging to establish a boundary between the two levels during the data analysis. How can we be sure that our level of analysis is aligned with the level of theory? Following this line of reasoning, the multilevel model necessitates a way to anchor the analysis at its respective level. In other words, when conducting the group-level analysis, the researcher must only address the construct of group learning, which is the group-level theory of OL. This could be achieved by incorporating the design principles of multilevel theory in the 4I-framework

2.6.2 The 4I-framework in the context of multilevel theory

Based on the terminology of multilevel theory, Crossan *et al.* (2011, p. 457) proposed that OL: (a) *"fits a homologous multilevel model"* and (b) *"primarily emerges via the process of compilation"*. The propositions will guide the development of the multilevel model.

Multilevel theory suggests a range of models to investigate multilevel phenomena, such as direct effects, mixed determinants, mixed effects, moderator, frog pond, and homologous multilevel models (Kozlowski and Klein, 2000, p. 39), Crossan *et al.* (2011) contend that OL could be best described using the *Homologous multilevel model*. A distinctive feature of this model is the ability to generalise its constructs and the linking processes at one level to other levels. The homologous assumption implies a functional similarity across levels, i.e. individuals, groups, and organisations are capable of learning as independent entities.

Although the constructs are functional-similar across the levels, what constitutes the structural contents of learning constructs is different at each level.

This is because learning was hypothesised to emerge mainly via the compilation process. As a consequence, individual, group and organisational cognition forms are considered *qualitatively distinctive*. In other words, the model must specify what constitutes the individual, group, and organisational cognition, so that the cognitive changes indicate learning. From the propositions, a homologous compilation model of OL requires the specification of *the levels of analysis, the linking processes* and *the constructs of learning* at different levels.

Because the 4I-framework has provided the 4I processes that connect the individual, group and organisational levels, this study focused on the constructs of learning at the three levels. Given that constructs are theoretical concepts that are used to explain phenomena, the multilevel model refers to the level of constructs as *level of theory* in order to contrast with *level of analysis*. Alternatively, we could think of OL as a multilevel phenomenon that is comprised of three level-specific mini-theories. Depending on the level of analysis, OL is represented by different theory.

2.7 The multilevel model of OL

To identify the constructs of learning at each level, the discussion focuses on two central questions: (i) *What could represent cognition at the individual, group or organisational levels*? (ii) *How do they give rise to the learning tensions between learning new thing and exploiting what has been learnt?*

2.7.1 Individual-level theory of learning

2.7.1.1 Mental model as individual cognition

Central to the learning process at the individual level is the relationship between cognition and action (Argyris and Schön, 1978; Lazarus, 1993; Crossan *et al.*, 1999). This relationship is expressed as where individuals have mental models that guide them on how to act in situations. Individuals learn by thinking and then acting, the results of their actions are interpreted to revise their mental models (Kim, 1998). Organisational study often embraces the cognitive construct of "*mental models*" at the individual level, since *mental models* help to explain how individuals make sense of their world, and why they behave in certain ways (Klimoski and Mohammed, 1994).

As a process, mental models affect the way in which individuals perceive the world and influence what they do (Johnson-Laird, 1983; Senge, 1990; Kim, 1998). The content of mental models encapsulates personal knowledge, beliefs, skills and other characteristics. Mental models are often conceived to have the forms of cognitive map or schema, knowledge and beliefs structure, etc. (Nonaka and Takeuchi, 1994; Doyle and Ford, 1998; Richardson and Ball, 2009). Given that they take multiple forms, measuring mental models is a challenging task. Klimoski and Mohammed (1994) suggest some techniques that could be used to review mental representations, such as verbal protocol analysis or analytical modelling, among others.

With mental models representing individual cognition, change in mental models signifies individual learning. In its basic form, individual learning in the organisational context is action-oriented, and operates within an existing framework of understanding, norms and routines (Tosey *et al.*, 2011). However, understanding today may not be adequate to explain tomorrow's environment (Barr *et al.*, 1992). Environment dynamics necessitate a different type of learning – i.e. radical learning – that aims at changing the current state of understanding,

norms, and routines, among other features (Miner and Mezias, 1996; March, 2006; Tosey *et al.*, 2011). In general, individuals learn in an organisational context could be conceived as incremental and radical-learning incremental (Miner and Mezias, 1996), which results in incremental and radical changes of individual mental models.

In the work environment, as individuals perform routine tasks, there is always some incremental change in their mental model, even if it is relatively little and only serve to reduce variation (Gupta *et al.*, 2006). However, there is no such thing as perfect replication. Errors will always occur during task repetitions (Gupta *et al.*, 2006). The more complex the tasks, the more likely it is that erroneous outcomes will occur. There are other mechanisms that generate errors, such as ignorance, failures of memory, or inattention. (March, 2006). Errors yield variation. Radical learning is made possible when individuals recognise the potential value of variation by making meaningful connections (Crossan and Berdrow, 2003). This involves an unconscious process of patterns and differences recognition as described in the *intuiting* process by Crossan *et al.* (1999).

When individuals learn a new thing that is radical to their current mental models, they often engage in explorative behaviours, such as searching and experimenting with new ways of doing things (Hill and Levenhagen, 1995). Over time, learning becomes efficient-oriented when the emphasis shifts from exploring to reducing uncertainty from earlier experience (Lant and Mezias, 1992; Hill and Levenhagen, 1995). Learning tasks mainly involve reproduction of past successes and correcting errors (March, 2006). The new mental models are stabilised. Eventually, individuals develop expertise and skills by accumulating experience over time. Learning becomes mostly action-oriented as the experts no longer have to think consciously about action (Crossan *et al.*, 1999).

2.7.1.2 The phenomenon of resistance

In an empirical study, Argyris (2003) observed how single-loop learning, which caused managers to espouse defensive reasoning, prevents double-loop learning from taking place. The nature of incremental learning gives rise to the defensive reasoning mindset, which leads to resistance to change. In Barr *et al.*'s (1992) study of two railroad companies that were under the same pressure to renew their strategy from the declining rail industry, one was able to adapt and recover, while the other suffered strategic inertia and faced bankruptcy. Barr *et al.* (1992)

found what made a difference between survival and bankruptcy was not whether the companies recognised the pressure, but rather how leaders were able to change their mental models in response to environmental changes. In both examples, the common theme is resistance to change.

During a new learning cycle, new ideas or insights become publicly available for interpretation. Individuals must struggle to develop new mental models. Since our values, belief system, knowledge, skills, and abilities are the essence that defines who we are, mental models encompass our identity (Ashforth *et al.*, 2008; 2010). Any stimulus that provokes changes in the individuals' mental models also provokes their identity and, therefore, triggers emotional responses (Huy, 1999). Radical changes in mental models could generate resistance if incompatible with the current mental models of the recipients.

Individuals react differently to changes, depending on how changes are cognitively and emotionally construed. It seems logical that individuals who perceive change as radical will generate more resistance, and negative and intense emotions than if they consider it an incremental change (George and Jones, 2001; Kiefer, 2004). The behavioural responses are outcomes of the cognitive and emotional reactions, ranging from negative, positive, mixed or neutral (Smollan, 2006). Low receptivity to change can translate into active resistance (e.g., being critical, finding fault, vandalism and sabotage) or passive resistance (e.g., quiet cynicism, withdrawal behaviours, procrastinating) (Huy, 1999). Huy (1999) suggested that for learning to occur, individuals must have some degree of receptivity to change.

Given the above discussion, the researcher posits that the learning tension manifests as the phenomenon of resistance to change at the individual level. The resistance phenomenon reflects the individual's struggles to develop new mental models. Individual learning denotes cognitive development that unfolds over time, and sometimes takes years (Berends and Antonacopoulou, 2014). Individual responses will be as dynamic as the changes themselves (Smollan, 2006). Understanding the factors that cause, contribute to or resolve the resistance tensions give insights into the learning process at the individual level.

Resistance to change is not necessarily a bad thing. Resistance can be viewed as a mean to preserve the meaning of past knowledge and prevent knowledge loss and reduction in overall competency (Easterby-smith and Lyles, 2011b). Due to its

negative connotation, many scholars have advocated different terms to describe resistance, such as change receptivity (Huy, 1999), reluctance (Piderit, 2000) or inertia (George and Jones, 2001). However, the researcher argues that the term 'resistance' is more appropriate to reflect the learning tension, because if unresolved, individual resistances might prevent learning at higher levels.

2.7.2 Group-level theory of learning

Group-level units are defined as work teams, which *"(a) are composed of two or more individuals, (b) who exist to perform organisationally relevant tasks, (c) share one or more common goals, (d) interact socially, (e) exhibit task interdependencies (i.e. workflow, goals, outcomes), (f) maintain and manage boundaries, and (g) are embedded in an organisational context that sets boundaries, constraints the team, and influences exchanges with other units in the broader entity"* Kozlowski and Bell (2003, p. 334).

Because teams are not natural entities, they are not capable of learning by default. Team learning necessitates teams to engage in team processes over time (Kozlowski and Bell, 2008). The outcomes of team process include the phenomenon of *Team mental models*, which serves as the apparatus of team cognition for explaining team learning.

2.7.2.1 Team process and team learning

From a system perspective, Marks *et al.* (2001, p. 357) construct the team process as *"team members' interdependent acts that convert inputs to outcomes through cognitive, verbal, and behavioural activities directed toward organizing taskwork to achieve collective goals"*. The collective goals include meaningful team or organisational outcomes, such as products, services, and emergent states (e.g., team satisfaction, cohesion, team mental models) (Marks *et al.*, 2001). Team process denotes the team's collective action to achieve team goals. The question this raises is: *What underlines the collective actions, so that teams can be treated as independent entities and capable of learning*?

Multilevel theorists argued that *patterns of interaction* underline the collective actions (Morgeson and Hofmann, 1999; Kozlowski and Klein, 2000). Patterns of interaction consist of series of ongoing individual process, events and event cycles (Morgeson and Hofmann, 1999). At the group level of analysis, the term *ongoing individual process* encapsulates individual member actions and the action context.

Time and location of the ongoing interactions signify a discrete event. Repeated interactions produce event cycles. The patterns of interaction entail the context and structure that underlines the team's collective actions, including goal specification, strategy formulation and planning, coordination, team monitoring and backup, and conflict management (Mark *et al.*, 2001).

Marks *et al.* (2001) delineated the patterns of interaction into a series of episodes. Each episode comprises of transition and action phases. In the learning context, the *interpreting* and *integrating* processes mostly occur during the transition and action phases respectively. The action phase describes the time when a team mainly engage in organised acts, e.g., surgical teams perform surgical operations. Teams perform tasks that contribute to meaningful organisational outcomes, i.e. *integrating* process. During the transition phase, team members reflect and evaluate their performance, and plan for the future. Teams engage in the *interpreting* process to produce shared understanding (Crossan *et al.*, 1999). The outcomes of previous team processes become the input of that process in the next episode; team learning occurs as a result.

The outcomes of team learning have individual and organisational impacts. For instance, successful operations of the surgical team contribute to the overall performance of a hospital. The results of previous episodes also trigger individual learning process, providing experiences and learning material for skill development (Kozlowski and Bell, 2008). Individual members learn by revising their mental models, which reduces the uncertainties of subject matters and increase the efficiency of their actions.

Over time, individual members not only gain expertise, knowledge and skills, but their focus also shifts to their teammates, who they interact with directly, and then to the team as an entity (Kozlowski and Bell, 2008). Phenomena are said to have emerged when the team members interpret their relationship as having the team dimension (Meindl, 1995); that is, when they construct their experiences as a team.

2.7.2.2 Team mental models as group/team cognition

The common observations are that team process enables team members to develop shared understanding, and they can take coordinated actions (Crossan *et al.*, 1999). As March (2006, p. 207) notes, *"Whereas the mechanisms of exploitation*

involve connecting organisational behavior to revealed reality and shared understandings, the recommended mechanisms of exploration involve deliberately weakening those connections". Researchers in this area invoke the concept of *Team mental models* as an important indicator of team learning (Kozlowski *et al.*, 1996; Kozlowski and Klein, 2000; Mathieu *et al.*, 2000; 2010).

Team mental models (hereafter TMMs) are a cognitive construct at the group level (Mohammed *et al.*, 2010). TMMs support the idea of team cognition, wherebby a team can somehow retain knowledge in a way beyond the cognitive ability of individuals and independent from the individuals (Klimoski and Mohammed, 1994). TMMs are defined as team members' shared knowledge, beliefs and assumptions about the relevant environment, and agreed-upon team norms (Mohammed *et al.*, 2010). Functionally, TMMs helps team members to interpret information similarly, anticipate future events, and act in an organised manner (Klimoski and Mohammed, 1994).

Due to the ambiguity of the term *shared,* TMMs and *Shared mental models* are often used interchangeably (Cannon-Bowers *et al.*, 1993). Shared mental models imply that team members hold *identical* cognitive representations. However, there is growing recognition that team members do not hold identical models, but rather *compatible* mental models, a configuration of overlapping representations (e.g., Cannon-Bowers *et al.*, 1993; Kozlowski *et al.*, 1996; Banks and Millward, 2000; Mohammed *et al.*, 2010). More specifically, team members hold multiple mental models simultaneously about their task-work (e.g., task goals, required knowledge, etc.) and team-work (e.g., team interaction patterns, norms, who know what) (Mathieu *et al.*, 2000; Marks *et al.*, 2001). Through team process, the team members' mental models align and overlap, resulting in cognitive similarity that explains collective sense-making and action.

2.7.2.3 Maintaining diversity in unity as group-level learning tension

During a new learning event, given the uncertainties of the situation, a team must allow the team members to maintain diverse perspectives for creativity representing a unique approach to problem solving, while ensuring the ability to act coherently as a team. Tension arises as team members need to simultaneously agree and disagree. The researcher posits that the new learning tension manifests at the group level as the internal conflict of TMMs, which can be referred to as the

tension of maintaining unity while sustaining cognitive diversity, or *maintaining diversity in unity* for short.

If left to their own devices, teams have the tendency to become homogeneous by systematically, over time, driving out diversity (Milliken and Martins, 1996). In many cases, a high degree of cognitive similarity is considered dysfunctional. The term "groupthink" describes the circumstances in which too much consensus among the team members prevents diverse perspectives, therefore affecting innovative thinking (Klimoski and Mohammed, 1994). Cognitive diversity is desired during new learning because it enriches the supply of ideas, unique approaches, and knowledge available to a team (Williams and O'Reilly, 1998), thereby facilitating exploration, creativity and innovation (March, 2006; Harrison and Klein; 2007). If innovation, exploration and experimentation are the objectives, such tendency is a systemic problem that needs to be managed (Milliken and Martins, 1996).

Any deliberate attempt to weaken the underlying interaction patterns, which give rise to TMMs, would reduce the cognitive similarity and increase diversity. However, teams with a high degree of cognitive diversity could have a negative effect on a team member's satisfaction levels. Team member differences often cause more interpersonal conflict, distrust, and within-unit competition (Harrison and Klein, 2007). The more cognitively diverse the teams are, the less likely it is that team members can integrate within the team, thus reducing performance (Milliken and Martins, 1996). The challenge of diversity design is to sustain sufficient similarity to ensure unity, so that team members can maintain diverse perspectives without affecting the team's collective actions.

There are a number of measures to increase cognitive diversity in teams. One viable option for maintaining a heterogeneous team is by actively diversifying the team member attributes, as postulated by, for example, Jackson *et al.* (1991), Tsui *et al.* (1992), Cummings *et al.* (1993) and Milliken and Martins (1996). Other mechanisms for stimulating original ideas include role-playing techniques, such as devil's advocate, promoting a psychological-safe environment (Edmondson, 1999), and connective thinking tools, such as analogising and brainstorming (Post *et al.*, 2009). However, the outcomes of these mechanisms are complex. Nemeth *et al.* (2001) found that although devil's advocate generates less original thoughts than authentic dissent, it might be worth the trade-off in term of effective cost and team

morale. However, using this technique, team members tend to generate more thoughts that support their initial viewpoints, and resist reconsideration.

In conclusion, the researcher adopts the construct of TMMs as team cognition to investigate OL at the group-level. TMMs are, arguably, one of the most well-developed concepts (Mathieu *et al.*, 2008; Mohammed *et al.*, 2010), with significant empirical and theoretical supports (e.g., Marks *et al.*, 2000; Mathieu *et al.* 2000; Smith-Jentsch *et al.*, 2005; Edwards *et al.*, 2006; Kozlowski and Ilgen, 2006; Lim and Klein, 2006). The conceptualisation of TMMs also provides an internal mechanism to describe the tension of maintaining (cognitive) diversity in unity that arises during a new learning cycle. Also, TMMs take into consideration the property of emergence (Kozlowski and Bell, 2008). The *shared* and *compatible* characteristic of TMMs is assumed to emerge respectively from the process of composition and compilation (Kozlowski and Klein, 2000).

2.7.3 Organisational-level theory of learning

2.7.3.1 Organisational memory as organisational-level cognition

Through the institutionalising process, organisations embed lower-level learnings into the organisational artefacts, including routines, culture, structure, systems, etc. The artefacts, combined with the organisational members, compose what scholars referred to as *organisational memory,* which is a construct of cognition at the organisational level (Walsh and Ungson; 1991; Olivera, 2000; Jasimuddin *et al.*, 2006; Klein *et al.*, 2007). The concept of organisational memory had been invoked in numerous studies to explain organisational learning (e.g., Huber, 1991; Stein and Zwass, 1995; Spender, 1996).

From a narrow view, Huber (1991) views organisational memory as the repository for storing and retrieving information and knowledge. From a broader view, Walsh and Ungson (1991) described organisational memory in terms of storage bins, including individuals, culture, structures, transformations, ecologies and external achieves. Functionally, organisational memory provides access to past knowledge, expertise and experiences which are beneficial to organisational performance (Stein, 1995; Jasimuddin *et al.*, 2006). At the same time, organisational memory could be dysfunctional (Walsh and Ungson, 1991). In a sense that old practices and knowledge were created in past circumstances might not be relevant

or severely limited in the present. This issue is analogous to the tensions of learning new things while exploiting what has already been learnt.

Employing four discourse models of neo-functionalist, critical, dialogic and constructivist, Klein *et al.* (2007) distinguish the characterisations of organisational memory in the literature. The authors suggest that organisational memory could embrace the constructivist perspective as *"Organisational memory develops from cycle to cycle, as activities evolve and the organisation learns. The association of memory with past experience dissolves, and it instead is characterised as working memory, … supporting the organisation as it develops and learns"* Klein *et al.* (2007, p. 114). Such characterisation of organisational memory put the time- and context-dependent characteristics of knowledge utilisation under the spotlight. As the result, the emphasis is shifted from storing static knowledge to enabling knowledge dynamics (Klein *et al.*, 2007). The researcher recognised the important implication of this perspective; that is the ability to resolve the tension of new learning. Since working memory is not static, change is inevitable and desirable.

2.7.3.2 The phenomenon of strategic renewal as the tension

The strategic renewal describes the phenomenon that harmonises the tension between exploration and exploitation (Crossan *et al.*, 1999). During a learning cycle, learning tensions are caused by the modifications of organisational objectives and (re)configurations of organisational resources to support changes. Strategic objectives are operationalised through organisational tasks, which are fulfilled by groups and individuals. The tension is resolved when new learning is successfully assimilated at the organisational level. Given that detailed discussions of the exploration-exploitation tension and the 4I- processes have been discussed in sections 2.4.2 and 2.6 respectively, the discussion continues with another important aspect of OL – *time*.

2.7.4 The temporal dimension of OL

Multilevel studies must pay attention to the temporal dimension (Kozlowski and Klein, 2000). OL is not only situated in a social context (Antonacopoulou and Chiva 2007), but also in space and time (Tyre and Von Hippel 1997; Berends and Antonacopoulou, 2014). To portray the complexity of time and its implication for this study, the researcher borrows the *Timescape* model of OL by Berends and

Antonacopoulou (2014), which defines time as multidimensional – that of *duration*, *timing* and *temporal modalities*.

Time is a boundary condition, which could be expressed as a particular timeframe; that is, *duration* (Adam, 2008). Duration can be measured by clocks and calendars, or by natural cycles. Duration affects OL through different mechanisms. It allows organisations to acquire experiences and external knowledge (Argote, 1999; Luo, 1999); to conduct learning activities, such as experimentation and reflection (Martin and Salomon, 2003); and to recognise delay in action–outcome. At the same time, duration also results in organisational forgetting and antiquation of knowledge. Although often perceived as an unwanted effect, organisational forgetting could create opportunities for renewal (Easterby-Smith and Lyles, 2011).

Berends and Antonacopoulou (2014) concluded that duration is a condition for OL. Thus, investigation of OL must explicitly identify the time frame and temporal reference points of organisations, e.g., organisation's age (Kozlowski and Klein, 2000; Berends and Antonacopoulou, 2014). For example, young ventures are more willing to experiment with novel ideas than established ones are (Lavie *et al.*, 201). This temporal context must be taken into account when providing explanations as to why organisations learn in a particular way.

Within the scope of duration, the second dimension of time is *timing*: Time as *timing* concerns at what moment learning processes occur. Learning is embedded in unfolding flows of events. The characteristics and impact of learning will depend on what has come before and what follows after (Berends and Antonacopoulou, 2014). Timing is concerned with trigger events or actions that lead to the concurrent series of subsequent events or actions. Timing is characterised by rhythm, timeliness and synchronisation (Berends and Antonacopoulou, 2013). While synchronisation and rhythm denote the temporal context of cross-level learning, timeliness highlights the value of knowledge and learning experience – i.e. what has been learned now might not be relevant in the future.

Organisations could purposefully create events to trigger learning by promoting learning in crisis (Antonacopoulou and Sheaffer, 2014), or developing learning routines, such as post-events or action reviews that such activities create (Kozlowski and Klein, 2000). House *et al.* (1995) employ the term *entrainment* to describe coupling strength of multiple levels or units during this period. When

levels are loosely coupled, new learning remains at the individual level. During entrainment, levels are tightly coupled, and high-level learning occurs.

For instance, individuals have different interpretations and ideas about a specific event as they experience it and communicate with others about it. During entrainment, synchronisation between levels occurs, where individuals may bring forth their interpretations, insights and ideas in a formal action-review meeting or reflection session. While top-down processes limit variation, bottom-up processes incorporate variation into higher-level learning. High-level learning occurs as shared interpretations of the event are developed based on individual learning. Although the official interpretations may or may not align with the individual's, they reduce uncertainty among members.

The *temporal modalities* dimension concerns *"how a person's experience at any moment extends from the present into the past and into the future"* (Berends and Antonacopoulou, 2014, p.439). At any moment, individuals may simultaneously consider the past, present and future, and experience them as a continuity (Emirbayer and Mische, 1998). The implication is that how individuals think and act is not simply based on accumulated experiences, but also by reinterpreting distant past events to fit with current understanding and perhaps anticipating the future (Garud *et al.*, 2011; Kaplan and Orlikowski, 2013). It is possible for the same individual to provide different answers about an event at different times of interview.

With attention to the temporal dimension, investigation of OL in multilevel settings necessitates the researchers to identify a specific timeframe during which a learning cycle has occurred. Any events that have occurred during the learning cycle should be identified. The events will provide context and temporal references, and also guide the investigation.

2.8 Conclusion

Up to this point, the OL literature has been reviewed with discussions of various concepts to support the development of the multilevel model. Inspired by the works of Crossan and colleagues (1999; 2011), the researcher proposes a compilation multilevel model to support investigations of OL in organisations, based on the 4I-framework (Crossan *et al.*, 1999) and Multilevel theory (Kozlowksi and Klein, 2000). Compilation models are rare in multilevel literature (Kozlowski

and Klein, 2000). The developmental process of the multilevel model in this thesis could be valuable for future multilevel studies that address OL or other phenomena.

Although the field of OL has made significant progress, the remaining theoretical gaps continue to be challenging. One of the field's theoretical gaps involves the intervening factors that influence OL (Easterby-Smith and Lyles, 2011). Because OL is a multilevel phenomenon, the effects of intervening factors could also span multiple levels. Such recognition necessitates a multilevel perspective to adequately identify the factors, their mechanisms, and the triggering circumstances. The multilevel model could potentially address the gap by providing the means for investigation.

Through the development of the multilevel model, this thesis highlights learning tensions which are widely recognised at the organisational level but rarely discussed at the group and individual levels. Better understanding of level-specific tensions could contribute to the conceptual development of exploration and exploitation (e.g., Gupta *et al.,* 2006; Lavie *et al.,* 2010). In addition, such understanding could also provide insights into the growing literature that suggests a shift from viewing tensions as a trade-off that needs to be managed to embracing their paradoxical nature (e.g., Miron-Spektor *et al*., 2017; Leung *et al*., 2018).

This thesis adopts the definition of OL in terms of both the feedback-based process and outcome of cognition development (Fiol and Lyles, 1985, March, 1991; 2006). The process of learning new things is depicted using a learning curve, while the outcomes manifest as changes in knowledge and behaviour. The development theme of the model is centred on the need to balance learning that exploits and explores (March, 1991; 2006). Respecting the contradictory nature of the exploration and exploitation, the research treats the balance as the patterns of enactment and completion of new learning cycles over time (Gupta, 2006; Lavie *et al.*, 2010). During a new learning cycle, the need to simultaneously explore new learning and exploit past knowledge gives rise to learning tensions; these occur at multiple levels. The learning tension is the underlying theme of this multilevel model.

Crossan *et al.* (2011) posit that the 4I-framework fits a *homologous multilevel model* and the *OL phenomenon emerges mainly through compilation processes*. As an emergent phenomenon, OL entails aspects of both process/function and structure, which allows the collective units to have a reality that is partly independent of the interactions that gave rise to it (Morgeson and Hoffman, 1999). The propositions

implicate that the OL phenomenon is functionally similar but structurally different across all levels (Kozlowski and Klein, 2000). This means that individuals, groups and organisations are capable of learning as independent entities, but what constitutes their structural contents of learning are different. Based on the guiding principles, this thesis developed a multilevel model of OL, summarised as follows:

Individual learning is about individual *mental model* change. When individuals learn a new thing that is radical, they must struggle to stabilise their new mental model (Nonaka and von Krogh, 2009). The tension that is caused by their struggles can be observed as the phenomenon of *resistance*. As individual learning emerges to the group level via the compilation process, team learning is about the development of *Team mental models* (TMMs). At the group level, the learning tension can be observed as teams try to maintain *cognitive diversity in unity,* given that team members need to ensure coherent actions while enabling diverse perspectives to achieve the best possible outcomes in ambiguous situations. At the organisational level, *Organisational memory* serves as the cognitive construct to explain organisational learning. The change in organisational memory can be observed as the phenomenon of *strategic renewal,* which highlights the tension between learning that explores and learning that exploits (Crossan *et al.*, 1999). Table 2 summarises the multilevel model of OL.

Table 2 Summary of the multilevel model

Theoretical foundations	Theoretical premises of the model	References
The 4I-framework & Multilevel theory	OL fits a homologous multilevel model and OL primarily emerges via the process of compilation.	*Rousseau (1985); House et al. (1995); Kozlowski and Klein, (2000); Hitt et al., (2007); Crossan et al. (1999; 2011)*
Level of theory	**Descriptions**	**References**
Individual	- Mental models as individual cognition. - Phenomenon of resistance as the tension of new learning.	*Crossan et al. (1999); Huy (1999); Klismoski and Mohammed (1994); Argyris (2003)*
Group	- Team mental models as group/team cognition. - TMMs' diversity in unity as the tension of new learning.	*Kozlowski and Klein (2000); Klismoski and Mohammed (1994); Mohammed et al. (2012); Marks et al. (2001); Mathieu et al. (2000); Kozlowski and Bell (2008)*
Organisational	- Organisational memory as organisational cognition. - The phenomenon of strategic renewal as the tension of new learning.	*Crossan et al. (1999; 2011); March (1991); Lavie et al. (2010); Klein et al. (2007); Walsh and Ungson, (1991)*

Chapter 3. Methodology

Researchers need to be aware of their philosophical foundations, which have a significant impact on how they think about what it is they are studying, and also how to go about conducting an investigation (Johnson and Clark, 2006). Adopting a philosophical position helps to inform one's research design which in turn guides data collection and data analysis (Saunders *et al.*, 2012). The author begins the methodology chapter with a discussion of the research philosophy employed in this thesis by addressing a number of philosophical stances in the context of organisational sciences.

3.1 Research philosophy

Niglas (2010) suggests that philosophical stances could be discussed in a multidimensional set of continua to understand how different positions inform different ways of thinking about the research process. The continua include ontology, epistemology and axiology. In this context, the research focuses on the philosophies of positivism, interpretivism and realism, given their popularity in social and organisational sciences. Moreover, one should mention pragmatism, which is not concerned with any particular philosophical commitments (Saunders *et al.*, 2012). For the pragmatists, the research questions or inquiries will determine the philosophical stance, which is more appropriate to answering some questions than others (Kelemen and Rumens, 2008).

3.1.1 Positivism

The philosophy of positivism tries to uphold the golden standards of the natural scientist when involved with social and organisational sciences. Positivists usually adopt the ontology of objectivism, which views reality as objective and independent of social actors. Emphasis is placed on the structural aspects of what is being investigated. For example, in the context of OL, the positivist might argue that there is a learning structure that enables learning because human learners learn in their local context or contexts, such as professional role or position in the organisational hierarchy, which are facilitated by a learning structure. Organisations could replicate this learning structure to enhance their learning capability. The underlying assumption is that organisations could learn or perform better by having the right learning structure in which the learners are optimally

supported. Studies of organisational ambidexterity have been undertaken by Tushman and O' Reilly (1996), Gibson and Birkinshaw (2004) and O' Reilly and Tushman (2013) among others.

Similar to natural scientists, positivists emphasise observable reality. To them, only observable phenomena can produce credible data of causal relationships, which describe and explain objective reality (Saunders *et al.*, 2012). Positivists look for evidence of the regularity (or patterns) of causal relationships to establish law-like generalisations, thereby explaining and predicting the outcomes based on the identified law-like relationships. The research questions are often developed in the form of hypotheses, which are deducted from existing theories. Data collection is designed to examine the research hypotheses. Therefore, the types and kinds of data were in fact pre-defined before the collection takes place. Collected data can be analysed using different statistical models to support or reject the hypotheses, which in turn helps to refine the theories.

As regards the continuum of axiology, positivists try to be value-free as far as possible concerning the research process. Value-free axiology is reflected in the process of the design of the data collection and analysis of collected data. Positivists might claim that little to negligible personal value is added to the data collection and the analysis of collected data; thus, it is referred to as value-free axiology. Gill and Johnson (2010) observe that positivist researchers will be likely to advocate quantitative study, which employs highly structured data collection designs and statistical analysis. Such methodological designs aim to facilitate the replication of research processes and findings, which is a virtue of the natural sciences.

3.2.2 Interpretivism

The philosophy of interpretivism is in contrast with that of positivism. Interpretivism adopts the ontology of subjectivism, which rejects the notion of an independent (social) reality. Interpretivists argue that the social world, including organisations and management, is essentially different from the physical and natural world. They put forward the view that social reality is jointly created by social actors as a result of their perceptions and interactions. Therefore, the world is unstructured and changing (Saunders *et al.*, 2012). As a result, social or organisational phenomena are considered rich and complex. Any attempts to study social phenomena by reducing their complexity to a degree of law-like generalisations are criticised as inappropriate.

Social reality is also complex in a sense that there are multiple realities. Given a diverse range of personal characteristics, each human interpreter might construct a version of reality that is unique to them. Researchers who adopt this stance put more emphasis on agency and rationality to explain the social phenomena being investigated. For example, in the context of OL, individuals are considered as the agents of learning that make organisational learning possible. Argyris and Schoen's (1978) models of *single- and double-loop learning* were introduced to facilitate rationality in the decision-making process of key organisational individuals, such as CEOs and leaders, among others. Argyris and Schoen (1978) provided two models that describe features of theories-in-use to help decision makers be aware of the underlying governing values that affect their actions.

Given the subjective notion of social reality, interpretivists advocate for research that recognises the differences in human actors and details of different situations (Saunders *et al.*, 2012); for example, how their subjective interpretations of the surrounding motivate their actions, what are the circumstances and conditions, etc. As interpretivists value the details and richness of how individuals think about and rationalise their actions, data are often collected in the qualitative form. The challenge for data analysis is to reconstruct the social reality based on the subject's worldview. Therefore, it is crucial for the researcher to become empathetic with the research subjects (Saunders *et al.*, 2012).

The above discussion suggests a position of value-bounded axiology. In fact, interpretivists do not shy away from admitting their role in the research process. They recognise personal values as part of what is being researched. Such awareness informs the ethical aspects of their research design, data collection and data analysis. As the research is value-bounded, the findings will be subjective. It is possible that researchers with different value judgements might draw different conclusions about the phenomena being investigated (Herron, 1996).

3.1.3 Realism

Realism believes that what we sense is the reality, which is external and independent of the human mind. That is to say, reality exists with or without our observation of it. Realism assumes a scientific approach that is similar to positivism to develop knowledge about the world (Saunders *et al.*, 2012). However, realists argue against the positivist scepticism of the *unobservable* world (Devitt, 2005). While positivists commit to observables (e.g., computers, trucks, etc.), scientific

realists embrace unobservable and intangible reality. Devitt (2005) argued that there is no issue about the existence and independence of unobservable entities when doing scientific research. As we are not always capable of observing certain events, this does not mean that such events do not happen. They can be identified through practical and theoretical processes (Bhaskar, 1998).

Bhaskar (1998), who developed *critical realism* as a philosophy of social sciences, suggested that reality has a stratified ontology, including the *empirical* (observable events), the *actual* (events) and the *real* domain (what exists). This ontological stratification makes it possible to combine ontological realism with epistemological relativism (Archer *et al.*, 2013). Our knowledge of the world is just a representation of the world itself. Reality is not dependent upon this knowledge (Smith, 2006; Saunders *et al.*, 2015). Therefore, from the critical realist point of view, the process of developing scientific knowledge is viewed as *"historically emergent, political, and incomplete"* (Easton, 2010, p. 125).

Bhaskar (1998) criticised positivism on the ontological basis that positivists picture reality as structured, undifferentiated and unchanging. At the same time, he also warned against the danger of committing an epistemic fallacy: our knowledge of the world does not constitute the real world itself. He argued that both structure and agency are necessary to understand social reality and phenomena. Social structure is a necessary condition, and it always pre-exists human agency; however, human agency is necessary for the replication and transformation of social structure.

The philosophy of critical realism has certain aspects that are different from so-called *direct realism*, which is more akin to positivism. Direct realists espouse that reality can be readily accessed through our senses and that illusions are caused by a lack of sufficient information (Saunders *et al.*, 2015). The more information we obtain, the more accurate our knowledge about the world becomes. The critical realist argues that there is a mental process that is involved in constructing reality. Our minds process information that we gain from our senses to create a unique representation of reality. Critical realists recognise that the social world is socially constructed and plural and that our knowledge of the world cannot be independent of social actors.

Such an epistemological belief has axiological implications: what we see is not always what we get due to the process of interpretation (Easton, 2010). Given

the limitations of the mental process, observation and knowledge are subject to fallibility, which means that when the researcher formulates theories, they cannot escape their own cultural bias and world-view as the result of the process of interpretation. Therefore, scientific research is value-laden and the researcher who studies social phenomena must be aware of this (Saunders *et al.*, 2012).

In summary, critical realism assumes a transcendental realist ontology, an epistemology of relativism, and value-laden axiology (Sayer, 2000; Easton, 2010; Saunders *et al.*, 2016). The critical realist's epistemology is different from that of the positivists and direct realists, who assume the world is relatively unchanging. At the same time, their ontology differs from that of the interpretivists because they recognise the independence of reality. In essence, critical realists view the world as structured, differentiated and changing (Bhaskar, 1998).

Critical realists recognise the importance of multilevel studies given the possibility to enhance our knowledge about the social phenomena being studied (Saunders *et al.*, 2012). Moreover, critical realism is often praised in social sciences because it is pragmatic about the research methods (Smith, 2006; Easton, 2010). The critical realists believe that the research methods should be flexible and fit the subject matter, whether they are quantitative or qualitative (Saunders *et al.*, 2015). Given the above discussion, this research adopts the critical realist stance.

3.1.3.1 Critical realism as the philosophy of social sciences

"*Critical realism argues that the world is characterized by emergence, that is situations in which the conjunction of two of more features or aspects gives rise to new phenomena, which have properties which are irreducible to those of their constituents, even though the latter are necessary for their existence*" Sayer (2000, p. 12).

In addition to the notion of ontological stratification, emergence is another important aspect of critical realism. As discussed by Sayer (2000), new emergent properties grant ontological status to objects or entities (e.g., groups, organisations), which in turn provide the basic building blocks of the critical realist explanation (Easton, 2010). These entities exist in their strata and cannot be reduced to their constituent parts. Therefore, the emergent properties of these entities must be studied at their own level (Sayer, 2000). The reductionist approach to explain phenomena is seen as inadequate. At the same time, social scientists should not expect our knowledge of social phenomena or emergent properties to remain

unchanged across time and space. This is because social actors have the ability to activate their causal power, i.e. to act upon their interpretation of situations, rather than being passively shaped by them (Sayer, 2000).

Given the understanding of the emergence concept and stratified reality, critical realists develop a different model of causation to explain how the world works. The real domain is populated by social entities or physical things with their structures and mechanisms. The entity structure refers to a set of internally related elements, objects, or practices (Sayer, 1992). Structures can be nested in a larger structure. For instance, organisations are entities comprised of smaller entities, such as departments and groups, among others. The internal structure grants entities causal powers or liabilities, e.g., organisations can efficiently produce a large quantity of the same product due to their optimised manufacturing structure. However, the same structure limits their ability to produce a different type of product (Sayer, 2000).

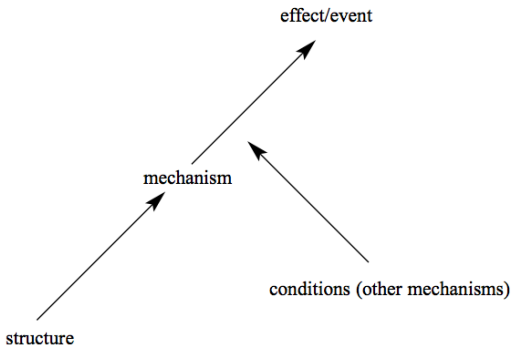

Figure 4 Critical realist view of causation (adopted from Sayer, 2000, p. 15)

Mechanisms denote the causal power of entities (Sayer, 2000). Mechanisms that operate in the real domain give rise to events in the actual domain. Such events may or may not be observed by observers that operate in the empirical domain simply because they are not always capable of making observations. Whether the entities choose to activate their causal power is contingent on other conditions (or mechanisms). When this is activated, the results depend on other conditions, and the effects generated constitute the actual domain (Bhaskar, 1998). The underlying structures and mechanisms of entities are ontologically decoupled from the events that they produce (Smith, 2006).

The point is that, depending on the condition(s), the same type of events could be the consequence of different mechanisms, or different types of events could be the result of the same mechanism. Such recognition has an important implication for the search for regularity of causation in the social sciences: "*what causes something to happen has nothing to do with the number of times we have observed it happening*" (Sayer, 2000, p.18). Therefore, critical realists reject the positivist's model of causation, which places an emphasis on the regular succession of events (Sayer, 2000).

To critical realists, events may occur regularly in closed systems or under special conditions, such as controlled environments during experiments. In contrast, the social world should be viewed as open systems in which if an event occurs regularly it is often the result of a deliberate effort to produce it (Sayer, 2000). Social entities, such as organisations, are systems with varied, complex and dynamic contexts. Thus, one should not expect to always find regularity of causation. Moreover, even if one cannot find the evidence of such causation, it does not mean its mechanism does not exist. The danger of emphasising regularity is attributing the effect to a specific mechanism (and its structure), which might have nothing to do with the actual cause (Sayer, 2000).

This model of causation has huge methodological implications. The critical realist's view of causation implies that social research should place more emphasis on qualitative accounts of conceptualisation and description, which often provide details of what causes changes or particular states, rather than mindlessly searching for regularity to achieve statistical generalisation. This means that the status of generalisation, an essential element of the social sciences, becomes relatively downgraded, but not redundant (Sayer, 2000b). Both are needed in social science. One provides comprehensive explanations of a social phenomenon's mechanisms. The other reveals the distribution of causations in terms of frequency and regularity. Such reconsideration has an impact on the role of case studies as a research method, which is discussed later.

3.2 Methodological choice

It is advised to be clear about the research approach. Easterby-Smith *et al.* (2008) provide three reasons. A well-informed approach helps the researcher to think about the methodological choice and its associated strategies that will enable a better answer to the research question. In turn, the researcher should be allowed

to make decisions about what data should be collected, from where, and how, including the techniques used in data collections and data analysis. Lastly, there might be practical constraints (e.g., access to data, etc.) that limit certain research designs. Knowing other options enables the researcher to adapt to given difficult circumstances.

3.2.1 Research approach

Deduction, induction and *abduction* are the three most popular approaches to formulating a research design. Depending on the extent to which existing theories are used to formulate the research theory or question, a certain approach might be more appropriate. Deductive reasoning often draws extensively from the literature to support the development of new theory in the forms of premises, testable hypotheses, or a series of propositions (Blaikie, 2010). The underlying logic is that if the premises are true, then the proposed theory must also be true (Ketokivi and Mantere, 2010). The key characteristics of the deductive approach are to explain causal relationships between concepts or variables. To do so, concepts are often operationalised in a quantitative manner so that data can be measured and analysed using statistical models. Research that employs a deductive approach would prefer a structured methodology to facilitate replication (Gill and Johnson, 2010). However, this does not mean the exclusion of qualitative data (Saunders *et al.*, 2012; Yin, 2013)

Unlike the deductive approach, induction usually begins with an inquiry of a particular phenomenon. Inductive reasoning uses known premises, such as analysed data, to generate untested conclusions or the formulation of a new theory. The aim is to develop a better understanding of the phenomenon, by recognising the complexity of the underlying variables and their relationships. Given such a consideration, the inductive approach to a research design often works with qualitative data to explore phenomena and identify themes and patterns (Easterby-Smith *et al.*, 2008). It is not difficult to speculate that the research process of induction is the opposite of the deductive approach. The inductive approach moves from data to theory, while deduction moves from theory to data.

Abduction is an approach to a research design that combines both inductive and deductive reasoning (Suddaby, 2006). Based on known premises, researchers can generate testable propositions. Data is collected to explore the phenomena of interest, and to identify themes and patterns. The findings help to generate new

theories or modify existing ones (Saunders *et al.*, 2012). The research cycle continues through subsequent data collection and theory-building. Van Maanen *et al.* (2007) noted that as the researchers move back and forth between data and theory in light of new insight derived from the data, they might generate a new theory that enables a better explanation of the investigated phenomena.

At first sight, it seems that this study should employ a design using the deductive approach because the development of the multilevel model was drawn extensively from the literature. However, the researcher argues that the logic of this study is more in line with the inductive or abductive approaches. This is because the purpose of the model is to support the investigation of the OL phenomenon in a multilevel setting, and the model does not reduce the investigated phenomena to causal relationships between variables.

3.2.2 Methodological choice: Qualitative research design

For the purpose of this study, qualitative research is more appropriate than quantitative research as a methodological choice. More specifically, the research is concerned with how organisations learn as multilevel systems. Given the broad scope of the research questions and the complex nature of multilevel research, answering this question requires theoretical support, meaning that the investigation will not occur in a theoretical vacuum. The development of the multilevel model aims to support empirical investigations of OL. Apart from the analytical foci that the multilevel model provides, the model does not draw any specific causal relationships between concepts and variables that may or may not be used to explain the phenomenon.

This study shares the view that the notion of causality in social phenomena cannot simply be reduced to statistical correlations and quantitative methods (Reed, 2005; Saunders *et al.*, 2015). Qualitative research allows us to study phenomena comprehensively in the form of in-depth historical analysis and how they have changed over time. Details and context are important to the empirical investigation. In contrast, quantitative methods such as surveys have a limited ability to investigate the context in such situations (Yin, 2009). The more variables there are to handle, the more complicated the design of the survey method becomes; for example, increasing the number of questions in questionnaires. This could lead to a reduction in the response rate and lower reliability in the study.

Since OL needs to be considered at the individual, group and organisational levels (Crossan *et al.*, 2011), it is inevitable that data will be collected on all three levels. Given the potential scale of the data collection that might be involved, a qualitative design with a small sample of subjects is more appropriate than a large sample size in quantitative research is. Not only will it enable the collection of details and contexts, but also in-depth analysis of the OL phenomenon. From the critical realist stance, facts and data are socially constructed and agreed upon by people rather than existing independently (Bhaskar, 1998). The need to measure and quantify data through operationalised concepts could make answers devoid of their own constructed meanings.

With qualitative research as the methodological choice, Saunders *et al.* (2012) suggest a number of associated strategies: *Action Research, Case Study Research, Ethnography, Grounded Theory and Narrative Research*. Research strategies inform the researchers about the methods of data collection and the data analysis process that are appropriate to address the research question (Denzin and Lincoln, 2005). However, due to their diversity and blurred nature, qualitative strategies are likely to cause confusion (Denzin and Lincoln, 2005; Saunders *et al.*, 2012). Different research strategies have different emphass and scope and particular sets of procedures. Each strategy is briefly reviewed and considered based on their merits and practical appropriateness.

3.2.2.1 Action research

Action Research concerns "*research in action rather than research about action*" (Coghlan and Brannick, 2010, p.04). Researchers who adopt an Action Research strategy focus on addressing real practical issues that they consider important and worthwhile (Shani and Pasmore, 1985; Reason, 2006). The process of Action Research is identified as emergent and iterative, involving diagnosing, planning, taking action and evaluating stages (Saunders *et al.*, 2012). As the name suggests, participation is a critical component of Action Research. Not only does the researcher contribute to their knowledge of the organisational practices, but they also collaborate with other organisational participants in the decision making at all stages (Reason, 2006).

An advantage of this strategy is that it enables the researcher and the participants to be informed by both theoretical knowledge and knowledge in action, based on first-hand experiences (Reason, 2006). The results from Action Research

are more than just an account of organisational development. New theories could be developed from the results to inform other contexts (Saunders *et al.*, 2012).

3.2.2.2 Case studies

The case study strategy is suitable for research that is explanatory or exploratory in nature. A case study allows the researcher to explore their research topic or phenomenon within its context and real-life contexts (Saunders *et al.*, 2012). It also enables a rich understanding of the phenomenon being studied, including its context, the enacted processes, and other aspects. Hence, the strategy is also employed in explanatory research. Given its versatility, a case study design may use qualitative or quantitative methods, or both, to achieve the research objective.

Yin (2009) highlights the importance of contextual factors in a case study by distinguishing between four case study strategies: single cases versus multiple cases, and holistic cases versus embedded cases. A single case is often represented by a critical case, where the actual case is extreme or unique. Alternatively, a researcher may select multilevel cases by *literal replication* (similar findings across cases) or *theoretical replication* (various outcomes are anticipated through a selection of different cases with different contextual factors) (Yin, 2009). The holistic and embedded case strategies may be chosen on the basis of the level of analysis needed. The holistic case primarily concerns the organisation as a whole, while the embedded case examines multiple units of analysis, such as individuals, departments, teams and organisations, among others.

3.2.2.3 Ethnography

Ethnography is a qualitative research strategy that studies people in groups that interact and share the same space. Ethnographers seek to understand the detailed cultural accounts of the shared beliefs, behaviours, interactions, rituals and languagesof study subjects (Cunliffe, 2010). The level of detail often requires the researcher to live among the people and interact with them on a daily basis. Ethnographers can adopt different philosophical stances in their strategies. For instance, *realist ethnographers* believe in objective and factual reporting from a third-person perspective. *Interpretive ethnographers* believe in subjective impressions and the likelihood of multiple meanings. Their reports are likely to reflect their role in the process of understanding meanings from the account of the first person

(Tedlock, 2005). *Critical ethnographers* are more radical and advocate bringing about change through their work (Saunders *et al.*, 2012).

3.2.2.4 Grounded Theory

Developed by Glaser and Strauss, Grounded Theory could be referred to as a methodological approach that provides a procedure to analyse, interpret and explain the meanings constructed by social actors in specific situations (Suddaby, 2006; Corbin and Strauss, 2008). Grounded Theory adopts the philosophy of interpretivism in social research as a response to mainstream positivism. It is often referred to as taking an inductive or abduction approach (Suddaby, 2006). The researcher usually begins analysing qualitative data and the outcome is a new theory that is grounded in data (Strauss and Corbin, 1998).

Qualitative data are simultaneously collected and analysed to develop analytical codes. There are several procedures for the coding process, for instance, Strauss and Corbin's (1998) three coding stages (i.e. open coding, axial coding and selective coding) or Charmaz's (2006) two coding stages (i.e. initial coding and focus coding). As a new code category emerges, the research will continuously collect new data about that category until the relationships among the codes within the category are verified (Saunders *et al.*, 2012). Given the iterative process of moving back and forth between data and theory, Grounded Theory is argued to be more aligned with an abductive approach (Reichertz, 2007).

3.2.2.5 Narrative inquiry

Narrative inquiry is a qualitative research strategy that places more emphasis on complete personal *stories* – hence the term 'narrative'. Researchers who adopt this strategy wish to preserve the continuity of the story by encouraging the participants to narrate their own experience rather than respond to a series of questions. Weaving multiple stories together enables the researcher to contrast or triangulate details, events and actions. There is an opportunity to develop a meaningful whole for the organisational reality by connecting events and actions over time (Gabriel and Griffiths 2004; Chase, 2005).

The researcher adopts a listener role, while the participants narrate stories, which can be as short as their experience of specific events or as long as the complete history of their lives (Chase, 2005). An in-depth interview is the primary means to collect data, often with a very small number of participants (Saunders *et al.*, 2012).

The literature concerning the Narrative inquiry strategy does not set standard procedures for the analytical process. However, the researcher is still subjected to analytical rigour to develop constructs or theoretical explanations (Saunders *et al.*, 2012).

3.2.3 Practical reasons for choosing a specific research strategy

There were some practical issues that had to be considered when choosing a research strategy for this study. There were financial and time constraints, since the researcher is a full-time Ph.D student from abroad (Vietnam). Access to organisations was another issue. Because the researcher has personal contacts in Vietnam, it was easier for negotiating access. This is particularly important for the scope of this study with three levels of analysis. The degree of accessibility that allows data collection of an organisation's documents and resources and interviews with top and middle-level managers was extremely valuable to the study.

There were also cultural factors to consider. With interviews as the primary qualitative method for collecting data, it would be advantageous to the researcher if he spoke the same language and had the same cultural understanding as the participants. The researcher contends that it was crucial to communicate effectively with the participants to ensure the quality of the interviews. This would also translate to the data analysis process. A cultural mismatch could lead to a misunderstanding and loss of context, particularly when the researcher needs to adopt a sympathetic stance to analyse the interview contents.

Practically, strategies that required participation, such as Action theory and Ethnography, were not suitable given the time constraints involved. Moreover, for the researcher to investigate OL, it was beneficial and more practical to select the context within which organisations had completed a new learning cycle. A change can take years. Grounded Theory is arguably not suitable for this study, given the scope of the analysis, i.e. three levels. The Grounded Theory strategy requires intensive and simultaneous data collection and data analysis (Suddaby, 2006). It might have been feasible if the study only focused on a single level of analysis rather than three. Finally, between the Case study and Narrative inquiry methods, the researcher argues that because the former pays more attention to levels of analysis, and also provides better-developed procedures for data collection and data analysis, it was more advantageous to this study. Given the practical considerations, the *Case study* strategy was adopted as the research strategy in this study.

3.3 Case study research

In this section, the discussion examines the rationale for choosing the case study strategy, and addresses some research issues that might be of concern going forward.

3.3.1 Rationale for using case study

A case study is suitable for researchers who are interested in the in-depth study of the phenomenon in real-life contexts (Yin, 2009). Yin (2009) highlighted the importance of contextual conditionings in understanding a phenomenon. The phenomenon and the context within which it occurs are usually entangled in real-life situations. The use of a case study enables the researcher to take this entanglement into consideration. Thus, the case study is often associated with qualitative methods (Saunders *et al.*, 2012). Such ability is crucial for investigating the OL phenomenon, which is also a localised process (Edmondson, 2002). How organisations learn is highly conditioned by their local contexts. Since no two organisations are alike, local contextual factors vary from organisation to organisation.

Case studies can also employ quantitative methods, although their ability to deal with the contextual factors is extremely limited (Yin, 2009). This can be done through the means of controlled environments (experiments) or by controlling the number of contextual variables in their design (surveys). However, given the separation of a phenomenon and its context, the in-depth understanding of social interactions that give rise to the former is likely to be lost. Also, the more variables to be analysed, the more complex the research design becomes; for example more questionnaires, larger sample size, and others. To some extent, maintaining the research feasibility will be exponentially difficult.

In spite of that, the benefits of studying a phenomenon in a laboratory-like environment are undeniable. There will be situations in which the numbers of variables exceed the data points or where facts require the triangulation of data from multiple sources to ensure their credibility, etc. (Yin, 2009). In such situations, the research could benefit from both quantitative and qualitative methods (Saunders *et al.*, 2012). The ability to cope *"with the technically distinctive situation"* (Yin, 2009; p. 18) highlights the methodological and technical flexibility of case studies.

Although the case study strategy has been recognised as a distinctive form of empirical study in research communities, it has also been criticised (Yin, 2009). There are concerns about its philosophical underpinning, generalisation ability, and confirmatory bias (Flyvbjerg, 2006; Eisenhardt and Graebner, 2007; Easton, 2010). The author would like to address these points before turning to the research design.

3.3.2 Critics of case study strategy

"You cannot generalize from a single case," some would say, "and social science is about generalizing." Others would argue that the case study may be well suited for pilot studies but not for full-fledged research schemes. Others again would comment that the case study is subjective, giving too much scope for the researcher's own interpretations. Thus, the validity of case studies would be wanting, they argued. (Flyvbjerg, 2006, p. 219)

3.3.2.1 Case study and the issue of generalisation

The knowledge that derives from research based on case studies is often criticised on the grounds of a lack of generalisability – the ability to generalise findings to universal knowledge (Flyvbjerg, 2006; Yin, 2009; Easton, 2010; Thomas, 2011b). Social scientific research often stresses the ability to generalise research findings because, without such ability, there is virtually no difference between an everyday generalisation and that from a scientific study (Thomas, 2011b). Any contributions made by social scientists are dismissed as a result. This line of criticism has often led to questions about the value of knowledge claimed by case study research and the value of case study research itself as a strategy for scientific study (Flyvbjerg, 2006).

For a large part of the research community, generalisations are an essential element of the scientific process. One implication of this is that theoretical (context-free) knowledge is somehow more valuable than context-dependent (practical) knowledge. Flyvbjerg (2006) argues that formal generalisations are often overvalued as the sources of scientific development while exemplary knowledge is underestimated. Theoretical, rule-based knowledge is not sufficient to develop expertise. Professional development requires the acquisition of experience and knowledge that are context-dependent. Moreover, case study research is also well-suited to produce this knowledge.

In addressing the issue of generalisable knowledge, case study advocators often draw a common line between carefully chosen experiments and the strategic selection of case(s) (Flyvbjerg 2006; Yin, 2009). They argue that as long as the chosen case(s) are typical or representative of the investigated phenomenon, then there is an opportunity for formal generalisation. However, similarly to experiments, a case study is generalised to its theoretical propositions, rather than to populations. Yin (2009) terms the kind of generalisations achieved by case studies as analytic generalisations. Other scholars use different terms to justify the generalisability of case studies – for example, qualitative generalisations (Tripp, 1985) naturalistic generalisations (Stake, 1995) and fuzzy generalisations (Bassey, 2001).

Another issue concerning generalisations is related to quantity – how can they be made from a single case or a few cases? As the case study strategy looks at the complex interaction between many factors, at the same time attending to their contexts, some might think that there is a trade-off: an in-depth explanation for the generalisation to a wider population (Gomm *et al.*, 2000). Others argue that this is simply not true. Yin (2009) views the assumption behind the "quantity" inquiry (e.g., large sample) as sampling logic, which is associated with quantitative studies. For case study research, sampling logic should be replaced by the logic of replication (further discussion is provided later) (Eisenhardt and Graebner, 2007; Yin, 2009). A generalisation of the case study method should be thought of in terms of an analytical generalisation, rather than a statistical generalisation, because of the different logic applied (Yin, 2009).

3.3.2.2 Case study strategy is biased toward verification

Case study research is argued to produce biases toward verification – the tendency to confirm the researcher's preconceived ideas. Thus, its findings are questionable. In response, Flyvbjerg (2006) asserted that all methods of inquiry contain verification biases. If anything, *"case study contains a greater bias toward falsification of preconceived notions than toward verification"* (Flyvbjerg, 2006, p. 237). Case study research often involves researchers interacting intimately with people in real-life contexts, studying the phenomena in-depth, which creates opportunities for falsifying assumptions, rather than confirming them (Hodgetts and Stolte, 2012). Because of this, case study research could offer an antidote to the problem of publication bias – the tendency to publish favourable results, or of statistically significant results (Rothstein *et al.*, 2006).

Flyvbjerg (2006) used an example that the proposition of "all swans are white" would be falsified if a single black swan is observed. This type of test is called *falsification*. For the sciences to progress, knowledge falsification is equally as important as knowledge generalisation. This view is particularly consistent with the critical realist perspective that all knowledge is fallible (Smith, 2006). For instance, Aristotle's definition of gravity held for hundreds of years and was then rejected by Galileo's experiment. The point is; where a quantity or large sample size is concerned one should be reminded that the development of scientific knowledge should not simply be judged based on quantity alone. It is necessary, but not sufficient. The case study could be used as supplementary to the development of theoretical knowledge (Flyvbjerg, 2006).

3.3.2.3 Discussion

Many authors defend the value of case study research through alternative conceptualisations of generalisations and its significance in scientific knowledge development (Bassey, 2001; Flyvbjerg, 2006; Yin, 2009). However, Thomas (2011; 2011b) warns against this line of thinking from social scientists as diluting the natural sciences' constructs of generalisability. He argues that the validity of case study research cannot be drawn from generalisability simply because it cannot represent a larger set. Instead, he proposed that the value of case study research should be judged from its offer to the scientific process, which is the opportunity to parse theory against reality, facts and concepts, and the opportunity for academic researchers to produce exemplary, tacit knowledge.

This study shares the view of Thomas (2011; 2011b). From the critical realist perspective, knowledge is subject to fallibility, particularly knowledge in the social sciences. Critical realists are open to the idea that their theory is less precise and less objective. This is the implicit assumption of theory building from cases (Eisenhardt and Graebner, 2007). Furthermore, theory-testing using case study research has the ability to falsify existing knowledge (Yin, 2009). It is critically important to move back and forth from the general – that is theory, to the specific – that is case(s), to challenge our previously held beliefs. Methodologically, there are many ways to study the world, and there is no superior way to think about and to study the social reality. We have a chance to uncover and understand the mechanisms of how the world works from the multi-disciplinary research community and through debates (Woodside and Wilson, 2003). Hence, case study research is appropriate for this study.

3.4 Designing a case study for this research

3.4.1 Time horizon

Given the practical considerations as discussed previously in section 3.2.3, the researcher adopts the cross-sectional approach to study the OL phenomenon. It is possible to carry out the case study strategy centred on interviews over a short period (Saunders *et al.*, 2012). There are other temporal considerations about the OL phenomenon, such as duration, timeliness and temporal modality (as discussed in section 2.7.4). For OL to be examined at three levels of analysis, it is preferred that the organisation being studied has completed a new learning cycle. The interviewees may then provide a complete account of their experiences, which indicates the full learning process.

3.4.2 Selecting a single case or cases

To bring about a methodological structure to select a case or cases, Thomas (2011) suggests a typology of a case study. The topology considers the *subject, object, purpose, approach* and *process* of case study research. Although the typology appears to occur in a sequential manner, the author notes that some decisions can be made simultaneously about the subject, object, purpose and approach.

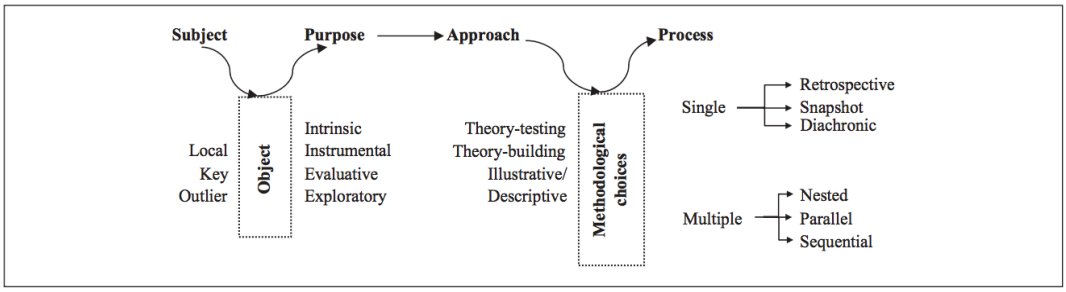

Figure 5 Typology of a case study (adopted from Thomas, 2011, p. 518)

3.4.2.1 Subject and Object

Thomas (2011) discussed the significance of separating *the object* from *the subject* in a case study inquiry. A case, *the subject*, should not simply be chosen because it is an instance of a class, which is comprised of similar phenomena. There must be a notion of a theoretical and scientific basis that provides an analytical focus. Thomas (2011) refers to such a focus as *the object*, an analytical or theoretical frame, which provides a means of interpretation, so that the case can be put into

context. The logic behind the separation is concisely put by Wieviorka (1992) via Thomas (2011, p. 513):

"For a 'case' to exist, we must be able to identify a characteristic unit. . . . This unit must be observed, but it has no meaning in itself. It is significant only if an observer . . . can refer it to an analytical category or theory. It does not suffice to observe a social phenomenon, historical event, or set of behaviors in order to declare them to be 'cases.' If you want to talk about a 'case,' you also need the means of interpreting it or placing it in a context."

Given the above discussion, the object could be considered as the proposed multilevel model that supports the investigation of the OL phenomenon. The subject, therefore, is identified by its ability to illuminate the object. Furthermore, there are several parameters that help to establish the boundary for the case(s), from spatial and temporal factors to personal, group, organisational or other factors (Stake, 2005; Simons, 2009; Yin 2009). There is a temporal requirement for choosing a case in this study. The case should cover a learning cycle, during which learning event(s) occurs to characterise a period of exploration. In addition, the learning cycle only concerns a single domain; for exampleproduct development, or business transformation. The conceptualisation of exploration and exploitation of this study necessitates these requirements.

Thomas (2011) suggested three principle ways to choose the subject: local knowledge case, key case, or an outlier case. A local knowledge case refers to the case inquirer's workplace, placement, or home, etc. and assuming the inquirer's access to quality internal information and data, there will be an opportunity for in-depth analysis and intimate knowledge (Thomas, 2011). Both the key and outlier cases have the capacity to exemplify the analytical object of the research inquiry, although in different manners. While the former illustrates the object, the latter illuminates the object by "*the virtue of its difference*" (Thomas, 2011, p. 514). From this discussion, the case should be chosen due to its key-ness to exemplify the analytical object – the multilevel model.

3.4.2.2 Purpose and approach to case study design

What is the nature of this study? Clarifying the purpose and nature of the study is an important step toward the research design (Saunders *et al.*, 2012). Using the terminology provided by Thomas (2011), this study could be considered to have an instrumental and exploratory purpose. The research questions concern how

organisations learn as a multilevel system and how the intervening factors work. Since the inquiry is broadly scoped, it has an exploratory element. In addition, the development of the multilevel model is intended to support answering that question, a means to an end – *instrumental*.

Research is not conducted in a theoretical vacuum. Different theories were employed in the development of the multilevel model, which provides an analytical frame to the case study. The research inquiry and the use of the multilevel model entail elements of both *theory building* and *theory testing*. What is being built is the understanding of (a) OL as a multilevel phenomenon and (b) the factors that could influence the learning process in this multilevel context. What is being tested are the constructs of the model and the underlying assumptions on which the model is built, e.g., propositions from Crossan *et al.* (2011) in Chapter 1.6.2. Given the complex nature of multilevel research, there is no clear boundary between theory testing and theory building in this study. Multilevel study relies on existing work and well-established theory to develop a theoretical model of the investigated phenomena: *"Multilevel models may, however, be unnecessary if the central phenomena of interest … have been little explored in the organizational literature" (*Kozlowski and Klein 2000, p.14*).*

3.4.2.3 Single or multiple studies

With the research purpose and approach stated, the design discussion turns to the choice of single or multiple studies. Thomas's (2011) argument about the rationale for such a decision differs from that of Yin (2009), with the latter (perhaps) being more cited among the case study community. Thomas (2011) suggests that the difference between single and multiple studies is the *element of comparison* among *the subjects*, which can be one or many. A single case does not have an element of comparison and is often concerned with a cause that changes in relation to time; for example, *retrospective*, *snapshot* and *diachronic* (akin to *longitudinal*). On the other hand, multiple studies (e.g., *nested, parallel* and *sequential*) contain an element of comparison. The differences or similarities between the cases are important and necessary to the testing or development of theory. Note that *nested studies* that involve multiple units of analysis within *one case* also contain an element of comparison (between the units of analysis). That is to say that the multilevel study could use a single case and can be considered as multiple studies due to the fact that it performs analysis at three different levels to form a broader picture.

Yin (2009) offers a different strategy to the single or multiple case decision. There are five rationales for single-case design: (1) the *critical case* for testing a well-formulated theory; (2) the *extreme or unique case,* which is so rare that its rareness value alone is worth studying; (3) the *representative or typical case,* which represents an instance of a class (e.g., a phenomenon) that can be used to study the circumstances and conditions that influence or give rise to such a phenomenon; (4) the *revelatory case* when the researcher has access to a study phenomenon that was previously inaccessible or extremely limited; and (5) the *longitudinal case,* which is the study of the same case at different points in time to understand the dynamics of the phenomenon over time.

For multiple-case studies, how cases are chosen depends on their ability to offer explanations for predicted findings. Predicted findings serve as the basis to enable replication of similar results across cases. This is referred to as *replication logic* (Eisenhardt and Graebner, 2007; Yin, 2009). If similar results across cases are predicted, then the design will follow the logic of *literal replication*. If contrasting results are expected given anticipated reasons, then the design will adopt *theoretical replication* logic (Yin, 2009). For instance, the multilevel model of OL proposed that the tension of new learning manifests as the resistance phenomenon at the individual level. Therefore, the researcher expects to find evidence supporting such a prediction, not only in one case, but across many cases of relatively similar contexts. The unit of analysis is another dimension of case study design. Yin (2009) refers to the design of this dimension as the *holistic* case versus *embedded* case. The holistic case focuses on a single unit of analysis, such as an organisation or group, while the embedded case also pays attention to the sub-unit(s).

Based on the above discussion, it is obvious that multilevel study in general benefits from the case study design, given the attention to different units of analysis. Case study design for this study is naturally identified with either the embedded design from Yin (2009) or the nested design from Thomas (2011). There is a difference between the two. From Thomas's (2011) point of view, a nested design is regarded as a *multiple study* even with a *single case* due to the fact that the subject is analysed multiple times as different units of analysis. The nested case gains its significance from its integrity and wholeness, in the sense that its units integrate and interact to depict a boarder picture (Thomas, 2011). To Yin (2009), an embedded case study could be part of a single-case or multiple-case design. The focus of

analysis shifts from the internal integrity of a single-case to the element of comparison and replication across multiple cases.

This study argues that the notion of integrity and wholeness is important to a multilevel study, particularly for OL, even more than the need to accommodate a wider range of contextually different or similar cases. Multilevel research is demanding and intensive (Kozlowski and Klein, 2000). It requires additional attention to the internal integrity and dynamic characteristics of the multilevel phenomena on the basis that neither the micro view nor the macro view is sufficient to understand them. A shift of focus will be likely to undermine those characteristics. For instance, in single-case design, the emphasis of comparison is among the units of analysis. However, in multiple-case design, this emphasis turns to the pattern of similarity or differences between units of the same level of analysis among the cases.

In addition, while there is no denying the value of undertaking the cross-case comparison, the already demanding work of multilevel research intensifies exponentially in the multiple-case of embedded design. This might be achievable by combined efforts of multiple experienced researchers, provided that they have access to multiple cases. For the nature of this work involving a single Ph.D. research student with limited resources, a more realistic approach is the *single-case embedded design*, or in Thomas's (2011) terms, *multiple studies of a single case nested design*. The chosen case will be studied in a *retrospective* manner.

3.4.3 Data collection

Data collection techniques are informed by asking the following questions: What data should be collected, from whom and how?

3.4.3.1 How can data be collected?

Up to this point, the researcher has established that a qualitative study is more appropriate to investigate OL in multilevel settings, given the analytical frame of the proposed multilevel model. The primary data are qualitative data, whichare mainly collected using the interview technique. A case study can collect evidence from different sources, and interviews are the most important one (Yin, 2009). A semi-structured interview, sometimes referred to as a *focused interview* (Merton *et al.*, 1990), is non-standardised and often used in qualitative research (King, 2004). It

is well suited for the in-depth study of complex phenomena, particularly in the context of multilevel settings. The semi-structured interview allows data collection of the individual perceptions and their opinions regarding complex and perhaps sensitive issues. It also enables probing for more information and clarification of answers. For the context-specific case study, the variety of interviewee backgrounds, professions and histories make use of a standardised or structured interview impossible. The interview could be done on a face-to-face basis or via communication technology, such as Skype, Facebook Messenger or Facetime.

The semi-structured interview allows the researcher to develop questions with a flexible degree of rigour to further explore the phenomena (Saunders *et al.*, 2015). Semi-structured interview questions depend on the context of the case study. Such interviews often start with an open-ended inquiry, followed by probing questions (Hsieh and Shannon, 2005). This type of interview is suitable for this study because the phenomenon of OL concerns human affairs or behavioural events, as proposed in the multilevel model. Well-informed interviewees can provide important insights, and introduce the researcher to other interviewees or sources of evidence (Saunders *et al.*, 2012). There are downsides of semi-structured interviews, however. The interviewee's answers are subject to the quality of their own interpretations, which could be infused with personal bias, erroneous memory, or inaccurate articulation. A reasonable solution is to cross-reference among the interview data and triangulate findings with other supplementary sources (Yin, 2009).

3.4.3.2 From who should data be collected?

This question is related to the identification of the units of analysis. For a multilevel study, the level of measurements must reflect the level of theory (Hitt *et al.*, 2007). This refers to the levels that the collected data represents, e.g., group-level data must be collected at the group-level, organisational-level data must be collected at the organisational-level, etc. Since interview data are generated by individuals, they are intrinsically individual-level data. There are instances where the content of the interviews could be related to the group or organisational levels, e.g., the team leader provides descriptive accounts of how the team operates and what has happened, or organisational leaders describe organisational structures, policies, or even decisions that have organisational impacts (Kozlowski and Klein, 2000).

It is also possible to generate unit-level data through aggregation, particularly in the context of the emerged phenomenon. However, additional efforts are required to differentiate each level of analysis. While the identification of individual-level unit(s) is relatively simple, it is more complex and controversial with multiple issues at the collective levels. For instance, where does one boundary end and another begin? How do we know that we are addressing units at organisational level or group level (Hitt *et al.*, 2007)? To guide the identification process, Kozlowski and Klein (2000) distinguished three properties of the unit at the collective level: *global, shared* and *configural*.

Global properties of collective-level units are usually descriptive and observable; for instance, team functions, team structure, numbers of members, and others. This type of information could be easily collected through an interview with the team manager or leader, who has access to relevant information. On the other hand, the *shared and configural properties* are said to emerge from an individual's characteristics, cognition, and behaviours. Therefore, Kozlowski and Klein (2000, p. 34) argued that "*individual-level data are summarised to describe the pattern or configuration of these individual contributions*". This means that the aggregation of the content provided by interviews with individuals is also appropriate to represent unit-level data. While shared properties require an evaluation of similarity, configural properties do not. Configural properties are interpreted based on the multilevel constructs (Kozlowski and Klein, 2000). Configural properties are associated with the compilation process (Kozlowski and Klein, 2000; Crossan *et al.*, 2011).

For the data collection process, there is always a danger of confusion between the unit of data collection and the level of theory or analysis. Such confusion stems from the fact that the data sources might be from individuals, while the unit of analysis is about the collective, or vice versa. The below matrix (Table 3) is developed for this study based on an example by Yin (2009). The table describes the ideal situation in which data sources should be collected, if available. Multiple data sources will enable data triangulation, which in turn improves the validity of evidence and the quality of the case study's outcomes.

Table 2 Level of data collection vs Level of analysis

Design	**Data collection source**		
	From individual	From team	From organisation
About individual unit *(e.g., manager, developer, change implementer, etc.)*	Their perceptions and attitudes of the change. Observations of how others respond to change.	Interview with the manager/supervisor of the individual unit about their behaviours and attitudes toward the change.	Interview with other employees and high-level leaders about the changes.
About group unit *(e.g., sales team, marketing team, initiative team, etc.)*	Team member perception of how the team interacts to carry out team tasks.	Interview with team leaders about team processes and composition. Team meeting minutes.	Interview with high-level managers who supervise the teams and their progress. Organisational records of team activities.
About an organisation	Interview with high-level managers or organisation's leaders about strategic decisions and organisational actions.	Meeting minutes of strategic team, or top management team.	Documentation, archival materials, etc. Organisational outcomes of the learning cycle and events.

3.4.3.3 What data or information should be collected?

First, contextual information must be collected to establish the case boundaries so that the researcher can develop a sense of what has happened. Contextual information includes what had changed, major events, the actors involved, external stimulations, etc. Since the case study is retrospective, a key informant could provide this information before the data collection. Based on the information, the researcher could articulate the open-ended questions for the interview protocol. Different questions might be posed to different interviewees depending on their participating role during the learning cycle of the investigated organisation.

Second is the detailed and specific data in the form of the interview's content. These data are the personal interpretation of the events that happened during the period of inquiry. The interviewees could provide a detailed description of past events, their interactions with other members, opinions and observations of the surroundings, etc. Interviews with high-level managers or leaders could reveal more information about the group-level unit and the organisation. Secondary data could be collected from different sources, such as archival records, documentation, meeting minutes etc., to enable triangulation.

3.4.4 Data analysis

There are numerous analytical methods that can be employed to analyse qualitative data, including Narrative inquiry, Template Analysis (King, 2012) and the Grounded Theory Method (Strauss and Corbin, 1998; Charmaz, 2006). Different analytical methods suggest a different approach to analyse qualitative data, depending on the nature of the study. For instance, the Grounded Theory Method of data analysis is without any preconception theory, while with Template Analysis, the researcher begins with a prior list of codes or categories that enables the analysis of data. The codes are subject to modification and verification (King, 2012). The common characteristic of these methods is their attention to the content and contextual meaning of the text data, which might be in verbal or print form, written reports, etc. (Kondracki and Wellman, 2002). The outcomes are patterns of similarity, which are reported in the form of themes, categories or sub-categories, and codes.

Given the common characteristics, approaches to analysis could be referred to as qualitative content analysis, which is defined as "*a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or patterns*" (Hsieh and Shannon, 2005, p. 1278). The objective of doing content analysis is to gain better and in-depth understanding of the phenomenon being studied. Thus, language plays a major role in revealing the meaning of the text (Hsieh and Shannon, 2005). Qualitative content analysis must go beyond counting the frequency of words, or certain events about the phenomenon, to classify similar meanings. The meanings could be derived from either explicit or inferred communication (Hsieh and Shannon, 2005).

Researchers can use the *conventional, directed* or *summative* approaches to analyse content. The key differences among the approaches concerns how initial codes are developed. *Conventional content analysis* takes an inductive approach to analyse data without imposing predefined categories and new categories emerge from data during analysis. If *directed content analysis* is adopted, the research often consults existing theory. The researcher, therefore, would develop an initial coding scheme prior to the analysis in accordance with the theory (Kyngas and Vanhanen, 1999). As the analysis proceeds, the initial coding list changes by adding new codes or refining old ones. Researchers can extend, refine or challenge existing theory based on their findings. S*ummative content analysis* approaches text data differently. The analysis begins with the identification of words or related terms that frequently appear either by using a computer or manually. The researcher then proceeds to analyse the patterns of those terms' contextual meanings. The outcomes enable better interpretation of contextual meanings, which is related to the use of certain words or phrases (Hsieh and Shannon, 2005).

3.4.4.1 Conventional content analysis

Among the three approaches, conventional content analysis seems to fit the purpose of this research, which aims to study OL as a multilevel phenomenon. While there is no shortage of studies that address OL at one specific level, multilevel studies are rare in comparison (Crossan *et al.*, 2011). Apart from the specification of phenomena that represent the manifestation of learning tension at specific levels, no categories were preconceived to describe OL. Using the conventional approach to data analysis, the researcher allows new insights of the phenomenon to emerge in the forms of relationships, categories and so on by becoming immersed in the data (Kondracki and Wellman, 2002).

Hsieh and Shannon (2005) suggest that the analytical process could be in line with the following procedures. The researcher starts becoming familiarised with the data by repeatedly reading to get a sense of the complete picture, and then, by highlighting the words from the text that appear to capture key meaning or concepts to develop codes (Morse and Field, 1995). The researcher needs to record their interpretations, impressions, thoughts and analysis of the text. As this process continues, codes emerge from the data and then become the initial coding scheme (Hsieh and Shannon, 2005). Related codes or concepts are grouped into categories based on their *internal homogeneity* and *external heterogeneity* (Patton, 1990). This means that codes within a category should have coherent meaning while showing identifiable boundaries between different categories. These emergent categories might form meaning clusters or themes (Patton, 2002). An audit trail should be generated as the results of the procedure to allow reviewability and quality control.

The advantage of conventional content analysis is that information that is gained from the interview participants is not imposed by preconceived theory (Hsieh and Shannon, 2005). This allows the interviews to flow more naturally since there is no need to ask specific questions that are related to the initial coding scheme. Moreover, because the case will be studied in a retrospective manner, not all details can be recalled by the participants. It is more likely that the interviewees can only remember the most significant factors or events during the learning process. Thus, it is more beneficial to this study to not be disruptive if possible.

There are challenges of this approach to content analysis. Without a sufficient understanding of the context, including the contextual factors of the events, the participants, their position and situation during the discussed events, etc., the identification of key categories might not be successful. It is also limited in theory development given the difficulty in establishing theoretical relationships between concepts from the findings. Such limitations could be attributed to the simplicity of the analytical procedure in comparison to a more sophisticated procedure of, for instance, Grounded Theory Method. The results, at most, could support concept development or model-building (Hsieh and Shannon, 2005).

3.4.4.2 Analytical strategy

For this study, the researcher expects to conduct three sets of analysis at the individual, group and organisational levels. At the individual level, the analysis will focus on the resistance phenomenon, as the manifestation of new learning

tension, and the factors that contribute to resolving the tension; more specifically, how the individual unit responds to changes by identifying the factors that are perceived (by them) to have an impact on the learning experience. Similarly, at the group level, the analysis focuses on identifying the factors that influence the development of new TMMs, which resolve the tension of maintaining cognitive diversity while ensuring unity. At the organisational level, the analytical focus is set on institutionalised artefacts, including organisational structures, new systems, strategic decisions, and others.

The expected findings will include the identification of intervening factors, which influence the learning process at each level of analysis. These factors will be synthesised across three levels to provide a more comprehensive understanding of their effects on learning. The experience gained from conducting the investigation using the proposed multilevel model will enable the researcher to answer the research inquiry, and to have a better understanding of the model performance and its theoretical building-blocks.

The next section briefly discusses the pilot study, which had been conducted before the main case, and the lessons learnt from it. The researcher gained not only the experience of doing qualitative research from the pilot study (e.g., interviewing techniques, keeping records, content analysis and writing reports), but also became more confident before approaching the key case.

3.5 Pilot study

Yin (2009) suggested that a pilot case study should be conducted for several reasons. First, it will help refine the data collection plan in accordance with the content that should be collected and the procedure to follow. It provided the researcher with the opportunity to gain experience in doing interviews and content analysis, and formulating what will be in the final report. The researcher was able to develop and refine the question protocol. The pilot case can be chosen on the basis of convenience, easy access, and the ability to illustrate the object of the research. The lessons learnt from the pilot case are useful to the main case. The pilot case can be found in Appendix B.

3.5.0.1 The pilot case: Software development in eSecurity

eSecurity is a SME (small- and medium-sized enterprise) with about 19 employees at the time of the interview (2016). The case is interesting because when eSecurity was founded in 2011, its business model only involved the distribution of security software. The company began to develop their own security product in early 2012. It was launched in early 2013. After that, the product received a number of innovation awards. The period when the company decided to develop their own product could be seen as a new learning cycle. The organisational outcomes are that they acquired the capability of product development and the software product itself. Since then, they have made the transition to the exploitation phase.

Before collecting the data, the author had a brief discussion with the firm's Director to gather some descriptive information about the case, including an outline of all the events that happened and the actors involved. Based on this information, the author was able to develop a timeline for this case. The Director, who acts as the key informant, verified this information. Data were collected by semi-structured interviews with four firm members involved in all the events – i.e. the Director, a sales manager, the lead developer, and a senior developer. Other organisational members were not interviewed due to the fact that they had no significant contribution to make to any events. This includes accountants, sales representatives, office administrators, and two other junior developers who had joined the company less than two months previously.

Since the company did not keep minutes of meetings, only interview data were collected. Organisational-level data, such as product sales performance and

financial resources spent on the product development, were mainly provided by the Director. The case was analysed according to the analytical strategy discussed in the previous chapter. The report for the pilot case study can be found in the appendix B. Here, the researcher reflects on the lessons learnt from studying this case.

3.5.0.2 The needs of domain-specific knowledge

Since the researcher received great support from the Director, there was no issue of accessibility during the data collection. The case was relatively simple and clear regarding what happened and the unit's contextual boundary. The interview questions were administered on the basis of what had happened, the interviewees' opinions of those events (if relevant), how they felt at different points in time, and other perceptions. For group- and organisational-level data, the interviewees were asked about their interactions with other members, and between teams, etc. Although the interviews were carried out smoothly, some topics were not discussed further due to the researcher's lack of technical knowledge.

Since learning is a localised process, individuals learn in the context of their work. The interviewees provided explanations in the context of their profession. This is a challenge during data collection, when domain-specific knowledge is required to have a fruitful and interesting conversation. If the researcher had had the necessary vocabulary and some technological knowledge, then the probing questions would have been more effective in gaining insights about the team process in relation to software development.

3.5.0.3 Lessons learnt from the data analysis

Data analysis was conducted at three levels according to the multilevel model. The first encountered challenge was about the identity of learning entities. Individuals can have multiple social identities in their workplace and might take different identities during the learning cycle. For instance, the lead developer can assume the identity of software developer, which reflects his profession. Or he can assume the identity of high-level manager, who has the ability to influence strategic decisions. Depending on the identity assumed, the analysis could arrive at a different meaning.

The same issue occurred at the group level. Group-level units were identified as three separate teams; that is, the strategic team, development team and sales

team. The problem is that the analysis of the strategic and sales teams had little to do with the overall narrative of the case. The author was able to overcome the identity issue by focusing on the questions of what this case study is about and who the key learners are. Since this pilot case concerns product development, the focus should be on the developer and the development team.

By employing the matrix of the units of analysis versus data collection sources, the vertical and horizontal boundaries of the units become clear. The matrix provided a comprehensive picture of the units of analysis and their roles within the learning cycle. For instance, it is clear that the developers and the development team played the most important role in the organisational outcomes (e.g., product creation, software development capability, etc.). Other organisational members (the Director, sales managers) and teams only played complementary roles. They can be regarded as different data sources to support triangulation.

Table 3 Unit of analysis vs. Data collection sources

Design	**Data collection source**		
	From individual	From team	From organisation
About individual unit: *Developer*	The developer's perceptions, attitudes and behaviours of the new idea.	Interview with the lead developer about other developers.	Interview with the Director and Sales Manager.
About group unit: *Development team*	Team member perception of how the team interacts to carry out team tasks.	Interview with the lead developer about the team process.	Interview with other teams (e.g., Sales, Strategic) about the development team in respect to their work.
About the organisation	Interview with the Director about decision making.	-	Interview with the Director about product performance.

The researcher also realised that the company was founded not too long (about six months) before the learning event occurred. They had not established any policies, structure, culture, or working patterns at that time. Given the lack of past learning, the learning tensions were difficult to detect. This particular point had been reflected in the selection of the case.

Chapter 4. Case file: Business Transformation of a Vietnamese Corporation

The business transformation of Telcom, a Vietnamese corporation, has been chosen as the case study for this thesis. Telcom is a large, publicly-owned company that has been operating for decades. This case study involves knowledge domains of business transformation, re-aligning the workforce, management process and information technology closely with the firm's new strategy and vision. The context of this case entails a new learning cycle, during which the element of learning tensions is presented. At the point where the study was taken up, the organisation had successfully resolved tensions relating to their business transformation, thus completing the learning cycle.

The objective of the investigation is to understand what factors, and under what circumstances, influence the learning process by addressing the tensions that arose during the transformational learning cycle. The author employed the proposed multilevel model of OL to support the investigation.

4.1 Case overview

Telcom Corporation is a publicly-owned organisation that provides a wide range of telecommunication services, for example land-lines, mobile phones, broadband internet and other content services. The research site was at *Telcom-HCM*, the largest regional entity of Telcom in Vietnam at this time. The workforce of Telcom-HCM alone was estimated at about 5000-6000 employees before the business transformation.

In the wake of new market regulations and competition, from the end of 2007 to the end of 2011, Telcom-HCM had undergone a large business transformation. They had successfully achieved a number of objectives, including business restructuring, the implementation of new compensation systems, new IT support systems, and new Strategic Planning and Management systems. Subsequently, their success had led to the transformation of the entire Telcom Corporation.

As a member of the Telcom Corporation, Telcom-HCM was governed by the policies and practices that mirror the government templates for non-business public organisations. Although the templates were modified to accommodate the business

environment, they still entailed a number of problematic characteristics for doing business. For example, an individual salary was mainly determined by seniority, i.e. the longer one worked for Telcom-HCM, the more one earned, regardless of one's contribution. The performance and skill-based components of the salary were small and negligible. For the purpose of analysis the researcher treated Telcom-HCM as an autonomous entity that is loosely connected to its parent company. Sufficient contextual boundaries were established so that meaningful findings and explanations could be derived from the analysis. By 'organisational level', the researcher refers to the *Telcom-HCM* organisation.

In the face of increasing competition and loss of market share, a need for internal change became increasingly necessary. The change was initiated by the Telcom-HCM themselves. The initial idea was relatively simple: the organisation needed to replace its compensation system in order to address the demotivated section of the workforce. Although there had been many internal efforts to modify the old compensation system, for example the re-calibration of the pay scale, the results were very limited. Telcom-HCM decided to approach external support. At the time, the Vice Manager of the Human Resources department, Mr. T, was assigned to find a workable solution. In the middle of 2008, one management consulting agency was contracted to organise and implement a new *"3P"* Compensation system. The 3P stands for pay for *Position, Person* and *Performance*.

Mr. T recalled the discussion with the agency's director that he thought had captured the essences of the 3P systems on solving the organisation's issues.

> *The consultant gave me an explanation of the principles (on how to motivate workers), which I feel are the root of the new system. The rest is just tools. Imagine three circles: the first is knowledge, the second is skills and the third is individual attitude. Knowledge can be obtained by learning and education. Work experience and practice improve skills. But work attitude is personal. If one's (work) knowledge is not sufficient, we could replace him/her with another. Practice will improve skills. But attitude is different. If one's work attitude is less than others, it would make a different in performance…*

After the new 3P system had been presented to the top managers, the agency was contracted to *"Design and implement the compensation system that pays for job position and performance"*. An overview assessment was conducted to understand the conditions of the organisation at that time. The report's key findings can be summarised as followings *(source: Assessment Report, submitted on 12.2018):*

1. **Structure**: Telcom-HCM's structure is long and narrow with many middle levels. The different levels have a tendency to overlap with each other in terms of function and responsibility; for example, functional units of the headquarters and of the local production centres. Thus, there was no basis upon which to identify a job position within the structure regarding its responsibilities and job description.
2. **Performance Appraisal System**: There was no uniform guideline on how to assess performance. Different production centres had their own ways of assessing performance, mainly on a peer-reviewed basis. Therefore, assessment results were often not reflecting actual business performance and were not connected to strategic objectives.
3. **Compensation and Benefit System:** The salary distribution did not reflect the difference between low-skilled and high-skilled jobs. Compensation was not based on a worker's position and actual contribution. Competitive salaries did not meet market standards. Thus, work attitude and performance were at an all-time low. There was a high turnover rate of highly skilled employees and an inability to recruit experienced people.
4. **Planning and Auditing System:** There was no planning and auditing system that connected the top and bottom levels. Information flows between and within levels were slow and inaccurate.
5. **Information and Communication Technology (ICT):** ICT were fragmented and file-based. Different places used different software to do the same jobs; for example accounting, planning, etc.

The report stressed that changing the compensation system was just "*treating the symptoms, and not the root causes*". Changing to the new 3P Compensation system without having the support from an adequate structure and other soft systems, as described above, would be difficult to achieve. If successful, it might only help to distribute salaries on a fairer basis among the workforce, but was highly unlikely to improve the organisation's overall performance.

A two-year implementation plan was proposed and accepted by the top-level management teams. As part of the contract agreement with the agency, the leaders of Telcom-HCM pledged their commitment to the business transformation project (hereafter, '*the project*' for short).

4.1.1 The project

The implementation project of the new systems had two major phases, and each stage was highlighted by several major events (Figure 7). The first "*Design and Experiment*" phase began in early 2009. The second "*Deployment"* phase was officially institutionalised in early 2010. The project was completed at the end of 2011 as the contract with the agency ended. However, the Telcom-HMC organisation had been continuously making incremental changes to their 3P system, even until the day that the interviews took place. At the end of 2011, four major outcomes had emerged as the results of the business transformation. Table 5 provides a summary of the implementation project, including objectives, strategies and outcomes.

Table 4 Overview of the implementation project

Implement	Situation	Strategy	Outcomes
Pay for Position (P1)	Overlapping job duty, redundant job position, etc.	Redefine the unit's functions and its structure. Define job description of a position	Minor structural change. Job role and position dictionary
Pay for Performance (P2)	No system to assign KPOs and KPIs	Adopted the Balance Scorecard method for measuring performance	Strategic planning and management system. New performance appraisal systems
Pay for Person (P3)	No uniform guideline for evaluating employee's competency	The agency provided terminology and methodology to define P3	New competency and performance appraisal systems

According to the archival documentation (*Compensation Policy, issue date 04/11/2010*), the 3P Compensation System can be succinctly understood by the three mechanisms: *Pay for Position* (P1), *Pay for Performance* (P2), and *Pay for Person* (P3):

$$\text{Individual Salary} = (P1 \times P3) + P2$$

With the new compensation system, any individual role and position in the organisation is predefined with job descriptions and a Position Score - P1. Based on the percentage scale of the P1-Score, a Competency Score - P3 is assessed every six months to determine whether the individual is fit for their role or position. If an employee was consistently evaluated as being less than 70%, he or she would be deemed unfit, and have to move to a new position or role. The Performance Score P2 reflects the actual result of their job performance, which is measured by quarterly KPIs.

Figure 6 The project implementation timeline

The Design and Experiment phase

The objectives of this phase were to prepare for the implementation of the new systems. The main tasks included redefining and categorising job positions in accordance with the Position score P1. At the same time, communication and education on the 3P system were provided to the top and middle managers. The preparation was mainly carried out by the implementation teams under mentorship of the agency. Training and communication programmes were provided by the agency, targeting different types of audience; for instance, operational knowledge for implementation teams, strategic knowledge for top-level managers.

Given the uncertainties and doubts about the appropriateness of the new systems, an experiment had to be conducted. A new Central Sales Centre (CSC) was created to carry out the experiment. CSC had a new structure and autonomous power to experiment with the 3P Compensation system. The experiment revealed several shortcomings that the organisation had to address to successfully implement the new systems. Two of these flaws identified were the lack of business data and supporting tools. The further implementation of the 3P Compensation system necessitated an IT support system. An IT team was formed to develop an in-house support system based on the requirements and context of the Telcom-HCM. The experimental results were very promising, as one HR Director recalled:

> HQ-T01: *I remembered at the time, the performance increased eightfold. Because it was so productive, we decided to deploy the full 3P system*.

The Deployment phase

At the beginning of 2010, Telcom-HCM decided to institutionalise real changes. Minor structural changes were first deployed at the West and East Companies and the HQ's Functional Units. During the course of the implementation, the Position P1 and Competency P3 Scores were continuously calibrated to reflect the organisational situations. At the same time, the organisation started training programmes for the Balanced Scorecard (BSC) method to prepare for its deployment. The BSC method and the evaluation of Performance Score (P2) were officially institutionalised in August, 2011. The key challenges of the implementation were about how to use BSC in practice, i.e. how to cascade strategic objectives to the local Key Performance Objectives (KPOs) and Key Performance Indicators (KPIs).

4.2 Data collection sources

The research was carried out in the form of a retrospective study, since the project had finished at the end of 2011. Although the business transformation occurred throughout the organisation, this case study only focused on three major entities of Telcom-HCM – namely, *The Headquarters, the West-* and *East Company*. This was due to their initial involvement and significant contribution to the project. The data sources for analysis were mainly compiled of semi-structured interviews, supplemented by the organisation's archival materials and public news. The archival data included a detailed work schedule during the project, the compensation policies, the agency's Analysis report with full appendix, and other organisational public materials. Most interviewees were members of the implementation teams, while some were stakeholders; for example, top-level leaders, and worker team leaders.

Due to the issue of accessibility during the data collection, two sets of interviews were conducted at different times: one in 2016 and one in 2017. However, the themes remained focused on the participant's activities, experiences, and perceptions during the projects. A list of more than 30 potential interviewees was produced using a non-probability snowball sampling technique. During the course of the interviews, the interviewees were asked to refer to other colleagues with whom they had been working with during the project. Not all recommended individuals were interviewed as they had either changed jobs, retired, or left the organisation over the years. The researcher conducted a total of 28 interviews (16 males, 12 females), in which 25 interviewed participants gave consent to have their interviews recorded. The other three declined, so detailed notes were taken during the interviews instead.

Each interview session was held at the participant's workplace and lasted forty-five minutes on average. Some interviews took more than one hour. The interview strategy combined semi-structured questions that were specifically related to the project and open-ended questions to explore to the interviewee's role and perception during the project. Additional questions were asked when interesting topics emerged, or specific details needed to be clarified. All interviews were conducted in Vietnamese. Because Vietnamese is the researcher's first language, the content was analysed in Vietnamese to avoid losing the context. Representative analysed content was translated into English as support evidence.

Twenty five audio recordings were transcribed using NVivo software. The transcribing process enabled the researcher to be familiarised with the data.

Additional read-throughs were conducted to validate and become more deeply immersed into the data. The researcher scrutinised the information carefully, frequently picking up errors in the transcriptions such as dates, times and locations. Common information was cross-referenced with other organisational archival data to establish a more reliable timeline of the project (as shown in Figure 7). The next step involved a classification process in which the interviewees were categorised by their professional role, managerial level, team, workplace, etc. To anonymise the data, each transcription was assigned a reference code based on the category. Finally, qualitative data were analysed on individual, group and organisational levels.

Table 5 Profession and Position categories of the interviewee

Professional role	**Count**
Accounting	1
Director	3
Field staff	2
HR	16
IT	1
Planning	5
Total	**28**

Position	**Count**
Field staff	2
High-level manager	3
Office Staff	13
Manager	10
Total	**28**

Since the key activities were about implementation of new systems, the units of analysis were identified as follows. At the individual level, the analysis was concerned with how *the implementers* learnt as they carried out the task of implementing the new systems: 23 of the 28 interviewees were identified as *implementers,* including 13 HR and planning staff and 10 managers who supervised and directed the execution of the process. The analysis focused on the implementers' experience and perceptions over time which influenced their responses to the change – i.e. resist or commit to change. The data of the implementers were triangulated with other data sources; for example, interviews with other organisational employees and high-level leaders (five in total), public materials, and others.

The group-level unit of analysis was identified as the *implementation team.* To understand the learning process of the implementation teams, the analysis focused on examining what factors might contribute to the group-level learning tensions. The findings were drawn from the aggregation of team member perceptions regarding the team interactions. Supplementary data, such as team reports or meeting minutes, were not available for triangulation. Telcom-HCM do not keep team meeting records. At the organisational level, Telcom-HCM is the unit of

analysis. Strategic decisions, organisational structures and other characteristics were analysed to understand what contributed to the learning tension at this level.

Detailed discussions are provided at each level of analysis in the following sections. Table 7 illustrates the data collection sources in relation to the different units of analysis of this case study.

Table 6 Units of Analysis vs. Data collection sources of the case

Design	**Data collection source**		
	From individual	From team	From organisation
Individual level: *The implementers*	The implementers' perceptions and attitudes	Interview with the manager-level implementers	Interview with other employees, high-level leaders
Group level: *Implementation teams*	Team member's perception of how the team interacted	Interview with the team leaders about team processes and composition	Team meeting minutes were *not* available
Organisational level: *Telcom-HCM*	Interview with high-level managers or organisation's leaders	Not available	Contract with the agency, compensation policies, training and communication material, the project planning

4.3 Individual level of analysis

The analysis focuses on the phenomenon of resistance as learning tension at the individual level. By attending to the factors that influence how individuals respond to change, the researcher was able to identify what contributes to the individual learning process, as well as understand the conditions and circumstances under which the factors operate.

Learning is a localised process (Edmondson, 2002; Berends and Lammers, 2010). Individuals in the workplace learn by performing specific tasks that are related to their *modus operandi*. The interviewees were identified as *implementers* as they were responsible for implementing tasks. However, they were from different departments, i.e. HR, planning staff and managers. The HR staff were primarily involved in the design and implementation of P1 and P2. The planning staff were responsible for the Balanced Scorecard system P3. The managers made decisions regarding the implementation of the system.

As the outcomes of the learning process, the implementers clearly recognised changes in their thinking about their job and the ways in which they work. For instance, when asked to elaborate on how they thought and worked before the enactment of the new systems compared to after, one implementer described how her behaviour and that of her colleagues had changed as a result of the project.

> *WE-T15: Before, there was not much work, a lot of free time, [I] just work until the end of the office hours … But, after we had implemented this [3P system], I feel the different. The more you work, the more you earn. The policies force you into a 'mould', work more, find new work to do, and no longer passively wait for works … I even work until the evening. For example, my manager still gives out work at 16 o'clock. I have to work if I want to submit it tomorrow, even if today office hour is over*

4.3.1 Resistance to change

The analysis indicated that the transformation met with resistance from senior field staff and low-skilled workers. They are the groups of change recipients who benefited from the old compensation systems and were drastically affected by the new systems. When the new systems were being implemented with the new scoring systems, these affected not only individual salaries, but also widened the pay gap between the regular staff and their managers. The increased pay gap fuelled more dissent. While the middle managers were relatively silent, the affected change recipients vocally resisted the change. The following discussion with a HR

employee who interacted directly with the recipients illustrates the overall picture at the time.

> *HQ-T18: Before, there was a group of level-7 (highest level) workers, who had a really high salary. When their role and position was redefined according to the P1 Score, their salary was immediately cut in the first month of the implementation. They were not happy! Most people on the same team were affected similarly. Although we had clearly explained everything, they kept sending letters of complaint…*
>
> *Their working attitudes were lazy but they still received high salary, even did not do any work. High-level workers, high salary, lazy work attitude. Their behaviour during the implementation was shockingly rude, terrible in general. There were a lot of complaints, and many other things. But it was clear at that time, we did this for the organisation, not for any single individual. Because the market was already competitive, we had to change. Although they resisted, and behaved negatively, they had to accept it at the end. If they did not comply, they would have to leave.*

Negative comments were posted on both the internal forum and public domains. Letters of complaint were sent out to many government bodies and newspapers. An example of a letter of complaint published in a national newspaper reads, "*We do not consent to the new 3P Compensation system, which is being applied at 'Telcom-HCM'. The 3P reduced the current salary of the workers by 10% to 50%...*" (The Labourer Newspaper, 2010). Over the course of the business transformation, people who resisted the change were retrained for new positions or encouraged to join the early retirement programme. Since the transformation has commenced, Telcom-HCM's workforce has been drastically reduced by 20%, from more than 5000 to around 4000 employees.

In contrast to the responses of the change recipients, the implementers were mostly in favour of the new systems. However, there were different degrees of commitment to change. Based on their responses and description of what they did during the implementation, the analysis identified three levels of motivation: the implementers committed to change because (a) they wanted to, (b) because they had to, and (c) because they felt obliged to. For instance, change endorsement, self-learning, and proactivity in taking the initiative indicate that individual want to change. Conversely, passively waiting for instructions indicated that the implementers had to or felt obliged to change.

The following provides two contrasting examples. When asked to describe their views and experiences with the changes, one implementer showed a

passionate attitude and critical understanding of the changes while the other provided a descriptive and short answer that indicated a general lack of interest.

> *WE-T15: From a practitioner's view, before the implementation,* ***I thought it was really good****. I saw that the old compensation system had many issues, for example, everyone was almost the same; middle managers were just a little bit higher, managers were a little bit higher and so too the directors. [...]* ***When we heard about the new systems, we looked for more information about what BSC was on the Internet*** *and from BASE (an education centre in Vietnam) […]*

> *WE-T09: When Telcom implemented it here,* ***I just did my duty. They instructed us how to build P1, how to evaluate competency, then I just followed that …***

There were several cases where the implementers provided a perspective that highlighted both the advantages and shortcomings of the changes. These responses were considered as 'critical', since they neither skewed toward embracing nor resisting the changes. For example, a manager's criticism on the effect of BSC (KPOs and KPIs) is shown below:

> *EA-T23: I think that the KPI and KPO do not have much meaning. The concept of specialisation in our industry, which is service-based, should be re-defined … Specialisation should be defined in the context of high-skilled workers, not low-skilled workers such as the welders […]*

The level of detail of the answers depended on the implementers' profession and position. For instance, the planning staff only described the system characteristics on the surface level, such as low pay gap, demotivation and salary spreading. The HR staff and managers provided more details. They often went beyond the apparent, to the underlying mechanics of how the salary was calculated and how that gave rise to the problematic system characteristics.

> *HQ-T02: … The salary structure of public organisations has two parts. The first (hard) part is compulsory, which pays according to the job role's level defined by the government …calculated by multiplying the base wage to pay scales… The second (soft) part is pay for performance, defined by the organisation. An individual's salary is paid by adding two parts […] That hard part was 50-60% of your salary …*

In conclusion, the analysis established that the learning tension existed as a resistance phenomenon, and since most implementers positively evaluated the change, they were committed to change and radical learning at an early stage.

4.3.2 The initial coding process

The conventional approach to content analysis was chosen to analyse the data. The purpose of the coding process is to identify the factors that influence individual responses to change, thereby influencing their learning process. The factors could be from the individual, group or organisational levels. The initial coding process was divided into three sub-processes (or steps): *labelling, commenting* and *tagging*. The rationale is to have an incremental analysis, with the outcomes of each step reviewable in the next one. Consequently, at the end of the analysis, an audit trail is generated (Appendix A). Based on this audit trail, the auditors can understand the context of the content, and how it was interpreted and coded.

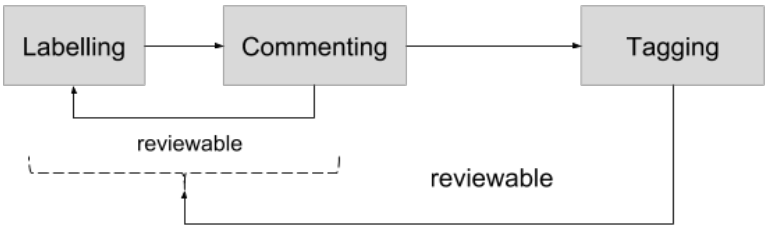

Figure 7 The coding process

4.3.2.1 Step 1: Labelling qualitative data

The 'Labelling' step assigns '*time*' and '*level*' labels to text data that were interpreted as influence factors. The *Time* labels have the values of *Before, During* and *After* to specify the time dimension of the text data. A *Retrospective* label would be assigned if the answers were considered time-independent; for example, "Leadership" was considered a factor that was important throughout the entire project according to some interviewees. The *Level* labels highlight the level-origin of factors, which were judged based on the researcher's interpretation of the following indicators.

The indicators of individual level (IL-Influences) factors include individual knowledge and skills, education background, profession, position and salary, among others. For instance, the education background of the implementers could be an explanation for why he or she responds to change in certain ways. In addition, because all the interviewees are Vietnamese, social and cultural norms could be regarded as individual-level influences. Group-level influences (GL-Influences) are indicated by how the implementers perceived their interactions within and between groups. Finally, how they perceived organisational artefacts, such as systems,

climates, policies, structures, programmes and others is considered an organisational-level influence (OL-Influences).

The following demonstrates the entire initial coding process at each step. The text was translated into English for the exhibition purpose. It must be noted that the analysis was conducted in Vietnamese to avoid losing contextual meaning.

> Original text: *"Qua cái triển khai cái hệ thống này á, triển khai cái hệ thống quản lý nguồn nhân lực này thì anh thấy 1 cái điều: để làm cái này thì có 1 bước cực kỳ quan trọng là anh phải làm sao cho người lao động nhận thức được cái này. Đối với đơn vị cổ phần, mới hay tư nhân thì để, ông chủ muốn j thì làm. Nhưng đối với 1 đơn vị nhà nước, anh phải làm sao dần dần cho người lao động người ta ủng hộ. Mà khi người ta thấy quyền lợi, người ta hiểu được thì đa số người ta ủng hộ. Đó là cái quan trong đó. Khi anh làm cái này thì có những người, người ta rất là lo là lo cho anh em là làm vậy lương hư sao. Cuối cùng làm ra thì có khoảng100-200 người /5000 người phản đối thôi."*
>
> Translation: ***Over the deploying course of this system,*** *the human resource management system****, I see one thing: there is one critical step that we have to make the employees understand and accept this****. It is simple with a joint stock, or private company, the owner can do what he/she wants.* ***But, with a public organisation,*** *we have to gradually make the employees support this.* ***When they saw the benefits, they would understand, then they would support us.*** *That is important. When I was doing this, there are people, who were really worry for others that what if the salary were broken. At the end, only 100-200 people over 5000 opposed this.*

Based on the meaning of this particular content, the researcher assigned an overall (a) *Retrospective* label, as it spans across the timeline; (b) *OL-Influences*, because the interviewee perceived the limitation of public organisations; and (c) *IL-Influences*, as how individual responses affected the success of the new systems were worded.

The intention of the labelling is not to achieve absolute interpretive accuracy, but to identify the temporal and situational context as accurately as possible. This step helped reduce a large amount of descriptive information, allowing the researcher to focus more on the labelled text and its context. The advantage to this is that it provides the ability to review previous steps. The researcher could find alternative interpretations of the text when revisiting the text in the next step.

4.3.2.2 Step 2: Commenting

One important aspect of doing qualitative analysis is that the researcher must adopt an empathetic stance to interpret data (Saunders *et al.*, 2012). The author tried to empathise with the interviewees in order to convey the meaning of their answers. The results were a short interpretative comment for each labelled text. The text data were highlighted in different colours, representing different *Level* labels. Take the translation of text data in chapter 4.3.2.2 for instance:

a) "*I see one thing: there is one critical step that we have to make the employees understand and accept this.*" was interpreted as: (The interviewee perceived) the importance of people's understanding and support for the project (IL-Influences).
b) "*But, with a public organisation, we have to gradually make the employees support this*" was interpreted as: (The interviewee perceived) the limitation of being a public organisation (OL-Influences).
c) *"When they saw the benefits, they understood, then they would support. That is important."* was interpreted as: (The interviewee perceived) that people's support is influenced by how they perceived the change in their salary (IL-Influences).

Table 7: Labelling and commenting step

Data	Labels	Comment
I see one thing: there is one critical step that we have to make the employees understand and accept this	Retro, IL	(The interviewee perceived) the importance of people's understanding and support for the project.
But, with a public organisation, we have to gradually make the employees support this	Retro, OL	(The interviewee perceived) the limitation of being a public organisation
When they saw the benefits, they would understand, then they would support us. That is important	Retro, IL	(The interviewee perceived) that people's support is influenced by how they perceived the change in their salary

4.3.2.3 Step 3: Tagging

By reviewing both the comments and labelled texts, interpretive *tags* were generated. Continuing with the above example, the comments of labelled text were assigned the following tags:

- *Perceived the importance of individual understanding and support* for (a).
- *Perception of public organisation's limitation* for (b).
- *Perceived the effect of a change in salary* for (c).

Table 8: The summary table of the initial coding process

Ref.	Original text	Comment	Levels	Time	Tag
HQ-T01	I see one thing: there is one critical step that we have to make the employees understand and accept this.	The interviewee perceived the importance of people's understanding and support for the project.	IL	Retro	Perceived the importance of individual understanding and support
HQ-T01	But, with a public organisation, we have to gradually make the employees support this.	The interviewee perceived the limitation of being a public organisation.	OL	Retro	Perception of public organisation's limitations
HQ-T01	When they saw the benefits, they would understand, then they would support us. That is important.	The interviewee perceived how individuals' understanding was affected by actual results, such as an improved change in their salary.	IL	Retro	Perceived the effect of a change in salary

4.3.3 Generating themes

From the initial coding, tags of the same-level label were grouped into similar concepts, and concepts under themes (Figure 8). This process adhered to Patton's (1990) criteria for judging categories – i.e. *internal homogeneity* and *external heterogeneity* – which stipulates that data within themes should have coherent meaning while showing identifiable boundaries between themes. After the themes had been generated, each theme was re-examined to assess its validity. The data generated a total of 322 tags, of which 20 were re-considered as information rather than influence factors. The remaining were categorised into 58 concepts, which were then grouped into 16 themes.

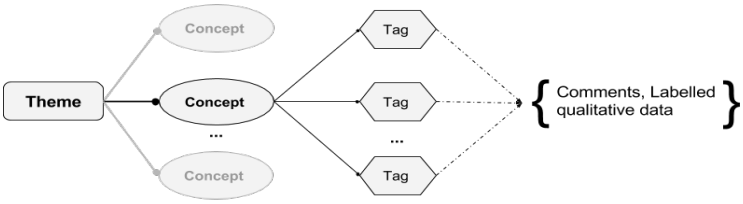

Figure 8 Typology of theme in the research

Take the theme *perception of team interaction* for instance: Various group-level tags were generated from text data that described how the implementers experienced teammate contribution, attitude, support and other factors during the project. These tags were grouped as concepts of *perceived teamwork effectiveness, perceived teammate contribution, perceived assistive behaviours, perceived teammate attitude,* and *perceived teammate capability*. Because the concepts arguably emerged from the interactions of implementers within the team context, they were placed under the theme "*perception of team interaction*", as opposed to experience emerged from interaction with team processes (e.g., planning, performance evaluation).

The themes are influence factors embedded in individual mental models as the results of the individual learning process. The themes were grouped by the level at which they originated. For instance, the learning experience of individuals was influenced by their *perception of team interaction*. Team interaction is arguably a group-level influence factor. Because themes were generated at the individual level of analysis, a 'perception of'- prefix was added in order to avoid confusion with themes identified at the group and organisational levels of analysis (section 4.4 and 4.5). The naming convention highlighted the fact that the themes were the outcomes of the individual *interpreting* process. All the themes at the individual level of analysis are summarised in Table 10.

There is special consideration regarding societal-level factors (e.g., culture, social norms). Since this research boundary is limited to the individual, group and organisational levels, societal-level factors were considered as an integral part of individual belief systems that influence individual behaviours independent of organisational and group context(s). Therefore, they were treated as individual-level factors in this study.

Table 9 The multiple-level influence themes

ORGANISATIONAL-LEVEL INFLUENCES		GROUP-LEVEL INFLUENCES	INDIVIDUAL-LEVEL INFLUENCES
Perception of communication programme Communication Role Effectiveness	**Perception of resource availability** Finance, Human resources, Business data	**Perception of team interactions** Contribution, Assistance, Capability, Work attitude.	**Personal factors** Psychological bias Personal motivation Conscientiousness knowledge, skills and other characteristics
Perception of support programme Support programme importance, Effectiveness of IT system, Experiment result, Training effectiveness	**Perception of system characteristics** Shortcomings Complexity	**Perception of team context** Team climate, Error tolerance, Workload, Stress/Pressure	**Natural factors** Time factor Age factor
Perception of leadership Support Participation Comprehension	**Perception of organisational climate** Working climate Organisational climate	**Perception of team processes** Compatibility Effectiveness	**Professional factors** Professional role Job position Tenure Salary
Perception of organisational characteristics Public organisation, Size, Structure, Traditions.	**Perception of organisational situation** Market competition Organisational performance Urgency.	**Perception of team leadership** Bias, Capability, Commitment, Participation, Comprehension, Support	**Social factors** Social norms Culture

4.3.4 Finding

4.3.4.1 Individual-level influences

Theme 1: Natural factors

Related concepts: Age, Time

Related concepts	Illustrative data
Age	WE-T11 – For *senior team leaders* to continue their position, they have to learn to work with computers. When the change occurred, many of them were falling behind, they had to resign as a team.

Theme 2: Professional factors

Related concepts: professional role, job position, tenure, salary

Related concepts	Illustrative data
Profession, Salary, Position	WE-T15 *(HR-Staff): From the perspective of a practitioner*, I thought it was really interesting, even before the implementation took place. … *Because I was working with the old compensation system, I saw many 'not so pretty' thing*. … WE-T12 (*Field staff*) – *To be honest, from the perspective of a normal worker*, when the 3P was applied. *I tried a lot to pass the 5-6-level exam to have a high salary.* Just keep it that way, I still work hard, right? Then I thought about the new 3P, *the managers with high salary, they would be biased with the new appraisal process, to keep their high salary*. We were confused for a long time. *I remember when the 3P was first applied, managers had a really high salary, 3-4 times ours.* People started to complain all over the internet, and in newspapers too.

Theme 3: Personal factors

Related concepts: psychological bias, personal motivation, conscientiousness, knowledge, skills and other characteristics

Personal factors are the factors that uniquely belong to individuals, including the individual's knowledge, skills, personalities, motivation, etc. The factors vary from person to person, which results in a different set of perceptions, attitudes and responses toward the changes.

Related concepts	Illustrative data
Psychological bias	WE-T25: When I became a manager, I evaluated the performance of my team members, then I started to understand the mentality of the manager. *Personally, I always want absolute fairness. But when I put the pen down, there is always a bit of personal feeling, because the marks become salary*. In addition, the Competency P2 cannot be objectively measured. You can mark one as good, or bad. But how much *good or bad cannot be (objectively) measured*. And that will affect people' salary.
Personal motivation	WE-T25 – (Better work attitude) Not only internal but also about the customers. *If I don't take good care of the customers, they will leave, thus affecting my salary*. We become more customer-oriented and take good care of them.
Conscientiousness	WE-T11 – *When I was at the West Company, I actively advocated for implementing the (objective) evaluations.* No one complained when we did that, unlike before, when the (old) evaluations were generally subjective.
Personal knowledge, skills and other characteristics	WE-T05 – I *used soft skills* to persuade them. Without their cooperation, I cannot complete the tasks.

Theme 4: Social factors

Related concepts: culture and social values

Social factors rendered the individual perception of the changes in terms of morality and acceptable behaviours, thereby influencing their responses.

Related concepts	Illustrative data
Culture and social values	HQ-T03 – *They listen to people from the outside, but not to us. We, Vietnamese, have a saying that familiarity breeds contempt.* WE-T04 – People want to work for a *public company*, because it is *stable and relaxed*, not for turbulence.

4.3.4.2 Group-level influences

Theme 1: Perception of team processes

Related concepts: perceived compatibility, perceived effectiveness

The theme describes the influence factors that are related to how individuals interpret the new processes. *Perceived compatibility* refers to whether the processes are compatible with the individual task work. *Perceived effectiveness* refers to the assessment of how well the new team processes achieved the objective that they were designed to accomplish.

Related concepts	Illustrative data
Perceived team process effectiveness	HQ-T03 – Negotiation by providing counter arguments. The *method of cascading KPO and KPI is interesting*. The team members and team leader must participate in the process of defining performance objective. Therefore, *they don't feel like being forced to*.
Perceived team process compatibility	WE-T09 – *I think the 3P is okay, but there are some issues* about the way it distributes salary among team members. *Our team (office work) is not like others.* If one person had sick leave, then no one else can do their work, because the works are specialised.

Theme 2: Perception of team interactions

Related concepts: perceived teamwork effectiveness, perceived teammate contribution, perceived assistive behaviours, perceived teammate attitude, perceived teammate capability.

Related concepts	Illustrative data
Perceived assistive behaviours, and teammate capability	WE-T11 - For example, to build and evaluate BSC: The Planning Department was in charge. First, BSC includes defining objectives, assigning work and evaluation of performance. But it is related to different functional units. *The Planning Manager was really miserable, because he could not imagine which objectives should be defined, etc.* Thus, he had to work closely with other functional teams. *But this is the extra work,* he still had a lot of other works to do. *So that progress was delayed, we (HR) had supported the Planning team.*
Perceived teamwork effectiveness, Perceived teammate contribution and attitude	WE-T04 – The HR department had many members, some were part of the implementation team, *but mostly I and WE-T05 work together. We cannot be absent or leave work to other people.* They supported us with note taking, etc. But we always felt a lot of pressure, because of so much work and responsibility. *The supporters just passively participated, nothing else. I think that the (data collection) team should actively engage*. I and WE-T05 had to carry the team.

Theme 3: Perceived team leadership

Related concepts: perceived team leader bias, perceived team leader support, perceived team leader capability, perceived team leader comprehension, perceived team leader commitment, perceived team leader participation.

Related concepts	Illustrative data
Perceived team leader subjectivity	HQ-T18 – The Performance score is rated by a team leader. *There was surely some bias in evaluation, which did not differentiate contribution of each team members.* But

	there was no such thing as absolute fairness… *Managers of functional teams did not want to cause any conflict or offend anyone, so they rated people equally. This made people who work hard feel unappreciated, because it was the same, nothing changed.* But they had to accept it. *I think it depends on the team leaders/manager. If they become stricter, then it would make a difference, and therefore, improve performance.* But, again, it will cause internal conflict.
Perceived team leader comprehension, participation, and commitment	HQ-T01 –When they (leaders) understood the new systems, *they shared a lot of burden with the core team, e.g., communicate with the field workers in seminars*, etc. A *hundred managers helped with communication is better than just 10 persons*. I think training is a good way to begin. *We must make sure they recognised the positive values of the new system*.
Perceived team leader capability	WE-T15 - Leadership style has to change. Before the change, many managers lack the necessary skills and capability. But now, they have to change. *Now, if they are not good, how can they manage other employees*?

Theme 4: Perception of team context

Related concepts: perceived team climate, perceived stress/pressure, perceived (increased) workload.

Related concepts	**Illustrative data**
Perceived increased workload and pressure	WE-T11 - *But in terms of personal work, these are extra work for the individuals*. In the beginning, because they are new, people were reluctant. For example, to build and evaluate BSC: The Planning Department was in charge. ... But it is related to different functional units. *The Planning Manager was really miserable, because he could not imagine which objectives should be defined, etc.* Thus, he had to work closely with other functional teams. *But this is the extra work, he still had a lot of other work to do. So that*

	progress was delayed, we (HR) had supported the Planning team. HQ-T01 - When you work, if you see opportunities with 70% chance of success, just do it. When I, HQ-T02, HQ-T03 and HQ-T06 were implementing the new systems, it was like *walking on a thin rope*.
Perceived team climate	EA-T08 – *At the time, we (the implementation team) were committed*, from the directors to managers, the union, etc. *Anyone who did not want to change will be isolated from the movement.* I think because of that commitment, we think we can do that. EA-T08 - Actually, at the East Company at the time, …. If it (the implementation) was decided, then just do it. *If we made a mistake, then we would fix it. We were not afraid, but worried … The team leader must protect us, so that we could face challenges.*

4.3.4.3 Organisation-level influences

Theme 1: Perception of resource availability

Related concepts: perceived financial resource availability, perceived human resource availability, perceived business data availability.

Related concepts	**Illustrative data**
Perceived financial resource availability	HQ-T06 – Because the leaders recognised the importance of training, *financial resources were not a concern.*
Perceived business data availability	HQ-T03 - We did not have any consistent Customer Relationship Management system. *Each had their own working systems. When they submitted their data to the HQ functional department, it was a mess. They had their own*

	format. If they wanted to, they could change the data for better results. Because we did not have a unified database.

Theme 2: Perception of organisational characteristics

Related concepts: perception of public organisation, perceived organisation size, perceived organisational structure, perceived organisational traditions.

Related concepts	Illustrative data
Perceived organisational structure, public organisation, and traditions	WE-T06 – *This is a public company. It will be simple, if you want to evaluate the employee competency of a private company.* But the public company had a large workforce. *Second, it was subsidised for a long time by the government, evaluations are difficult*.
Perceived organisational size	EA-T07 – Although the agency provided good methods, we, as a public organisation, *had too large a workforce. Most of the workforce was redundant, to be honest*.

Theme 3: Perception of leadership

Related concepts: perceived leader support, perceived leader commitment, perceived leader comprehension.

This theme highlighted the impact of individual perception of the leaders, top management team. Individuals interpreted leaders' commitment, consensus, and support behaviours as the critical success factors, thus, influencing their commitment and actions.

Related concepts	Illustrative data
Perceived leader support	HQ-T03: *The most important person of the project is the director. He had to support and commit to this project.* If we are in the middle of the project, you know the organisation had 5000 people with a lot of different opinions, it could fail. *We had to make sure that the directors and middle managers, including subsidiary companies, understand and support the project.* […] More importantly, we had to make an arrangement: they

	must participate by making reports, etc., […], *so that they had comprehensive understanding of the project. They will support and participate in the project.*
Perceived leader comprehension	EA-T06 – … At the same time, the leaders of all major sites (West, East, HQ, etc.) had to change first. *Because leaders must have a comprehensive understanding of the new system, so that they can implement it. If they were unclear, then we would definitely fail.* […]
	EA-T08 – There are a lot of uncertainties […] each individual can understand the systems in their own way, based on their position. *High position, but lacking understandings, is an obstacle to the implementation. If we want to change, then the high and middle managers/leaders must commit*. Of course, *among the managers, there were different opinions. The first obstacle is the mentality of the organisational leaders.*

Theme 4: Perception of system characteristics

Related concepts: perceived system shortcomings, perceived system complexity.

Related concepts	**Illustrative data**
Perceived system shortcomings	HQ-T02 - It does not matter how high the soft part was. Your total salary would always less than a senior field worker. *That was the systemic problem ... we could not even recruit new talents. We tried to modify the system before, but due to the government policy, the hard part cannot change*. Our modification had limited effect because the core of the system did not change.
Perceived system complexity	HQ-T02: The 3P method was new. We did not have the in-depth understanding of the methods.… *It was complex*. That was just the 3P. The Balanced Scorecard was so difficult to understand, even more complex. BSC was used to evaluate P2. … I participated in the

	implementation, *but even I had difficulty in understanding. Not to mention the field team leaders. Education is one thing. But having the know-how to work with it!? It was not even their profession.*

Theme 5: Perception of communication programme

Related concepts: perceived communication role, perceived communication effectiveness.

Related concepts	Illustrative data
Perceived communication role and effectiveness	HQ-T03 – When implementing new systems, managers must understand the systems. *Communication is next. We had to make the employees understand too. It is very important.* EA-T08 – *Before the implementation, we started the communication programme.* The organisation opened many training classes, which were taught by the agency. *Based on what we learnt, and from reading books, we wrote the (communication) materials so that the workers can understand.* Because if we used the agency's materials, it would be very difficult to understand.

Theme 6: Perception of support programmes

Related concepts: perceived support programme importance, perceived the effectiveness of IT system, perceived experiment result, perceived training effectiveness.

Related concepts	Illustrative data
Perceived effectiveness of IT system	WE-T25 – The BSC deployment was the most complex one. Key objective and indicators cascading were time-consuming. Because we cannot be subjective about it. *If we want to measure our objectives, IT support system was needed. Otherwise, the evaluation could not be done.* New business data must be built … data was the most important. *In the beginning, I assigned KPOs and KPIs, but*

	there was no support system. It was difficult. But now it is better.
Perceived support programme importance	HQ-T16 – (to solve the redundant workforce problem), there were many ways. *One is role-rotation, changing to a more suitable role. Second is that they still do that work, but of course with less salary. Third, is early retirement programme.* EA-T07 – In 2012, *the CEO institutionalised a new rotation policy, which was fantastic.*
Perceived training effectiveness	EA-T06: *I was trained to operate the BSC quite a lot, but not enough. There were many challenges.*

Theme 7: Perception of organisational situation

Related concepts: perceived market competition, perceived organisational performance, and perceived urgency.

Related concepts	**Illustrative data**
Perceived market competition and urgency	EA-T24 –*Just look at our competitors, they already took the market share. When I went to the annual meeting, we used to be at the top in the past, but now, we are losing our market share. Quite obviously, every leader recognised that we are falling behind*.
Perceived organisational performance	WE-T10 – In 2010, *when we began the implementation, we did not see much effectiveness*, until 2011 and 2012, we started to see some changes. The most obvious change was in 2015 and 2016, when we grew in revenue and market share. [...] *We had less workforce, so that means improved performance and profit.*

Theme 8: Perception of organisational climate

Related concepts: perceived working climate, perceived organisational climate.

Individual perception of organisational climate is a combination of various interpreted signals, such as the change in work conditions; perceived team and organisational members' work attitude, and how they respond to changes.

Related concepts	Illustrative data
Perceived working climate	WE-T06 –Because they were working for a long time, they had more contributions, so that their *team leaders had a difficult time to work with them. For example, they did not complete their tasks, or would complete with no quality at all. Low performance, but high salary.*
Perceived organisational climate	HQ-T18 - *Their working attitude was lazy but still received a high salary, even though they did not do any work. High-level workers, high salary, lazy work attitude. Their behaviours during the implementation were shockingly rude, terrible in general.* There were a lot of complaints, and many other things. […] *Although they resisted, and behaved negatively, they had to accept it at the end.* If you did not comply, you could leave, no compromises.

4.3.5 Discussion

Based on the generated themes and the assigned time labels, the researcher attempted to reconstruct the learning process of the implementers before, during, and after the project.

4.3.5.1 Before the project implementation

Before the implementation took place, the organisation had provided training for the implementers, so that they became familiar with the operational principles of the new compensation systems. The implementers' initial evaluations were mostly in favour of the new systems. As a representative example, an HR-staff implementer with more than ten years of experience working with the old salary system explained why she supported the new systems:

> *WE-T15: From the perspective of a practitioner, I thought it was really interesting, even before the implementation took place. The old salary (system) had many shortcomings, for instance, everybody's salary was similar, middle manager level was only a little bit higher, and so was director level. There was virtually no gap between their salary. A manager of a 10-person team was paid just a little bit more, so that he/she did not have any motivation. Because I was working with the old compensation system, I saw many 'not so pretty' things. For instance, a postal clerk or an HR manager, or a Sales person, their salary was all the same.*
>
> *When I learned the theory of the new systems, I found it good and appropriate, we need to redefine the compensation. Those who have difficult works should earn a high salary, simple works, earn less. Who works more, earns more. The potential future was promising.*

Dissatisfaction with the old system was echoed among the implementers. The old compensation systems were often described negatively, such as "*unfair*", "*unable to motivate work*", etc. Because of the implementers' profession (e.g., HR, Planning Staff), they had to interact with the old systems on a daily basis. When they noticed the mismatch between what they expected and the reality, negative experience arose. The mismatch was perceived as unfair between what people actually contributed and how they were paid. When being presented with an alternative option that promises more equality in work-related pay, they were more likely to gravitate toward the new option. Most implementers viewed the new systems as the solutions. As a result, they were more willing to change.

How the implementers perceived the *organisational situation* also contributed to their willingness to change. The situation of Telcom-HCM at the time was described as "*change is the matter of survival*", or "*cannot back down*". Such descriptions of urgency reflected the implementers' sympathetic stance with the causes of change. At the same time, as they perceived the top-level leader's commitment to the transformation (e.g., the contractual pledge), they might feel more assured in terms of supports (e.g., training, resources, etc.), so that they could embrace the change.

Conversely, the difficulties of the transformation were fully recognised among the implementers. Given that there had been unsuccessful attempts to change systems in the company in the past, some implementers felt doubt, uncertainty and pessimism about the change. In addition, negative perceptions of the public organisation, such as "*difficult to change*", "*Telcom was too large*" or "*too complex*", also contributed to those feelings. These factors could explain why a few implementers feel less motivated to mobilise toward change, and just passively wait for instructions.

4.3.5.2 During the project implementation

When the implementers started their tasks, they began to form a clearer picture of the new systems. The new 3P systems were mutually described as complex and difficult to operate. The following discussions of an HR vice manager and a Planning manager about their experiences with the systems highlight the complexity of the new systems:

> *HQ-T02: The 3P method was new. We did not have the in-depth understanding of the methods. Because it was a combination of three different methods to build a compensation model. Only he (the agency's director) can explain in details… It was complex. That was just the 3P. The Balanced Scorecard was so difficult to understand, even more complex. BSC was used to evaluate P2. … I participated in the implementation, but even I had difficulty in understanding. Not to mention the field team leaders. Education is one thing. But having the know-how to work with it!? It was not even their profession.*

> *EA-T06: I was trained to operate the BSC quite a lot, but not enough. There were many challenges. From the team level, it is quite simple. Because the tasks were clear, we could easily evaluate. But from the company level, it was complex. Which criteria should be used for the evaluation, and how? It must be defined ... I remember when*

we finished the implementation (end of 2011), it was functionally acceptable. It took more than three years to become okay.

Problem complexity presented a steep learning curve that was challenging for individual learning. As they become aware of the knowledge gap, many implementers, who were highly motivated about the change, reported actively learning by themselves to bridge the gap. Conversely, the implementers, who were less motivated, just waited for the superior's instructions about what to do. Their initial evaluation of the new systems could be accounted for by explaining their propensity to take actions toward change. As they gained more feedback from the tasks, the implementers continued to re-evaluate their understanding. However, during the implementation, tensions did arise due to negative outcomes of their actions, which were contingent on other external factors.

For instance, the new P1-Score for managerial positions causes dissatisfaction, mostly due to the mismatch between the position's salary and the actual competency of the managers. Once the change was enacted, it first increased the salary of current team leaders and managers. However, many of them did not meet the new requirements for their positions. The initial results were not well-received among the implementers. An implementer asked to be off the audio recording to describe the situation at the time:

*WE-N27: **I was really discontented**! Although I know that the new system was really good, to fully accept it was difficult. We made the system change but did not prepare the workforce. For example, the P1 (score of one position) required a lot, but the person (for that position) was not capable. **Many people were displeased, and even some team leaders felt that they were not worthy of their position.***

For individual learning, disappointing outcomes and unexpected consequences could be detrimental, as negative feedback often increases uncertainty. As a result, the implementers could be discouraged to continue with their course of actions (assuming that they were right) and change trajectory.

When carrying out the tasks, the implementers interacted with not only their team members but also other organisational members. The quality of these interactions could influence their learning experiences; for example, negative if lack of cooperation from other organisational members, and vice versa.

WE-T05 - During the surveying, some teams cooperated, some did not. It was challenging, simply because we cannot know all the details and description of all the

jobs at Telcom-HCM. Difficult, but we have to do it! If they do not want to cooperate, then we must force them, using directive orders ...

In the team context, the implementers constructed their team experience based on the quality of team interactions; for example, how supportive other team members were, the ability of the team leader, and so on. While most implementers described their team experience as supportive, cooperative and collaborative, some were not happy with the quality of support they received, given the increased workloads and pressure from the implementation schedule.

WE-T04 - Some members were just doing a little bit of support. Sometimes, we felt the pressure and workload. They were just there and passively listened; did not even join in the conversation. The surveying team should have been more active.

Team leaders had an important role in shaping the implementers' experiences. As the implementers perceived commitment and support of their team leaders, they were motivated to take actions toward change. Many implementers stated that they feel safe to engage in discussion and take actions without fear of being penalising for making mistakes, because of the supportive climate:

EA-T08: Actually, at the East Company at the time, …. If it (the implementation) was decided, then just did it. If we made mistakes, then we would fix it. We were not afraid, just worried … The team leader had to protect us, so that we could face challenges.

The role of team leaders was more than just facilitating a supportive climate. They enforced organisational objectives and cooperation to ensure team unity. One HR Manager described a situation, where he had to take stern action to ensure that the team focused on the objective:

HQ-T01: I was the team leader of the implementation team, I also set the objectives for the IT development team. I worked with them frequently. It was not a smooth experience. Within the team, there were some individuals, who did not want it to work out. I did not know what their motives were, to sabotage or not. But after a while, I asked the team directly: "I want you to propose a solution, and you can give constructive feedback, but do not denounce the common goal". At that time, I removed one person from the team, and then everything went really well!

With the implementation of the new compensation systems, new processes were activated, e.g., evaluation of individual performance and competency. But,

due to the lack of performance data, it was difficult to carry out the evaluations. An HR Staff recalled the early enactment of BSC system:

> *WE-T25: In general, at the beginning, to understand it (the BSC) was already difficult. We had a lot of training, for expert, work units, about cascading BSC, it was difficult. When deploying, I saw that some KPOs could only be on paper, because we did not have data to evaluate, no system to do that. It was disoriented at the beginning.*

At the same time, the new processes generated more work for HR staff, such as manually checking and calculating the evaluated performance. The experience was described as "*horrible*" or "*undoable*". The hands-on experience of the new systems was considered negative by many HR implementers. The negative experiences highlighted the need for IT support. It presented the opportunity for the development and adoption of the new IT support system.

For many implementers, it was clear that the success of the transformation was dependent on the participation and support of their leaders. The top management team and top-level leaders were considered as the role models, who led by example. They were the first to adopt the new evaluation processes even before the organisational deployment. This was important for the success of the new systems. An HR Manager recalled his conversation with the top-level leaders with a passionate voice.

> *WE-T11: The commitment of leaders was very important! … When I was discussing with my director about his commitment. I proposed some KPOs and KPIs for evaluation. It was a bit subjective at the time, but still logical ... He was the one who did the evaluation, he must be committed. So, I constructed for the functional departments and teams, KPOs and KPIs, for each leader and manager …* ***We started the new processes from the top.***

Finally, many implementers perceived the support programmes as effective in terms of introducing concepts and theory of the systems but considered that they were not sufficient to support the implementation. "*I was trained to operate the BSC quite a lot, but not enough. There were many challenges*" - EA-T06. Nevertheless, the net effect of those programmes on individual learning could be considered as positive.

4.3.5.3 After the project implementation

The project finished on schedule at the end of 2011 with the new systems successfully implemented. The implementers had developed a better understanding of the new systems. The Lead implementer of the project recognised that the new systems are more than just about salary.

> *H1-T01: The contract that we signed was not about the compensation, but actually about Human Resources Management Systems (HRMS). I told the consultant that salary is just the last piece of the puzzle… We discovered that for this to work, the underlying structure, professional role and positions, etc. must be redefined. Most people when they hear 3P, they only think about compensation and salary… . Because the new system (HRMS) is dynamic, we could adjust and modify it as we want. Of course, we have to respect the underlying principles of the system.*

As the implementers learnt more about the new systems, they formed new perceptions that were different from their initial conceptions. Some were positive, such as *fair*, or *dynamic*. Some were critical, such as the new evaluations are not compatible with the office work, or highly subjective to bias. One manager shared her experience of the evaluation processes:

> *HQ-T22: I had both planning staff and investment staff. Planning staff must also understand investment work. But clearly, I did not give the planning staff any investment works, then why should I evaluate their investment capability? … It would be unfair if I gave them a bad point, but if I rated them randomly, then it would be biased… It is quite illogical. However, there was no time to fix that. I have to compromise.*

Some top-level leaders were concerned about the misalignment between business context and the new compensation systems. One shared a critical analysis of this matter:

> *EA-T23: (I think) we need to start from the context of our services and market. From the management perspective, we need a degree of flexibility… Restructuring needs to be about adaptation, to become environment-fit. Not just for the sake of restructuring… I think that what we did was mainly about changing the workforce, but lacking business objectives, such as providing new services, etc.*

4.4 Group level of analysis

Since group-level analysis requires data to be analysed at the group level, the interview data were aggregated to represent group-level data. The group-level unit of analysis was identified as the *implementation team* and the interviewees were addressed in the discussion as team members of their respective implementation team. The first challenge of group-level analysis was to specify the group boundaries, which are presented in the following section.

4.4.1 Team boundary and composition

4.4.1.1 Team boundary

The workplace of the interviewees provided a natural boundary to separate one team from another, namely the HQ team, West (Company) team and East (Company) team. Although these teams were linked to each other in some way, these connections were relatively weak, and had more organisational-level than group-level impact. Therefore, each team could be considered as an autonomous entity. Although the HQ team always had higher authority than the West and East teams, the HQ team neither dictated nor interfered with how other teams carried out their tasks. For example, a member of the West team described how decisions were made when redefining the structure of the General Department:

> *WE-T10 - The same job role, but it was in a different department at a different company. For example, between the East and West Companies, the General Departments basically have the same functions. However, Accounting and Financing personnel were a part of the General Department at the West Company, in contrast to the East. You see, if I based it on the definition of what the General Department does, then it would be problematic, because Accounting and Finance were not part of it. We discussed what should be removed or included, then we waited for direction (from HQ).*

With the above example, the HQ would consider the results from the West and East teams to generate an organisational template for the General Department. Therefore, the interactions between the HQ team and other teams were characterised to have organisational purpose and meaning. Given that the team boundaries had been specified, the author turned to the team patterns of interaction to examine each team's structural and functional characteristics.

4.4.1.2 Team composition

A critical variable of team composition is patterns of interaction, which reflect task or workflow interdependence (Kozlowski and Ilgen, 2006; Mathieu *et al.*, 2008). Scholars have identified four forms of interaction networks; these are *pooled, sequential, reciprocal* and *intensive* interdependencies (Tesluk *et al.*, 1997). The interaction networks represent the internal structures of the implementation teams, which grant them causal power to process information effectively and to take collective actions. Kozlowski and Bell (2008) assert that team learning is more likely to propagate along these networks of workflows, but they do not rule out the role of informal social exchange.

In *pooled* interactions, there is no real workflow among team members. Tasks might be distributed on a voluntarily basis. If TMMs emerge, cognitive similarity is expected to be the result of friendship or proximity (Kozlowski and Bell, 2008). The *sequential* structure describes the workflow arrangement, which resembles assembly lines. The task-work and information flow in one direction. Thus, team members might know the sources of incoming tasks and the destinations of the task results, but are unlikely to develop a full understanding of the workflow. The *reciprocal* structure is similar to the sequential structure, but tasks and information flow forth and back. Team members may develop a shared understanding of how their adjacent teammates work. Finally, the *intensive* structure describes a network arrangement of workflow, where all members have multiple linkages among themselves (Mathieu *et al.*, 2014). Cognitive similarity is characterised by centrality and frequent and alternative transactions among team members (Kozlowski and Bell, 2008). A summary of the implementation teams and their interaction networks are presented in Table 10 and Figures 11, 12 and 13.

Table 10 The Implementation Teams

Team	Count	Team member
HQ	7	HQ-T01, HQ-T02, HQ-T03, HQ-T16, HQ-T17, HQ-T18, HQ-T22
East	6	EA-T06, EA-T07, EA-T08, EA-T21, EA-N26, EA-T24
West	10	WE-T04, WE-T05, WE-T09, WE-T10, WE-T11, WE-T14, WE-T15, WE-T25, WE-N27, WE-N28

(Note: The bold circle indicates the manager-level and the HR profession is highlighted.)

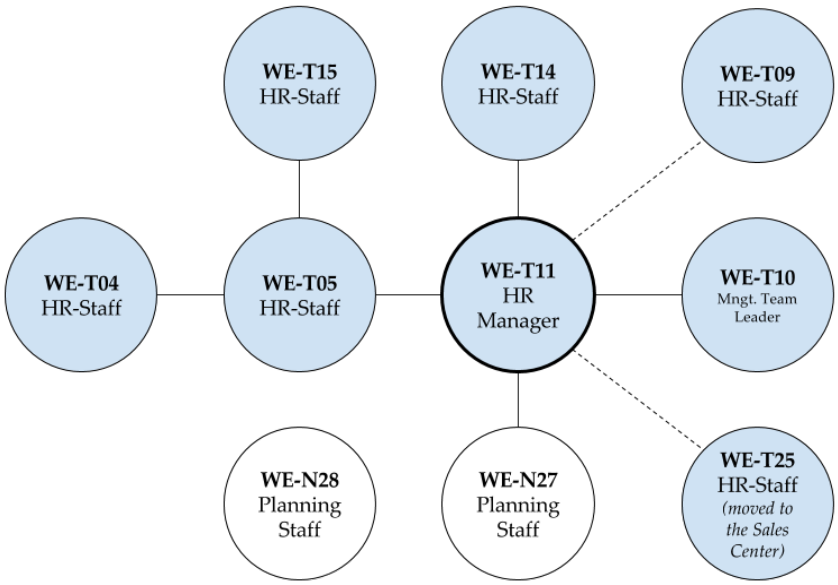

Figure 9 The West company's implementation team

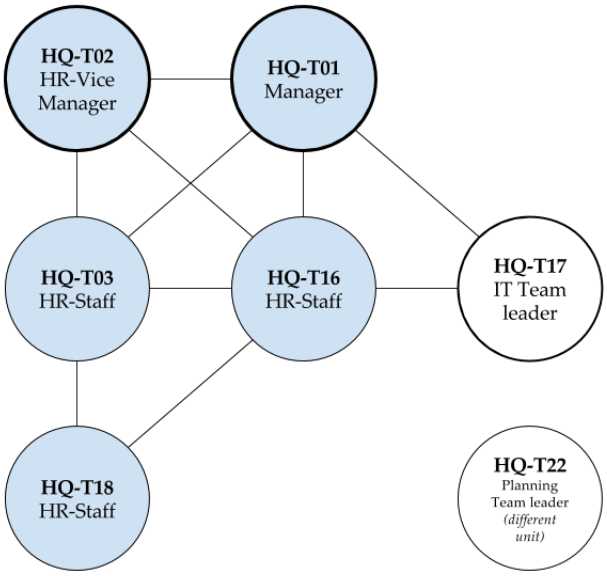

Figure 10 The HQ implementation team

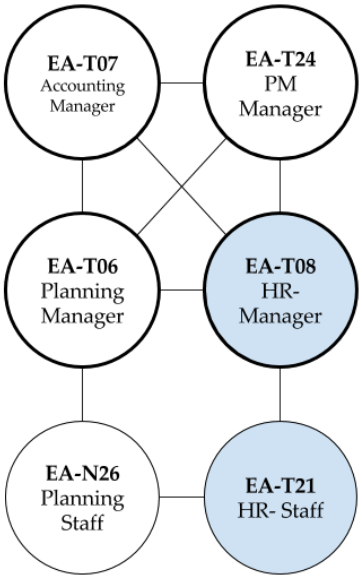

Figure 11 The East company's implementation team

Provided that the implementation teams were comprised of cross-department team members, including Planning, HR, Accounting and others, they were heterogeneous in terms of task-work, background and skills. HR and Planning departments played the core roles during the project. The patterns of interaction resemble a mix between *reciprocal* and *intensive* structures. They are reciprocal because the team tasks were primarily carried out by the HR and Planning team members. Similar cognitive patterns about specific tasks can be expected from the HR (or Planning) staff and HR (or Planning) managers. On the other hand, teams have intensive network-like structures because other managers played supporting roles during the implementation. They were involved in the decision making and supported the team tasks to a certain extent.

4.4.2 Team mental models

The multilevel model proposed that the Team mental models emerge as a result of team learning. TMMs is characterised by cognitive similarity to the degree of being compatible among the team members to explain shared understanding and organised actions. This compatible property captures not only the array of patterns, but also variability among member mental models to characterise the TMMs (Kozlowski and Klein, 2000). Given that, the first and foremost question was whether TMMs of the implementation teams had actually emerged.

Levine *et al.* (1993) argue that the criteria for such judgements are that there should be a level of awareness among the team members regarding the similarities and differences of their thought processes. This means that mental models must be consciously and explicitly negotiated and agreed upon. The data suggest that the negotiation process took place during the implementation.

> *HQ-T18 - Everyone worked well together. Of course, there were some arguments to understand and coordinate, because it was new. There was no big fight or anything. Coordination was good.*

Others suggest that the similarity between team members' *task-work* and *team-work* model could be used to assess TMMs, since team members hold multiple mental models simultaneously about their task-work (e.g., team objectives, task goals, required knowledge, etc.) and team-work (e.g., team interaction patterns, norms, who knows what, etc.) (Mathieu *et al.*, 2000; Mohammed *et al.*, 2010). For example, at the HQ team, team members used a similar metaphor to describe the 3P system:

HQ-T03 - The design of the compensation system must be based on three circles. Knowledge, from education. Second, is skills accumulated from work experience. But, the most important is attitude. Many people are really good, but they did not want to work. They have lots of qualifications but did not want to work.

HQ-T02 - To understand 3P ... imagine three circles. The first is knowledge, the second is skills, and the third is attitude. Knowledge from education, skills from work experience, but attitude is personality. If a person does not have the required knowledge, we can hire another. Skills can be learned from working. But attitude is different. If one person has a worse attitude than another, then it will reflect on their performance.

There was also some similarity on the characteristics of the old systems:

HQ-T18 - *When I was working at Telcom-HCM, the old compensation system was not so fair… Telcom-HCM wanted to have a system in which each position must have a clear description and evaluation indicators.*

HQ-T16 - *The old system kind of have everyone the same salary, thus, it did not motivate people… After the change, the new structure was clear … each position has a P1 score and P3 score. After the new system was implemented, we could see its advantages. Salaries became fairer, not absolutely, but acceptable.*

The examination of the team members' task-work model can be drawn from their understanding of the system and its characteristics, task goals, specific tasks and their required knowledge. From the description provided by the interviewees, three major team tasks were identified:

(a) surveying the job description of each role and position.

(b) constructing a dictionary of the job and position description based on the survey.

(c) implementing the BSC system.

The HR staff were in charge of the first and second tasks, while planning staff were responsible for the third. For instance, for the task of constructing job specifications, team members of the West Company team provided a similar discussion about the task-work:

WE-T05 - *There were some people who would not cooperate. They described more than what they normally do. For instance, one task takes only 3 minutes, but they*

said it was 5-10 minutes, or 2-3 hours. I just need to come and observe their work to measure the real time. We need some skills to do that.

WE-T04 - *Between the production and back-office units, the production was more supportive. The back-office did not know what to list, because their work cannot be clearly quantified… We recorded everything in detail, for example, producing a document, how long, the submitting process, etc. But it was hard to evaluate during the implementation.*

WE-T10 - *Actually, it was an iterative process. Our unit constructed the P1 very carefully. First, we needed to list all the task work, which was given to the staff. Then we needed to evaluate their performance or productivity. It was simple with the production unit, but difficult with the back-office. Our tasks were mostly qualitative so we need to count in detail how many documents per day, hours per document, etc.*

In another example, team members of the East Company team provided similar descriptions of the lack of business data, which was necessary for the evaluation of performance and competency.

EA-T06 - When you give out the KPOs, you need to prove with data that they are logical. If you cannot, they would not accept that. It was very difficult. At that time, I had some data sources, but they depended on the system to provide that…

EA-T08 - I was worried at the beginning, with a system like this, and we do not have data, what can we do? … So, our focus at the time was to obtain business data and communication down to the root level….

The evidence suggests that team members developed task-work models and team-work models. The team members' task-work models were mostly different, but they overlapped in terms of tasks descriptions and reference to who knows what or who has done what. Specifically, team members were able to provide detailed accounts of their tasks and describe some aspects of other members' tasks. They were able to refer to what other team members had done or known. The findings fit into what Moreland (1999) called *memory differentiation,* which is an indicator of the *transactive memory.*

Transactive memory is held by individual team members about what other team members know, regarding their expertise, weaknesses and strengths (Prichard and Ashleigh, 2007). Research evidence suggests that transactive memory can enhance team performance and effectiveness (e.g., Liang, Moreland, and Argote, 1995; Ren, Carley and Argote, 2006; Prichard and Ashleigh, 2007). Collectively,

combination of transactive memory in teams is similar to TMMs in a way that team members' task-work models are overlapped and compatible to form a greater whole. The construct of transactive memory focuses more on task-related aspects, while TMMs broaden the perspective by highlighting the importance of both task and team aspects in team development (Mathieu *et al.*, 2000; Mohammed *et al.*, 2010).

Given the existence of transactive memory and team-work models, new TMMs had successfully formed. However, the data regarding team members' interactions was subtle and not sufficient to account for the group-level learning tension. There was a lack of detail in the way people discussed their interactions in teams. When asked about the interactions in the team during the implementation, most responses were generally along the lines of *"everything was good"*, or *"coordination was good"*; for example,

> *HQ-T18 - Everyone worked well together. Of course, there were some arguments, but to build understanding because it was new. There was no big fight or anything. Coordination was good.*

However, based on some descriptions of some interviewees of what they had done as a team, some insight can be drawn. For instance, a member of the East company team shared a group action:

> *EA-T08 - When describing the job description of each position, we needed to ensure clarity to prevent overlapping. … and it was quite complex. It was not simple to untangle. Therefore, besides regular work, working together (with other team members to tackle this issue) was a regular occurrence, not just for one or two days.*

At the West company team, the monitor and back-up behaviours suggested shared understandings about the tasks among the team members. The HR Manager described his empathy and support for the work of planning staff:

> *WE-T11 - The BSC methods required planning to be forecasted, assigned and evaluated.* ***It was linked to many functional units.*** *That's why the planning staff were really miserable. They could not figure out which KPOs and KPIs should be included. They had to work closely with the other teams.* ***This task was new to them, and it was not their normal daily work. Thus, sometimes, it affected the overall progress. We had to support them.***

Even so, the facts were that all the teams had successfully implemented the 3P system, and some members of the teams led the transformation of the entire

Telcom Cooperation later on, so it can be contended that group learning had occurred. With that in mind, the team members' interpretation of the implementation could provide valuable insights into the team learning process.

4.4.3 Finding

4.4.3.1 Group-level influences

Theme 1: Team composition

Team composition describes the structure and patterns of interaction among the team members.

Theme 2: Team process

Related concepts: team monitoring, back-up and support, evaluation process, team planning.

Team processes are the means through which team learning occurs. Several team processes were identified during the implementation

Theme 3: Awareness of team capability

Awareness of (a lack of) team capability is an emergent factor that describes how the team members perceived the capability of their team, including themselves and other team members.

Related concepts	Illustrative data
Awareness of (lack of) team capability	HQ-T01 - We do not really understand the new systems; our team lacks the manpower and necessary capability to implement the new systems. HQ-T02 - *The 3P method was new. We did not have the in-depth understanding of the methods.* […] It was complex. […] I participated in the implementation, but even I haddifficulty in understanding. Not to mention the field team leaders. Education is one thing. But having the know-how to work with it!? It was not even their profession.

Theme 4: Team leadership

Related concepts: facilitate psychologically safe and error-tolerant environment, enforce team objectives, display good understanding, support and participate in team processes.

The theme of team leadership identifies the team leader actions, which, through the eyes of the team members, give rise to the leadership qualities: comprehensive, supportive, decisive and responsive.

Related concepts	Illustrative data
Facilitate psychologically safe and error-tolerant environment	EA-T08 - Actually, at the East company at the time, …. If it (the implementation) was decided, then just do it. *If we made a mistake, then we would fix it*. *We were not afraid, just worried … The team leader must protect us, so that we could face challenges.*
Enforcing team objectives	*HQ-T01:* I was the team leader of the implementation team, I also set the objectives for the IT development team, so that I worked with them frequently. It was not a smooth experience. *Within the team, there were some people, they did not want it to work. I did not know what their motives were, to sabotage or not.* […] At that time, I had to remove one person from the team, then everything went really well.
Display good understanding	WE-T11 - When I was discussing with my director about his commitment. I proposed some KPOs and KPIs for evaluation. *It was a bit subjective at the time, but still based on logic ... He was the one who did the evaluation, he must be committed. So, I constructed for the functional departments and teams, KPOs and KPIs, for each leader and manager …*
Actively support and participate in team processes	EA-T08 - We always worked together, not just 1 or 2 days. Besides our routine, this (the implementation) was our regular … If there was any (technical) problem … I told the director, he immediately asked for the

	Technology Manager. We would have a meeting on that afternoon and make changes. Really fast! WE-T04 - At that time, we pressed the issue hard. With other managers, we work directly with them without concerning our manager. In general, they supported us. If there were questions, our manager would discuss with them directly.

Theme 5: Team climate

Concepts: *supportive, psychological safety, error tolerance.*

The theme of *team climate* describes how team members perceive the conditions, which enable them to carry out their tasks and to solve problems collaboratively.

Related concepts	Illustrative data
Error tolerant	EA-T08 - Actually, at the East company at the time, …. If it (the implementation) was decided, then just do it. *If we made a mistake, then we would fix it. We were not afraid, just worried … The team leader must protect us, so that we could face challenges.*
Psychological safety	HQ-T18 - Everyone worked well together. Of course, there were some arguments to understand and coordinate, because it was new. There was no big fight or anything. Coordination was good.
(lack of) supportive	WE-T04 - Although the HR Department had many people, and some of them were part of the surveying team, only I and Mr. K (WE-T05) work together primarily, so we cannot be absent most of the time. *Some members just doing a little bit of support.* Sometime, we felt the pressure and workload. *They just participate and passively listen, did not even join in the conversation. The surveying team should have been more active.*

	WE-T11 - To build and evaluate BSC: The Planning department was in charged. ... But it is related to different functional units. The Planning Manager were really miserable, because he could not imagine which objectives should be defined, etc. Thus, he had to work closely with other functional teams. *But this is the extra work, he still had a lot of other work to do. So that progress was delayed, we (HR) had supported the Planning team.*

Theme 6: Team member participation

Related concepts: participation frequency, participation activeness.

Team member participation is characterised by the frequency and activeness of team member engagement in some team processes

Related concepts	**Illustrative data**
Participation frequency and activeness	WE-T04 - *Although the HR Department had many people, and some of them were part of the surveying team, but only I and Mr. K (WE-T05) work together primarily, so we cannot be absent most of the time.* Some members just doing a little bit of support. Sometime, we felt the pressure and workload. *They just participate and passively listen, did not even join in the conversation. The surveying team should have been more active.*

4.4.3.2 Organisation-level influences

Theme 1: The project planning

The project planning provided the team with an overall schedule, which set the temporal boundary for task completion. It also provided the project objectives and scope, so that team members could work out the task objectives and how to achieve them.

Theme 2: Organisational structure

Related concepts	Illustrative data
(Issue of) organisational structure	WE-11 – There are many problems, for example, the HR department had certain intentions when redesigning the position P1 in a team, but only the direct team managers have the authority to assign positions in team […] *We only work with the unit managers, not the direct team leaders or managers. There are many middle levels.*

Theme 3: The support programme

Concepts: *communication content, training opportunity.*

The theme described the support programme in the context of their functions as the OL influence factor that facilitates a common interpretation of the changes across the organisations. The training programme provided teams with learning opportunities and materials to develop a shared vocabulary and understanding. Communication content shapes and legitimises the discussion narrative, etc.

Related concepts	Illustrative data
Communication content	EA-T08 – The organisation opened many training classes, which were taught by the agency. *Based on what we learnt, and from reading books, we wrote the (communication) materials so that the workers can understand.* Because if we used the agency's materials, it would be very difficult to understand.

Training opportunity	HQ-T03 – We provided a lot of training, like a thousand times. EA-T06 - I was trained to operate the BSC quite a lot, but not enough. There were many challenges. WE-N25 - You have to provide training regularly, Rome was not built in a day.

Theme 4: Higher-level supports

Concepts: *provide organisational resources, enforce organisational cooperation.*

The theme of higher-level supports highlights the role of TMT or leaders in supporting team/group learning. They provide necessary *organisational resources* and *enforce cooperation* across the organisations.

Related concepts	**Illustrative data**
Enforce organisational cooperation	WE-T05 - *During the surveying, some teams cooperated, some did not. It was challenging. […]* Simply because we cannot know all the details and description of all the jobs at Telcom-HCM. *Difficult, but we have to do it! If they do not want to cooperate, then we must force them, using directive orders ...* WE-T04 - The top-level leaders trusted, supported and paid attention to our proposals. Issues would be corrected immediately. *They also enforced cooperation, managers of other unit must support us to carry out the tasks.*
Provide organisational resources	HQ-T06 – Because the leaders recognised the importance of training, *financial resources were not a concern.*

Theme 5: Organisational climate

Concepts: *lack of cooperation, resistive climate.*

The theme of *organisational climate* describes how team members perceive the overall attitudes and responses among the organisational members regarding the implementation.

Related concepts	Illustrative data
Lack of cooperation	WE-T05 - *During the surveying, some teams cooperated, some did not. It was challenging*. They even told us that the 3P system is not practical, it won't work. We need to use soft skills to persuade them, *because if they don't cooperate, then we cannot do anything.* Simply because we cannot know all the details and description of all the jobs at Telcom-HCM. *Difficult, but we have to do it! If they do not want to cooperate, then we must force them, using directive orders ...*
Resistive climate	HQ-T18 - Their behaviours during the implementation were *shockingly rude, terrible in general. There were a lot of complaints, and many other things*. … Although *they resisted, and behaved negatively, they had to accept it at the end*. If you did not comply, you could leave, no compromises. Later, everything was getting better.

4.4.4 Discussion

Given that the implementation teams were assembled mainly for the project, the discussion only focuses on the period during the implementation. During that time, the situations were described as ambiguous and uncertain: "… *You know, our team, we were like walking on a rope at that moment" (*HQ-T01*)*. The teams were aware of their lack of understanding about how to carry out the implementation. Since team members recognised that they lacked knowledge and experience, and that no one had the expertise, it prompted the necessary conditions for exploration. Team members were encouraged to take the initiative and employ self-learning.

The teams learned by doing on the tried-and-true basis as they were willing to tolerate mistakes. Given how the team members perceived the back-up and support behaviours, the *team climate* was characterised as *supportive*:

> *WE-T11 - To build and evaluate the BSC: The Planning department was in charge. ... But it was related to different functional units. The Planning Manager was really miserable because he could not imagine which objectives should be defined, etc. Thus, he had to work closely with other functional teams. But this was extra work, he still had a lot of other work to do. The progress was delayed, we (HR) had to support the Planning team.*

There existed a *psychologically safe* and *error-tolerant* climate as team members felt free to discuss and make sense of ambiguous situations.

> *HQ-T18 - Everyone worked well together. Of course, there were some arguments, but to build understanding because it was new. There was no big fight or anything. Coordination was good.*

> *EA-T08: Actually, at the East company at the time …. If it (the implementation) was decided, then we would just do it. If we made a mistake, then we would fix it. We were not afraid, just worried … The team leader had to protect us so that we could face challenges.*

From the examples above, the role of team leader was highlighted as they contributed largely to facilitating the appropriate learning team climate. Effective team leadership positively influenced the overall learning experience of the team. In this case, team leadership commitment is characterised by the team leader's responsiveness, supportiveness, error tolerance, and ability to enforce team objectives. While examples of other qualities have been provided in the discussion,

the following one highlights the responsiveness of the team leader in problem solving:

> *EA-T08 - We always worked together, not just for 1 or 2 days. Besides our routine, this (the implementation) was regular to us… If there was any (technical) problem … I told the director, he immediately asked for the Technology Manager. We would have a meeting that afternoon and make changes. It was really fast!*

Although the team climate was often described in positive terms, not every team member described their experiences similarly. This highlights the compatibility of TMMs. Team members experienced the same event differently as they assessed the quality of their interactions when carrying out the tasks together. The quality of team member participation could influence team learning by negatively contributing to the emerging property of team climate. Take two members of the West company team for example, who discussed their experiences regarding other team members:

> *WE-T04 - Although the HR Department had many people, and some of them were part of the surveying team, only I and Mr. K (WE-T05) work together primarily, so we cannot be absent most of the time. Some members were just doing a little bit of support. Sometimes, we felt the pressure and workload. They just participated and passively listened and did not even join in the conversation. The surveying team should have been more active.*

However, Mr. K was not really concerned with the lack of active participation from others, since he was the key person responsible for the tasks.

> *WE-T05: I was responsible for the tasks. Four team members weren't always with me. For example, if A and B were busy then C would go with me. But I always had to go and was responsible for summarising all the works in the team.*

As the teams took actions to implement the new systems, they encountered issues of cooperation. Although the implementation teams had privileges, their actions were still bounded by the organisational structure and policy. The old structure and policy imposed certain limitations on the team actions and achievements, thus, influencing their learning experience. Such limitations often required support from higher authorities. For the teams, support from TMT and leaders allowed the team actions to have higher priority and official status within the company.

WE-T05 - During the surveying, some teams cooperated, some did not. It was challenging. They even said that the 3P system was not practical, that it wouldn't work. We needed to use soft skills to persuade them, because if they didn't cooperate, then we could not do anything simply because we did not know all the details and description of all the jobs at Telcom-HCM. It was difficult, but we had to do it! If they did not want to cooperate, then we had to force them, from higher authorities…

The lack of cooperation was one of many other factors (e.g., lack of business data, organisational structure, resistive climate, etc.) that could have negatively affected team learning, given that teams relied on the feedback of their collective actions to plan for future actions. Take the organisational structure, for example, as the HR Manager of the West Company team described the limited effect of their efforts when implementing the change of P1-Score:

WE-T11 - The HR Department and HR Manager had a specific plan. But when assigning people to roles, we had many middle levels. At the time, role assignment was carried out by the direct manager. It led to a situation like this: the HR department wanted to assign 2 or 3 positions, but the direct manager competed for the assignment. The problem was that we only work with the Director, but not the direct manager. There were three different levels of management. This is very problematic when applied in a public organisation.

Strategic leaders played an important role in addressing these issues by ensuring cooperation across the organisation or by responding in a timely manner to problematic events. Top-level leaders' responsive and supportive behaviours characterised their commitment to change. A member of the West Company team linked the positive experience of the team surveying task to the support of TMT.

WE-T04 - At that time, we pressed the issue hard. We worked directly with other managers, without asking our manager. In general, they supported us. If there were questions, our manager would discuss it with them directly. The TMT trusted, supported and paid attention to our proposals. Issues would be corrected immediately. They also enforced cooperation, and managers of other units had to support us to carry out the tasks.

4.5 Organisational level of analysis

4.5.1 Outcomes of organisational learning

Telcom-HCM successfully completed the transformation. New learnings were embedded in the organisational memory as the outcomes of the *institutionalising* process. The renewal of the organisational memory denoted the completion of the learning cycle. Telcom-HCM transitioned from exploration to exploitation.

4.5.1.1 Renewal of the compensation system

To understand the systemic issue that was caused by the old compensation system, it is necessary to understand how an individual salary was structured. A HR manager provided a detailed description of the old system:

> *HQ-T02 – The salary structure of public organisations has two parts. The first (hard) part is compulsory, which is paid according to the role's level as defined by the government …calculated by multiplying the base wage to pay scales… The second (soft) part is pay for performance, defined by the organisation. An individual's salary is paid by adding two parts… At the beginning, the hard part was only about 20% (of the total salary), 80% for the rest. Over time, it grows to 50%-60% and so on (of the total salary) … the soft part becomes negligible.*

Although there were many factors that affected an individual salary, seniority was the key characteristic of this system. The longer a person worked for the company, the higher the salary that he or she was paid due to the increased pay scale. For example, a low-skilled, non-essential senior staff member could earn more than a high-skilled new employee if the person had worked long enough in the organisation. This characteristic had been identified as a systemic issue that caused dysfunctional behaviour in employees, such as bad customer service, negative work attitude, lack of motivation and low performance, among others.

By removing the seniority factor from the equation, the new 3P systems enabled Telcom-HCM to adjust the performance salary, which in turn motivates individual working attitudes and behaviours. The new 3P System can be briefly understood by its key mechanisms: pay for Position, Performance and Person. Any individual role and position in the organisation must be predefined within job descriptions and has a Position Score P1. Competency, P3, is evaluated on a half-yearly basis, while the Performance Score, P2, is measured by quarterly KPIs.

4.5.1.2 Structural changes

Before the project, Telcom-HCM's structure consisted of 11 functional units at its Headquarters (HQ) and seven subsidiary companies with different internal structures and functional units. A simplified organisational structure of Telcom-HCM is depicted below based on the report analysis of the agency.

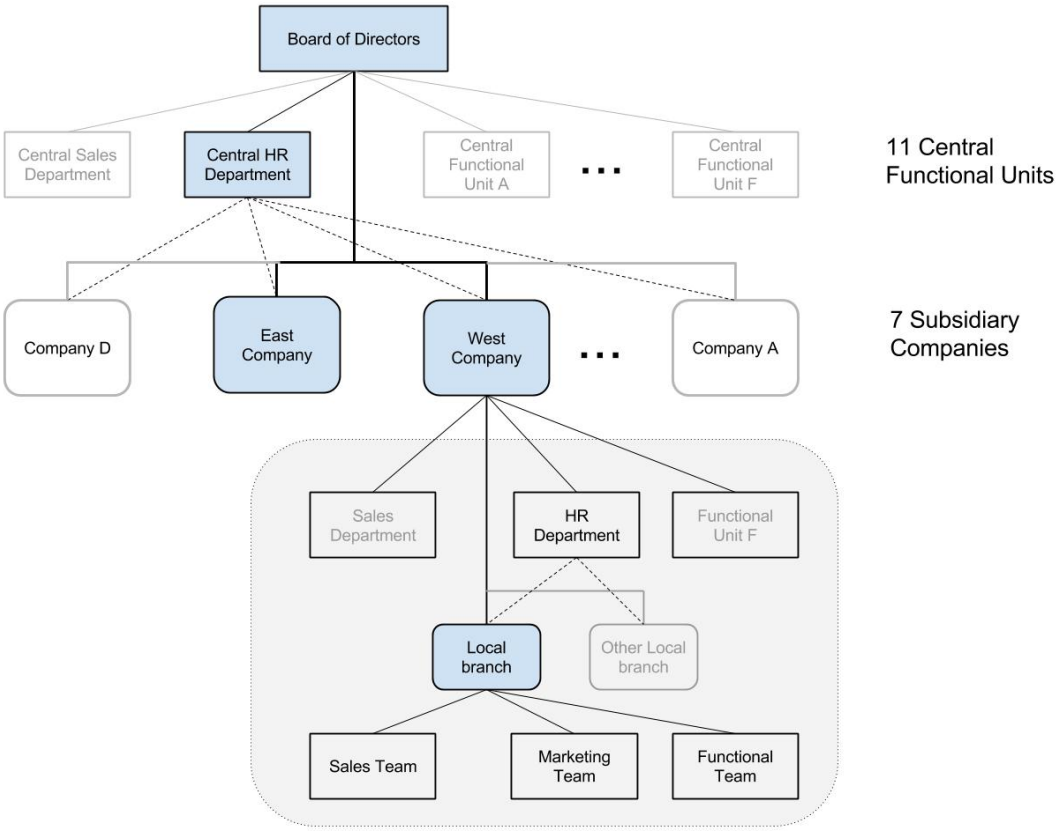

Figure 12 Telcom-HCM business structure (based on the analysis report)

After the two-year project, there were minor structural changes to accommodate the implementation of the new compensation system. However, once the system had been successfully integrated, it became the catalyst for further structural changes. At the time of the data collection, Telcom-HCM had restructured most of the vertical companies to nine different regional centres.

4.5.1.3 IT support system

The IT support system is an organisational artefact that was created as a result of the implementation project. It was a product of necessity given the scale of the organisation. During the project, the tools provided by the Agency were insufficient to effectively support large-scale operations. For instance, the terminology dictionary and evaluating tools were provided in Microsoft Excel file format. They might work well for small- and medium-sized companies, but not in the case of Telcom-HCM. The tools were not welcomed by the implementation teams. An implementer discussed her frustration with the tools:

> *HQ-T16 - The Excel file was horrendous, (I) could not understand anything… The dictionary was this thick* (showed with hand gesture) *… We have to build 1500 positions. How can we do it manually, without the IT program? …*
>
> *A position is defined by 16 factors. Each factor has its own competency on a 5-point Likert scale. With 5000 employees, it is impossible to evaluate the competency score (P3) (using the Excel file) …*

The lead developer of the IT Team further explained:

> *HQ-T17 - You cannot evaluate because you need the competency dictionary (every time you do it). You have to know the definitions of the scale level in order to grade. If you grade a factor, such as sales skill, at level 4 out of 5, you need to know what level 4 means, because it has a definition.*

Once the IT support system was developed, it became an inseparable part of the organisational infrastructure. After the project, both the IT development team and the IT system were promoted to support the entire Telcom Corporation.

4.5.1.4 New organisational norms

The analysis indicated significant behavioural and cognitive changes in the working climate and norms. For instance, the field workers are willing to work longer and extra hours to complete the tasks because their performance now has significant impact on their salary. One HR staff member revealed that a field worker could now earn a salary that is even higher than a director. As a result, the working climate changed from being characterised by seniority privileges, lack of motivation and office hours only, to looking for extra work and cooperation. Organisational norms had also changed as the employees become aware of new values, for example being customer-friendly, results, and performance-oriented values among others.

The following example illustrates the changes in climate and norms. The analysis found that this story of a field team leader resonated throughout the analysis.

> *WE-T13 - Before the changes, it seemed like the attitude of "if I feel like it, I will work, otherwise, no" was deeply engrained into people's minds. I mean, if I do not work, I still earn the same salary. People were slow and unmotivated, there was no discipline at all. With the 3P system, because it clearly assigns tasks for each individual, if you do not complete your tasks, then it will show up there. People began to wake up …*
>
> *Take a big customer like a bank for example. They pay us a lot of money for an Internet line. So, if any problem happens, we need to take care of it in two hours. Before the 3P system, we fixed it without caring how long it took. But after the 3P system, for big customer, it is two hours. It does not matter how we reschedule our work. We have to set a high priority for big customers and fix the problem in under two hours. We all recognised that.*

4.5.1.5 Strategic and planning management system – Balanced Scorecard

The evaluation of individual performance depends on the organisation's ability to objectively define and measure it. Given the lack of such a capability, the organisation needed a method that enables them to specify an individual's KPOs and KPIs that are linked to the organisation's strategic objectives. Although the Balanced Scorecard method (BSC) was initially introduced for individual performance appraisal purposes, its larger meaning was recognised. The BSC became the organisation's new strategic and planning management system.

BSC is a strategic performance management tool developed by Kaplan and Norton (1992). In essence, it is a framework designed to translate the organisation's strategic objectives and visions into tactical and operational objectives, which are specific and quantifiable. The BSC allows the organisation to objectively measure performance in terms of achieving results. The BSC method is often associated with the Management by Objectives approach. While both are similar on the underlying goal-centric philosophy, the BSC focuses on four central perspectives, i.e. the learning, financial, customer and internal business processes (Kaplan and Norton 1992; Dinesh and Palmer, 1998). Although the implementation of the BSC was challenging and interesting, it is not the purpose of this study to focus on it alone. The BSC system is treated as an integral part of the transformation.

4.5.1.6 Organisational capabilities

Another important outcome of organisational learning is the development of existing and new organisational capability. The IT support system is an example. The organisation utilised its existing technical knowledge-base to develop an IT support system. The new IT system not only supported the implementation, but also became a critical artefact of organisational operations. The organisation had learnt how to conduct the implementation without being dependent on external support. After the implementation, Telcom-HCM played a key role in the business transformation of the Telcom Corporation, which only took one year.

> *HQ-T01: We finished in 2013. Then in 2014, the Telcom Corporation saw our achievement. They decided to apply it to the entire corporation. They began just like us. But because Telcom-HCM had done the implementation, their transformation was completed really fast. We (Telcom-HCM) carried out the implementation for them, so that the 3P system was completely integrated, I remember it was around 6/2015.*

Up to this point, the renewal of organisational memory has been discussed with multiple changes. The analysis triangulated evidence from the interviews of high-level managers and leaders and archived documents provided by Telcom-HCM and public resources such as newspapers. At the organisational level, leaders and high-level managers were considered as the agency of organisational change. Although they are individuals, they have the ability to institutionalise a new set of rules and policies or change the organisational structure. Their decisions have organisational-level impacts that determine the course of learning.

4.5.2 Finding

Theme 1: External conditions

Related concepts: Higher-level structural changes, market dynamisms.

Related concepts	Illustrative data
Market dynamisms	EA-T24 - Years ago, we were at the top of the market, *but our share had declined. It is very obvious. When I went to the meetings, all the managers felt that we were losing…* We used to be proud of being part of the Telcom organisation. *But now they (the competitors) had surpassed us*, our salary is lower! EA-T06 - *Years ago, Telcom was monopolistic without any competitors*, yet monopoly entailed many problems: unfriendly service, high price, bad working and service attitudes.
Higher-level structural changes	WE-T19 - The (current) CEO was coming back to Telcom-HCM as Vice Director (at that time*). Before that, he had worked on the restructuring project of the Telcom Cooperation, which had not been followed through.*

Theme 2: Support programmes

Concepts: IT support programme, communication programme, and training programme, temporary policies.

Theme 3: Organisational structure

Related concepts: vertical separation structure, loosely-coupled systems.

This theme highlights the characteristics of the organisational structure that had impact on learning at the organisational level.

Related concepts	Illustrative data

loosely-coupled between hierarchical levels	WE-T11 - The HR Department and HR Manager had a specific plan, like this like that. *But when assigning people to which role, we had many middle levels*. […] *The problem was that we only work with the Director, but not the direct manager. There were three different levels of management.* It was very problematic when applying to a public organisation.

Theme 4: Strategic leadership

Concepts: advocacy, commitment.

The theme highlights the characteristics of strategic leadership, which emerged from the follower's perceptions of the leader's behaviours. Advocacy leadership reflects the leader's actions that advocate for changes, e.g., search enabling, peer persuasion, etc. Commitment reflects through their supportive and participative behaviours.

Related concepts	**Illustrative data**
Advocacy	WE-T19 - The (current) CEO was just coming back to Telcom-HCM as Vice Director (at that time).[…] The new compensation system was introduced during his time. He had promoted and proposed to use the new BSC system, around 2008-2009. HQ-T18 – We have to thank the (current) CEO, he is a great leader. He was the Vice Director, who took the first step forward, so that everyone followed.

Theme 5: Strategic intentions

Related concepts	Illustrative data
Strategic intentions	*HQ-T01:* One is that they implement, we only received. But we think if they do it all, then what would happen after they left? Second, they provide methodology, we implement. But I see that we have not yet understood the methodology…How can we do it? … the agency proposed two approaches, one involved a complete structural change, another is step by step… Based on the organisational situation at the time, we saw that a complete structural transformation was (a) too disruptive for a public company; (b) we do not really understand the new systems; and (c) our team lack the manpower and necessary capability to implement the new systems. Thus, we decided on the second approach, which was keeping the current structure, new wines in old bottles.

Theme 6: Organisational climate

Related concepts	Illustrative data
Resistive organisational climate	HQ-T18 - Their behaviours during the implementation were *shockingly rude, terrible in general. There were a lot of complaints, and many other things*. … Although *they resisted, and behaved negatively, they had to accept it at the end*. WE-T05 - *During the surveying, some teams cooperated, some did not. It was challenging*.

Theme 7: Business performance

Related concepts	Illustrative data
Business performance	EA-T24 - Years ago, we were at the top of the market, *but our share had declined. It is very obvious. When I went to the meetings, all the managers felt that we were losing…*
	WE-T10 – In 2010, when 3P was implemented, its effect was not clear. 2011-2012 we saw some positive change, but not much. Until 2015-2016, performance increased clearly […]

4.5.3 Discussion

4.5.3.1 Before the implementation

Market dynamisms and *higher-level structural changes* were identified as two external factors that triggered the business transformation at Telcom-HCM. Market dynamisms were characterised by the fundamental change in the telecommunications industry and rapid development of technology. Since the government allowed the participation of other players in the telecommunications market, Telcom-HCM began to compete with other companies. Given the rapid development of telecommunications technology, Telcom's technological advantages were rendered insignificant; for example, mobile technology replaced landline telephones, fibre optics replaced dial-up, and so on. As the underlying technologies shifted, the market preferences shifted too.

> *EA-T24 - Years ago, we were at the top of the market, but our share had declined. It is very obvious. When I went to the meetings, all the managers felt that we were losing… We used to be proud of being part of the Telcom organisation. But now that they (the competitors) had surpassed us, our salary is lower!*

> *EA-T06 - Years ago, Telcom was monopolistic as it did not have any competitors. Yet having a monopoly entailed many problems: unfriendly service, high prices, and bad working and attitudes. About performance, to be honest, performance in that period did not reflect the reality. It was unrealistic! The business cost, income, and net return were not clearly defined.*

Although the case study treated Telcom-HCM as an autonomous entity, the structural changes of its parent company, Telcom Corporation, must be considered. Historically, the Telcom Corporation was tasked with two major services for the public – postal and telecommunication services. In 2007, Telcom Corporation was divided into the Postal and Telcom Corporation, with Postal becoming a separate entity. Under new government regulations, the Telcom Corporation had been planning to restructure the entire organisation. For various (undisclosed) reasons, the restructuring plan was abandoned. However, the restructuring intention of the parent Corporation enabled the necessary conditions for changes in Telcom-HCM. Market dynamisms and higher-level structural changes could be grouped under the theme of *External conditions*.

However, the external conditions were necessary but not sufficient to enact the business transformation. The role of the strategic leader, who advocated for change, was important. The current CEO of Telcom, who served as Vice Director of

Telcom-HCM at that time, was advocating for change. He actively supported the search for new ideas and solutions. Leadership advocacy supports explorative actions, so that organisations can transition from exploitation to exploration, thereby enacting a new learning cycle.

> *HQ-T18 – We have to thank the (current) CEO, he is a great leader. He was the Vice Director that took the first step forward, and everyone followed.*

> *HQ-T02 - At that time, the board of managers had the (current) CEO. They requested to find a consulting agency and let them help with a new compensation system. We did not need to invent one because there were many well-designed systems out there already. Why wouldn't we use one instead of re-inventing the wheel?*

Strategic intention. Before enacting the implementation, strategic concerns were related to how the organisation was able to develop capacity so that they could apply the methodology without the need to retain the agency's service. This very specific strategic intention had led to the decision of the transitional plan. The plan began with the Consultant Team in charge and coaching the implementation teams. As the teams became more capable, they would gradually take over the implementation process. As a result, Telcom developed an organisational capability that allows them to customise the new system to their unique situation.

> *HQ-T01 – First, is that they implemented, and we only received. But we all thought, if they do it all, then what would happen after they left? Second, they provided methodology, and we implemented it. But I saw that we had not yet understood the methodology…How could we do it […] Based on the organisational situation at the time, we saw that a complete structural transformation was (a) too disruptive for a public company; (b) we did not really understand the new systems; and (c) our team lacked the manpower and necessary capability to implement the new systems.*

The transformation was expected to have radical effects on the organisation. If the implementation project followed a radical restructuring plan, which was one of the options proposed by the agency, the consequences would be too great and unpredictable. The less disruptive option was decided on: only minor structural changes were allowed to accommodate the new systems.

4.5.3.2 During and after the implementation

With the replacement of the old compensation system, the changes started to produce winners and losers. The negatively affected categories included low-skilled and senior staff. These categories represented a large portion of the organisation's demography. According to one HR Director, at the time, the average age of employees was about 50 years old. As a result, the changes caused tensions. The tensions took the form of resistance and doubt, and characterised the organisational climate during the implementation. A resistive organisational climate could have hindered change, as it could have generated more opposition and oppressed support.

> *HQ-T02 - Because I was a member of the implementation team, I participated in all the meetings and listened to opinions of others. My experiences were that, if people supported us, great! … If they openly resisted the changes, we have different ways to gain their support. The most difficult case was the one who neither openly supported nor resisted. They tended to change their opinions based on the situation. There would be no problem if everything went well. If there were difficulties, they would support the opposition, thus creating even more resistance.*

During the implementation, lower-level units – for example the implementation teams and individuals – were allowed sufficient autonomy. The West and East company were *loosely coupled* to the HQ at the operational level. Although they share some common operations at the strategic level, each site has its own structure and context. These semi-structured characteristics explained why the lower-level units' autonomy generated learning variations that were necessary for exploratory learning. For instance, the results of the job position survey from each site were collected and reviewed to create a common organisational template. In summary, the characteristics of organisational structure seem to have mixed effects on the implementation. They supported autonomy but hindered the implementation that took place at the lower levels.

To address the uncertainties of the transformation, an experiment was conducted in the new Central Sales Centre (CSC). With the experiment, Telcom-HCM was able to apply theoretical knowledge to their specific organisational context and successfully identified various obstacles that were unique to their situation. For instance, the lack of business data and increased managerial work led to the development of the IT support system. The experiences accumulated during the experiment in the CSC were valuable toward the main implementation.

HQ-T01 - During the implementation, even the agency faced obstacles because they only had experiences with smaller companies before. Those companies usually have a few hundred employees, while Telcom-HCM had thousands. We did not make much progress. I suggested that we must run an experiment with an entirely new and separate unit. It was the Central Sales Centre. The 3P was applied to the CSC to identify any difficulties and assess the method's effectiveness.

The organisation attended to various issues and unexpected problems using support programmes and policies, e.g., communication, training, and IT support systems, and early retirement and other policies. Support programmes can be considered as organisational actions and efforts to internalise external knowledge by leveraging the existing capabilities. For example, Telcom-HCM utilised the technical capability to develop IT support system, training and communication capability to support the distribution of new knowledge. Take the training programme to illustrate this point: given that different audiences required different content, the organisation relied on some individuals with relevant skills to articulate theoretical to context-specific knowledge for training purposes. The organisation was able to internalise new external knowledge by proactively fitting it into the business context.

Training programmes provided materials and common vocabulary of the new systems. The new concepts and their associated vocabulary require explanations in order to enable discussion, ideas and interpretation exchanges. The frequency and magnitude of each programme was varied, depending on the situation and context. For instance, the operations of the new system required a completely new body of knowledge, thus routinely and frequently updated *Training programmes* were necessarily to train and prepare the employees for working with new systems. A Planning member of staff, who had become an expert in the BSC said: "*You have to provide training regularly, Rome was not built in a day*" - (WE-N27).

Communication programmes played a crucial role in shaping a legitimate common interpretation. There was a common narrative among the implementers to explain the need for the new system and why it was better than the old one (e.g., fairer salary, the more you work, the more you earn). However, it was not the only one; during the implementation, various streams of narrative were created to make sense of the ongoing changes. The stories shared among the field staff were different. For instance, when the new salary system was enacted, the salary gap between staff and manager positions widened. The narrative among the field staff was that they (the managers) would protect themselves to maintain high salary,

while the senior staff, who had contributed for a long time, suffered a salary reduction.

> *WE-T12 - When we briefly heard about the 3Ps, people (team members) began to rile up. There was a salary gap between team leaders and members already, and now the 3P?! We heard that people in high positions would have a very high salary, but lower salaries for normal staff. It did not matter whether you were a level 1 or 7 worker (higher is better) as old members are mostly level 7 workers. They were not happy.*
>
> *When the new salary was applied, each person's salary was keep secret in accordance with the new policy … but you know, through different ways they found there was a large gap between manager/team leaders and members… They thought the managers would do favours for each other to maintain a high salary. People were confused and angry at that time.*

The leaders' commitment was important during the implementation. Leadership commitment is characterised by behaviour that is perceived by their followers. The Telcom-HCM leaders ensured that the organisation focused on the change objectives by enforcing the newly institutionalised systems. They attended in a timely manner to emerging issues and also leveraged the internal knowledge-base by supporting the internal IT team. For example, the HR Director recalled his decision to support the development of the IT support system:

> *HQ-T01: At that time, in that context we could successfully develop the IT system, but not now. The IT support system was lucky to be developed at the right time and right place. When you do something, if you see the opportunity with a 70% success rate, just do it. Do not pass such an opportunity by.*

Because the IT team worked closely to support the implementation teams by addressing their issues immediately, the integration of the new IT support system was smooth and well-received. As a result, Telcom-HCM gained new technological capability.

4.6 Case discussion and implication

4.6.1 Learning tensions

The analyses provide evidence to support the use of *Mental models, Team mental models* and *Organisational memory* as cognitive constructs to investigate OL in multilevel settings. The findings substantiate the learning tensions that manifest at the individual and organisational levels, i.e. the phenomena of *resistance* and *strategic renewal*. However, the group-level learning tension of *maintaining diversity-in-unit* was not detected with the collected data. The researcher suspects that this might be due to the limitation of the retrospective case study, which is not sensitive enough to detect this phenomenon. Despite that lack of evidence for the group-level tension, the analysis was still able to identify several influential factors that contribute to group-level learning.

Although many influential factors, or themes, were discussed during the three levels of analysis, this study addresses five factors that have significant impacts on learning. They are *mindfulness, boundaries, leadership, supportive learning climate,* and *ICT* (Information and Communication Technology). The following sections locate these factors within wider theoretical discussions.

4.6.2 The intervening factors of learning

4.6.2.1 Mindfulness about learning

The analysis indicated that the interviewees were conscious of and open about their lack of domain-specific knowledge and capacity to implement the new system at the beginning period of the business transformation. This awareness seems to trigger a psychological state in which the interviewees recognised that they were engaging in a learning process. Being mindful about the learning process not only enabled them to be open-minded about new ideas, but also encouraged them to take actions. Many interviewees recalled that their actions and decisions were taken on a try-and-true, learning by doing basis. They accepted that mistakes and errors are part of the learning process. Given that individual learning hinges on the individual's ability to mobilise toward changes, being mindful about the learning process resolves the tension that inhibits actions as the individuals struggle to stabilise their new mental models. The finding brings forward the concept of *mindfulness* and its role in OL.

Definition of mindfulness often involves mental states of awareness and attention to what happens at the present moment (e.g., Ruedy and Schweitzer, 2010;

Zhang and Wu, 2014). Ongoing present-focused events are experienced with open attitude (Zhang *et al.,* 2013) and receptive awareness (Brown and Ryan, 2003), free of evaluation or judgement from past experience (Reb *et al.,* 2014). The value of studying mindfulness in organisational settings is recognised since organisational attention is considered scarce and a limited resource (Levinthal and Rerup, 2006).

To understand the role of mindfulness in OL, Levinthal and Rerup (2006) address the complementary relationship between mindful actions and less-mindful actions. Less-mindful actions are associated with automatic, routine-based behaviours that are necessary for organisational operation given scarce attentional resources (Levinthal and Rerup, 2006). Mindful actions are local, situated, and in the moment. They are suitable for dealing with ambiguous situations by attending to subtle and weak feedback signals that emerge from ongoing operations (Levinthal and Rerup, 2006). Therefore, mindful actions are associated with improvisation (Miner *et al.,* 2001), exploration and effective adaptation (Levinthal and Rerup, 2006). Weick and Sutcliffe (2006) broaden the discussion by contrasting how mindfulness is viewed from Western and Eastern philosophies.

Weick and Sutcliffe (2006) view Western thinking of mindfulness as the act of distinction-making, normalising, and concept-refining through information processing. Eastern versions of mindfulness go beyond this to understand how the act of conceptualising itself interferes with how we see and interpret the world (Weick and Sutcliffe, 2006). Weick and Sutcliff (2006) suggest that *collective mindfulness* could address the scarcity of organisational attention – by focusing on the *quality* of attention. "*Attention is scarce when it is undisciplined and obstacles interfere with clear comprehension, but attention is more plentiful and sufficient when it becomes more stable and vivid*" (Weick and Sutcliffe, 2006, p. 521).

Similar to the development of the OL field, research on mindfulness in organisations faces multilevel challenges with unanswered questions about the relationship between individual and collective mindfulness (Sutcliffe *et al.,* 2016). Is there a relationship? What are the effects of collective mindfulness on the individual, and vice versa? Sutcliffe *et al.'s* (2016) critical review highlights the infancy-state of research on antecedents of collective mindfulness, the influences of organisational factors on individual mindfulness, and the role of culture, and other factors.

From the case study, mindfulness about the learning process was found at all levels of analysis. The finding suggests that collective mindfulness may emerge via the process of isomorphic composition. As team members and managers

explicitly acknowledge their incapability, teams became aware of their current *collective* incapability in order to implement the new systems; thus, a team collective mindfulness emerges. As a result, team members are assumed to take the learner role. They are neither expected to have the know-how nor to be impeccable. Rather, teams rely on collective sense-making to navigate through uncertainties, while placing emphasis on the team members' ability to take the initiative. This concerns team members engaging in proactive behaviour, which goes beyond simply responding to the situations or to requests from others.

Evidence suggests that moderate demands of team coordination might indirectly contribute to the emergence of team collective mindfulness by supporting individual mindfulness. Weick and Sutcliffe (2006) suggest that moderate demands of coordination could benefit individual mindfulness. Lesser need for coordination means lesser distraction. Individual mindfulness is crucial for individuals to be sensitive to weak signals of developing problems. The result is that teams become better at sensing problems, and maybe problem-solving. Thus, collective mindfulness benefits indirectly from a moderate degree of coordination.

At the organisational level, leaders who are mindful about the learning process play an important role in enabling collective mindfulness and sustaining attention. They recognise learning goals, and then incorporate them into the change objectives. Organisations attend to the learning goals while moving toward their objectives. For example, being aware of their incapability led Telcom-HCM to select a transitional plan that emphasised capability development, which was built into change objectives. Being mindful of developing internal capability, Telcom-HCM mobilised resources effectively and utilised their knowledge-base to achieve these goals.

For OL, this thesis contents that enabling mindfulness at the beginning of a (radical) learning cycle is crucial for success. Mindfulness could be the necessary antecedent for the emergence of other phenomena, such as supporting a learning environment. Mindfulness has far-reaching benefits for health and well-being, work meaningfulness, and individual and organisational performance (Sutcliffe *et al.*, 2016). This thesis contributes to the development of the mindfulness concept regarding its multilevel relationship, and the relationship between mindfulness and team coordination.

4.6.2.2 Boundaries

Boundaries were identified as another important intervening factor of OL in this case study. While the multilevel analysis supports prior works on the inhibiting effect of boundaries on cross-boundary learning (e.g., Orlikowski, 2002; Easterby-Smith *et al.*, 2008), it went beyond the apparent to examine how such effect manifests to influence learning at the group and individual levels. To facilitate a wider theoretical discussion, Carlile's (2004) conceptualisations of knowledge boundaries could be employed.

The issues of boundaries become apparent when learning requires actions to be taken across business functions (Carlile, 2002; 2004). Carlile (2004) suggested that as the *novelty* of the learning situation increases, knowledge boundaries arise in three forms – i.e. *syntactic, semantic,* and *pragmatic*. Even when learning contexts and conditions are known, stable and familiar to the actors involved (least novelty), knowledge transfer still faces syntactic boundary, which is referred to the issues of having common syntax, and lexicon. As the novelty of the learning situation increases to the point that causes interpretive ambiguity, actors face a semantic boundary. Lastly, the pragmatic boundary arises when the increasing novelty results in different interests among actors that have to be resolved.

The case study not only found three forms of boundaries; it also recognised the processes that are used to address the challenges of boundaries as described by Carlile (2004). The implementation of the new systems across business functions presented complex learning contexts that gave rise to all three types of boundary. In the earlier phase of the implementation, the presence of syntactic boundaries was apparent. The new 3P systems introduced new concepts and vocabularies that required dissemination through training programmes. Carlile (2004) named this process '*transferring*'.

It was clear that training programmes were not sufficient to support the implementation as most implementers expressed the difficulties they faced in relating new concepts to their work context. This indicated the presence of a semantic boundary. To further disseminate new learning across other business units, the concepts of the new systems were re-interpreted using language that is appropriate and easy for the workers to understand. This process is regarded as *translating*, which is crucial to bridge the semantic approach (Carlile, 2004). Pragmatic boundaries highlight the differences between the actors' interests and those of the organisation that required alignment via practical and political processes (Carlile, 2002; 2004, Bechky, 2003). Evidence showed that tremendous

practical and political efforts were invested during the business transformation to support such alignment (e.g., experimenting, support programme, negotiation among top-level leaders, communication, etc.).

Evidence from the case study substantiated Carlile's (2002; 2004) conceptualisation of boundaries by adding empirical support in the context of business transformation. Most prior empirical studies of boundaries are mainly conducted in the context of product development (e.g., Carlile 2002; 2004; Easterby-Smith *et al.*, 2008). At the same time, the findings highlight the important role of boundaries as an influence factor of OL. The effect of boundaries on learning at different levels is discussed next.

Boundaries and Organisational learning

The findings suggest that unit boundaries emerge naturally from structure, such as hierarchical template, functions, processes and systems, among others. The greater the structural differences between two units the greater their knowledge boundaries are. Functional-similar sub-units that have strong boundary conditions, such as autonomy, different internal structure, decentralised systems and processes, would generate variations when solving similar learning problems. Sufficient variations are necessary for exploration to occur successfully as they ensure a wide range of coverage during an exploration period (March, 2006). Thus, boundaries are considered as the mechanism that supports exploration.

The analysis has also found boundaries to have latent effects that inhibit exploitation. The latent effects became active during the integrating and institutionalising processes, when *cross-boundary* actions took place among the sub-units. The findings suggest that strong boundary conditions cause learning tensions when organisations need to diffuse and assimilate newly learned superior knowledge across subgroups; that is, when organisations need to replicate past success in order to transition from exploration to exploitation. Without adequate attention paid to address the tension, organisational learning could become discontinuous.

From the case, the multiple sites of Telcom-HMC – i.e. East, West and HQ – conducted the implementation differently, thus generating variations that allowed for Telcom-HCM to cover more possibilities. As a result, they arrived at the most appropriate solutions. At the same time, each site had its own sub-divisions, with various structures, processes and systems, while sharing the same organisational resources. Given the lack of common practices and centralised systems for

managing information, Telcom-HCM had to commit many more resources and efforts to accommodate the integration of new institutionalised learning across the sub-units – for example, merging sub-divisions, job rotation, intense training, and encouraging early retirement.

Boundaries and group learning

Boundaries manifest as the problem of cooperation at the group level. As the implementation teams conducted boundary-spanning tasks, it was problematic for team learning because the effective results of team tasks were contingent on the cooperation of other units. Levinthal and March (1993) note that negative feedback could lead to further exploration due to inconsistent outcomes and uncertainties. As a consequence, it became more demanding for the teams to engage in making sense of the situations without discounting individual members' previous efforts.

From the case, although the implementation teams were composed of cross-functional members, they still had to operate within the boundaries and scope defined by the then current structure. Due to the lack of cooperation, the results of their actions did not always meet theexpectations and often gave rise to unexpected consequences. Even after the implementation had been completed, adjustments continue to be made.

Boundaries and individual learning

In the context of business transformation, boundaries presented challenges to individual learning by limiting what the individuals can do and indirectly affecting the outcomes of their actions. Because individuals rely on positive feedback to stabilise their new mental models, unexpected results might cause negative feedback that increases the uncertainties and generates more learning tension. If the resources for taking actions are finite, individual learning might be disrupted. Empirical evidence of learning discontinuity is well-studied and certainly not rare (e.g., Berends and Lammers, 2010).

4.6.2.3 Leadership

The multilevel analysis identified leadership as an influence factor of OL. *Leadership advocacy* and *leadership commitment* are two characteristics of leadership that help resolve learning tensions at different levels of analysis. Since the findings are drawn from the perceptions of the followers, leadership is defined from a follower-centric perspective (Meindl, 1995). This approach emphasises how

leadership is defined from the follower's perceptions of leaders' actions and context, within which the actions take place.

This thesis complements mainstream leadership studies, which often focus on linking learning styles to the demographic traits of senior leaders or top management teams, e.g., heterogeneous top management team and product innovation (Smith, Collins and Clark, 2005); CEO tenure and firm innovation (Wu, Levitas and Priem, 2005); and management styles such as transformation and transactional leadership (Vera and Crossan, 2004). By identifying the leader's behaviours that are 'style-free' under specific organisational circumstances, the findings complement the growing recognition that strategic leaders need to be versatile in terms of their management styles (e.g., Tushman and O'Reilly, 1996; Rowe, 2001; Crossan *et al.*, 2011).

Leadership advocacy

Because of the strong path-dependence of past success, organisations are always subject to learning inertia (Liao, 2008). Under a crisis situation, organisations rely on individual agency, e.g., high-level leaders, to trigger new learning or strategic renewal (Crossan *et al.*, 2011). *Leadership advocacy* can be used to describe a leader's behaviour which advocates for change, such as actively structuring and identifying organisational problems, taking action to persuade peers, and providing resources for explorative activities, among others. Leadership advocacy should be differentiated from commitment due to its connotations and contextual conditions. Leadership advocacy triggers new learning cycles, while leadership commitment is crucial for a successful transition from exploration to exploitation.

Leadership commitment

Commitment has always been a key factor of learning or knowledge creation (Nonaka and Takeuchi, 1995). The findings identified behaviours of leaders that constitute their *commitment*. From the follower's perspective, the leader's behaviours are characterised as (a) *supportive* – by providing necessary resources and facilitating cooperation, psychological safe environment, etc., (b) *participative* – by being responsive to organisational issues and actively engaging in problem solving, and (c) *comprehensive* – indicates how well-understood and articulated they could be when explaining the change and its implications.

During the transformation, established practices and organisational and technological systems have systemic forms of power that limit organisational actors in how to interpret and act in situations (Lawrence *et al.*, 2005). When radical change

challenges institutions, it creates ambiguous situations in which organisational actors are required to act out of the 'normal' range. They might be reluctant to take different courses of actions, simply because they do not know how, or have different interpretations of situations. Such circumstances often require leaders to exercise their power to resolve the tension. They support exploration by facilitating legitimate interpretations of new ideas and support team actions that span boundaries.

Lawrence *et al.* (2005) refer to the forms of power that support radical change as *episodic*. As leaders continuously exercise their episodic power to address the learning tension, their behaviours signify a commitment to change that significantly affects the interpretations and actions of other organisational actors. Leadership commitment is characterised by the follower's perceptions of the leader's behaviours. Examples from the case include implementers' perceptions of how top-level leaders participated in problem-solving and enforced cooperation to support team actions. It is apparent that the impact of leadership commitment is significant in resolving learning tension. It required a degree of proactivity from the leaders.

At the group level, team leaders (and managers) are not only the facilitators of supportive learning climates, but also the curators of shared meanings. Team leaders ensure that individual interpretations are in alignment with those of the organisation so that the team can act in unity and produce effective organisational results. While both team and strategic leadership are necessary to the success of new learning, the role of (middle) managers and team leaders is far more important in addressing the tension of group learning. Strategic leaders take supportive roles to provide resources and support, such as when teams need to take boundary-spanning actions.

At the individual level, individuals usually rely on their direct manager for clarification of meaning and idea evaluation to stabilise their new mental models. Managers are responsible for ensuring that the learning goals and their contexts are accurately interpreted during times of radical change. By promoting meanings, ideas and actions that are compatible with the learning goals, team leaders actively shape the learning experience of their individual members. Similarly, top-level leaders are often responsible for setting common visions and framing learning contexts, within which individual learning occurs (Berson *et al.*, 2006). Individuals could feel encouraged and supported when perceiving the leader's commitment so that they might commit to the change objectives.

4.6.2.4 Supportive learning climate

Climate is widely recognised as a factor that could inhibit, reduce or promote learning (Kacey *et al.*, 2001; Lim and Morris, 2006). Climate is the product of shared experience that describes the cognitive and motivational state of a team and an organisation. This means that climate is typically dynamic in nature due to its mutable quality as an emergent state (Marks *et al.*, 1999). Once emerged, climate affects the learning process by feeding into the psychological and behavioural processes of individual learners, which might bring about tensions.

This study distinguishes *team climate* from *organisational climate*. From the case study, team climate can be characterised as a *supportive learning climate,* while the organisational climate can be described as *resistive* at certain times but generally supportive and commited to change.

Team climate: supportive learning climate

The finding of team climate substantiates the construct of *supportive learning environment* by Garvin *et al.* (2008) and resonates with findings from studies of team innovation (e.g., Post *et al.*, 2009). *Managerial support, error tolerance* and *psychological safety* were identified as the characteristics of team climate that have a positive impact on team learning. Given the complexity of some problems and the lack of domain-specific knowledge, an appropriate team climate is necessary for problem-solving teams. A supportive learning climate encourages the proactive behaviour of team members, such as taking the initiative to problem-solve and participate in collective sense-making to accurately understand problems or situations.

Team members constructed a team experience as supportive when they perceived support behaviours from teammates and the team leader. A supportive climate highlights the interaction's *quality*, as opposed to the interaction's *nature*, e.g., workflow patterns, or participation frequency. Team members might participate and interact frequently in team processes simply because they have to; this does not constitute the quality of their interactions. Supportive behaviours were identified as team members actively monitoring task progress to provide support and back-up when needed; for instance, recognising the increased workload and pressures from keeping up with the implementation schedule prompted HR members to support planning staff with their tasks.

During the change, implementing mistakes were considered as a source of learning that the team members reflected upon. Although some mistakes had long-term consequences, for example, affecting the salary of many staff, they were

corrected without blaming or discounting the team members' efforts. Team members were found to experience the team climate as *error tolerance,* which motivated them to take initiatives during periods of radical change. At the same time, they felt safe from criticism, rejection or other negative consequences for disagreeing with other team members or having alternative interpretations. Such experience constitutes *psychological safety,* which was found to encourage diverse and innovative thinking from other studies' findings (e.g., Edmondson, 1999; 2002; Post *et al.*, 2009).

Many scholars argue that the *supportive learning environment* is a building block of learning organisations (e.g., Edmondson, 2004; Garvin *et al.*, 2008; Lancaster and Di Milia, 2015). Garvin *et al.* (2008) identify four key characteristics of a supportive learning environment: psychological safety, appreciation of differences, openness to new ideas, and time for reflection. The construct is widely recognised and often employed to explain knowledge-sharing culture (Song and Kolb, 2012; Song *et al.,* 2009); however, little has been done to validate and refine what constitutes a supportive learning environment. While the important role of *managerial support* is clear in enabling a supportive learning environment (Lancaster and Di Milia, 2015), this thesis contributes to the construct development by providing empirical support to the *psychological safety* apparatus and expanding the discussion of error tolerance.

An error-tolerance environment arises from the way in which teams handle errors, which are part of the learning process – i.e. detection and correction (Argyris, 2002). Edmondson's (2004) empirical study discovered the primary influence factor of error detection is the team members' willingness to discuss error openly, and an error-tolerance environment would increase team members' willingness to acknowledge and discuss their mistakes. As team members become mindful about the learning process, they recognise that mistakes are unavoidable and part of the learning process. Mistakes were not held against them. Therefore, mindfulness is arguably an enabling antecedent of the error-tolerance environment, which is necessary for group-level learning, by improving the rate of error detection and correction.

Organisational climate

Once emerged, a resistive organisational climate could inhibit organisational learning by affecting the outcomes of exploration activities. The case analysis indicated that the resistive climate made it difficult for the top-level leaders, who are the institutional agents of change, to assess the effectiveness of their exploration

and acquire accurate interpretations of situations. As a result, this created opportunities for change-sceptics or resisters to legitimise their rationale against radical change. Thus, this potentially caused internal conflict among top-level leaders that would affect the organisational commitment and learning continuity.

For individual learning, the thesis found that the implementers, who were committed to change goals because they wanted to or because they felt obliged to, were identified more with the organisational commitment to change, rather than the resistance movement. They showed a degree of empathy to organisational situations, and also alignment with the change's objectives. Thus, these individuals were not affected much by the resistive climate. In contrast, the implementers who had little choice but to change were found to be passive. They were more likely to be affected by the resistive climate, which could reduce their motivation to change. In general, how organisational climate affects individual learning is contingent on how the individuals evaluated change in the first place.

4.6.2.5 Information and Communication Technologies (ICT)

The role of ICT, as IT support systems, was recognised as one critical success factor of the transformation. The findings indicate a symbiotic relationship between the use of ICT and organisational changes. Symbiotic refers to an iterative, incremental process of the ICT' development that depends on identifying the operational problems caused by organisational change. At the same time IT solutions change how people work. Because implementation of the new ICT fundamentally changes the way in which people work, it poses a major risk of user resistance, as people may refuse to use or may under-utilise a new ICT system and its related practices (Gibson, 2003; Kim and Kankanhalli, 2009). Suprisingly, in this case study, the implementation of ICT system did not suffer user resistance, which is the most salient reason for ICT failures (Gibson, 2003).

At the individual level, to improve user acceptance, users need to be aware of switching benefits and have switching costs reduced (Kim and Kankanhalli, 2009). Because user preference tends to be in favour of maintaining their current status or situation, reducing switching costs is often difficult. In the case study, the implementation of the ICT system played a supportive role rather than being the driving factor of change. Users first become aware of their pain points caused by other changes and the IT solutions were offered as potential remedies. Because users recognised the switching benefits (e.g., reduced workload, better data quality, increased speed, etc.), they were receptive to the new ITC systems.

However, the implementation of ICT presented another learning curve for individuals. They must learn how to use the technology to operate them. It was challenging for many individuals, especially low-skill and senior staff, who used to traditional way of work. For instance, many leaders of the field teams resigned because they had difficulty working with computers. In contrast, the HR staff, who already knew how to work with computers, embraced the use of ICT given its positive impact on their works.

At the group level, the use of ICT offset the managerial workloads by digitising team processes. It reduces cognitive resources required for memorising, or the needs to search for relevant information. As the result, systematic errors that might occur during the team processes have been eliminated or greatly reduced. Furthermore, ICT allows for collection of-and access to- quality data, which prevents potential conditions for team conflICT and team member' dissatisfaction related to managerial biases.

At the organisational level, ICT were presented as solutions to support the business transformation. Operational issues were first identified and experienced by users. At the organisational level, ICT helped to resolve the learning tension by presenting themselves as the solutions to many systemic issues that are related to business data and managing information. ICT systems enabled the centralisation of information, which reduced the boundary conditions of sub-units. Data became more reliable, timely and available in real time, which in return has reshaped the way in which many HR staff and managers work. In addition, given the size of Telcom-HCM, centralisation supports the scale of their operations. Business processes are streamlined and easier to replicate.

4.6.2.6 Other factors

There are other contextual factors that could be considered to play antecedent roles to OL; for instance, external conditions, business performance, and the complexity of learning domains. External conditions provide explanations in terms of governmental conditions, and historical, industrial and market contexts. At the individual level, external conditions supplied contextual meanings, which serve as the rationale and justified causes for individual commitment and actions.

Business performance indicates the overall performance of the organisation given a set of criteria, e.g., financial performance, market share, etc. It provides feedback that signals the need of organisational changes. High-level leaders might develop a sense of urgency based on the perception of the business' performance.

However, given the delaying effect of feedback (Senge, 1990), the role of business performance on learning during the transformation was not significant.

Finally, the complexity of learning domains has an impact on OL. It is apparent that the more complex the knowledge domain, the steeper the learning curve. In this case study, the total learning curve was characterised by multiple knowledge domains, e.g., task quantification, Balance Scorecard and ICT development and deployment. Each knowledge domain represents a mini learning curve that could exponentially contribute to the complexity of the total learning curve. For teams, each additional knowledge domain might increase the workload. For individuals, a new knowledge domain may present new learning obstacles that affect their learning goals.

Chapter 5: Conclusions, contributions, limitations and implications for future research

In this final chapter, the researcher comments on four things: answers to the research objectives as the conclusion; research contributions; reflections on the research methodology: advantages and limitations; and implication for future endeavours.

5.1 Conclusions

From the development of the multilevel model and the case study's results, the research questions to address *how organisations learn in multilevel settings* can be answered as follows:

How does OL occurs over time at and across three levels?

OL involves a feedback-based process and outcomes of cognitive development (Fiol and Lyle, 1985; March, 2006). The process can be understood as a function of experience over time and is usually depicted as a learning curve. Learning outcomes can be regarded as cognitive development, which manifests as changes in behaviours, performances, and understandings. A learning cycle is enacted when learning entities begin to learn new things. During this cycle, tensions could arise if the new learnings are incompatible with what had been learnt before. Once the tensions are resolved, entities successfully acquire new knowledge and develop new capabilities. Conversely, learning might become discontinuous or dysfunctional. Thus, new learnings could be prolonged or abandoned.

OL in multilevel settings is characterised by the learning tensions that may arise at the individual, group and organisational levels during the learning cycle. At the individual level, when individuals learn new things in an organisational context, they can struggle to assimilate new understandings into their mental models. Individuals learn from the feedback of their actions toward change. The experience gained will stabilise the new mental models and guide their subsequent actions. If the new learning is incompatible with their current understanding and beliefs, individuals could resist change due to various psychological and organisational factors that are embedded in their mental models. The phenomenon of resistance is the manifestation of learning tension at the individual level.

In a team, one usually needs to be in concert with other team members when performing team processes and team tasks to produce effective results. At the group level, learning occurs as team members develop team mental models. TMMs explain a team's shared understanding and the ability to take organised actions. To achieve the optimal learning outcomes, a team must be able to maintain diverse perspectives while ensuring unity in order to enable coherent team actions and supply of innovative ideas. Tension arises when team members negotiate back and forth to develop a shared understanding of the situations, evaluate outcomes, and plan for future actions. The need to maintain cognitive diversity in unity characterises the group-level learning tension.

Once a learning cycle is enacted, new learnings require exploration that competes with exploitation of past learning for organisational resources. Tensions arise due to the modifications of organisational objectives and (re)configurations of resources, such as finance, knowledge, structure and power, among others, to support changes. Strategic objectives are operationalised through organisational tasks, which are fulfilled by lower-level entities, which at the same time shape their behaviours. When new learnings are successfully assimilated into organisational memory, the learning tension is resolved and exploration becomes exploitation.

This thesis supports the cross-level learning processes as described in the 4I-framework (Crossan *et al.*, 1999). Throughout the case study, the presence of the cross-level 4I-processes was clearly recognised, except for *intuiting*, which is a subconscious process that is difficult to detect. In addition, although the findings of this study regarding the learning tensions are limited, they still support the proposition that OL emerges mainly via the compilation model (Crossan *et al.*, 2011). Given the nature of compilation emergence and the dynamic of cross-level processes, unresolved tension at one level could cause chain reactions at other levels. Learning and knowledge flows might be disrupted as a result. To ensure learning continuity, organisations need to simultaneously attend to these tensions.

What factors may influence the learning process and their mechanisms, and under what circumstances?

The need to resolve learning tensions emphasises the need to understand how the intervening factors work. What, when, and how a factor is triggered depend on the learning contexts in which something is learnt. Because learning contexts vary across knowledge domains and organisational conditions, the patterns of influential factors may differ. Each domain may need to be studied systematically so that consistent conclusions about the factors' triggering

mechanisms and circumstances can be drawn. This recognition echoes similar remarks by Lavie *et al.* (2010).

For instance, in the context of business transformation, the boundary factor was triggered by cross-boundary actions. Once activated, it manifests as issues of cooperation that negatively affect learning at the group and individual levels. However, the boundary effects help to generate lower-level learning variations, which are necessary for exploration learning. In other learning contexts, if boundary-spanning actions are not performed, the boundary's latent effect might not be activated, but still exists. Thus, it is not relevant for those learning contexts.

In conclusion, this study has found the argument made by multilevel theorists (e.g., House *et al.*, 1995; Kozlowski and Klein, 2000) to be accurate, and that multilevel phenomena cannot be understood adequately by micro or macro perspectives alone. The findings suggest that attention is required to resolve learning tensions at three levels. Managerial efforts to address resistance to change alone may have limited or unexpected effects without understanding the underlying causes that might be triggered by higher-level factors. These factors need to be treated at their respective levels. A lack of clear understanding of how the intervening factors work, as discussed by Easterby-Smith and Lyles (2011), may be attributed to a lack of interest in multilevel research. This research hopes to spark more interest in the multilevel study of OL, and identifications of domain-specific intervening factors, their mechanisms, and their circumstances.

5.2 Contributions

This multilevel study contributes in three areas: theoretical, methodological, and practical.

5.2.1 Theoretical contribution

5.2.1.1 The research findings

In general, this case study identified the influential roles of *mindfulness*, *boundaries*, *leadership*, *supportive learning climate*, and *ICT* on OL. At the same time, the findings substantiate previous works on the conceptual development of these factors. For OL, this thesis argues that enabling mindfulness at the beginning of a (radical) learning cycle is crucial for success. Mindfulness could be the necessary antecedent for the emergence of other phenomena, such as a supportive learning environment. In addition, regarding the links between individual mindfulness and collective mindfulness, our finding suggests collective mindfulness emerges via an

isomorphic compositional model. To promote collective mindfulness during the learning cycle, organisations need to consider moderating the demand for team coordination, which was found to have a positive effect on individual mindfulness.

Research on *boundaries* has recently gained more recognition, mostly from studies of absorptive capability (e.g., Carlile, 2002; 2004; Easterby-Smith *et al.*, 2008; Knoppen *et al.*, 2011; Sturdy and Wright, 2011). This study provides additional empirical evidence on the effect of boundary-spanning knowledge or learning flows by describing the mechanisms of boundaries that generate learning variations and inhibit exploitation during a learning cycle. In addition, the findings endorse Carlile's (2004) conceptualisation of knowledge boundaries and related processes in the context of business transformation. Given the more apparent role of boundaries in the OL and absorptive capability fields, there are other opportunities for future research on the topic of boundaries, which would forge a stronger link between the two research fields (e.g., Nemanich *et al.*, 2010; Vera *et al.*, 2011).

This study contributes to the construct development of the supportive learning environment (Garvin *et al.*, 2008) by providing empirical evidence of the psychological safety apparatus. The findings also support the significant role of team members' willingness to discuss errors openly, which may give rise to an error-tolerance environment (Edmondson, 2004). From the case study, the researcher speculates that it might be easier for teams to facilitate a supportive learning environment during a radical learning period when they are constantly facing ambiguous situations and time pressure. In addition, within the context of learning, problem-solving teams might need to be more error-tolerant than functional teams due to the nature of their tasks.

The value of viewing leadership from the follower-centric perspective gives voice to the followers' and subordinates' perceptions of the important factors required from a leader's behaviour. With the increasing recognition that leaders need to be robust in their leadership styles (e.g., Vera and Crossan, 2004; Berson *et al.*, 2006), it might be more relevant to address what they should do or how they should behave given specific circumstances; for example, participate in problem-solving, give support, etc. during times of radical change, rather than what theyvshould be; for example, be risk-prone, risk-averse, etc. At the same time, the finding emphasises the important role of leaders and team leaders (or middle managers) who not only facilitate supportive learning climates but also ensure learning continuity.

User acceptance is the one major risk that causes project failure (Kim and Kankanhalli, 2009). Because ICT have structural properties, implementation of new ICT systems usually causes structural disruption that may have both positive and negative consequences. Large-scale ICT' implementation should be framed as supportive to reduce user resistance. Users should be made aware of their operational problem first to recognise the switching benefits and values of IT solutions. However, it must be noted that new technology always entails a learning curve, which might be too steep for some users. Organisations must ensure adequate support and training to help these users overcome learning hurdles.

5.2.1.2 The development of the OL multilevel model

The *learning curve* approach is often employed to investigate OL in various contexts, such as manufacturing (e.g., Argote *et al.*, 1990); service industry (e.g., Darr *et al.*, 2005; Boh *et al.*, 2007); and software development (Boh *et al.*, 2007). Although effective, the learning-curve approach is limited to answering whether experiental learning improves productivity or performance. It does not permit understanding of specific mechanisms by which productivity or performance is influenced (Boh *et al.*, 2007). The OL multilevel model of this study complements the learning curve method by addressing this limitation. The model is capable of revealing the influence factors and their mechanisms as demonstrated in the case study.

Based on multilevel principles (Kozlowski and Klein, 2000) and the OL multilevel 4I-framework (Crossan *et al.*, 1999), the multilevel model is able to relate seemingly disparate level-specific phonemena as learning tensions, e.g., change resistance, TMM, and organisational memory. This allows a more holistic understanding of OL as a multilevel phenomenon. Single-level theories of OL may not consider the complex interactions of learning tensions from other levels. Therefore, they do not take into account the effect of factors that are only apparent at other levels of analysis. For example, change management may focus on managing change resistance using strategies that target individuals (e.g., incentive, etc). These strategies may not pay attention to the group-level tensions, which requires different sets of strategy. Given the complex interactions of influence factors across levels, some strategies may even seem counter-intuitive. For example, to promote mindfulness at the individual level, coordination among team members needs to be kept at a moderate level.

5.2.1.3 The construct of the multilevel model

The analysis supports the individual *mental models, team mental models,* and *organisational memory* as the cognitive constructs of the multilevel model. On its own, each construct is well-developed and has received numerous empirical endorsements. While the data show support for *resistance* and *strategic renewal* as learning tensions at the individual and organisational levels, the group-level learning tension did not fit the collected data.

The limitation of the research design could be the main reason for the lack of identifiable evidence. This limitation is discussed later. Nevertheless, more studies are needed to further support the multilevel constructs of this model.

5.2.1.4 The conceptualisation of exploration and exploitation

Regarding the conceptualisation of exploration and exploitation as two ends of a continuum, the lessons learnt from the study provided some practical and theoretical insights. Practically, there are some nuances that one should be aware of when addressing the exploration period, during which learning activities also include replications of past success, which are exploitative in nature. This is because organisations need to gradually transition into the exploitation period. Perhaps, it would be less confusing to consider this as the exploration-exploitation period, in contrast to the exploitation-exploration period.

Theoretically, the researcher realised that *human elements* are absent from most discussions of exploration and exploitation, although the learning-base perspective recognises the human antecedent of learning. In a sense, the defining characteristics of explorative or exploitative activities are drawn from the nature of the activities themselves, whether it is about competing for scarce resources, or activity types such as research, experiment and manufacturing. The researcher contends it is advantageous to characterise any organisational activity by two dimensions. The first one is related to the type and domain-specific knowledge of the activity – for example, manufacturing or marketing. The second dimension involves human learners who carry out activities in a manner that is subjected to a learning curve as a function of experience over time.

This conceptualisation upholds the trade-off and contradictory nature of exploration-exploitation relationship. It recognises both the human element and knowledge domain of explorative and exploitative activities. Take the '*search*' activity for example: It is intuitive to identify a search as an explorative type in

comparison to manufacturing. Yet, when the search activity is subjected to the second dimension, it is also clear that depending on the skill and experience of the person(s) conducting the search activity, the results could be quite different. A person with little experience must explore different ways to search, while a person with more experience can search more effectively. Moreover, the time dimension is brought into focus, which is crucial for not only OL, but also multilevel study. Researchers may place emphasis on different dimensions depending on the focus of their study, i.e. single-level or nested-level study (Gupta *et al.*, 2006).

5.2.1.5 The links between cognition and behaviour in learning

Many learning theories are built on the assumption of the relationship between cognition and behaviours. Some emphasise the interrelationship between cognition and behaviour and conclude that the learning process encompasses both cognitive and behavioural change (e.g., Argyris and Schön, 1978; Crossan *et al.*, 1999; Vera *et al.*, 2011). Others argue that learning is about cognitive changes, and it may or may not result in behavioural change (e.g., Fiol and Lyles, 1985). From the case study, the analysis indicates that the link between cognition and behaviour exists. However, behavioural changes might not manifest clearly during the learning process due to social pressures. The role of culture should be considered in explaining the way in which individuals modify their behaviours in responding to learning tensions.

For cultures that are collective-oriented, such as Vietnam and many Eastern societies, learning tensions at the collective levels could have more impact on the behavioural change in comparision to individually-oriented cultures, e.g., Western societies. Individuals might resolve their internal tensions and start to learn. However, they are still subjected to the tensions at the group and organisational levels, which could inhibit them from openly changing their behaviours. Once the tensions are resolved, behavioural changes become more apparent. Therefore, observable behavioural changes might require a longer time to manifest in a collective-oriented culture. More research is needed to further investigate the effects of culture on multilevel learning.

5.2.2 Methodological contribution

Case study research has been previously employed to study OL phenomenon, including OL in multilevel contexts, by, for instance, Crossan and Berdrow (2003) and Berends and Lammers (2010). In both studies, the authors focused on tracking the idea(s) that evolved across levels via the 4I processes to

substantiate the 4I-framework (Crossan and Berdrow, 2003), and to address the temporal dimension of OL (Berends and Lammers, 2010). Since the emphases were placed on the cross-level processes, the cases were analysed as a whole at the organisational level. Units of analysis were not specified in both studies.

In this study, the case was analysed three separate times; each time at different levels with identified units of analysis to enable a multiple-level perspective of the OL phenomenon. In that sense, the methodology used in the case study is aligned with the definition of Yin's (2009) *embedded case* study, and Thomas's (2011) *nested case*. To the best of the researcher's knowledge, it may be the first time this methodology is employed in case study research of OL. If OL is considered as a multilevel phenomenon, then, surely, it should be analysed at multiple levels. This is the methodological contribution of the research.

5.2.3 Practical contribution

How to think about and to investigate OL in multilevel settings has always been challenging for many researchers and practitioners. There is a risk of misalignment between the levels of theory, measurement and analysis (Hitt *et al.*, 2007). With the experience gained from the case study, the author contends that inexperienced researchers would be more likely to commit errors if their analyses focus on the cross-level processes that simultaneously exist at different levels; for example, interpreting and integrating. This does not mean that researchers cannot directly utilise the 4I-framework to investigate OL in multilevel settings as some scholars have done (e.g., Crossan and Berdrow, 2004; Berends and Lammers, 2010).

The value of the multilevel model comes from its ability to establish analytical foci at different levels so that level misalignment could be avoided. In this study, the analytical foci are learning tensions that manifest as specific phenomena at different levels. The data analysis at the individual level involved the identification of factors that influence the phenomenon of individual resistance, thereby preventing misalignment by anchoring the analysis at that specific level.

Because the learning tensions are predefined, the multilevel model imposes a systematic use of multiple level-perspectives on the same events during the data analysis process. This enables the researcher to draw connections between seemingly disparate concepts, thereby identifying the conditions and trigger mechanisms of intervening factors, their latent effect, and cross-level manifestation. For instance, if learning is only analysed at the individual level or group level, the researcher might not be aware of the boundary's latent effect, its trigger, and its

manifestation. Thus, the cause of learning discontinuity might have been attributed to the issues of individual commitment or miscommunication.

For OL practitioners who are interested in analysing how an organisation learns using the multilevel perspective, the multilevel model could be used to guide the investigation. From the extensive data analyses of this case and the researcher's knowledge of the way multilevel modelling should be undertaken, a list of recommendations to carry such work out in the future is presented as follows.

- First, before data collection, it is important and advantageous to identify the specific knowledge domain(s). For instance, although the case study was about business transformation in general, it consists of different knowledge domains including 3Ps systems, BSC, and IT, among others. Practitioners are recommended to consult domain experts. Proper understanding enables in-depth discussion during interviews, which may allow collection of more valuable data.
- Second, specifying the identity of learning entities in relation to their learning tasks. In the case study, the interviewees can be of any profession (e.g., HR, planning, accountancy) or be of any managerial position (e.g., team leader, manager). During the business transformation, their main tasks involve implementing new systems; therefore, they can be regarded to have a shared identity as implementer.
- Third, given the confusion between units of analysis and data sources, a matrix of data collection sources versus units of analysis should be developed to inform the data collection and analysis (for example, Table 3 in Chapter 2.4.3).

5.3 Limitations of the thesis

To investigate OL in multilevel settings, a retrospective case study centred on qualitative methods has many advantages as well as limitations. The use of qualitative research in a retrospective case study is likely to uncover aspects of intervening factors that span multiple levels. Because quantitative methods focus on prior theoretical deduction and controls of contextual conditions, these aspects may not be noticed (Easterby-Smith *et al.*, 2008). The qualitative analysis enabled the researcher to make a judgement about the factors' effects that might have different qualitative properties across levels. However, this is also a weakness of this study.

A limitation of this retrospective study was not sensitive enough to detect the tension of learning at the group level, which requires details of team members' interactions. The interview participants might have had difficulties recalling the details of certain events, or they might have simply skipped over anything that was considered unnecessary or to have negative connotations. Although it is acceptable to aggregate individual data to represent group-level data (Kozlowski and Klein, 2000; Hitt *et al.*, 2007), the study lacked the means to triangulate group-level data with secondary data; for example minute reports (the organisations do not have these reports).

It would have been ideal to have a longitudinal study with a series of interview sessions, team meeting observations, and other data collection methods. However, such a study would require more manpower, additional financial resources, time, and also full accessibility to the organisation, which would have to be granted. There is always a trade-off between the cost and quality of data collection. Retrospective studies provide the opportunity to study the case at a fraction of the cost. The researcher argues that the trade-off is worth considering given the ability to achieve 80% of the results by spending 20% of the resources. Nevertheless, overall, the collected data provided more value to the investigation of learning at the individual and organisational levels than at the group level. This is a limitation of retrospective case study design.

Another concern of the retrospective case study is whether the collected data can accurately describe the organisational reality at the time. The answers provided during the interviews may not truly reflect the thoughts and behaviours of the interviewees in the past; or, in light of new information, the interviewees might re-evaluate their past understanding, actions, and the rationality behind those actions.

Arguably, in the context of this study, the quality of data collection could be boiled down to how the interviewees considered the factors that were significant to their experience. Time can filter out events or factors that had little or no impact on the individuals. Under this effect, the events being recalled can be considered significant and matter to the interviewees. The use of triangulation with secondary data also helps negate memory issues. Although the quantity of detailed data might not be high, the researcher argues that the data are significant to the interviewees and thus representative to the study. In addition, since the transformation had been completed, the interviewees might feel more comfortable sharing their thoughts and opinions without worrying about the consequences.

Finally, regarding the generalisability that was discussed at length in the methodology chapter, section 3.3.2, the research does not attempt to generalise learning patterns and findings to the population, but to test the utility of the multilevel model in supporting a multilevel investigation of OL. This study has successfully demonstrated how the model can be used in retrospective case study research to provide meaningful answers to research questions. The findings can be regarded as exploratory, and complementary to future studies.

5.4 Implications for future research

Since the findings were drawn from a specific case study, more studies are required to build a comprehensive context- and domain-specific portfolio of OL, as suggested by Lavie *et al.* (2010). Future research could adopt the proposed model to investigate learning in different contexts. Alternatively, multilevel models with different cognitive constructs could be used to investigate similar cases, thereby identifying the strengths and weaknesses of different multilevel models for different situations. For instance, the group-level cognitive constructs, such as transactive memory or collective knowledgecould be employed.

In summary, the research recognised that there is no "one size fits all" multilevel model. Since there are many possible learning outcomes, OL can be investigated using different means, such as performance variance, rather than cognitive development. Researchers could have different specifications for their model, depending on their interests and how they think about learning. Through this thesis, the researcher hopes to ignite more interest in multilevel research.

Appendix A

Table 11 Meta data of Interviews

#	Code	Data format	Intw. Leng.	Place	Position	Profession	Type
1	HQ-T01	audio transcript	67	HQ	HR Manager	HR	Middle Manager
2	HQ-T02	audio transcript	65	HQ	HR Vice Manager	HR	Middle Manager
3	HQ-T03	audio transcript	63	HQ	HR Staff	HR	Office Staff
4	WE-T04	audio transcript	32	West	HR Staff	HR	Office Staff
5	WE-T05	audio transcript	32	West	HR Staff	HR	Office Staff
6	EA-T06	audio transcript	66	East	Planning Manager	Planning	Middle Manager
7	EA-T07	audio transcript	60	East	Acct. Manager	Accounting	Middle Manager
8	EA-T08	audio transcript	47	East	HR Manager	HR	Middle Manager
9	WE-T09	audio transcript	30	West	HR Staff	HR	Office Staff
10	WE-T10	audio transcript	28	West	Mngt. Leader	HR	Middle Manager
11	WE-T11	audio transcript	54	West	HR Manager	HR	Middle Manager
12	WE-T12	audio transcript	28	West	Field Team Leader	Field	Middle Manager
13	WE-T13	audio transcript	28	West	Field Team Leader	Field	Middle Manager
14	WE-T14	audio transcript	34	West	HR Staff	HR	Office Staff
15	WE-T15	audio transcript	48	West	HR Staff	HR	Office Staff
16	HQ-T16	audio transcript	35	HQ	HR Staff	HR	Office Staff
17	HQ-T17	audio transcript	35	HQ	Lead IT developer	IT	Middle Manager
18	HQ-T18	audio transcript	38	HQ	HR Staff	HR	Office Staff
19	WE-T19	audio transcript	39	West	Vice Director	Director	Top Manager
20	HQ-T20	audio transcript	33	EduCen.	HR Vice Manager	HR	Middle Manager
21	EA-T21	audio transcript	34	East	HR Staff	HR	Office Staff
22	HQ-T22	audio transcript	34	HQ	Plan. Team Leader	Planning	Middle Manager
23	EA-T23	audio transcript	55	East	Vice Director	Director	Top Manager
24	EA-T24	audio transcript	25	East	PM Manager	Director	Top Manager
25	WE-T25	audio transcript	44	West	HR Staff	HR	Office Staff
26	EA-N26	Note	60	East	Planning Staff	Planning	Office Staff
27	WE-N27	Note	60	West	Planning Staff	Planning	Office Staff
28	WE-N28	Note	35	West	Planning Staff	Planning	Office Staff

Male interviewees: 16; Female interviewees: 12

Due to the restricted word count limits, it is not possible to provide all raw data in Appendix A. The following data are examples of an audit trail to illustrate the analytical processes.

REF	Original text	Translation	Level	Time	Comment	Tag	Concept	Theme
WE-T11	Bây h nó đòi hỏi vận hành tin học nhiều. Nên tổ trưởng ko không nổi. Hồi đó có tổ chức đào toạ và thông báo rồi, là những anh lớn tuổi. Thì phải tiếp tục lo đầu tư vi tính để học. Đến giai đoạn chuyển đổi. Ko làm được, xin rút thì một loạt tổ trưởng từ chức.	For *senior team leaders* to continue their position, they have to learn to work with computers. When the change occurred, many of them were falling behind, they had to resign as a team.	IL	During	Senior team leaders had difficulties to learn new technology.	Perceived age as learning issues	Age	Natural factor
WE-T15	Lúc đầu ở góc độ người làm, khi chưa triển khai thì mình thấy rất là hay, … Thì chính vì chị là người thực hiện cái cơ chế tiền lương, do đó thấy có nhiều cái ko đẹp lắm.	*From the perspective of a practitioner*, I thought it was really interesting, even before the implementation took place. … *Because I was working with the old compensation system, I saw many 'not so pretty' things*. …	IL	Before	Because of her profession (HR, Salary) the interviewee evaluated the new system positively in comparision to the old system.	Profession provides perspectives	Profession	Professional factor
WE-T12	Thì ko dấu diếm j, bản thân anh cũng là 1 công nhân bình thươngf, thì tâm lý lúc đầu nó 3PS áp vô. Bây h thấy cũng làm, tôi cũng cố gắng thi nâng bậc để tôi được đồng lương cao khi tôi	*To be honest, from the perspective of a normal worker*, when the 3P was applied. *I tried a lot to pass the 5-6-level exam to have high salary*. Just keep it that way, I still work hard, right? Then I thought	IL	During	From his perspective as a normal worker, who had passed exams and gained high salary, the interviewee does not	Profession provides perspectives Salary is important	Profession, Salary	Professional factor

	được cái ngưỡng bậc 5-6 rồi. Cứ áp vậy đi lương của tui như vậy tui vẫn làm tốt mà đúng ko. Rồi cũng suy nghĩ 3Ps, như vậy, rồi mấy sếp rồi lương cao rồi cũng thiên vị lẫn nhau rồi chấm cái năng lực của cái người đó cao. Rồi cũng ko dấu được cái chuyện khi mà chuyển giao đó thì cái tâm lý hoang mang 1 thời gian dài. Mà cái 3Ps này anh nhớ áp zô áh thì cái tháng lương đầu tiên thì lãnh đạo rất cao. Cao gấp mấy lần, gấp 3-4 lần anh em ở dưới. Anh em bắt đầu comment tùm lum tà la trên mạng, rồi báo chí cũng có đưa rồi 1 thời gian.	about the new 3P, *the managers with high salary, they would be biased with the new appraisal process, to keep their high salary*. We were confused for a long time. *I remember when the 3P was first applied, managers had really high salary, 3-4 times ours.* People started to complain all over the internet, and in newspapers too.			like the change in salary. Managers gained more salary than normal staff.			
WE-T25	Nhưng khi mìnhlàm quản lý, mình đi chấm người khác đó,lúc đó mìnhmới biết tâm lý của người quản lý như thế nào.Dù là bản thân chị cũng ko thich cào	When I became a manager, I evaluated the performance of my team members, then I started to understand the mentality of the manager. *Personally, I always want*	IL	After	Personal feelings are always present during the evaluation process, because it will affect other's salary.	Perception of personal bias	Psychological bias	Personal factors

	bằng. Nhưng khi mình cầm bút chấm người ta, mình cũng có hơi có 1 tý xíunào đó để tìnhcảm nương nhe. Vì nó ko có cáiđo lương. Nếu có thì sẽ ko bị cảm xúc chi phối. Ờh nên khi chấm thì cũng đánh giáanh em là có người nàyngười tốt, người dở, dở cơ nàothì ko đo, tốt hơn baon nhiều thì ko đo được. Nhưng cái chấm đó nó ảnh hương đến lươn của họ	*absolute fairness. But when I put the pen down, there are always a few personal feelings, because the marks become salary*. In addition, the Competency P2 cannot be objectively measured. You can mark one as good, or bad. But how much *good or bad cannot be (objectively) measured*. And that will affect people's salary.						
WE-T25	ko những trong nội bộ màcòn khách hàngnữa, Anh làm ko tốt mà khách hàngrời bỏ nhiều thì ảnh hưởng đến lương của anh. Cái đódần dần thay đổi đến chăm sốc kháchhàng, mình trân trọng kháchhàng hơn.	(Better work attitude) Not only internal but also about the customers. *If I don't take good care of the customers, they will leave, thus affecting my salary*. We become more customer-oriented and take good care of them.	IL	After	Motivated to provide better customer service because it would affect his/her salary.	Motivated to achieve business objectives	Personal motivation	Personal factors
WE-T11	Thì hồi đưới công ty Tây chú kiên quyết đề xuất đánh giá. Làm xong thì ko có khiếu nại. Chứ ngày xưa toàn lấy chung chung.	*When I was at the West company, I actively advocated for implementing the (objective) evaluations.* No one complained when we did	IL	During	Advocate for change, actively taking action toward change.	Willing to change	Conscientiousness	Personal factors

		that, unlike before, when the (old) evaluations were generally subjective.						
WE-T05	Thì mình phải xuống bằng những cái kỹ năng mêm, mình thuyết phục để người ta phối hợp. Tại người ta ko phối hợp mình ko xây dựng được đâu.	I *used soft skills* to persuade them. Without their cooperation, I cannot complete the tasks.	IL	During	Soft skills were needed for gaining cooperation.	Personal soft skills	Personal knowledge, skills and other characteristics	Personal factors
HQ-T03	Nhưng được cái ở ngoài nói nó nghe, còn mình nói là nó cãi tới sáng luôn. Nói ko nghe. Bụt chùa nhà không thiêng.	They listen to people from the outside, but not to us. *We, Vietnamese, have a saying that familiarity breeds contempt*.	IL	During	The interviewee attributed the lack of confidence in internal capability to culture.	Culture	Culture	Social factors
WE-T04	Tam lý đi làm nhà nước là muốn ổn định, chứ ko phải là vận động ko ngừng	People want to work for a *public company*, because it is *stable and relaxed*, not for turbulence.	IL	Retro	Stereotype of public organisations.	Stereotype	social values	Social factors
HQ-T03	Tranh luận có 1 cái sự phản biện. Thì ở đây, phương pháp giao mục tiêu thì nó cũng hay. Thì ở đay người lao đọng đúngr a. Tổ trưởng là phải tham gia vào quá trình giao mục tiêu, khi	Negotiation by providing counter-argument. The *method of cascading KPO and KPI is interesting*. The team members and team leader must participate in the process of defining	GL	During	The new team process is effective because it was based on mutual agreement.	Perceived new team process as affective	Perceived (team process) effectiveness	Perception of evaluation processes

	đó họ cảm nhận cái này họ ko bị ép buộc, ở trên xuống.	performance objectives. Therefore, *they don't feel like being forced to.*						
WE-T09	Chị thấy 3Ps nói chung nó cũng ổn định, nhưng nó đang chia cục lương nó đang luẩn quẩn trong tổ. Còn bên chị 1 đống ko ai giống ai. Mà người mà họ nghỉ đó. thìhọ vô họ cung làm vì ko ai thế được, riêng công việc người ta , thì người ta nắm.	*I think the 3P is okay, but there are some issues* about the way it distributes salary among team members. *Our team (office work) is not like others.* If one person had a sick leave, then no one else can do their work, because the works are specialised.	GL	After	Perceived new team processes as incompatible with office work.	Perceived new team processes as incompatible	Perceived (team process) compatibility	Perception of evaluation processes
WE-T11	Vd như xây dựng và đánh giá BSC chẳng hạn.: Nhóm BSC có bên phòng, hồi đó là Phòng kế hoạch, trung tâm điều hành, phòng kỹ thuật đánh giá. 1 Cái BSC nó giao là xây dựng, giao và đánh giá kế hoạch, nên nó liên quan nhiều bộ phận. CHo nên cái anh thường trực phòn kế hoạch đó, rất là khổ sở. Vì ko hình dung được là khi giao cho đơn vị thì giao những chỉ tiêu nào,	For example, to build and evaluate BSC: The Planning department was in charge. 1 BSC includes defining objective, assigning work and evaluation of performance. But it is related to different functional units. *The Planning Manager was really miserable, because he could not imagine which objectives should be defined, etc.* Thus, he had to work closely with other functional teams.	GL	During	Sympathising with teammate works because the implemented tasks were difficult and increased workload. Need to provide support to achieve	Perceived teammate lack of capability Perceived teammate's increased workload The need to support team members to	Perceived teammate capability	Perception of team interactions

	thông số nào. Cho nên phải bám chuyên môn kia. Đây là công việc mới mà hồi giờ ảnh lo cái trọng tâm hằng ngày, còn cái này đâu phải trọng tâm. Cho nên là nhiều lúc rất là, tiến độ bị trở ngại, cho nên bên Kế hoạch báo tổ chức để hỗ trợ thêm thôi. Thì nó cực lắm.	*But this is the extra work,* he still had a lot of other work to do. *So that progress was delayed, we (HR) had supported the Planning team.*			team objectives and meet deadline.	achieve the team goals	Perceived assistive behaviours	
WE-T04	Cái thứ 3 là tuy là phòng nhiều người, cũng cơ cấu 1 số người vào, tuy nhiên anh với khải làm là chính, nên ra nhiều khi mình vắng ko được. Hoặc giao cho 1 số người phụ. Anh với Khải là chính, 1 số người chỉ ghi nhận, là cái công việc nó hỗ trợ. Mình làm mình cảm thấy bị áp lực, gánh nhiều quá. Còn các thành phần khác nhiều khi đi cho có ngồi nghe, ko tham gia ý kiến nữa. Đáng lẽ là trong hội đông, tổ làm việc thì mình phải mạnh dạn làm	The HR department had many members, some were part of the implementation team, *but mostly I and WE-T05 work together. We cannot be absent or leave work to other people.* They supported us with note taking, etc. But we always felt a lot of pressure, because of so much work and responsibility. *The supporters just passively participated, nothing else. I think that the (data collection) team should actively engage*. I and WE-T05 had to carry the team.	GL	During	The interview highlighted his/her friendship with WE-T05, and their role. Thought that other team members did not contribute enough during the data collection.	Perceived the effectiveness and role of teamwork Perceived the lack of team members' contribution	Perceived teamwork effectiveness, Perceived teammate contribution and attitude	Perception of team interactions

	việc với đơn vị. Hoặc là khi phỏng vấn làm việc người ta còn rụt rè. ANh với Khải phải gánh nhiều.							
HQ-T18	Cái điểm P2 là lãnh đoạ chấm rồi. ĐƯợc ko được là do bản thân mình. Dương nhiên là đâu đó vẫn còn là dĩ hoà vi quý, nó ko thể hiện được rõ cái năng lực thực sự và cống hiến thực sự . Nhưng mà trên đời này có j goi là công bằng tuyệt đối đâu. .. LĐạo của cái khối chức năng thì dĩ hoà vi quý thôi. ko muốn mất lòng ai, nên cứ xét 1- 1- 1. Như vậy cũng làm cho người họ có sự cống hiến họ cảm giác là cho dù có cống hiến thì cũng vậy thôi. Thì vẫn phải chấp nhận, Ăn thua lãnh đạo đơn vị thôi. Anh mạnh tay, dám mạnh dạn cho người khác hơn, người kia xuống, như vậy mới tạo	Performance score is rated by team leader. *There are surely some bias in evaluation, which did not differentiate contribution of each team member.* But there is no such thing as absolute fairness… *Managers of functional teams did not want to cause any conflict or offend anyone, so they rated people equally. This made people who work hard feel unappreciated, because it is the same, nothing changed.* But they have to accept it. *I think it is depending on the team leaders/manager. If they become stricter, then it would make a differentce and, therefore improve performance.* But, again, it will cause internal conflict.	GL	Retro	Highlighted team leader's lack of objectivity in recognising the contributions of team members. Perceived that team leaders need to be objective, but also recognised the danger of causing team conflICT.	Perceived team leaders' bias in team processes	Perceived team leader's subjectivity	Perceived team leadership

	được động viên trong sx. Nhưng vậy thì vô hình chung nó lại làm là mất đoàn kết.							
HQ-T01	Khi mà người ta nắm được PP truyền đạt thì mình rất khoẻ. Đi hội nghị j đó khi công nhân hỏi thì giải thích. Gần trăm người giải thích còn hơn là chỉ 1 nhóm các anh khaong 10 người. Nên anh thấy đào tạo là 1 cái hướng để ta triển khai cái này ra. Mình đào tạo liên tục để làm sao người ta nhận ra cái này là nó hiệu quả.	When they (leaders) understood the new systems, *they shared a lot of burden with the core team, e.g., communicate with the field workers in seminars*, etc. A *hundred managers helping with communication is better than just 10 persons*. I think training is a good way to begin. *We must make sure they recognised the positive values of the new system*.	GL	During	Perceived the importance of getting team leaders (and managers) to understand and commit to the change, so that they could support the business transformation.	Perceived the need to gain support from team leaders and middle managers, and what they could do to support the transformation	Perceived team leader comprehension, participation, and commitment	Perceived team leadership
WE-T15	Ngày xưa cũng có, nhưng bây h đâu đó thì cũng còn, nhưng mà nó ko bất thường, vd những quan hệ cần làm. Bây h đề bạt là làm đúng tiêu chuẩn năng lực. Chị ko biết nhiều nơi khác trong tập đoàn như thế nào. Chị Thấy ko làm giỏi làm ko nổi đâu	Leadership styles have to change. Before the change, many managers lacked the necessary skills and capability. But now, they have to change. *Now, if they are not good, how can they manage other employees*?	GL	After	Adequate skills and capability are required to be a manager	Perceived the requirements of team leader's capability	Perceived team leader capability	Perceived team leadership

WE-T11	CHo nên cái anh thường trực phòn kế hoạch đó, rất là khổ sở. Vì ko hình dung được là khi giao cho đơn vị thì giao những chỉ tiêu nào, thông số nào. Cho nên phải bám chuyên môn kia. Đây là công việc mới mà hồi giờ ảnh lo cái trọng tâm hằng ngày, còn cái này đâu phải trọng tâm. Cho nên là nhiều lúc rất là, tiến độ bị trở ngại, cho nên bên Kế hoạch báo tổ chức để hỗ trợ thêm thôi.	But it is related to different functional units. The Planning Manager was really miserable, because he could not imagine which objectives should be defined, etc. Thus, he had to work closely with other functional teams. *But this is the extra work, he still had a lot of other work to do*. So that progress was delayed, we (HR) had supported the Planning team.	GL	During	Sympathised with Planning Manager's increased workload and stressful situation.	Perceived increased workload	Perceived increased workload and pressure	Perception of team context
HQ-T01	Khi triển khai trong công việc của em, cơ may cơ hội thấy có khả năng thành công 70% là bắt tay vô liề. Đừng bỏ qua, lúc đó bọn anh 3 anh em Tiến, tám, và châu. Mấy anh em như đi trên dây.	When you work, if you see opportunities with 70% chance of success, just do it. When I, HQ-T02, HQ-T03 and HQ-T06 were implemented the new systems, it was like *walking on a thin rope*.	GL	During	Highlighted the decision-making process in an ambiguous situation.	Perceived pressure due to uncertainty	Perceived pressure	Perception of team context
EA-T08	Lúc đó là bên chị quyết tâm làm , từ sếp , GD cho đến công đoàn. chuyên môn cho đến dưới. Ai mà ko làm họ sẽ tự thấy là họ đi ra khỏi	*At the time, we (the implementation team) were committed*, from the directors to managers, the union, etc. *Anyone who did not want to*	GL	During	Described the commitment of team members toward change, and felt that	Perceived team climate as commitment	Perceived team climate	Perception of team context

	cái guồng đó, nên nhờ sự quyết liệt đó nên họ thấy là họ làm được.	*change will be isolated from the movement.* I think because of that commitment, we think we can do that.			who did not commit would be left behind.			
EA-T08	Chắc chắn sẽ có sai, nhưng sai thì sửa và làm tiếp… Nhưng mà mình phải chứng minh được mình làm tốt và người đứng đầu phải bảo vệ mình thì mình mới đứng ra mình làm được .	Actually, at the East company at the time, …. If it (the implementation) was decided, then just do it. *If we made a mistake, then we would fix it. We were not afraid, but worried … The team leader must protect us, so that we could face challenges.*	GL	During	Described the role of team leader to faciliate team conditions that supported experimental actions.	Perceived team climate as psychological safe and error-tolerant	Perceived team climate	Perception of team context
HQ-T16	Do lãnh đạo rất là quan tâm đến vấn đề đào tạo cho nhân biên hiểu cái 3Ps là j. Nên rất ủng hộ. Về chi phí thì ko thành vấn đề	Because the leaders recognised the importance of training, *financial resources were not a concern.*	OL	During	Financial support was provided.	Finance were not a problem	Perceived financial resource availability	Perception of resource availability
HQ-T03	Rồi cái quy trình quy định, nó cũng rời rạc, chính sách kinh doanh nó cũng rời rạc, nó ko có tạo thành ra 1 cái hệ thống quản trị khách hàng. Lúc đó mạnh thằng nào thằng đó xây dựng. Ông này cũng xây dựng,	We did not have any consistent Customer Relationship Management system. *Each had their own working systems. When they submitted their data to the HQ functional department, it was a mess. They had their own*	OL	During	Business data were fragmented with questionable quality. The organisation lacked a centralised database .	Perceived a lack of adequate and quality business data	Perceived business data availability	Perception of resource availability

	ông này cũng vậy, nhưng ko có chuẩn nào hết. Bởi vậy lúc mà báo cáo lên trên phòng chức năng á, thì chỉ trông chờ số liệu ổng báo cáo lên. Mà ổng muốn báo cáo sao thì ổng báo cáo. Thì ổng báo cáo làm đẹp số liệu ổng. Tại vì mình ở đây mình ko có cái hệ thống cơ sở dữ liệu thống nhất.	*format. If they wanted to, they could change the data for better results. Because we did not have a unified database*.						
WE-T11	Chú đặt vấn đề ngay là thứ 1 là cái vấn đề thành thích, thứ 2 là năng lực. Đây là doanh nghiệp nhà nước. Thì nếu anh đánh giá năng lực với tư nhân thì nó đơn giản rồi. Với DNNN thì nó đông. Thứ 2 nó vẫn còn kế thừa của bao cấp, cho nên nó ko chuyển đổi dỏi mới được.	*This is a public company. It will be simple, if you want to evaluate the employee competency of a private company*. But public company had a large workforce. *Second, it was subsidised for a long time by the government, evaluations are difficult*.	OL	During	Telcom-HCM are a public organisation, that had a complex structure, large workforce, and was difficult to change.	Perceived organisational structure and characteristics	Perceived organisational structure, public organisation, and traditions	Perception of organisational characteristics
EA-T07	Mặc dù người tư vấn họ tư vấn rất đúng, nhưng thực trạng nó như vầy. DNNN nó như vầy, lực lượng lao động nó quá lớn. Nói thẳng ra là thừa.	Although the agency provided good methods, we, as a public organisation, *had too large a workforce. Most of the workforce was redundant, to be honest*.	OL	Retro	The organisation had large workforce but redundant.	Perceived the size of the organisation	Perceived organisational size	Perception of organisational characteristics

HQ-T03:	Mà quan trọng nhất làm dự án này là ông GĐ đó. Ổng phải theo dự án này, phải ủng hộ và quyết tâm. Có nhiều khi làm giữa chừng mà ở dưới, em biết không, cỡ 4k-5k người, mà nó cứ ý kiến ý kiến, công đoàn, đảng, rồi ý kiến vô là thất bại liền. Bởi vậy mình phải làm sao cho các GĐ các đơn vị, làm sao cho chức năng, BGĐ VTTP người ta hiểu và đồng tình với dự án đó. Khi đó nó thông suốt và ủng hộ. […] Bởi vậy mình phải sắp xếp là mấy ổng phải qua báo cáo, làm báo cáo, làm sao mà các thành phần chóp bu này thông suốt hết. […]Rồi ổng phải theo cái dự án quyết liệt, ổng phải đến nơi. Ổng làm giữa chừng mà ổng thay đổi, ổng lung lay cái là dự án nó thất bại.	*The most important person of the project is the director. He had to support and commit to this project.* If we are in the middle of the project, you know the organisation had 4000 - 5000 people with a lot of different opinions, it could fail. *We had to make sure that the directors and middle managers, including subsidiary companies, understand and support the project.* […] More importantly, we had to make arrangements: they must participate by making reports, etc., […], *so that they had comprehensive understanding of the project. They will support and participate in the project.*	OL	Retro	Percieved the need to gain support from the top-level leaders. Highlighted what the leaders needed to do to support the transformations.	Perceived the supportive role of leaders Perceived the important of leader's commitment	Perceived leader support	Perception of leadership
EA-T06	Thứ 1 vì LĐ phải là người quán triệt cái này mới áp	At the same time, the leaders of all major sites (West, East,	OL	During	Leaders need to understand the	Perceived the importance of	Perceived leader comprehension	Perception of leadership

	dụng được. Còn nếu mà LĐ ko quán triệt cái này thì thôi dẹp ko làm được. Đấy là LĐ của các đơn vị.	HQ, etc.) had to change first. *Because leaders must have a comprehensive understanding of the new system, so that they can implement it. If they were unclear, then we would definitely fail.* […]			system comprehensively to participate in the implementation.	leader's comprehension of the new systems		
EA-T08	Có nhiều cái mình ko thể lường trước được. […] Mà tất nhiên trong ban lãnh đạo có người này , người kia, ko phải ai cũng như nhau. Chính sự nhận thức của người đứng đầu sẽ là 1 cản trở đầu tiên. Tại vì có khi sẽ ảnh hưởng đến quyền lợi của họ. Cho nên cái việc hợp tác nó rất là quan trọng.	There are a lot of uncertainties […] each individual can understand the systems in their own way, based on their position. *High position, but lacking understandings, is an obstacle to the implementation. If we want to change, then the high and middle managers/leaders must commit*. Of course, *among the managers, there were different opinions. The first obstacle is the mentality of the organisational leaders.*	OL	During	Leaders need to understand the system comprehensively and commit to the change.	Perceived the importance of leader's comprehension of the new systems	Perceived leader comprehension	Perception of leadership
HQ-T02	lương thì phần còn lại cho dù có cao mấy đi nữa, thì tổng lại cũng ko bằng lương Công nhân đâu. Cái đó nó bất cập ở chỗ đấy: … Thì đó	It does not matter how high the soft part was. Your total salary would always less than a senior field worker. *That was the systemic problem*	OL	Before	Highlights the shortcomings of the old compensation systems that cause systemic issue.	Perceived the negative of old compensation system	Perceived system shortcomings	Perception of system characteristics

	là bất cập, nó ko thu hút được nhân sự … Cái bản chất ko thay đổi được, …Cộng lại nó cũng ko thay đổi được bản chất.	*... we could not even recruit new talents. We tried to modify the system before, but due to the government policy, the hard part cannot change*. Our modification had limited effect because the core of the system did not change.						
HQ-T02	Trong cái tiêu chí đánh giá mà tư vấn xây dựng cho mình áh, trong thực tế dùng cái đó vào nó khó. … Thì cái đó là ko phải ai cũng hiểu, thì cái đó là cái khó. Anh là người tham gia đó mà anh còn cảm thấy là nó còn khó, thì cái ông tổ trưởng dưới kia mà để ổng hiểu cái đó. trình độ là một chuyện nha, hiểu rồi làm, ko phải chuyên môn nữa.	The 3P method was new. We did not have the in-depth understanding of the methods.… *It was complex*. That was just the 3P. The Balanced Scorecard was so difficult to understand, even more complex. BSC was used to evaluate P2. … I participated in the implementation, *but even I had difficulty in understanding. Not to mention the field team leaders. Education is one thing. But having the know-how to work with it!? It was not even their profession.*	OL	During	Highlighted the complexity of the new systems in terms of operation; that even high-skill employees had a difficult time in understanding them.	Perceived the complexity of the new systems	Perceived system complexity	Perception of system characteristics

HQ-T03	Nói chung khi gặp mình phải, quan trọng nhất 1 nhà quản trị khi triển khai dự án thì phải hiểu phương pháp. Phương pháp phải nắm vững. Hiểu, biết làm, thứ 2 là truyền thông. Mình hiểu phương pháp đó nhưng phải làm sao cho người lao động người ta thông suốt, thì cái đso là quan trọng nhất	When implementing new systems, managers must understand the systems. *Communication is next. We had to make the employees understand too. It is very important.*	OL	During	Highlighted the importance of communication during the transformation.	Perceived the role of the communication	Perceived communication role and effectiveness	Perception of communication programme
EA-T08	nhưng mà đã truyền thông trước rồi. Lúc đó công ty mở nhiều lớp. Chưa đào tạo nhưng mà mời INLEN vào , mình tự đào toạ. Tụi chị tự lấy những j mình đi học, tự học, đọc sách thêm biết được, MÌnh viết theo ngôn ngữ của họ để nói chuyện với họ. Tại vì nếu để INLEN làm, họ noi theo phương pháp giảng dạy thì sẽ khó, còn mình nói theo phương pháp ngôn ngư của công	*Before the implementation, we started the communication programme.* The organisation opened many training classes, which were taught by the agency. *Based on what we learnt, and from reading books, we wrote the (communication) materials so that the workers can understand.* Because if we used the agency's materials, it would be very difficult to understand.	OL	Before	Communication programme was started earlier to prepare for the changes. Communication materials were rewritten for the targeted audiences, i.e. workers.	Perceived how to achieve an effective communication programme	Perceived communication role and effectiveness	Perception of communication programme

	nhân thì họ dễ tiếp nhận hơn.							
WE-T25	Nói chung là cái nặng nhất là cái BSC đó, để phân rã được từ trên xuống dưới thì tốn thời gian. Tốn rất lâu luôn. Đã làm cái đó thì ko thể nói cảm tính. Mà muốn xây dnjg đo lường thì phai là cả 1 hệ thống thông tin. Thì mới kiểm soát đo lượng được. Còn ko đo lương được thì làm sao mà chấm BSC. Thì lúc đó cả 1 hệ thống dữ liêu phải được xây dựng.	The BSC deployment was the most complex one. Key objectives and indicators cascading was time consuming. Because we cannot be subjective about it. *If we want to measure our objectives, the IT support system was needed. Otherwise the evaluation could not be done.* New business data must be built … data was the most important. *At the beginning, I assigned KPOs and KPIs, but there was no support system. It was difficult. But now it is better.*	OL	During	Highlighted the need of IT support systems to carry out new evaluation processes and other team processes.	Perceived effectiveness of IT system	Perceived effectiveness of IT system	Perception of support programmes
HQ-T16	Có nhiều hướng em. 1 là chuyển họ sang công việc khác phù hợp năng lực của họ. 2 là họ vẫn làm công việc đó nhưng lương của họ thấp hơn, đánh giá năng lực của họ thấp hơn, 3 là mình	(to solve the redundant workforce problem), there were many ways. *One is rotation, changing to a more suitable role. Second is that they still do that work, but of course with less salary. Third is early retirement programme.*	OL	During	Listed the support programmes during the transformation.	Perceived the role of support programmes	Perceived support programme importance	Perception of support programmes

	có mấy đợt giải quyết mất việc làm đó.							
EA-T07	Sau đó, 2012, sau khi anh Đức long lên anh ra 1 cơ chế cưcj hay, đó là GĐ đơn vị này thì sẽ phải có luân chuyển hàng năm	In 2012, *the CEO institutionalised a new rotation policy, which was fantastic.*	OL	During	Endorsed a support programme (to solve organisational problem).	Perceived the role of support programmes	Perceived support programme importance	Perception of support programmes
EA-T06	Thời gian đào tạo ko đủ dài, theo anh là ko đủ để người ta hiểu sau.	*I was trained to operate the BSC quite a lot, but not enough. There were many challenges.*	OL	During	Although training was provided it was not sufficient.	Perceived the effectiveness of training programme	Perceived training effectiveness	Perception of support programmes
EA-T24	THực tế khi mình sơ kết tổng kết thì ngày xưa mình đứng đầu, nhưng h thị phần giảm xuống. Thấy rõ, khi em đi họp, từng lãnh đạo khi đi họp thì cảm nhận được mình thua người ta rồi nè.	*Just look at our competitors, they already took the market share. When I went to the annual meeting, we used to be at the top in the past, but now, we are losing our market share. Quite obviously, every leader recognised that we are falling behind*.	OL	Retro	Highlighted the situation of the Telcom-HCM, that they were losing marketing share and performed poorly.	Perceived the urgency of the business's situation	Perceived market competition and urgency	Perception of organisational situation
WE-T10	Công ty điện thoại năm 2010 để làm 3Ps thì cũng chưa đâu, chưa có thấy hiệu quả nhiều, đến 2011-2012 là mới thấy nó tăng, nhưng đặc biệt là tăng mà nhìn rõ nhất là bắt đầu khi 2015-2016, là thấy rõ. Là do cái tỷ	In 2010, *when we began the implementation, we did not see much effectiveness*, until 2011 and 2012, when we started to see some changes. The most obvious change was in 2015 and 2016, when we grew in revenue and market share.	OL	After	Described the improvement of business performance as the results of the transformation.	Perceived the improvement of busisness performance after the change	Perceived organisational performance	Perception of organisational situation

	lệ tốc đọ phát triển và doanh thu. Tuy nghiên số lượng lao động giảm so với số lượng ban đầu, như vậy là tăng năng suất lao động, thì sẽ có lợi nhuận.	[...] *We had less workforce, so that means improved performance, and profit.*						
WE-T11	Nhiều nhân sự ảnh trong 1 tổ ảnh có quá trình cống hiến. Cho nên nhiều lúc anh lãnh đạo trực tiếp, tổ trưởng ảnh lãnh đạo rất là khó. Vd, bảo làm cái này thì cũng làm, nhưng mà làm thì chểnh mảng, qua loa, cần người khác hỗ trợ.	Because they were working for a long time, they had more contributions, so that their *team leaders had a difficult time to work with them. For example, they did not complete their tasks, or would complete with no quality at all. Low performance, but high salary.*	OL	Before	Described the negative working attitude of many workers before the transformation.	Perceived working attitude of organisational members	Perceived working climate	Perception of organisational climate
HQ-T18	Họ quen với cái kiểu làm ỳ ạch mà lương vẫn cao. ko cần làm. Công nhân bậc cao, cứ tàng tàng lương vẫn cao. Khi đưa cái j mới vào thì họ phản ứng, có những cái phản ứng mà nói chung là rất là sốc, ko được nói chung là có văn hoá cho lắm, cũng kiện cáo, cũng lung tung hết. […] thì lúc	*Their working attitudes were lazy but still received high salary, even though they did not do any work. High-level workers, high salary, lazy work attitude. Their behaviours during the implementation were shockingly rude, terrible in general.* There were a lot of complaints, and many other things. […] *Although they*	OL	During	Described the resistance to change of many organisational members, that manifested as resistive behaviours, uncooperate attitude, etc.	Perceived resistance and lack of cooperation from many organisational member	Perceived organisational climate	Perception of organisational climate

	đó họ phản ứng, tiêu cực, nhưng cuối cùng cũng phải chấp nhận. Còn không thíhc thì phải out ra, chứ ko thể vì cá nhân mà ưu ái hơn được.	*resisted, and behaved negatively, they had to accept it at the end.* If you did not comply, you could leave, No compromises.						

Appendix B

Pilot case: Product development at eSecurity company

Case overviews

eSecurity is a SME (small- and medium-sized business), with about 19 employees at the moment. The company began to develop their own security product in early 2012. It was launched in early 2013. After that, the product had received a number of innovation awards. Their case is interesting because when eSecurity was founded, its business model was only the distribution of security software. Despite being a small start-up company with limited resources, eSecurity decided to diversify their business strategy, by developing their own product. eSecurity had explored and acquired product development capability. Since then, they have made the transition into the exploitation phase. It is not only that this case fit the objective of this study, but its context is also entirely different from our second case. This allows the researcher to evaluate our model under different contextual conditions and knowledge domain.

Before collecting data, the researcher had a brief discussion with the firm's director to gather some descriptive information about the case, including an outline of all the events that had happened, and the members involved. Based on this information, the researcher was able to develop a timeline for this case. The director, who acts as the key informant, verified this information. Data were collected by semi-structured interviews with four firm members, who are involved in all the events, e.g., the Director, a Sales Manager, the Lead developer, and a senior developer. The others were not interviewed due to the fact that they have no significant contribution to make to any events. This includes accountants, office administration, and two others junior developers, who have joined the company less than two months previously.

Organisational level			Exploration period			Exploitation period	
Timeline	**11/2011**		**5/2012**		**01/2013**	**2014**	**now**
Event	*eSecurity was founded*	*Idea incubating*	***Key event: The proposal of the product development.***	*Product development*	*First prototype. Product launching*	*Received some awards. Continue to invest to the product development.*	***Key event: Cutomer feedback.*** *(Customers wants a prevention feature from the product)*
Group level			**Strategic team**	**Product team**	**all**	**all**	**all**
Individual level		Lead developer	Director	Lead developer	all	all	Director
			Lead developer	Senior developer			Lead developer
				Other developers			Senior developer
							Sales manager

An overview timeline of the eSecurity case

Our case study illustrated eSecurity's story of their new learning trajectory, as the company initiated organisational renewal by diversifying their business strategy. The outcomes were considered as successful with the development of their own product, and acquisition of new capability, e.g., software development. The evidence indicates that while the learning process was successful, its outcomes could potentially lead to organisational inertia. The sources of learning inertia seem to spread across levels of analysis, preventing organisations tfrom absorbing the feed-forward learning. As a result, learning might break down at the individual and group levels before it could be embedded in artefacts and become organisational. The findings support Crossan *et al.'s* (1999) assertion that there might be bottlenecks, which affect a dynamic flow of learning across levels of analysis.

The proposal

In early 2012, eSecurity decided to develop their own security product. In the wake of increasing cyber-attacks on government agencies' websites, especially changing its interface to display inappropriate contents, they recognised that there are opportunities for a security product that monitor the website's interface and alert the administrators in real time.

"They (public agencies) want the administrators to receive notifications in real time. Sometimes they have no idea, after being attacked for weeks. Because the websites rarely get updated. When the websites were attacked and displayed inappropriate content, that damages their credentials and image. Many people were fired in those events. So we come up with a solution that monitors multiple websites with real-time notifications, especially for those agencies, because one public organisation can have many websites." (The Director)

The product development idea was proposed by the lead developer. Before coming to eSecurity, he worked for a public agency, and his work required him to support other public organisations in case of an emergency that is related to cyber-attacks. He noticed that *"they (the customers) do not have any tool to solve that problem (cyber-attack), most of them"*. However, the lead developer did not come forward with the idea, because the working climate was perceived as "*unwelcoming*" and "*not supportive*". After joining eSecurity for about six months, the lead developer decided to propose and focus on the idea. Explaining the reasons behind his commitment, he rationalised, "*The old environment (previous workplace), it is absolutely in no condition to support that (the idea): first is human resources, second is time to focus on that. But here, I see that I can have better support.*", and "*the good thing is that when I'm working with the director, everything is quite open, I can share what I think, to be honest*".

After an informal discussion, the idea was accepted by the director. At the time, eSecurity was young and actively looking for strategic directions. The idea of developing an in-house product fits the director's long-term vision, *"I think resources for this (product development) are not too much, and it also aligned with my strategy, which is distribution and used our own product"*. Despite the fact that there was uncertainty over *"whether it will be a success or not"*, the director considered his investment in product development as low risk, *"Because everything (core architect, low resource requirements, market demand) is okay, I supported the idea"*. A team was created to develop the idea into a product, featuring two key functionalities, real-time monitoring and notification.

The product development

As a small company, eSecurity had limited resources to support multiple organisational objectives. The lead developer recalled their situation: "*I had to work with what is available, I could not find (talent) in the market for my purposes. There were some technical difficulties; some members can work really fast, because they have programming knowledge, others just know some basics.*" To compensate for the lack of resources, the lead developer decided how the development team spend their time to fulfil different organisational tasks. During the early stage, the members of development team spent "*more than 90%*" of their time developing product (according to the director), and about 10% for other technical tasks, e.g., technical support, after sales activities. The boundary between different teams began to emerge, as members identified themselves as developers, or sales person.

The lead developer shared his experiences from early days, *"I draw from my experiences, more like see that do that, experiment while working. If I saw that it was not productive, then I would change. I think so! But now is much better! I know how to work, task and team management"*. Other team members gained confidence, as they acquired skills and knowledge. *"The lead developer set goals, main features. But operational tasks are my responsibility. I'm the one who understands what the limitations of this product are, what it needs"*. The senior developer described his current role in the team.

In the early days, the team had four members, including the lead developers and three other freshly graduated students. The lead developer plays a major role in the product development team. Not only did he provide one-on-one technical training and coaching to other team members, but he was also responsible for setting objectives and planning for the development, "*My view is that I will have a master plan at the beginning, and then break it down into smaller modules for others …*

Each will handle a separate area". Overall, the development team engaged team process that could be characterised as explorative, by experimenting with different ways of doing things, and made changes according to their experience. "*There was a period that we have to abandon everything and start from the beginning*". There have been some changes over time. Two of the original developers have left the company and replaced by two new members. The team appeared to have developed its own structure-based on seniority, norms for handling conflICT, and backup behaviours.

After six months from the proposal event, a prototype was introduced. *"The product is not different from my imagination, mainly the interface. Some functions were limited. It could only notifyof an attack in real time, but it seems right. Basically, it has some main functions, but not the other one. But I'm quite pleased because the most important one is there, real-time notification, "* the director recollected. He asked the team to continue with the development of the product, another main feature *"monitor*". At the same time, the company began preparing for the product launching. They promoted the product via different channels, such as newspapers, sales and competitions. The results of their strategy were considered successful. Although the product received several innovation awards in 2014, it has not performed well in the market. The director shared: *"We have one to two customers, but quite trivial"*. Despite that, the diversification strategy helps differentiate eSecurity from other competitors, and created a positive image of their brand name with the domestic customers. The net effect was the overall growth of their financial performance (according to the director).

Responses to technical feedback

The lead developer recognised the important implication of the 'prevention' feature for his product. However, he seemed to be reluctant in taking action toward the idea of developing this feature.

I'm not always open to any feedback. In fact, there is (customer) feedback from sales (member) that I feel not quite logical. For instance, what we make, our product (feature) is just monitoring, not prevention. But at the moment, I do not want to focus on it. I think long-term plan, in the next few years, I have to do that (the prevention feature) (The lead developer).

There were shared beliefs among the development team that although the product has fewer functionalities than other solutions, this does not mean it is a lesser product. *"When they (customers) buy other solutions … the effectiveness is not high, or too many cumbersome features… the main function is not focused…"*. To the

development team members, the objective of the product is focusing on monitoring and real-time warning, not prevention. This allows quick responses from the website's administrators once they are aware of malicious attacks. It is the matter of product quality rather than quantity.

The sales team appeared to have different views on the matter. To them, customer feedback reflects the reality, "*because, in reality, it's their (customer) job, and they let us know"* (Sales manager). Failure to take on customer feedback is a matter of a product's *"life or death"*. At one point, the Sales manager gave a critical comment, *"It does not matter how good the eSecurity product is, but if we are not willing to accept, adjust or change to address the customer's need, we cannot make sales. This means the product is 'sunk', or dead"*. By evoking strong and direct metaphors, i.e. (ships) 'sunk', 'life or death' or 'dead', he appears to argue against the views of the development team. At the same time, he recognised that there are technical challenges, that might affect the product development.

The director gave similar remark when discussed the current strategy, in relation to the future of the product development, *"There are many things that we want to do, but cannot, technically … We have many feedbacks from the market, but because (1) is technical difficulties, and (2) is expensive investment, we have to pass."*, and *"I want to improve what we are having, make money from the product, and then continue to invest"*. In essence, the product development strategy remains unchanged. eSecurity continues to focus on its current strategy and market acquisition. Since there is no change in development objectives, the product development continues to improve incrementally.

Individual-level of analysis

We have argued that OL manifests at the individual level as the phenomenon of resistance. Our finding confirms that individuals exhibit resistance to change because of their learning process. To illustrate how individual learning engender rigidity, we first turn to two events that concern the product development, the proposal and the customer feedback.

Learning is a localised process in the organisational context that involves specific individuals carrying out specific tasks (Edmondson, 2002). A person's position in the organisation influences his/her learning processes in particular, and the others in the organisational structure in general (Berends and Lammers, 2010). Two key individuals in this event are the director and the lead developer. The lead developer plays the central role, because only he knows how to develop the product, while the director has the ability to enact product development. The director's responses to the proposal were overall positive. He recalled his reaction during the proposal, "*When he (the lead developer) proposed his idea, I said 'Oh that sounds good', so I told him to go ahead because I think it is feasible* ". Other individuals, whose roles are less important, responded neutrally to the idea. The senior developer recognised the benefit of the project for him and others, despite being sceptical about the success of the idea.

Although this event does not necessarily highlight our argument of individual learning that engenders rigidity, it is a precursor to contrast the later event, which supports the argument. We examine how the individuals' responses to change are affected by personal, structural and contextual antecedents.

Change context. Although not every person in the organisations will respond to change, in the same way, the general positive or negative direction of responses is deductible. For instance, changes that entail negative context are often cited as downsizing, business transformation, etc. (Paterson and Cary, 2002). Conversely, an expansion programmr might bring about positive reactions, whereas a merger could generate mixed responses from the employees (Smollan, 2006). Smollan (2006) posits that change context moderate individual responses to change. The nature of a change event is reflected in the change context at the individual level. The idea of developing a new product mainly generated positive responses. It seemed to provoke neither conflict of interests nor potential harmful consequences. Instead, its success could benefit both the organisation and the individuals involved. In addition, the context at the time may have positively influenced

individual's receptivity to the idea. eSecurity was a young venture and was actively looking for a strategic direction. The proposal represented an opportunity.

Perceived favourable outcomes. Cognitive evaluation involves individual assessing change and predicting outcomes, for themselves, others and the organisations (Matheny and Smollan, 2005). If the outcomes are perceived as favourable, individuals are more receptive to change, and vice versa (Huy, 1999). If they find it difficult to anticipate the future, they are likely to remain either neutral or ambivalent (Smollan, 2006). The director's discussion showed that he was able to picture the concept and its implications, based on his working experiences in the security industry. It helped reduce a certain degree of uncertainty, thereby being more receptive to support the idea. We found that the ability to anticipate outcomes largely depends on the individual's knowledge, skills and other personalities.

Commitment. In this event, the lead developer committed to develop his idea. *"At that time, I did not think it will be successful like now … I have nothing to lose at that time"*. The director also committed to change, by fully supporting the product development. Under uncertainty, commitment is what makes actions, and also learning, possible. Nonaka and Takeuchi (1995) stress that the knowledge creation process needs to pay attention to individual commitment. Structure and working climate may play an important role, as they underline individual autonomy and intention in the workplace.

Perceived available resources. How individuals perceive the availability of resources depends on their position in the organisational structure (Berends and Lammers, 2010). Different positions have different levels of access to strategic resources and information. Therefore, individuals may perceive organisational resources differently. The individual ability to take actions toward changes hinges on their perception of necessary resources (time, financial and human resources), support structure, skill sets, etc. (Huy, 1999). Since eSecurity is a small company with limited organisational resources, the role of resources is magnified in making decisions toward change. The director repeatedly made reference to the required resources when justifying his decision; "*when we review the resource for investment … It does not require many resources"* or *"Of course, if it cost too much, I would not approve"*. The lead developer also highlighted the importance of resources by contrasting his previous job. "*I did not have resources to do that [develop his idea]*", to the current one *"I have better support here"*.

Perceived working climate. There was no evidence that eSecurity had formed a culture at the time, yet the lead developer still perceived the environment as

supportive. His positive experience could be linked to his personal relationship with the director, *"the good thing is that when I'm working with the director, everything is quite open, I can share what I think, to be honest"*. It might also be the result of how work is carried out at eSecurity, and his position at the firm. In return, the director often uses positive terms such as *trust*, and *core architect*, when referring to the lead developer. In addition, OL is widely accepted as a social process (Crossan *et al.*, 1999; Brown and Duguid, 2001), which is political in nature (Lawrence *et al.*, 2005; Berends and Lammers, 2010). In this case, we found no evidence that indicates any political factor involved.

After four years, eSecurity has become more established, and also achieved some considerable successes. They learned new skills, i.e. how to develop a product. Overall, OL had occurred, and eSecurity had made the transition into the exploitation phase of the learning cycle. In this event, the context of change is about the product features, which mainly concern the members of the product development team. The team members did not explicitly mention that topic when discussing customer feedback, except for the lead developer. Mixed responses were provided, as he commented on the feedback being *"not too logical"*, yet still recognised the implications of missing the feature. The result was his decision to focus on improving the current product and address the prevention feature in the future.

According to other members of the firm, technical difficulties are the barrier to developing the requested feature. However, such a problem was not mentioned by the lead developer; rather he appeared to involke alternative reasoning to justify his decision, *"But at the moment, I do not want to focus on it. I think long term plan, in the next few years, I have to do that (the prevention feature)"*. Huy (1999) notes that change resisters often employ a facade of rationality to appear more legitimate. The lead developer's responses could be viewed as a passive form of resistance, which prevented him from setting the agenda for problem-solving. No action has been made toward change; thus, incremental learning prevailed. It must be noted that, while other antecedent factors remain almost unchanged, i.e. position, support structure, etc., the lead developer has learned and acquired new knowledge as the results of the product development.

Group-level of analysis

At the group level, we initially grouped the interviewees into three teams, namely Strategic, Product development and Technical sales teams. Criteria are based on the nature of the team tasks and the participants. Following Tesluk *et al.'s* (1997) description of the workflow interdependence, e.g., pooled, sequential, reciprocal and intensive, the strategic team fit the description of *pooled* interdependence, because the director and lead developer members often exchange ideas and knowledge on an as-needed basis, rather than official meeting with fixed agenda. The product development team members interact more intensively in network-like settings, thereby following the *intensive* model. Finally, the workflow of the Technical sales team is likely to be *reciprocal*, where work flows back and forth in predictable patterns between sales and technical members. A summary description of team tasks, functions, composition and their interaction dynamics are presented in the table below.

Team	Type	Team task(s)	Team composition	Interaction dynamics
Strategic Team	ad-hoc	Set and evaluate strategic goals for the product (i.e. key features).	The Director, Lead developer	Workflow: pooled Frequency: Low
Product Development Team	permanent	Develop a software product envisioned by the Lead developer.	Lead developer, senior developer, two junior developers	Workflow: intensive Frequency: High
Technical Sales Team	ad-hoc	Sale more products. Demo proof of concept to customers. Collect feedback.	(Director), Sales Manager, Lead developer, senior developer	Workflow: reciprocal Frequency: Low

Figure 13 Team composition and interaction dynamics

The researcher has argued that OL manifests at the group level as the phenomenon of TMMs, which is described by some degree of similarity in team members' mental models. The analysis suggested that the Strategic and Product development teams have developed TMMs, while the Technical Sales team have not, due to various reasons.

The product development team

The product development team exhibited a high degree of TMMs' convergence. Analysed data showed that team members clearly constructed their experiences to have a team dimension; terms that describe collective identity "my team, we, us" were often used in the interview session. Other indicators include

improvement of team performance and development of collective qualities, such as team norms, structure, etc. When the team was formed, they engaged in team processes despite the relative lack of experience. The development team has experimented with different ways of working, based on what the lead developer described as a tried and true method. The senior developer shared his earlier experiences regarding the team process:

"During work, the challenges are how we defined a problem, and how to solve it. In the beginning, everything was upside-down. … we want it to be like this, but the results missed the point. There was a period that we have to abandon everything and start from the beginning. Another problem is team management, interaction between team members and progress…".

As they gained experience and became more efficient, the team also developed other team qualities, such as adaptive, norms, structure, etc. On the example of adaptive capability, the lead developer works in parallel with the senior developer in some important functions, to ensure work's continuity in case of absence. This process was implemented after two original team members had left the company. Another example of the adaptive capability is a structural change. Originally, the product development team started with a flat hierarchical structure, and only the lead developer has manager-like status. Over time, the team developed a vertical quasi-structure based on seniority. The senior developer has acquired the sub-group leader status, which allows him to distribute tasks to two new junior developers. *"The lead developer takes care of ideas, main functions, but how it works, is me! I understand this product and its limitation, what it needs"*. This is also the results of knowledge loss due to turnover.

The team has also developed norms of how to handle work and conflict. There is a certain degree of autonomy in how things were done; each developer handles their own areas, e.g., design, back-end, etc. The lead developer is in charge of defining main tasks. According to the senior developer, when conflICT arise some might last for several days; they would try to convince others first. If they were unable to resolve the conflict, the lead developer would make the final decision. The senior developer also reported that the team often engage in debates and challenging each other's ideas. This highlights the role of the leader, who is viewed as a facilitator of a psychological-safe environment that promotes discussion of different views (Edmondson, 1999; 2002).

When it comes to the product development, other team members tend to agree with the lead developer's view and decision. In the researcher' interviews

with the team members, except for the lead developer, none of them explicitly mention the customer feedback related to the "prevention" feature. Although they highlighted the importance of customer feedback, most provided examples are complementary to the product key features. Analysed data suggest that the members of the product development team are highly aligned with the lead developer's views, which can be the result of their workflow settings and intense interactions.

TMMs emerged as the result of shared understanding, and consensus, and are capable of retaining knowledge beyond the individual (Kozlowski and Klein, 2000). For a team to acquire the adaptive ability, and to learn independently of its team members, team necessitates TMMs. While TMMs are clearly important for group-level learning; they also have negative consequences. TMMs operate on common interpretations and standards of how things are done in groups. This helps in reducing uncertainty and increasing efficiency; at the same time, TMMs limit variety and variation at the individual level of analysis. We understand that TMMs work like a filter, which generates a group environment that allows certain compatible thinking to pass and discourages incongruent thinking. Over time, teams systematically become homogenous, as their members converge further to a certain worldview or practices. In the case of this study, although it is unclear whether the development team exhibited groupthink, one thing that is certain is that none of the team members explicitly discussed technical difficulties in relation to the customer feedback during the interviews.

When the external circumstances change, strong internal path dependence will lead to learning inertia and sub-optimal performance. In the case of this study, both the strategic team and the development team have achieved a collective understanding of the implication of customer feedback. However, actions have not been taken toward change. Team members may engage in innovative activities, but their efforts are bounded by the task objectives, which remain unchanged. Consequently, the learning flows stopped at the group level. OL became discontinuous. An inevitable consequence of TMMs is the erosion of organisational performance over time, as the accuracy of TMMs becomes less reliable. This could explain the mixed results in empirical studies, where group-learning practices predict organisational performance, e.g., Bontis *et al.* (2002) and Di Milia and Birdi (2010).

Organisation level of analysis

Organisational inertia

This study employs the model of punctuated equilibrium to explain OL. Learning phenomenon is depicted in terms of exploration to exploitation life cycles. Punctuated equilibrium assumes that exploitation follows exploration naturally. Therefore, the interpretation of balance is understood as organisations successfully making transitions between exploitation and exploration. Organisations are always subjected to learning inertia (Crossan *et al.*, 2013). The term 'inertia' describes the situation when, if an organisation faces difficulties, they tend to do more or less of the same things, instead of doing thing differently. It is understood that strategic inertia is the organisation's tendency to favour exploitation over exploration (March, 1991, 2006), and strategic renewal is the ability to overcome the inertia by enabling another learning exploration – exploitation cycle (Crossan *et al.*, 1999). In this case study, eSecurity had successfully enacted a learning cycle by developing their own product. At the moment, if they strategically decide to address the technical barrier from the development of the prevention feature, they would enact another learning cycle.

The decision to support the product development triggered re-allocation of human resources within the firm. The technical members spent 90% of their time on the development tasks. As technical members become developers, the boundary between different teams emerges. Structural change in the form of departmentalisation had occurred. Levinthal and March (1993) note that departmentalisation generally increases the learning effectiveness of lower-level entities, yet subsystems' learning effectiveness is also dictated by the extent to which a problem is decomposable. We consider the event of technical feedback to put their arguement into perspective. Technical difficulties have been recognised at the organisational level as the problem that prevents the continuity of the product development. By considering this problem as separable, as it is the product development team's problem, eSecurity *make* it separable (Weick, 1979). Technical issues are not seen as an issue that affects the well-being of the organisation; thus, they do not exist at the organisational level. Over time, the problem could become irrelevant (Levinthal and March, 1993). Therefore, organisational inertia occurs.

Organisational structure

In addition, organisations execute their operations via organisational structure, which defines the distributions of power, resources, etc. across the system

(Lavie et al., 2010). Mechanistic structures tend to emphasise exploitation, e.g., routine operations, functional specialisation, while organic structures with less rigid establishments allow for more autonomous processes, thereby supporting exploration. Departmentalisation increases structural establishment, and in turn rigidity. Rigidity, which emphasises exploitation, results from the institutionalisation of new capabilities (e.g., product development) and also political structure (Crossan *et al.,* 1999). The perceived success of the product underlined the roles of the lead developer, and cemented his position of power within the organisation. During the interview, the director constantly referred to the product development team as "the lead developer's team". Levinthal and March (1993) noted that organisational power associated with past successes tends to persist over time.

Risk preferences

Managers' perception of risk may influence the organisation's tendency toward exploration or exploitation. While risk aversion drives exploitation; risk-prone attitude encourages exploration (March, 1991; Lavie *et al.,* 2010). Despite the "uncertain" element about the future of the product, the director did not consider his decision as risky. "*It was quite simple, strategically, we just need to develop our own product.*" The risk factor was offset by his perception of required resources when the director decided to support the idea. "*When we review about the resource for investment … It does not require many resources"*, and later, he commented, *"Of course, if it costs too much, I would not approve".*

Risk-averse preference "cost" the company opportunities. Slow reactions from earlier positive feedback were attributed to the poor market performance of the product. The director was critical when recalled his decisions. *"Because of my uncertainty, it took more than 2 years to find the market"* and *"Because I was too reserved, keep testing market, although we had received this and that awards. Knowing the product is good, customers like it. Wish I was more aggressive, have better and more solid promotion strategy."* The desire to improve the market performance reinenforces sales activities, instead of addressing customer needs. Strategic inertia results from shifted attention towards other organisational goals.

Appendix C

Interview protocol

1. Introduction

The researcher introduces himself and provides a brief explanation of the research. The interviewees are informed of their rights and asked to sign a consent form.

2. Interview

Context and Historical perspective

- Could you please introduce yourself and your work history at Telcom?
- Could you tell me more about your experience during the business transformation?
- What are your roles?
- Can you tell me more about the organisational context before the transformation?

Individual-level questions in the context of the interviewee's work

- What are your personal perspectives about the 3P system?
- If possible, could you give me more details about your initial reaction when you first learned about the 3P system?
- Could you tell me how the implementation was carried out?
- What are the challenges?
- How did you overcome them?

Group-level questions in the context of the interviewee's group work

- Can you tell me more about your team? How many people? Who are they? How are tasks assigned?
- How often do you work together?
- How does the team work in terms of making decisions and taking actions?
- What are your perspectives about the teamwork and interaction among team members?
- Did conflICT often arise during meetings?
- How did the team manage the differences?

- What were the challenges?
- How did your team overcome them?

Organisational-level questions

- Could you tell me more about your experience when interacting with other organisational members during the transformation?
- How did they react once the new system was implemented?
- How are strategic decisions made?
- What were the rationales behind those decisions?
- How were organisational supports during the transformation?
- What were the challenges?
- How did the Telcom overcome them?

Reflection

- What do you think are the most important factors that determine the outcome of the business transformation?
- Since the transformation, have you noticed any changes in the way you and other people work or organisational performance?
- What have you learned from your experience?

Wrap-up

- What areas that you feel are important have not been covered?
- What, if anything, is worth mentioning in your story or experience during the transformation that you might want to share?

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