

Organisational learning and information systems : an exploration from a sensemaking perspective.

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Publication Date:

2008

DOI:

<https://doi.org/10.26190/unsworks/6650>

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Organisational Learning and Information Systems: An Exploration From A Sensemaking Perspective

Tji-Beng Jap

**Submitted for the Degree of
Doctor of Philosophy (Information Systems and Management)
School of Information Systems, Technology and Management
The Australian School of Business
University of New South Wales
2008**

Originality Statement

I hereby declare that this submission is my own work and to the best of my knowledge it contains no material previously published or written by another person, or substantial proportions of material which have been accepted for the award of any other degree or diploma at UNSW or any other educational institution, except where due acknowledgement is made in the thesis. Any contribution made to the research by others, with whom I have worked at UNSW or elsewhere, is explicitly acknowledged in this thesis.

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Acknowledgements

First and foremost I would like to thank my principle supervisor, teacher, coach, mentor and confidant, Professor Dubravka Cecez-Kecmanovic for her tireless help, support and motivation during these research years. She has not only been a source of wisdom and guidance but also a mentor and coach to me. I appreciate your time and patience throughout this wonderful life journey, I have learnt so much from you that no amount of words can do justice to my gratitude. You helped me experience and enjoy the sweet taste of research and now I am addicted (thanks to you!). Truly you have helped shape the person that I am now. I look forward to continuing this journey with you well beyond the PhD, thankyou!!

To my co-supervisor Dr Deborah Bunker, thankyou for your help and support throughout my time in the school, especially in the later parts of the thesis development where your help was felt the most. My thanks also extend to my other co-supervisor Dr. Robert Kay whose efforts kept me on course especially in the early years. To Deborah and Robert - I want to say that your invaluable advice along the way has not gone unnoticed.

A special thanks to Associate Professor Fethi for helping to streamline the PhD process, this has no doubt helped me get to where I am now. I must thank Rebecca Abrahall for all her help as my principle editor. I can say that your attitude towards life has definitely made the last leg of my journey very enjoyable. I would also like to take this opportunity to acknowledge the support extended by Dr Dominic Fitzsimons.

I would also like to take this opportunity to formally acknowledge all my fellow colleagues at the school including all staff members. Your encouragement and help has enriched my learning journey and kept me going despite all bumps and bruises felt along the way.

To all the people at the South-East Asia Bank who took part in the research, I thank you for your hospitality, support, enthusiasm and time. A special mention must go to Mr Aswin Wirjadi who was instrumental in granting permission to conduct this in-depth case study in his organisation. Without your support none of this would have been possible, thankyou!

Finally to my family, my late wife Lily. and sons Edo and Bernard, your patience and encouragement will never be forgotten. Lily, you have always and will always be special to me, I wholeheartedly thankyou for sharing your life with me and believing in me. It gives me honour to dedicate this thesis to you.

Abstract

This thesis explores the relationship between information systems (IS) and organisational learning. The literature suggests that IS implementation and use can affect and stimulate organisational learning, including higher order learning. However, it is not well understood when and how IS enable and support and when they disable and prevent organisational learning. Furthermore, studies of the relationship between IS and organisational learning tend to reflect theoretical fragmentation of organisational learning literature – focusing either on the individual or on the organisation as a learning entity.

The objective of this thesis is to explore the relationship between IS and organisational learning beyond these limitations, including different learning views from the individual up to the organizational. This is achieved by drawing from a Sensemaking perspective of organizations (Weick, 1995) that fills an important gap in linking information systems, organizing, and learning. The Sensemaking perspective offers an understanding of human sensemaking and sense-‘unmaking’ as an essential individual, collective and organisational ingredient of organising and learning. By integrating Argyris and Schön’s (1978) theory of organisational learning with the sensemaking model of organizations this thesis suggests a more comprehensive view to explore the relationship between IS and organisational learning. Specifically this thesis examines the following research question:

What are the ways and mechanisms by which information systems’ implementation and use engage sensemaking in organisations, and how does such engagement engender or prevent organisational learning?

This research question is investigated through an interpretive, longitudinal case study of the implementation and use of a loan approval information system in a large South-East Asian Bank. The study involved an extensive collection of data from the Bank headquarters and its branches, including 43 interviews, strategic and operational documents, IS project documents and informal discussions.

The thesis makes two important contributions to knowledge. Grounded in empirical data, it first argues that the emergence of organizational learning when instigated by an IS implementation is likely to follow the pattern from ‘not learning’, to ‘single-loop’ to ‘double-loop’ learning. Secondly, it also proposes that an IS’s likelihood to instigate organizational learning depends on the nature of sensemaking involved: a) if an IS implementation engages only individual, intra-subjective sensemaking organizational learning is not likely to occur and system is at risk of being rejected; b) for single-loop learning to emerge the engagement of intra- and inter-subjective sensemaking, mutually intertwined during an IS implementation, is required, and c) the change of mindset and double-loop learning can be achieved through the interplay of all sensemaking processes (intra, inter, generic-subjective and extra-subjective) in an IS implementation. This thesis puts to the test and demonstrates the value of the Sensemaking approach to the understanding of the relationship between IS implementation and organisational learning.

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1 Introduction

1.1 Introduction to the Chapter

The first chapter of this thesis introduces the nature of this interpretive based research that focuses on Information Systems (IS) implementation and use the relationship with organisational learning. This chapter begins with a brief introduction to the nature of this study and a background of existing literature in the related fields. This background gives rise to the research focus and research objectives, which guide this research. This is followed by a justification of the theoretical and practical contributions of this research. The chapter concludes by detailing the structure and organisation of the thesis.

1.2 Statement of Problem

Advances in technology and IS have reshaped the way companies operate. The ability to communicate and share information and knowledge globally means that a small change somewhere in the world can resonate locally, throughout every segment of society and in all aspects of organisations instantaneously. As a consequence, today's organisations regardless of size, are required to adapt and to learn. As a result many organisations seek to gain and maintain a competitive advantage through adoption and innovative use of IS, organisational learning, and adaptability. Not surprisingly in the IS literature the topics of IS and organizational learning have been emerging for the last two decades. For instance, in his discussion on the emerging literature on information technology and organisational learning Robey (2000) identified two focal points. The first is the application of organisational learning concepts to the implementation and use of information technology in organisations. The second is the study of the design of information technology applications to support organisational learning. Based on his research into information technology and organisational learning, Robey concluded that

information technologies increased an organisation's capacity to learn, and reciprocally, organisational learning facilitated the adoption of information technologies.

Of particular interest to this thesis are the findings that IS implementation and use can affect and stimulate organisational learning. While emerging streams of research make use of organisational learning to understand the implementation and use of IS within organisations, there is a lack of understanding surrounding the ways in which the implementation and use of IS affect organisational learning: either enable and support or disable and prevent organisational learning. Furthermore, studies of the relationship between IS and organisational learning often suffer from conceptually unsound foundation in organisational learning literature, which is theoretically fragmented – focusing either on the individual or on the organisation as a learning entity (in other words seeing learning as a property of an individual or a property of an organisation).

Researching the relationship between IS implementation and organizational learning is important for at least three reasons. Firstly, given the current state of knowledge, development of the theoretical explanations of this relationship grounded in the empirical material, would make a significant contribution to the IS discipline. Secondly, a deeper understanding of the ways in which IS implementation may affect organizational learning will assist companies in their more appropriate planning and more effective adoption of IS. Thirdly, by developing plausible and theoretical sound explanations of how IS impacts on organisational learning, both practitioners and researchers will be able to gain further insights into empirical evidence from IS implementation, especially in cases of IS failures.

1.3 Research Objectives

The main objective of this research is to understand and contribute to the theoretical explanation of how IS implementation and organisational use of IS impact on

organisational learning. In the course of achieving this objective I conducted an extensive literature review in both IS discipline and organization studies. The exploration of the literature has led to the selection of some foundational organisational theories that enable deeper examination of organization, IS and learning phenomena. In particular the study of Argyris and Schön's (1978, 1996) work on organizational learning, and Weick's (1995) sensemaking approach to organizations, including Weily's (1994) theory of semiotic self, among others, provided a sophisticated and rich foundation for my study.

The Sensemaking approach to organisations and its adoption to study organizational knowledge and IS (Cecez-Kecmanovic, 2004, 2005) enable examination of interconnectedness of organising, sensemaking and learning during an IS implementation. Organisations are viewed as a dynamic web of ongoing sensemaking processes that are created and recreated through the continuous and simultaneous interplay of action and interpretation between the varying levels of sensemaking: the intra-subjectivity of organisational members that participate in and are recreated by continually emerging inter-subjective sensemaking; generic subjective sensemaking that tends to persist and resist changes often emerging from inter-subjective sensemaking; and extra-subjective sensemaking that underpins and enables all other sensemaking processes (Cecez-Kecmanovic, 2004). To understand organisational learning requires the examination of processes by which human beings make, deconstruct and remake sense (both individually and collectively) of self, their work contexts, situations and experiences, their organisation and the organisational environment. As the Sensemaking approach offers an in-depth understanding of individual, collective and organisational sensemaking and sense-'unmaking' as an essential ingredient of organising and learning, it seems plausible to draw from and expand on the Sensemaking approach in conjunction with theories of organisational learning in an effort to better understand the impact of IS implementation on organisational learning.

This thesis will therefore examine the following research question:

What are the ways and mechanisms by which information systems' implementation and use engage sensemaking in organisations, and how does such engagement affect organisational learning?

This research question is investigated based on a longitudinal interpretive case study of an IS implementation in a large South-East Asian bank (SEA Bank). By developing and implementing the IS the SEA Bank aimed to change its business processes and introduce new risk management strategy. My ability to observe first hand the disruption of regular practices due to IS introduced in the branches and regions and the ways actors made sense and engaged with IS implementation that eventually led to organizational learning provided a rare opportunity to study the impact of IS on organizational learning in a real life context.

1.4 Thesis Organisation

The thesis is composed of six chapters. **Chapter One** provides a general introduction to the thesis. I begin with an overview of thesis's purpose then continue with an introduction to the research question and an overview of the methodology. This chapter concludes with an overview of the remaining chapters.

Chapter Two presents a review of the relevant literature, beginning with an introduction to Robey's (2000) concept of the symbiosis between IS and organisational learning research, proceeding with an examination of the broad organisational learning literature. The literature review continues with the examination of the different theories and approaches to organisational learning, notably cognitive and non cognitive approaches, followed by the introduction of Argyris and Schön's (1978) organisational learning theory which remained the most cited and highly influential. The discussion continues with the Cultural approach to organisational learning and Weick and Robert's (1996) concept of Collective Mind. This is followed by an in-depth examination of Organisational Learning theory by Argyris and Schön (1978, 1999), and Chak and Snell's (1998) interpretation of it. The chapter then introduces the general theory of sensemaking in organisations by

Weick (2001,1995), followed by Weick's re-interpretation of Wiley's (1994) theory of Semiotic-Self as a theory of sensemaking in organisations. Furthermore, the Sensemaking Theory in Organisational knowledge and learning by Cecez-Kecmanovic (2004, 2005), presented next, opens the way forward in examining information systems and organisational learning within the sensemaking perspective. The chapter concludes with the research question for this thesis.

Chapter Three provides an overview of research methodology and the longitudinal case study method chosen for the research. The chapter begins with the philosophical nature of the interpretive research approach (Crotty, 1998), followed by a discussion of the framework used in carrying out the research methodologically in information systems. A general introduction of the positivist/quantitative and the interpretive/qualitative approaches is provided, followed by an exploration of important concepts and principles of conducting the interpretive field study put forward by Klein and Myers (1999). This is followed by a discussion on the research approach adopted for this study. In this section I briefly explain each step of the empirical field work. This includes the introduction to the case company, prologue of the case study, the case study data collection, first level data analysis and telling the story from the actors' perspective, followed by my own interpretation and theoretical argumentation of the empirical material. The theoretical interpretation has been informed by and grounded in the theories described in literature review (Chapter 2). This is followed by a discussion of the possible limitations and ethical considerations of this research. This chapter concludes by detailing the potential contribution to theoretical explanation of information systems' impacts on organisational learning through a sensemaking view of organising and learning.

Chapter four presents findings from the case study conducted over a two year longitudinal period (2003-2004). The chapter outlines the case study organization, the SEA Bank, followed by the first level analysis of empirical data from the Bank Headquarters and the three regions (out of twelve) where a new IS for loan management was implemented. This also includes an introduction of the risk management practices of the loan business in the Bank. This first level analysis was

conducted by looking at how the actors viewed the IS implementation and the resulting changes in their work processes. Because of the longitudinal nature of the study and multiple data sources I was able to investigate the entire process from multiple perspectives: including top management, regional management, branch management, IT staff and account officers in the branches.

Chapter five provides an interpretation of the findings using the theoretical lens of Argyris and Schön's (1978) theory of organizational learning (modified by Chak and Snell, 1998) infused with the analysis of sensemaking processes. This is sometimes called second level analysis. The course of events during IS implementation is interpreted with respect to stages of organizational learning with similar patterns occurring in each region: from not learning, to single-loop learning, to double loop learning). By drawing from interviews, documents, reports and official Bank sources, this Chapter provides the theoretical explanation of the emergence of learning (from not learning to single and double-loop learning) instigated and enabled by IS implementation via the intertwined processes of sensemaking. The analysis of sensemaking enables exposure of actors' behaviour and meaning making throughout IS implementation leading to a more refined explanation of its relationship to organizational learning. The research question is answered here in the context of the case study. The theoretical explanation of the relationship between IS implementation and organizational learning in the case company presents an expansion of Argyris and Schön's learning theory.

Theorizing in **Chapter Six** goes one step further by making tentative analytic generalizations (Yin, 1984; Walsham, 1995) from the empirical findings. This Chapter provides a more concise and more general answer to the research question. It is proposed that the engagement of different sensemaking processes during an IS implementation determines the likelihood of the emergence of organizational learning. It is argued that sensemaking (in particular the model of sensemaking in organizations by Cecez-Kecmanovic, 2004) provides a missing link in explaining the impact of an IS implementation on the emergence of stages of organizational learning.

Chapter seven draws together the findings from this research and makes concluding remarks. The Chapter discusses the theoretical and practical contributions that stem from a novel way of conceptualizing the relationship between an information system implementation and organizational learning. The chapter concludes by addressing research limitations and suggesting potential future research topics shown to be of interest to the field of information systems and organisational learning.

2 Literature Review

2.1 Introduction

In this Chapter I will examine the existing literature to determine the ways in which information systems (IS) impact on organisational learning, delving into theories of organizational learning and the sensemaking perspective of organisations. I will firstly discuss the nature of IS and IS implementation issues from the perspective of organisational learning, followed by an analysis of organisational learning and the principal theories espoused in the literature. This analysis leads to an in-depth examination of Argyris and Schön's (1978, 1996) theories of organisational learning, which are the dominant and widely accepted in the literature. A greater understanding of Argyris and Schön's work leads me to a discussion of the need to explore and understand the role of IS in and their impact on the complex socio-organisational phenomenon of organisational learning, and the potential of the sensemaking theory of organisation as a possible means for generating a deeper understanding of IS impact on organisations and the ways in which they learn.

2.2 Information Systems and Organisational Learning

In the modern business environment IS have become a staple element that can be found present in almost all organisational processes, and as business processes inevitably involve the processing, storage, retrieval, and analysis of information, facilitated by humans, the use of IS is virtually inevitable. In any given organisation, as Ang et al. (1997) demonstrate, the human-centric processes of working, learning, and innovating of work practices are closely related implying a link between organisational learning and IS. Pentland (1995) called this link an 'intuitive connection' between the processes that evoke a metaphor of learning, and Robey defined organisational learning as "an organisational process, both intentional and

unintentional, which enables the acquisition of, access to, and revision of organisational memory, thereby providing direction to organisational action” (2000, p.130). Furthermore, Janson et al. (2007) found during their investigation of the longitudinal case study of a Slovenian Company, that organisational actors used IT systems to endorse the processes and practices of organisational learning, which enabled them to make a successful transition to a market economy.

While emerging streams of research make use of organisational learning to understand the implementation and use of IS within organisations, there is a lack of understanding surrounding the ways in which the implementation and use of IS affect organisational learning. Based on existing literature, Robey (2000, p.138-139) has summarised four specific conclusions denoting the ways in which organisations learn *how* to implement IS:

Firstly, learning is closely linked to experience. Past experience with information technology can improve future implementation if organisations consciously reflect and learn from it. But it is also possible for such experience to be ignored and for implementation problems to persist...

Secondly, learning may not only be enhanced through formal activities such as training and action research, but also through activities that are situated within the context of work practice...

Thirdly, knowledge barriers can be overcome by learning from other organisations and from intermediaries such as consultants and service providers...

Fourthly, research reveals the importance of dynamics in the learning process. Organisations appear to adapt to technologies during brief periods following their introduction or in response to later breakdowns or disruptions. Once these windows of opportunity are closed, learning is likely to stop as new routines become established.

Based on his research in information technology and organisational learning, Robey concluded that information technologies increased an organisation's capacity to learn, and reciprocally, organisational learning facilitated the adoption of information technologies (depicted in Figure 2.1 below).

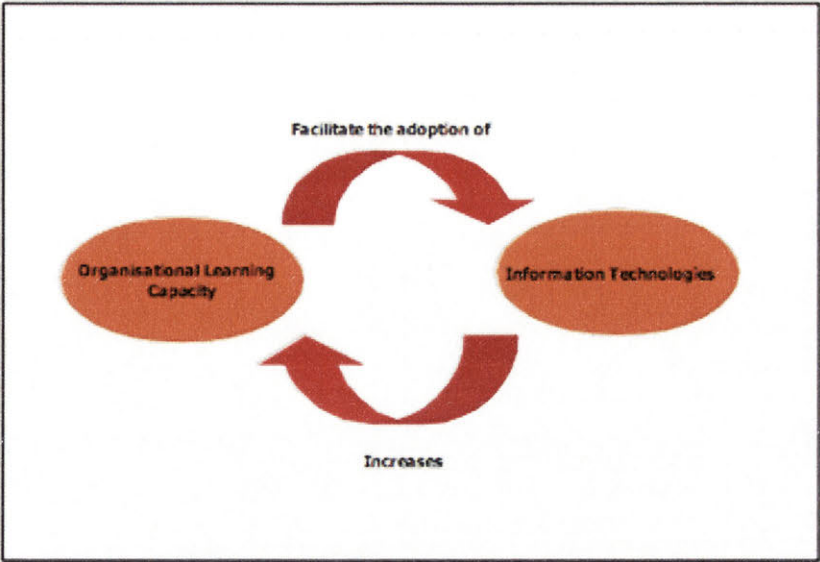


Figure 2.1 Robey's (2000) reciprocal relationship between an organisation's capacity to learn and information technology

The literature in IT-supported organisational learning is relatively recent, and much of the research combines the issues of IT, learning, organisational learning and knowledge management into the one basket. Research addressing knowledge management has to some extent replaced the issue of IT-supported organisational learning before it had the opportunity to wholly develop (Scarbrough et al., 1999). Alavi and Leidner (1999) viewed IT as a tool used to support Knowledge Management, which implied organisational learning followed as a consequence of the implementation of knowledge management systems.

Broendsted and Elkajer (2001) proposed a view of organisational learning that derives from participation in social work practices and involves human existence and development. They argue that organisational learning occurs as members engage and participate in communities of practice (Brown and Duguid, 1991; Wenger, 1998) thereby emphasising the social character of learning. They proposed an integrated view of organisational learning and IT that includes: i) the telos of learning or the direction of learning ii) the 'subject-world relation' of learning, which describes the general requirements of the relationship between the learner and the social context of

learning, iii) *learning mechanism* which describes how the actual learning process takes place, and the mechanisms through which learning processes are organised (Lave, 1996), iv) the scope of technology, which encompasses the IS applied within an organisation to support organisational learning, and v) the role of technology itself with respect to organisational learning. Broendsted and Elkajer (2001) argue that the process of implementing and applying IT in an organisational context is complex, and that IT-supported organisational learning is concerned with how organisational members engage in daily work practices and form social relationships, and how communities of practice emerge, because it is within these communities of practice that organisational learning unfolds.

The role of experience has always played an important part in how organisations succeed or fail in learning. Many organisations have adopted incremental approaches to implementing the new information system. Cigna Corporation's (Robey 2000) experiences of business process reengineering, for example, enabled them to apply the knowledge and learning gained during earlier projects to the ultimate success of a subsequent project. There are also other approaches, such as the case of an architectural firm Flower and Samios, which contrary to the Cigna approach, used their direct experience obtained 'in the field' by adopting a 'learning by doing' approach when implementing new computer-based architectural tools. The requirements of staff to rapidly master the use of new tools, and quickly disseminate their new knowledge to their peers, allowed the company to successfully integrate new systems within the firm's core business processes. Heiskanen and Assinen (2003) used the concept of Theories-in-Use (Argyris et al., 1987) to offer insight into the ways in which IS development enables organisational learning through persistent motivation in resolving IS problems. They analysed nearly thirty projects over the course of eighteen years to provide a more detailed account of the ways in which university reporting systems were developed. They were able to show that organisational learning was related to reflective IS practices, which enabled the improvement and development of IS capabilities through these learning cycles.

Although formal training is the most popular form of learning by organisational members about a newly implemented IS, research has shown that if an organisation is to successfully understand and implement a new IS, they need to address the *social context of learning*. Robey (2000) noted that many organisations improve through learning that has no direct link to the formalised training efforts of the organisation. Brown and Duguit (1991) revealed that formalised training can in fact encourage ‘down-skilling’, which is generally seen to be unhelpful. This is because the assumptions underlying formal training are based on the notion that employees are untrained, uncooperative, and unskilled, requiring an overly simplistic version of the training program. Brown and Duguit (Ibid) further demonstrated that Orr’s (1990a, 1990b, 1987a, 1987b) research illuminated the fact that in order to understand a newly introduced system, groups of workers will develop an informal practice of ‘learning-by-doing’:

Reps [the system users] must-- and do--learn to make better sense of the machines [systems] they work with than their employer either expect or allow. Thus they develop their understanding of the machine not in the training programs, but in the very conditions from which the programs separate them – the authentic activity of their daily work. For the reps (and for the corporation, though it is unaware of it), learning-in-working is an occupational necessity.

Within an organisation it has been shown that there is always an internal organisational barrier to free knowledge dissemination, and external sources of knowledge have been shown to play an important role in the ability of an organisation to learn. Organisations that have already learnt the use of IS effectively can provide vicarious learning opportunities for other organisations that choose to imitate them. On the other hand, imitation carries the risk that knowledge will not transfer from one context to another, and organisations not only learn the successful experiences of their predecessors, but also the unsuccessful experiences (Robey 2000).

One powerful means of learning from other organisations is how to recognise and analyse intermediaries. Attewell (1992) suggests organisations need to delay the adoption of new IS until they obtain sufficient know-how to support its

implementation and operation. It has been shown that those organisations that are among the first to implement a new IS have a flatter learning curve than those who wait. Research suggests that organisations modify their uses of IS as they gain practical experience over time, and the incremental improvements observed are not necessarily spread evenly over time (Gaimon 1997).

Despite the complex social processes to which IS are subject, they are implemented and used throughout organisations in abundance. Clearly, their implementation is not a ‘plug-and-play’ operation, as the introduction of a new IS involves numerous actors over significant periods of time, creating and changing complex social processes which ultimately influence the ways in which organisations learn during the implementation of a new IS.

Group learning has long been considered an important aspect of organisational learning and its relationship with IT (Bondarouk, 2006). Bondarouk developed a theoretical framework aimed at understanding the influence of group learning on the implementation of IT, based on the Kolb’s (1984) experiential learning research. This theory views learning as an action derived from experience, requiring individuals to resolve opposing demands. Experience-based group learning is based on five cycles of processes. The first process addresses the collective acting/operating steps within IT, through which the individual users act with the given technology, performing everyday tasks and replicating techniques they learnt during training. Secondly they reflect upon experiences, because

“when individuals’ everyday work situations are interrupted by a new technology...users will start to reflect on their behaviours and that...will engage them in the whole range of sense-making activities, regardless of the nature of operations with technology” (p.44).

This knowledge-dissemination introduces a key difference between individual and group learning. Bondarouk (2006), using Weick et al. (2005) argues that users might express, for example, doubts and suspicions, or trust and beliefs, concerning IT-related difficulties; or consider possible reasons for, and outcomes of, mistakes made

while operating the system; or discuss errors in working with certain IT functionalities. Next, users can share understanding steps, which implies the mutual acceptance of and respect towards a diverse range of ideas and suggestions (Kim, 1993). The final step towards group learning concerns mutual adjustment. This step addresses the attainment of mutual agreement, either explicitly or implicitly, regarding the use of IT within the organisation or group. Bondarouk (2006) claims that his framework constitutes the key aspects of the sense-making processes present in learning cycles that are built upon existing group experiences and understandings.

This concludes my review of the literature addressing IS and organisational learning, covering a specific spectrum of topics relevant to my research. I briefly addressed the literature from Robey's (2000) classification of organisational learning research as it pertains to IT, focussing specifically on the social context of learning. While there has been much research addressing the implementation of IS and its subsequent impact on the individual and group learning, as well as the impact on the social aspects of organisational learning from different theoretical perspectives, the complex relationship between an IS implementation and organisational learning still lacks deeper understanding. To understand *how* an IS implementation simultaneously affect individuals and groups so as to engender and bring about organisation learning requires further empirical and theoretical examination. Such studies would have to be informed by and take advantage of the rich and still growing organisation studies literature on organisational learning to which I turn next.

2.3 Organisational Learning

2.3.1 Introduction

Research surrounding organisational learning has an extensive history that spans over thirty-five years. The body of work has recently experienced exponential growth and a renewed interest in the field (Cohen and Sproull, 1996). An exhaustive bibliographic review undertaken in 1997 shows that there were as many published academic papers addressing organisational learning in 1993 as there were in the

whole decade of the 1980s (Easterby-Smith, 1997). However, the majority of the literature on organisational learning is rather fragmented and discussion occurs at various levels of abstraction, ranging from the theoretical, to the practical, to descriptive tales of best practice. This review of organisational learning literature begins with a brief explanation of the theoretical background to organisational learning and later focuses on the cognitive view of Argyris and Schön's (1996, 1978) theory of organisational learning.

2.3.2 'Organisational Learning' vs. the 'Learning Organisation'

In the organisation studies literature two terms— 'organisational learning' and the 'learning organisation' – are often used with not always clear distinction. They are however not equivalent and thus should not be used interchangeably. Whereas learning organisation is a prescription of the ideal characteristic of an organisation, organisational learning is a description of processes and behaviours that make an organisation learn. Argyris and Schön outline the following distinction between the terms:

One branch of literature – prescriptive, practice-oriented, value-committed, sometimes messianic, and largely uncritical – treats the phrase, 'learning organisation', as the catchword for whatever it is front-running ... organisations are doing and whatever the rest of the world needs to do to catch up with them.

The second branch, also probably stimulated by the ideas in good currency triggered by the wave of the new global competition, treats organisational learning as a research topic for scholars, mainly in schools of management and business. The second branch tends to be distant from practice, sceptical of first-branch claims, nonprescriptive, and neutral with respect to its definition of learning – that is, open to the view that learning may be good or bad, linked or not linked, to effective action or desirable outcomes (1996, p. xix).

Despite Argyris and Schön's comprehensive definition of the term, organisational learning has been defined in a multitude of different ways by many different authors. These various definitions are summarised in Table 2.1 below:

Table 2.1 Summary of various definitions of organisational learning

Year	Authors	Definitions of organisational learning
1978	Argyris and Schön	Organisational learning as a process of detecting and correcting errors.
1984	Daft and Weick	Organisational learning as acquiring knowledge about the interrelationships between an organisation’s actions and its environment.
1985	Fiol and Lyles	Organisational learning as a process of improving actions through better knowledge and understanding.
1989	Strata	Organisational learning as the principle process by which innovation occurs. In fact, Stata argues that the rate at which individuals and organisations learn may become the only sustainable competitive advantage, especially in knowledge-intensive industries.
1990	Senge	Learning organisations are organisations where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspirations are set free and where people are continually learning how to learn together.
1991	Day	Organisational learning is comprised of the following processes: open-minded inquiry, informed interpretations and accessible memory.
1991	Huber	An entity learns if, through its processing of information, the range of its potential behaviour is changed.
1992	Lee et al.	The organisational learning process is a cyclical process in which individual actions lead to organisational interactions with the environment. Environmental responses are interpreted by individuals who learn by updating their beliefs about cause-effect behaviour.
1992	Meyer-Dohm	Organisational learning is the continuous testing and transforming of experience into shared knowledge that organisations access and use to achieve its core purpose.
1992	Mills and Friesen	A learning organisation sustains internal innovation with the <i>immediate</i> goals of improving quality, enhancing customer or supplier relationships, or more effectively executing business strategy; and the <i>ultimate</i> objective of sustaining profitability.
1992	Nadler et al.	Learning requires an environment in which the results of experiments are sought after, examined and disseminated throughout the organisation.

Year	Authors	Definitions of organisational learning
1993	Garvin	A learning organisation is an organisation skilled in creating, acquiring and transferring knowledge, and modifying its behaviour to reflect new knowledge and insights.
1993	Kim	Organisational learning is defined as increasing an organisation capacity to take effective action.
1993	Levinthal and March	Organisational learning copes with the problem of balancing the competing goals of developing new knowledge and exploiting current competencies in the face of the dynamic tendencies to emphasise one or the other.
1994	Slater and Naver	At its most basic definition, organisational learning is the development of new knowledge or insights that have the potential to influence behaviour.
1995	Crossan et al.	Organisational learning is a process of change in cognition and behaviour that does not necessarily imply the immediate changes in performance.
1995	Schwandt	A system of actions, actors, and processes that enables an organisation to transform information into valued knowledge, which increases its long-term adaptive capacity.
1996	Marquardt	An organisation that learns has the ability to powerfully, collectively and continually transform itself to better collect, manage, and use its available knowledge for success.
1996	Miller	Learning is to be distinguished from decision-making. The former increases organisational knowledge, the latter need not. In fact, learning may occur long before, or long after, action has been taken.
1998	Levitt and March	Organisations are seen to learn by encoding inferences from history into current routines that guide behaviour.
1998	Snell and Chak	Learning is a meaningful change in the processes, structures, assumptions or concerns that connect individual members.
2000	Robey	Learning as an organisational process, both intentionally and unintentionally.
2001	Broendsted and Elkjaer	Learning as a tool facilitating access to and participation in social practices, including a shift from a peripheral position to becoming a full member of a particular community of practice.
2003	Heiskanen and Assinen	Learning as a reflective practice via different action strategies.

Year	Authors	Definitions of organisational learning
2006	Bondarouk	Learning as experience-based group learning: Acting, Reflecting, Knowledge disseminating, sharing understanding, and mutual adjustment.
2007	Janson, Cecez-Kecmanovic and Zupancic	Learning as the ability to question individual and collective assumptions and work processes and change them together with desirable goals in response to changing social, economic, political and commercial environments.

These definitions suggest different conceptualisations of organisational learning in the literature, and a lack of agreement between various authors. Some researchers maintain a ‘process-orientated’ perspective while others are focused more on descriptive measures to determine the state of organisational learning. Clearly, there are no agreed upon definitions or conceptualisations of organisational learning, however, it can be seen that the various conceptualisations can be classified along two dimensions: the descriptive vs. normative dimension (Robinson, 1995) and the cognitive vs. non-cognitive dimension. I will now delve into a discussion of each dimension in greater depth.

2.3.3 Descriptive and normative views of organisational learning

According to the *descriptive view*, organisational learning has been viewed as a commonplace process of changing organisational routines, based on feedback from the internal and/or external environment. Alternatively, according to the *normative view*, organisational learning is perceived by some as a relatively rare phenomenon that takes place only under a unique set of conditions. Those adhering to this view seek to intervene in the operations of organisations to determine how this learning can best be accomplished.

The descriptive view of organisational learning involves the adjustment of action as a result of the interpretation of feedback. Experiential lessons are captured by routines so that these lessons are available to those who have not directly experienced the lessons. These routines are then transmitted to others via formal and informal

socialisation processes, and recorded in the organisation's collective memory (Levitt and March, 1988). Theorists within the descriptive group (Huber, 1981; Dibella et al, 1996; Fiol and Lyles, 1985; Dodgson, 1993; Levitt and March 1988; Hedberg, 1981; Stata, 1989; Watkins and Marsick, 1993) acknowledge there is no single 'best' way for organisations to learn, and there is also considerable opportunity for misinterpretation of feedback resulting in the incorrect adjustment of subsequent action.

Theorists who subscribe to the normative view of organisational learning see learning as a collective activity that only takes place under certain conditions, and that learning as a means for organisational improvement does not occur by chance or random action, but through the development and use of specific skills. Without disciplined action or intervention, they believe organisations will fail to learn because of the many forces or barriers that constrain learning. The interest of these descriptive theorists, as well as practitioners, focuses on learning about the conditions that produce excellence in organisational learning, so that organisations are able to more readily make changes that solve rather than hide (or exasperate) problems (Robinson, 1995).

Theorists subscribing to the normative view (Argyris and Schön, 1978; Senge, 1990; Leithwood and Aitken, 1995; Louis, 1994; Garvin, 1993; Rait, 1996) are of the opinion that organisational life is not conducive to learning. Organisational learning barriers or 'disabilities', as they are defined by Senge (1990), exist due to the ways that individuals have been trained to think and act. The source of poor performance and organisational failure is often to be found in the limited cognitive skills and capabilities of individuals, when compared to the complexity of the systems they are called upon to manage (Robinson, 1995). Organisational learning is especially difficult where problems involve dynamic complexity, that is, when cause and effect are not closely related in time and space and changes do more harm than good (Kim and Senge, 1994). Thus the complexity of the system weakens an organisation's ability to learn from past experience. In an effort to avoid or solve these learning

problems, normative theorists look to organisational leaders to establish appropriate conditions that are essential for and conduce to organisational learning taking place.

2.3.4 Cognitive and non-cognitive approaches

The cognitive approach to organisational learning focuses on *internal processes* of action, while the non-cognitive approach focuses on *external patterns* of action. The *cognitive approaches* to organisational learning have relied heavily on one of two approaches, both of which share a common characterisation of learning. The first cognitive approach treats organisational learning explicitly as learning by individuals within an organisational context. Simon (1991) claims that all learning takes place inside the individual's mind; and that, therefore, organisations learn in only two ways: through the learning of its existing members, or through the ingestion of new organisational members who have new knowledge the organisation did not previously have. But Simon's theory is problematic in that it ignores the social work context in which all individual learning takes place. This theory cannot explain a situation when individuals learn but the organization does not.

Many theorists (Argyris and Schön, 1978; Fiol and Lyles, 1984; Levitt and March, 1988; Kim, 1993; Leithwood, 1996) state that organisational learning is distinct in essence, from individual learning. However, Bolman (1976), Shrivastava (1983), and Sim and Gioia (1986) quote examples where organisational learning was specified to be different from individual learning, but nevertheless it was described as a form of individual learning and not treated as organisational learning per se (Cook and Yanow, 1996). Weick and Robert (1996) claim that while organisational theorists are acknowledged to be studying social cognition, their preoccupation with individual cognition has left most with little more than an ability to apply this line of thinking to the collection of individuals 'one brain at a time'.

The second cognitive perspective involves the application of models of individual learning to the development of theories of organisational action. For example, Weick (1996) sees the defining property of learning as the combination of same stimulus

and different response, but the fact that this is rare in organisations leads him to consider how organisations might employ stimulus-response learning in a ‘non-traditional way’. His point is that organisations either do not learn or they learn in non-traditional ways. Morgan (1996) suggests a further extrapolation of the notion of individual learning, providing appropriate models for organisational learning as he examined how organisations can be understood to be brain-like and how this might help us design organisations with respect to learning. This approach views organisations and the people in them as self-organising, self-monitoring, self-correcting entities that function somewhat like the brain, where brain functioning involves organic, neural interconnections through which information is processed almost instantaneously. Many theorists, however, (Cook and Yanow, 1996; Hutchins, 1996; Weick and Robert, 1996) challenge the narrowness of these cognitive perspectives and have been searching for new conceptualisations of organisational learning. It is therefore important to be clear on the limitations of this cognitive approach.

Cook and Yanow note that using theories of individual cognition to explain collective learning...

Raises a set of complex arguments concerning the ontological status of organisation as cognitive entities – specifically, arguments about how organisations exist and how the nature of their existence entails an ability to learn that is identical or akin to the human cognitive abilities associated with learning. In other words, because the cognitive perspective adopts its understanding of learning from theories about individuals, it follows that to discuss cognitive organisational learning, one must first show how, in their capacity to learn, organisations are like individuals (1996, p435).

Secondly, the study of individual learning is in itself extremely complex, and while much progress is being made in the field, it remains for the most part in a state of flux. While advances are being made in understanding individual cognition, the absence of an established, commonly accepted theory of individual learning means its application in an organisational context is problematic to say the least. “...Linking our understanding of organisational learning to cognitive theory, at the very least,

obligates us to account in organisational terms for developments in that theory or to explain why this is not necessary” (Cook and Yanow, 1996, p.436).

Thirdly, apart from the problems posed by debates concerning organisational ontology and the nature of theories of individual learning, Cook and Yanow (1996) argue:

It is not clear how two things that are, in so many ways, so obviously different as individuals and organisations could nonetheless carry out identical or even equivalent activities. Further, even if it were shown that organisations and individuals are ontologically equivalent in the possession of cognitive capacities required for learning, it would not necessarily follow that they would both learn in the same fashion (1996, p.436).

Adherents of the individual perspective (Huber, 1996; Weick, 1996; Levitt and March, 1996; Dibella et al, 1995; Dixon, 1994) respond to the cognitive view with arguments that are close to those of the behavioural theorists of organisational decision-making and change. Integral to the concept of knowledge management are the concepts of organisational memory and procedural routines. Within the latter perspective, organisational learning is viewed as routine-based, history dependent and target oriented. That is, organisations are seen to learn by encoding inferences from history into routines that guide behaviour (Levitt and March, 1996). Organisational memory, on the other hand, explains how organisations encode, store and retrieve organisational knowledge and provide insights into how routines arise, stabilise and change.

Despite these arguments, it is clear that individuals do indeed learn in the context of organisations and there is nothing inherently invalid in applying models of individual learning to organisations. There is also no doubt that a great deal of important work has emerged as a result of these efforts (Cook and Yanow, 1996).

On the opposing side of the cognitive approach to organisational learning is the non-cognitive approach, whereby theorists conceive of organisational learning as the development of an *inter-individual*. The following section describes three non-cognitive approach of organisational learning.

The first approach, termed the *cultural approach*, rejects the cognitive approach of collective learning, with Cook and Yanow (1996) holding that

Learning can be done by organisations; that this phenomenon is neither conceptually nor empirically the same as either learning by individuals or individuals learning within organisations; and that to understand organisational learning as learning by organisations, theorist and practitioners need to see organisations not primarily as cognitive entities but as cultural ones (Ibid, p.431).

Cook and Yanow (Ibid) studied collective learning in a small flute-making factory and used their experience to illustrate a cultural perspective to organisational learning. They suggested cultural learning across sub-cultures within a single organisation will occur even in the midst of turbulence, and that there is evidence to support the cultural perspective as a means of explaining collective learning, also suggesting this approach to organisational learning may be more successful in small organisations or groups. The cultural approach allows us to see that a group of people can and do act collectively, and also act in ways that suggest learning without relying on an individual-cognitive view of such learning. Despite these differences, both the cultural and the cognitive perspectives include the study of the activities of individuals and the main difference between the two is in their ultimate focus:

While the cognitive approach takes individual action as its primary point of reference; the cultural perspective focuses on a group of individuals moving within a 'net of expectation'...Within the cultural perspective organisational knowledge is not held by an individual, nor do we see it as the aggregated knowledge of many individuals. What is known is known and made operational only by several individuals acting 'in congregate' (Cook and Yanow 1996, p.448).

From their case analysis, Cook and Yanow (Ibid) exemplified the ways in which organisational learning is a collective activity as opposed to an individual activity, involving "the acquiring, sustaining, or changing of intersubjective meanings through the artifactual vehicles of their expression and transmission and the collective action of group" (p.449). Meanings, whether acquired from new members or created by existing ones, come about and are maintained through interactions between members

of the organisation, suggesting that much of the organisational learning is in the form of tacit understanding and communication.

Secondly, the concept of the collective mind was developed to explain organisational performance in situations requiring continuous operational reliability. The collective mind is conceptualised as a pattern of heedful interrelations of actions in a social system (Weick and Roberts, 1993), or in other words as *intelligent organisational behaviour*. Weick and Roberts (Ibid) claim that discussions of a collective or team mind have been rare, despite the fact that people claim to be studying 'social cognition'. They do, however, acknowledge exceptions to the rule and recognise these exceptions in their discussion of the collective mind. They address the concept of a collective mind in their analysis of events that occurred on an aircraft carrier, using flight operations to illustrate the concept:

The technology is relatively simple, the coordination among activities is explicit and visible, the socialization is continuous, agents working alone have less grasp of the entire system than they do when working together, the system is constructed of interdependent know-how, teams of people think on their feet and do the right thing in novel situations, and the consequences of any lapse in attention are swift and disabling (1996, p.331).

They further distinguish between the individual and the collective mind in the following manner:

Our focus is at once on the individual and the collective, since only individuals can contribute to a collective mind, but a collective mind is distinct from an individual mind because it adheres in the pattern of interrelated activities among people (Ibid, p.334).

A collective mind may take the form of cognitive interdependence focused around memory processes. People in close relationships enact a single transactive memory system complete with differentiated responsibilities for remembering different portions of common experiences. People know locations rather than the details of common events and rely on one another to contribute missing details that cue their own retrieval (Wegner, 1987; cited in Leithwood, 1996, p.10).

Leithwood (1997) believes that there is essentially a connectionist view of individual learning applied to the collective mind. He argues that organisational learning as a form of adaptation uses individual members of the organisation as instruments in a way that constitutes adaptation at the aggregate level of the organisation. Therefore, organisational learning is understood to occur when organisations, in response to external or internal sources of disturbance or shock, select their own decision rules that lead the organisation to a preferred state.

Hutchins (1996) discusses the third concept of 'mutual adaptation' when he presents his study of the pilothouse of a large navy ship. In this particular case, members of the navigational team were confronted with a crisis situation when the ship lost its power supply, and as a result two types of mutual adaptation were described. The first type Hutchins describes as largely unreflective, as it occurred as a result of each of the team members being forced to adapt their usual contribution to the team in the hope that others would help out and fill in with the other tasks as required. The second type was identified when it became apparent that the team was not going to be able to respond to this challenge. At this stage they attempted to recruit other members of the organisation to help out with the necessary tasks.

It is common sense, claims Hutchins, to suggest that work is organised in accordance with plans that are created by designers who reflect on the work setting and manipulate representations of the work process in order to determine new and efficient organisational structures. If outside designers are not considered then the organisation of work is attributed to conscious reflection by members of the workgroup itself. For Hutchins there is an important difference between the processes of change enacted via supervisory reflection with interventions imagined in the classical view, and the processes of change enacted via local adjustment. These differences amount to the distinction between design and evolution. An outsider conducts the design search but the evolutionary search is conducted by the system itself; the evolutionary search is the process of adaptation.

Leithwood (1996) concurs with Hutchins' view of learning. He describes learning as the result of imagined new challenges that stimulate individual team members to adapt their contributions to the team's actions. In this way, the individual contributes to the learning of the team. As other team members adapt their contributions, each team member learns the adequacy of his or her initial response and perhaps the need to adapt further. To the extent that the acquisition of a useful adaptation to a changing environment counts as learning, it must be considered that this is a case of organisational learning (Hutchins, 1996).

Building on this notion of mutual adaptation, Leithwood (1996) developed a detailed framework for inquiry into team learning processes. He began with Neck and Manz's (1994) consideration of 'groupthink'. Based on this framework, the outcome of team learning is a *pattern of action* that ranges from rational to irrational. This pattern of action need not lead to a change in behaviour; instead it may entail a decision to continue with previously defined behaviours that have sustained the test of time to remain valid. Leithwood (1996) states that these "patterns of action are the direct result of interrelations among individual cognitions of team members, characterized earlier as mutual adaptation" (p.17). Neck and Manz (1994) suggest that the productivity of these processes is greatest when the conditions for the team include "encouragement of divergent views, open expression of concerns and ideas; awareness of limitations and threats to the work of the team; recognition of members' uniqueness; and discussion of collective doubts" (cited in Leithwood, 1996, p.18).

2.3.5 Argyris and Schön's theory of Organisational Learning

Lipshitz (2000) argues that few names are more closely associated with organisational learning than those of Argyris and Schön. This is also attested by Easterby-Smith (1997), who proposes that the literature on organisational learning consists of six distinct disciplines, using different ontologies and focusing on different aspects: psychology and organisational development; sociology and organisational theory; management science; strategy; production management; and

cultural anthropology. According to Easterby-Smith, Argyris and Schön have contributed to at least two of these six disciplines. Firstly, they have conceptualised the psychology and organisational development discipline, contributing the themes of cognition and underlying values and the problematics of defensive routines and the transfer of knowledge from individual to collective learning. Secondly, they have contributed to the discipline of management science, which involves the themes of knowledge, error correction, and single-loop and double-loop learning. Their work is also highly relevant to the theme of conflict and organisational politics, which is part of the discipline of sociology and organisational theory. It is fair to conclude that no other researcher or research group has exerted more wide-ranging influence in the field of organisational learning than Argyris and Schön.

An article in the *Organisational Dynamic* uses the title “A conversation with Chris Argyris: The father of organisational learning” (Fulmer and Keys, 1998) and an article in *Training and Development* “A Chat with Argyris, a HRD guru” (Abernathy, 1999) further acknowledges Argyris and Schön’s contribution to the field of organisational learning. Despite their huge influence, Lipshitz (2000) argues that Argyris and Schön’s work is frequently referenced but rarely followed or fully understood. The fact that Argyris and Schön have left their mark principally on the rhetoric of organisational learning is unfortunate, because their works have much more to offer to both researchers and practitioners of organisational learning.

Argyris and Schön’s (1996) famous theories of *single-loop* and *double-loop learning* have been developed from their *theory-in-use* (refer Figure 2.2 below), with their *theory-in-use* being based on their *theory of action*. Argyris and Schön propose a theory of action that represents organisational task knowledge, which may be variously represented as systems of beliefs that underlie action, and as prototypes from which action is derived. They argue this theory of action has the advantage of including strategies of action, the values that govern the choice of strategies, and the assumptions upon which the overall theory is based. This theory of action can be applied to both organisations and individuals, which may take two different forms. The *espoused theory* denotes the theory of action advanced to explain or justify a

given pattern of activity. On the other hand, the *theory-in-use* denotes the theory of action implicit in the performance of that pattern of activity.

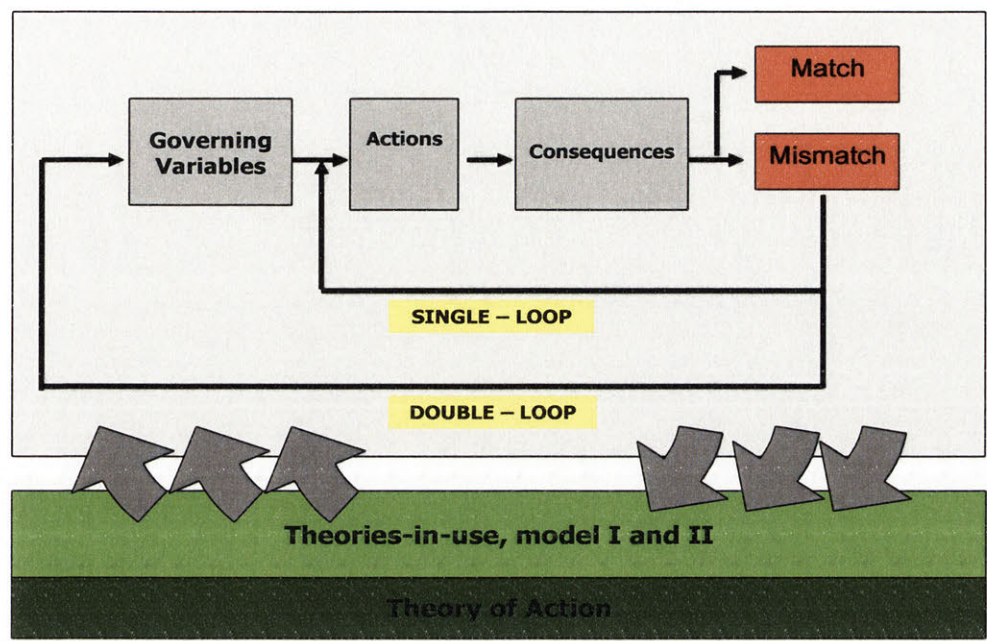


Figure 2.2 Argyris and Schön's (1999) presentation of single-loop and double-loop learning

According to Argyris and Schön, if human beings deal with issues that are embarrassing or threatening, their reasoning and action conform to a particular model of theory-in-use, which Argyris and Schön call *Model I Theory-in-Use*. Model I informs the action that enters into primary learning loops, but which also inhibits double-loop learning. On the other hand, if human beings can examine mistaken assumptions, reconcile incongruities, make specific any vagueness, test notions, bring together scattered information to make meaningful patterns, and bring to the surface previously withheld information, these conditions, which are all enablers of double-loop learning, are also the key components of a *Model II Theory-in-Use*, and people using this theory in use are highly unlikely to use Model I Theory-in-use, which give rise to primary inhibitory loops. Argyris and Schön summarise that single-loop and double-loop learning are consequences of learning from the Model I Theory-in-use and Model II Theory-in-Use schemes respectively.

Argyris and Schön (1996) propose that an organisation's learning system is mutually dependent upon the theories-in-use that individuals bring to their behavioural worlds. Individuals' theories-in-use help to create and maintain an organisation's learning system. On the other hand, this learning system contributes to the strengthening or restructuring of each individual's theory-in-use. One of the most important kinds of double-loop learning is second-order learning, in which the members of an organisation discover and modify the organisation's learning system. This second-order learning is the prevailing paradigm of organisational inquiry. It occurs as a result of a shift from the conditions for Model I Theory-in-use to the conditions for Model II Theory-in-use learning. Gregory Bateson (1972; cited in Argyris and Schön, 1996, p.29) calls second-order learning *deutero-learning* and Pentland (2003) called Argyris and Schön's single- and double-loop learning *operational and strategic learning* respectively.

Using Argyris and Schön's approach as a generic theoretical model of organisational learning, other researchers have further developed theoretical models of organisational learning, such as Snell and Chak (1998) who proposed a *level of learning* framework for organisational learning. They argue that Argyris and Schön (1974), Hawkins (1991, 1994), and Torbert (1994) have each identified distinct systemic levels of learning for individuals and organisations. They claim four levels of learning, as opposed to the original two proposed by Argyris and Schön. The first level is zero (loop) or 'not learning'; second is single-loop learning; third, is double-loop learning; and fourth is deutero or triple-loop learning. This level of learning framework from Snell and Chak (1998) is essentially an interpretation of Argyris and Schön's single-loop and double-loop organisational learning theory and organisational deutero-learning. Figure 2.3 describes Snell and Chak's levels of learning, while Table 2.2 further reveals their view of learning and behavioural changes in individuals and organisations for each level of learning.

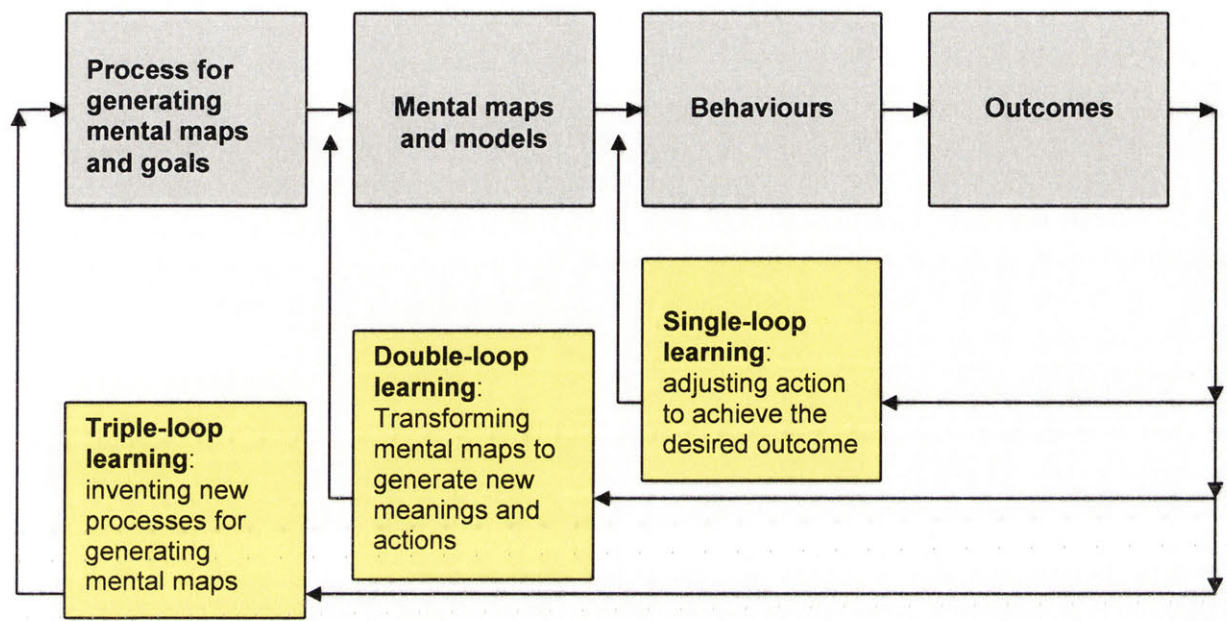


Figure 2.3 Single, double and triple-loop learning (Snell and Chak 1998)

Table 2.2 Levels of Learning (Snell and Chak 1998)

Level of learning	Manifestation for individuals	Manifestation for organisations
Not learning	Isolation: failure to receive feedback on actions, failure to take in any new information.	Fragmentation: no linkage between individuals' mental models and shared mental models; loss of the individual means; loss of that person's expertise.
Single-loop learning	Adapting: becoming more skilful; registering that one's actions are not achieving goals, adjusting one's actions to increase the possibility of achieving goals.	Consolidating: adding to the firm's knowledge and competency base without altering present policies, present objectives, present mental maps or basic activities.
Double-loop learning	Developing: choosing to learn different kinds of skills; understanding why one's prior meaning-making or goal-seeking systems were inadequate and led to incongruities and omissions; reframing problems from a position of deeper insight.	Transforming: changing the firm's knowledge and competency base by collectively reframing problems, developing new shared paradigms or mental maps, modifying governing norms, policies and objectives.
Deutero (triple-loop) learning	Inventing: becoming aware of the limitations of all grand frameworks; creating ways of coming up with new structures of thought and action suitable for particular occasions and monitoring the effects of these frames.	Co-inventing: collective mindfulness, members discover how they and their predecessors have facilitated or inhibited learning; producing new structures and strategies for learning.

This model of organisational learning provides a well developed theoretical foundation to identify and characterise different levels of learning involving both individuals and organisations. This model does not, however, describe how different learning levels operate together, nor does it explain how individual learning transforms into group and organisational learning or vice versa. It also fails to address the impact of the cultural and collective mind on organisational learning. The recognition of these limitations in Argyris and Schön's (1996) theory (and its

various enhancements) and a search for a conceptual link between IS and organisational learning lead me to examine the underlying sensemaking processes of organisational learning at the individual and group levels of abstraction using a sensemaking approach to organisations that will be discussed in more detail in the following section.

2.4 A Sensemaking approach to organisation and learning

2.4.1 Introduction

Sensemaking has been interpreted in various ways by different authors. This thesis adopts the distinction made by Dervin (1983) whereby *Sensemaking* (capitalised) refers to the approach or methodology for studying and understanding how humans, as active agents, “construct what they construct, why and with what effects” (Weick 1995, p.4) and *sensemaking* (not capitalised) which refers to the making and unmaking of sense. Although this distinction is made, it is recognised that the concepts of sensemaking as a phenomenon and Sensemaking as an approach are often collapsed and confused in social science discourses.

The most general notion of sensemaking (as a phenomenon) is sensemaking as communicating behaviours, both cognitive and social, and a combination of individual and social activities, which allow people at varied levels to construct and design their movements through time and space (Dervin 1983; Weick 1995). Some authors see sensemaking in a broader sense that also includes action. For instance Thomas et al. (1993) define sensemaking as “the reciprocal interaction of information seeking, meaning ascription, and action,” (p.240). Specific circumstances are “turned into a situation that is comprehended explicitly in words and that serves as a springboard to action” (Taylor and Van Every, 2000, p.40). Weick et al. (2005) expand on this notion to describe sensemaking as “a process that is ongoing, instrumental, subtle, swift, social and easily taken for granted” (p. 409). Sensemaking is seen as “the primary site for materializing meanings that inform and constrain identity and action” (Mills 2003, p.35).

Sensemaking as an approach refers to the relationships between the research methods used, the working concepts that direct the research methods and the meta-theory or philosophical assumptions, upon which the research rests. It examines assumptions and propositions about “the nature of information, the nature of the use of information, and the nature of human communicating” (Dervin et al. 2003, p.270) at different levels of organisations and society, thus enabling us to explore the missing link between IS and organisational learning.

Weick (1995) proposes seven distinguishing characteristics that set sensemaking apart from other explanatory processes in organisations, such as understanding, interpretation, and attribution. The proposed characteristics included being grounded in identity construction, retrospective, enactive of sensible environments, social, ongoing, focused on and by extracted cues and driven by plausibility as opposed to accuracy (Ibid). It is important to note that there is no single, accepted view of organisational sensemaking, and Weick (1995) determined that there were at least fifty-five important resources (publications) available for exploring organisational sensemaking.

This literature review is specifically interested in organisational sensemaking, based on Weick’s (1995) interpretation of Wiley’s (1998) ‘semiotic self’ view of sensemaking. This *self as a level* theory is laid out by Wiley (1998) in the Peirce-Mead model of the semiotic self. Wiley (1994) developed this model based on Charles Sanders Peirce’s semiotics (Hoopes, 1991) and George Herbert Mead’s *The Social Self* (1913, 1964). While it is not in the scope of this Chapter to explore Peirce-Mead’s semiotics, it is however important to note that it is from this work that Peirce-Mead’s model of semiotics was developed, and it is upon this model that Wiley developed and proposed his concept of *levels*.

Historically there has been little (if any) consensus amongst philosophers and social theorists regarding the concept and implications of ‘levels’. Wiley (1998) proposed a model of major competing levels for the purposes of understanding the autonomy and irreducibility of the self. He proposed a six-level scheme, which places the

individual with a level of *self* at its *centre* (see Figure 2.4 below). Above the level of self are the *interactional*, *social organisational* and *cultural* levels. These three levels, combined with the central level of self are all symbolic in nature. This is in direct contrast to those levels below the level of self, which are the *biological* and *physio-chemical* levels. These lower levels are non-symbolic and physical in nature and as befits the needs of my research, these physical levels will not be explored in this review.

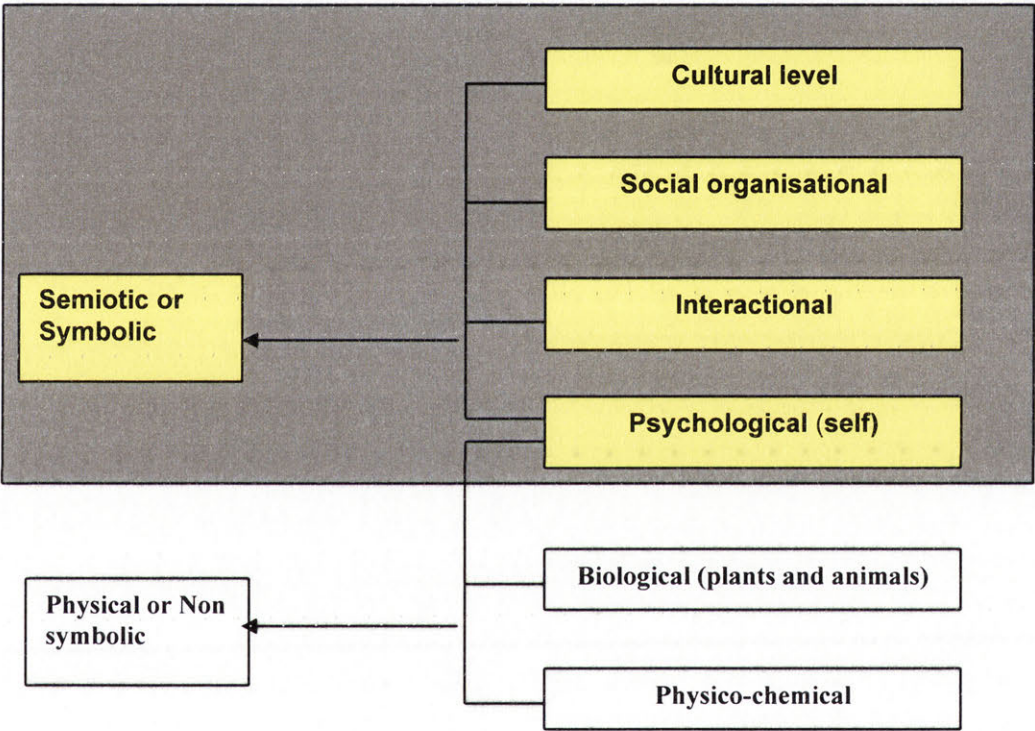


Figure 2.4 Wiley's (1998) original levels of semiotic self

Wiley defines all levels above the interactional as characteristic of social structures, and thus inclusive and descriptive of organisations (1998). The distinctive characteristic of these levels is the shift from *inter*-subjectivity to *generic* subjectivity. According to Wiley, at these levels of abstraction

“Concrete human beings, subjects, are no longer present. Selves are left behind at the interactive level. Social structure implies a generic self, an interchangeable part-as filler of roles and follower of rules-but not concrete, individualized selves. The ‘relation to subject,’ then, at this level is categorical and abstract” (p.258).

Cecez-Kecmanovic (2000, 2004) further developed Weick's (1995) ideas about sensemaking in organizations by adopting Wiley's four levels of symbolic or semiotic self. The resulting model of sensemaking is discussed in the following subsection.

Sensemaking is considered essential in any problem situation. When individuals are confronted with uncertain situations or ambiguous events, they strive to make sense of them, to understand their cause(s) and assess the need to act. In other words, they assign meaning to a situation and determine their action. As Schön (1983) explains:

In real-world practice, problems do not present themselves as givens. They must be constructed from the materials of problematic situations, which are puzzling, troubling, and uncertain. In order to convert a problematic situation to a problem, a practitioner must do a certain kind of work. He must make sense of an uncertain situation that initially makes no sense. (p.40)

Whenever we encounter an event that is surprising, puzzling, troubling, or incomprehensible, we try, more or less consciously, to interpret and assign meaning to it, that is, to make sense of the situation with which we are faced. This process of making sense involves "reciprocal interaction of information seeking, meaning ascription, and action" (Thomas et al, 1993, p.240). In the course of ascribing meaning, interpretation and explanation we typically draw from our experiences and background knowledge of the context within which the event(s) took place. We also often talk to our fellow colleagues (workers, citizens, friends), share our experiences, test assumptions and beliefs in an attempt to 'structure the unknown' and 'negotiate strangeness', thus collectively make sense of an uncertain and surprising event. Being an individual or collective process, that is, pertaining to different levels of social reality, sensemaking is fundamental for the existence and functioning of organisations, and individuals comprising them (Weick, 1995).

2.4.2 Sensemaking view of organisations

A Sensemaking view of organisations recognises that human actors create and maintain inter-subjective meanings and social order in the face of complex, uncertain

and changing environments (Cecez-Kecmanovic, 2004). As they make sense of the world around them and the events in which they participate, social actors create and negotiate their meanings. Sensemaking is both an individual and a collective activity, and separating the two is seen as a recurrent issue (Weick, 1995). The interpretation and understanding of an event or a situation – achieved either individually or collectively – is an outcome of the sensemaking process, the importance of which is usually more appreciated if it triggers or enables an action (Louis, 1980). As we come to understand organisations less as rational, formal systems with tightly controlled structures (such as those described by Weber, 1978), and more as open, loosely coupled systems, comprising coalitions of shifting interests and groups that interact with their environment (Scott, 1987), we recognise more uncertainty and ambiguity, and consequently put more emphasis on sensemaking.

That sensemaking is essential for organising is nicely expressed by Weick:

“Both organizations and sensemaking processes are cut from the same cloth. To organize is to impose order, counteract deviations, simplify, and connect, and the same holds true when people try to make sense” (1995, p. 82).

Whilst the exploration of sensemaking processes in organisations has a long history¹, no theory of organisation exists that is explicitly founded upon the Sensemaking paradigm. Nevertheless, Weick argues that “there are ways to talk about organisation that allow for sensemaking to be a central activity in the organisation and the environment it confronts” (1995, p. 69).

In this thesis, I will adopt a more elaborate perspective of sensemaking in organisations, based on Wiley’s (1988, 1994) *theory of semiotic self* and Weick’s (1995) subsequent interpretation of this theory (described and extended by Cecez-Kecmanovic, 2000, 2004, 2005). This Sensemaking view of organisations identifies four distinct modes of sensemaking that correspond to different symbolic levels of self, or in Wiley’s words, different “upward reductions of self” (1998).

¹ See a brief summary of historical roots in Weick (1995, pp. 64-69).

Intra-subjective sensemaking refers to an individual (self, actor, subject) who makes sense of events and situations, work practices and conditions, an organisation and its environment, policies, decisions, etc. An individual has thoughts, beliefs, feelings, desires, intentions, knowledge, skills and skills that determine how she or he makes sense. This level of sensemaking is called intra-subjective as “meaning is within the self, and the subject is, by definition, fully present” (Wiley, 1994, p. 154). However, as an individual interacts with others and socialises in an organisational context his or her intra-subjective sensemaking is not an isolated, solitary process but one that draws from and is embedded in the sensemaking processes of others. Intra-subjective sensemaking relates to an individual who acquires and interprets information, learns from past experiences and newly acquired knowledge to make sense of the world, as well as acting and interacting within it.

Inter-subjective sensemaking involves individuals (actors) who via social interaction share their experiences and interpretations, thus co-creating collective and inter-subjective meanings of events and situations, based on which they may take joint or coordinated actions. Inter-subjective meanings emerge from a group of individuals via social interaction when

“[Individual] thoughts, feelings, and intentions are merged or synthesized into conversations during which the self gets transformed from *I* to *we* ... where a *level of social reality* forms, which consists of an inter-subject, or joined subject or merged subject” (Weick, 1995, p. 71; emphasis in the original).

At this inter-subjective or collective sensemaking level “the meaning is not within but between and among selves” (Wiley, 1994, p.154). Many social theories pertain to this level of sensemaking. For instance, inter-subjective or collective sensemaking is related to the notion of ‘communities of practice’ as defined by Lave and Wenger (1991) and applied in an organisational context by Brown and Duguid (1991). Groups of interdependent participants engaged in common work practices share a social context that helps them develop shared identities. “Members of such groups collectively develop an outlook on work and the world that may reflect the organisation as a whole, but will most intensely reflect the local community” (Brown

and Duguid, 2001; p.202). This suggests that inter-subjective or collective sensemaking not only results from a particular group's social interaction, but also from the broader interaction and communication within an organisation as a whole, thus reflecting organisational sensemaking. Similar ideas such as this are also expressed in the notion of the *collective mind*, as defined by Weick and Roberts (1993), discussed above.

Generic-subjective sensemaking involves the creation and maintenance of generic meanings shared by members of an organisation. Inter-subjective meanings, continuously created via social interaction, are synthesised into generic meanings and subsequently transferred to other actors who did not necessarily participate in their creation. Generic meanings are, for instance, related to roles, norms and rules, administrative and control systems, decision-making processes, strategies, policies, standards, and the like. Generic-subjective sensemaking emerges at the level of social structure, resulting from a shift of "inter-subjectivity to generic subjectivity" (Weick, 1995, p. 71). At the level of social structure and generic subjectivity "concrete human beings, subjects, are no longer present. Selves are left behind at the interactive level. Social structure implies a generic self, an interchangeable part – as filler of roles and follower of rules – but not concrete, individualised selves" (Wiley, 1988, p. 258). An 'organised self' is composed of common attitudes, norms, and institutions that an individual internalises into his or her own conduct. The concepts used to describe organisations at this level are social structures or the collective consciousness (Durkheim, 1934, 1970), collective agents and role holders (Wiley, 1994), roles, norms and rules, control systems, patterns of activities or actions, and scripts or standard plots (Barley, 1986). IS that automate and support business processes typically implement a particular model of these processes, including policies, structures, norms and rules how they should be performed. In other words, IS inscribes social structures together with the embedded generic subjective meanings. In such a way IS can be seen as reinforcing social structures, or can be intentionally deployed to change them.

Extra-subjective sensemaking refers to a symbolic reality that involves customs, norms, rituals, stories, myths, metaphors and other language forms. This *symbolic reality* falls under the general rubric of culture, which underpins all other sensemaking levels. Culture, defined as being “composed of pure meanings, divorced from the individuals who, in any concrete meaningful act, are required to think or feel these meanings” (Wiley, 1994, p. 158) is by its nature *extra-subjective*. It provides an abstract and idealised organising framework transmitted via social interaction, including common experiences and socialisation of organisational members. Expressed in language, symbols, metaphors, and stories, culture provides a reservoir of background knowledge, both allowing and constraining the ascription of meaning and sensemaking at other levels.

The various characteristics of sensemaking at different levels within organisations are summarised in Table 2.3 below. The three levels of sensemaking above the level of individuals should be understood as different generalisations of social reality, each more distant from the individual self than the last. It has to be emphasised that all four levels of sensemaking are distinguished only in an analytical sense, however in practice they are interconnected, intertwined, mutually impacting on each other and therefore cannot be separated. Furthermore, these levels should not be seen as implying a hierarchy, only different abstractions of self that are always present, and always interacting (Wiley, 1994).

The sensemaking view of organisations enables us to understand and distinguish between specific types of sensemaking within an organisation, and also to investigate the impacts of one level of sensemaking upon another, and the resultant tensions between. For instance, the ways actors interact are determined by patterns of communication and organisational interlocking routines as part of social structure. On the other hand, actors in interaction may continuously create and recreate inter-subjective meanings so as to reproduce those routines, ensuring the prevailing social structure is maintained.

Table 2.3 Sensemaking view of organisations (Cecez-Kecmanovic 2004)

Extra-subjective sensemaking (culture level)	➤ a reservoir of meanings – tacit, taken-for-granted beliefs, assumptions, values and norms – that determines the horizon of possible understanding among organizational members. ➤ a symbolic reality expressed and transmitted through language, symbols, metaphors, rituals, stories ... that affect meanings at other levels.
Generic-subjective sensemaking (organization structure level)	➤ involves generic meanings that define social structure and ‘structuring property’ that reproduces it (Giddens, 1984). ➤ generic-subjective sensemaking is expressed through institutional roles and normative expectations, organisational design, administrative and control systems, decision-making processes, policies, reward systems, patterns of activities or actions, scripts, many of which can be encoded in information systems.
Inter-subjective sensemaking (collective level)	➤ involved in social interaction individuals interpret events and situations inter-subjectively and co-create shared meanings and collective understanding: ‘the meaning is not within but between and among selves’ (Wiley, 1994, p. 154). ➤ inter-subjective and collective sensemaking inheres in patterns of interactions or connections in the group engaged in social practice; inter-subjective sensemaking involves both shared understanding and collective identity.
Intra-subjective sensemaking (individual level)	➤ an individual makes sense of their work practices, tasks, problems, events, organization and its environment, policies, decisions, etc. , based on individual values, beliefs, knowledge, education, experiences, assumptions, feelings, interests, etc. ➤ at the individual level ‘meaning is within the self and the subject is ... fully present’ (Wiley, 1994, p. 154) and knowledge is individually owned.

Alternatively, through social interaction, new inter-subjective meanings may emerge in response to changing market conditions, for instance, which challenge rather than reproduce existing routines and structures. Whilst forms of generic subjectivity tend to order and control activities and behaviour, social interaction as a permanent source of creativity and innovation may reinforce or challenge these forms and control mechanisms. The tensions between inter-subjectivity and generic subjectivity are one of the essential processes that define an organisation (Weick, 1995).

2.5 Conclusion: IS, sensemaking, and organisational learning

Argyris’ Theories of action (1974, 1985), and especially the Theory of Organisational Learning (Argyris and Schön, 1978, 1996) together with useful extensions of these theories (Chack and Snell, 1998) provide a foundation to explore the processes by which an organisation can learn. The quest to examine how IS

impact on organisational learning extends the problem space covered by organisational learning literatures. It is not only organisational learning that is of interest, but also how changes in the informational basis of working and organising – introduced by an IS – affect or instigate organisational learning. While there were attempts to investigate this relationship in the IS literature (as presented in this chapter, e.g. Janson et al. 2007; Robey et al. 2000, Ang et al. 1997), it remains under-researched and inadequately theorised. Given the complexity and considerable time needed to implement IS, further in-depth and longitudinal studies are called for to enable deeper and more realistic empirical investigations of this relationship (Janson et al. 2007).

The brief review of the Sensemaking approach to organisations highlights interconnectedness of organising, sensemaking and learning (Weick et al. 2005). Organisations are viewed as a dynamic web of ongoing sensemaking processes that are created and recreated through the continuous and simultaneous interplay of action and reaction between the varying levels of sensemaking: the intra-subjectivity of organisational members that participate in and are recreated by continually emerging inter-subjective sensemaking; generic subjective sensemaking that tends to persist and resist changes often emerging from inter-subjective sensemaking; and extra-subjective sensemaking that underpins and enables all other sensemaking processes (Cecez-Kecmanovic, 2004). Each sensemaking level creates a particular type of knowledge – individual, collective, organisational or cultural – that exhibits specific characteristics and sensemaking at each level draws from and uses all types of knowledge (Cecez-Kecmanovic, 2004, 2005). Similarly, acquiring knowledge and learning applies to individuals, groups and organisations as a whole (Janson et al., 2007). To understand organisational learning (both single-loop and double-loop) requires the examination of processes by which human beings make, deconstruct and remake sense (both individually and collectively) of self, their work contexts, situations and experiences, their organisation and the organisational environment. As the Sensemaking approach offers an in-depth understanding of individual, collective and organisational sensemaking and sense-‘unmaking’ as an essential ingredient of organising and learning, it seems plausible to draw from and expand on the

Sensemaking approach in conjunction with theories of organisational learning in an effort to better understand the impact of IS implementation on organisational learning.

This thesis will therefore examine the following research question:

What are the ways and mechanisms by which information systems' implementation and use engage sensemaking in organisations, and how does such engagement affect organisational learning?

This research question will be investigated based on a longitudinal case study, which seeks to examine, analyse and understand the implementation of an IS and its impact on organisational learning within a large South-East Asian bank (SEA Bank). The details of this study will be described in Chapter 3 Methodology to be presented next.

3 Research Methodology

3.1 Introduction

This chapter presents the philosophical assumptions underlying my research and provides arguments for the selection of specific research methods utilised with the ultimate goal of answering the following research question:

What are the ways and mechanisms by which information systems' implementation and use engage sensemaking in organisations, and how does such engagement affect organisational learning?

This chapter describes and justifies my choice of theoretical perspective, methodology and subsequent research methods, all selected with the express purpose of addressing this thesis' research objectives and research question.

3.2 Theoretical Grounding

Drawing from Crotty's (1998) discussion of the foundations of social research, I will now discuss this thesis' epistemology, theoretical perspective, methodology and research methods on which this thesis is grounded, as a justification for the methods used to address my research question and objectives.

Crotty (Ibid) states that a researcher must first acknowledge the ontology of their research, which is concerned with what we believe about the nature and existence of reality. A person's ontological assumptions guide their "way of looking at the world and making sense of it. It involves knowledge, therefore, and embodies a certain understanding of what is entailed in knowing, that is, how we know what we know" (Ibid, p.6). The two primary ontological perspectives in social research are *idealism* and *realism*. Idealists believe reality is dependent on the human psyche, and mental

structures and activities, and that as such does not exist without human awareness. In contrast, realists believe the world exists independent of human understanding. It is a belief based on reason and knowledge rather than emotion (Crotty 1998).

There are two key forms of realism – *external* realism and *internal* realism. External realism “proposes that reality exists independently of individuals, it is ‘objective’” (Nandhakumar and Jones 1997, p. 110), whereas internal realism “considers reality as an inter-subjective construction, shared between individuals” (Ibid). Internal realists hold that the world we know and refer to is empirically real but is also mind-dependent and co-created. As my research aims to investigate, understand and ultimately explain socio-technical phenomena – an IS implementation and use and the ways this implicated organisational learning – from the perspective of the sensemaking theory, my ontological assumptions are not clearly fitting within the crude realist-idealist distinction. In approaching social reality and individuals as they refer to and recreate this reality I assume that it (reality) cannot and does not exist independently of the individuals involved. In this sense mine is a non-objectivist ontology. Furthermore, I also see social reality as inter-subjectively perceived and co-constructed, which can be seen as internal realism (Nandhakumar and Jones, 1997).

The next level of theoretical abstraction is *epistemology*. Epistemology is concerned with the nature of knowledge and how valid knowledge is created (Crotty 1998). I adopt constructivist epistemology, which inhabits the general assumption that “knowledge is not disinterested, apolitical, and exclusive of affective and embodied aspects of human experience, but is in some sense ideological, political, and permeated with values” (Schwandt 1994, p. 198). Constructivism (also ‘constructionism’) is consistent with the ontological perspective of internal realism, and it explicitly rejects the predominant objectivist view in IS which assumes meaning and meaningful reality as distinct from and separate to human consciousness (Ibid). Constructivism posits that “all knowledge claims and their

evaluation take place within a conceptual framework through which the world is described and explained” (Schwandt 1994, p. 197). Meaning is not discovered, but constructed. Different people construct their meanings in different ways, since it is a product of one’s history, experiences, understandings, practices and language. Truth or meaning is not, therefore, an objective truth waiting to be discovered, but a direct consequence of and response to our “engagement with the realities in our world” (Crotty 1998, p. 6).

There have been many calls in the IS research literature to address the integrative nature of IS and organisational learning within real-life organisational settings. For example, Robey et al. (2000) in their review and assessment of Information Technology and Organisational Learning research argue that IT and organisational learning research streams have close conceptual links. Their review discusses the relationship between IS and organizational learning: an organisation’s capacity to learn is determined by the success of the IS that had been implemented and conversely, the success of an IS was dependent upon the organisation’s ability to learn.

It has been shown in Chapter 2 that organisational learning has been widely researched, resulting in a large number of publications in organizational studies literature. However in the IS literature organizational learning and the role of IS in enabling the learning have not been widely empirically studied. The reasons may be i) the complexity of issues related to IS implementation and its relation to organizational learning, ii) difficulties in finding an appropriate theory of organizational learning that could be extended to deal with IS phenomena, and iii) designing appropriate study and finding a research site where IS implementation and use as well as organizational learning can be studied.

It is clear that this research requires thoughtful research methods and an in-depth analysis of real-life data in order to gain a more profound understanding of the

relationship between IS and organisational learning. This combined with the use of Argyris and Schön's organizational learning theory and the sensemaking theory means the research approach and research methods need to be carefully considered and selected to ensure the research question is appropriately addressed.

3.3 Research Methods

3.3.1 Theoretical Perspective

My research design for this study is governed by the research objectives described in the previous chapter. Janesick (1999) and Cheek (1999) argue there are five principles that need to be carefully considered when developing a research design. First, the connection of the design of the empirical study to the paradigm or perspective being used; second, the materials which allow the researcher to address the problems of praxis and change; third, the target of study (who or what); fourth, the strategies of inquiry which will be used; and fifth, the preferred methods or research tools which will be used for collecting and analysing empirical materials.

Different approaches to IS research can be found in the literature. The dominant approach to IS research was the positivist approach. IS research can be classified as positivist if there is evidence of formal propositions, quantifiable measures of variables, hypothesis testing, and drawing of inferences about phenomena from a representative sample to a stated population (Orlikowski and Baroudi, 1991). The positivist approach is primarily quantitative in nature and places an emphasis on the measurement and analysis of causal relationships between variables. Proponents of positivist studies claim that their work is achieved from within a value-free framework (Denzin and Lincoln, 2000). This, of course, is not necessarily accurate. Positivist research designs place a premium on the early identification and development of a research question, a set of hypotheses, location of research sites, and development of a statement concerning sampling strategies as well as a specification of the research strategies and methods of analysis that will be

employed. Trauth (2001) argues that, given the positivist research tradition in North America, it is not surprising that early research in IS was dominated by the positivist tradition (Eisenhardt, 1989; Lee, 1989; Markus, 1983; Paré and Elam, 1997).

In the 1990's, interpretive research emerged as an important movement in IS research (Walsham, 1995), and has become a legitimate research approach in IS since. Interpretive research has been associated with qualitative research. 'Qualitative' implies an emphasis on the *qualities* of entities and the *processes* and *meanings* that are not experimentally examined or measured in terms of quantity, amount, intensity or frequency. Qualitative research concentrates on the socially constructed nature of reality, in some cases even the intimate relationship between the researcher and the research subject and the situational constraints that shape inquiry. Furthermore, qualitative research recognises the value-laden nature of (any) inquiry, and the ways in which social experience is both created and given meaning.

As my theoretical perspective is embedded in the constructivist epistemology, subsequently this informs my choice of research methodology and methods. Different theoretical perspectives imply different ways of researching the world, and the constructivist epistemology embodies several theoretical perspectives. I have chosen interpretivism as my research approach because it assumes human or social actions are inherently meaningful, and in order to grasp the meaning of an action a researcher needs to understand and interpret what the action means, and what it does in the given context (Schwandt 1994). To achieve these interpretive goals researchers conduct "the systematic analysis of socially meaningful action through the direct detailed observation of people in natural settings in order to arrive at understandings and interpretations of how people create and maintain their social world" (Neuman 2003, p. 62). Since my research aims to garner an understanding of the thoughts and actions by individuals and groups in organisational and social contexts, with the goal of attaining deep insights into IS phenomena and organisational learning, an interpretive field study is the preferred method.

Klein and Myers (1999) proposed a set of principles for conducting and evaluating interpretive field studies in IS. I will now briefly discuss these principles, as they are relevant for my own research, and achieving authenticity and rigour in this thesis.

The first principle is “the fundamental principle of the hermeneutic circle” (p. 71) which states that an understanding of the complex whole (a text) is developed from an understanding of its individual parts and that the understanding of the parts is further improved by increased understanding of the whole. The second principle is the “principle of contextualisation” (p. 73), which recognises the inevitable differences between the understanding of the interpreter and the understanding of the author. This difference should not be ignored, but accepted, with the aim being to seek meaning in the context. The third principle is the “principle of interaction between the researcher(s) and the subjects ... [which] requires the researcher to place himself or herself and the subjects into a historical perspective” (p. 74). That is, the ‘facts’ of the situation are produced through the human interaction inherent in social research. Fourth is the “principle of abstraction and generalisation” (p. 75). Klein and Myers state that in interpretive research,

Theory plays a crucial role ... and clearly distinguishes it from just anecdotes. However, theory is used in a different way than is common in positivist research; interpretive researchers are not so interested in ‘falsifying’ theories as in using theory as a ‘sensitizing device’ to view the world in a certain way (Ibid).

The fifth principle is that of “dialogical reasoning” (p. 76) which requires the researcher to confront and acknowledge his or her prejudices that guided the original research design; and sixth is the “principle of multiple interpretations [which] requires the researcher to examine the influence that the social context has upon the actions under study by seeking out and documenting multiple viewpoints along with reasons for them” (p. 77). Finally, the seventh principle is “the principle of suspicion” (Ibid) which encourages researchers to:

‘Read’ the social world behind the words of the actors, a social world that is characterized by power structures, vested interests, and limited resources to meet the goals of various actors who construct and enact this social world (Ibid).

These seven principles are dependent upon one another, each adding to the overall cogency, trustworthiness and plausibility of interpretive research cases, and should be incorporated into all interpretive works. With these principles in mind, I will now discuss the details of my research design, which has been informed by internal realist ontology, constructivist epistemology and interpretive theoretical perspective.

3.3.2 Case Study Research

Due to the exploratory nature of sensemaking theory and the revelatory objectives of this thesis, I have chosen an interpretive *case study* as my primary research strategy. A case study examines a phenomenon in its natural setting through interviews, direct observation, the analysis of documentation and archival records, and the examination of physical artefacts (Benbasat et al. 1987). Because my research aims to develop a rich, contextual understanding of how IS influence organisational learning, I judged a case study was the appropriate method as it allows a focus on the “sticky, practice-based problems where the experiences of the actors are important and the context of action is critical” (Bonoma 1985, cited in Benbasat et al. 1987, p. 369).

Interpretive case study research complements both the research objectives and theoretical grounding of this research. Firstly, interpretive case studies allow for the construction of meaning through the direct engagement between the researcher and the research subjects who experienced first-hand the situation being investigated. Secondly, it achieves a rich understanding of the complex nature of how new IS implementation and use prevent or produce organisational learning necessitates that the study is conducted within its natural setting, which further justifies the choice and appropriateness of a case study strategy.

The case selection focus was IS implementation project, which had recently been completed or was in the final stages of development, and which also exemplified the relationships with organizational learning. There needed to be a certain level of risk and complexity inherent in the project such that a degree of richness in data could be assured (Neuman 2003). The practicality of gaining access to a company and its sensitive projects was another big issue. After numerous attempts to get access to various companies and discussions about the prospective IS projects I have chosen a large bank in South-East Asia called here South-East Asia Bank (SEA Bank). SEA Bank was selected due to its IT strategy and innovative use of IS to undertake transformation of its business processes. The opportunity to conduct my research within SEA Bank was also advantageous in that I was familiar with the environment, local culture and language, which added an extra dimension of richness to my analysis.

Before I commenced my study and the formal data collection, I held several preliminary interviews with senior managers within the SEA Bank to determine which project would be the most appropriate to investigate given the objectives and nature of my research. I have chosen the case of an IS development and implementation for loan approval processes for small to medium size enterprises, as the most important IS projects within the Bank at the time. Importantly, I've got the necessary approval to conduct a longitudinal case study on this project by the Bank's top management.

3.3.3 SEA Bank: The Case Company

SEA bank is one of the largest banks in South-East Asia, with more than twenty two thousand employees (SEA Bank Annual Report, 2002). The Bank operates twelve Regional Offices and a total of more than six hundred Branches with fifteen Divisional Offices in Head Office. The Bank has one of the most sophisticated IT support systems in the industry and in 2003 SEA Bank's annual budget for IT/IS investment was more than \$50 million (USD). Currently the Bank has more than

eight million customers, with daily transactions amounting to more than \$2.5 million (USD).

For several years SEA Bank has been a leader in transaction banking. Historically, a large local business group formed SEA BANK in 1957. There were many companies within the group, which formed one of the largest conglomerate businesses in the country and the Bank's loan business mainly involved financing business partners within the conglomerate.

After the 1997 Asian Economic Crisis, the business group within which SEA Bank operated lost its control and ownership of the Bank. In 2002 SEA Bank changed ownership, and subsequently became a publicly listed company. Although SEA Bank had sophisticated funds and transactional business processes, senior management became aware that they needed to improve other aspects of their business if they were to strengthen their current role as a financial intermediary. In this respect they wanted to continue to expand their loan business while reducing their reliance on the investment in government bonds, which had become necessary after the Asian Economic Crisis. In 2002 the total debt in government bonds for all banks was the 2007 equivalent of \$9 billion¹. SEA Bank needed to expand its loan business to reduce investment in government bonds.

This need was first addressed through a change in corporate strategy. As SEA Bank wanted to assume a more prominent role as a financial intermediary, this required the development of a coherent strategy for credit growth and asset expansion. Historically they knew there were certain weaknesses that needed to be addressed before this goal could be achieved. In order to acquire the skills and technology necessary, SEA Bank forged a collaborative and strategic agreement with a large European bank, Euro Bank (EB). EB was contracted to provide risk management

¹ All loan amounts calculated in this thesis are the equivalent of Australian dollars, valued using a 2002 exchange rate

advisory and technical services to the SEA Bank. This collaboration commenced in June 2002 for a one-year term. SEA Bank hoped that this collaboration would help yield growth in loan business, which traditionally was not their strength.

The collaboration with EB in 2002 resulted in a concerted effort to launch an ambitious two-year program aimed at improving and strengthening risk management practices, including infrastructure and capabilities in the SEA Bank. The goal was to raise SEA Bank's risk management practices to the level of international best practice. They needed to do this in order to prepare for the implementation of new Central Bank regulations to be based on the Basel II Accord².

Based on Basel II Accord, EB proposed the most important features for loan risk management: Firstly, the introduction of the 'four eyes' principle, or segregation between the loan origination and credit approval functions across their entire loan portfolio. This separation was being implemented in stages and was expected to be in place throughout SEA Bank by the year-end of 2004. Second was the introduction of the Credit Risk Scoring System, which was introduced and built into the newly proposed Loan Application Information System (LAIS). The SEA Bank believed that the implementation of LAIS and subsequent segregation of responsibility for loan origination and credit approval would allow the simultaneous expansion of the Bank's loan portfolio while minimising risk and developing independence and reliability in the loan approval process.

SEA Bank's loan portfolio at the time broadly consisted of three different categories. In the first category, *corporate* loans (equal to or greater than \$10 million), the 'four

² Basel II Accords are recommendations on banking laws and regulations issued by the Basel Committee on Banking Supervision. The purpose of Basel II is to create an international standard that banking regulators can use when creating regulations about how much capital banks need to put aside to guard against the types of financial and operational risks banks face. The final version of Basel II includes: Ensuring that capital allocation is more risk sensitive; Separating operational risk from credit risk, and quantifying both; Attempting to align economic and regulatory capital more closely to reduce the scope for regulatory arbitrage. (Basel Committee on Banking Supervision, July 2006 revision)

eyes' principle was implemented by fully separating the marketing and loan approval processing functions. The second category of loans, *commercial* loans (less than \$10 million but greater than \$1 million), it implemented the 'four eyes' principle by separating the origination and loan analysis function. Loan origination was conducted at the Branch level, and loan analysis was conducted at newly formed and specialised Region Credit Centres (RCC), which were decentralised and segregated from the Branches. The third type of loans, SME (Small-to-Medium Enterprises) Loans are loans up to the amount of \$1 million. For SME loans, credit analysis and loan origination are both conducted at the Branch level. The 'four eyes' principle was introduced through a new credit risk scoring system, which was built into LAIS, the new system used for SME credit analysis. LAIS was implemented at the level of SME loans because the SEA Bank recognised these loans as having the greatest potential for growth within the Bank.

LAIS had two major functions: it was both a decision support tool and a risk assessment tool. The overarching objective of LAIS was to speed up the SME loan approval process whilst simultaneously enforcing the 'four eyes' principle. The original version of LAIS started as a simple Microsoft Excel-based tool, which was implemented on stand alone PCs within SEA Bank. Over time, and through collaboration with SEA Bank, EB further developed and expanded upon the initial prototype and developed several versions of LAIS. Version 1 failed in implementation and had to be reworked to produce version 2. Although version 2 still had many problems that needed to be resolved, SEA Bank staff used it while EB made further improvements and enhancements based on their requirements. These improvements were released as sub-versions of version 2, which ultimately led to version 3. This process continued, resulting in LAIS version 4, which was the final version of LAIS developed by EB. At this stage the collaborative relationship between EB and SEA Bank ended, and SEA Bank's internal IT Division took on the responsibility of LAIS and its future development, which included a web-based version of the system in addition to an all-encompassing loan management system.

3.3.4 Data Collection and Analysis

They study of the LAIS development and implementation took overall two years. First I collected documents about the Bank and its LAIS project. Then I got the permission to visit the Bank and conduct a field study. My field study involved several visits. The first visit was undertaken from May-July 2003 and the second from April-May 2004. I also conducted a short site visit in December 2004 to collect internal SEA Bank data summaries and reports detailing the results of the LAIS implementation.

During my field study I collected empirical data in the form of:

- semi-structured interviews (52 in total),
- informal conversations with various managers and staff members,
- relevant documentation (Annual reports, User manuals, Risk Management Advisory documentation, Project documentation, etc.)
- notes from the formal meetings I attended, and
- notes from my personal observations during the visits.

My most important source of data, however, was the 52 interviews I conducted and transcribed in the local language totalling 1,050 pages. My data collection was also aided by the fact that I had the full support of SEA Bank's Vice-President, who arranged for his assistant to organise meetings and interviews with various staff members throughout the Bank. The Vice-President's support meant I received high levels of cooperation from research participants.

I conducted interviews with participants from three Regions – Regions A, B and C – however not all interviews were relevant to my research. I was also able to collect SEA Bank's Annual Reports for 2002 and 2003, the user manual for the old system (DLAS) that was ultimately replaced by LAIS, versions 1, 2, 3, and 4 of LAIS

developed by EB, EB's Risk Management Advisory documentation used during SEA Bank's conversion to LAIS, Project documentation for the Web-based LAIS, SEA Bank's LAIS progress reports and reporting outputs from both LAIS and DLAS. Table 3.1 details the data collection timeline and Table A1 details the interviews undertaken with SEA Bank participants; see Appendix A1.

After transcribing interviews in their original language I commenced data analysis. The analysis technique I used was thematic analysis (Neuman, 2006). The first stage of data analysis can be named an intuitive 'open-coding'. It was open and intuitive because I selected interesting ideas, concepts and themes irrespective of any particular theory or framework. However, I was guided by my objective to understand LAIS implementation and use as well as to explain how LAIS implementation and use affected organizational learning. Given that I did complete my literature review, I was aware that it was inevitable that my open coding was necessarily sensitized by the theories I studied. Nevertheless I remained open to interesting ideas and concepts that would have not been selected had I conducted my coding as a 'theory-based' coding.

Table 3.1 LAIS implementation timetable and the researcher involvement in the case study

Index	Date	LAIS implementation	Researcher Involvement in the empirical field study
1	June 2002	SEA Bank launch a two year risk management project and sign a one year collaboration with EB	
2	September 2002	EB propose a LRSS (Loan Risk Scoring System) and the “four eyes” principle implementation	
3	November-December 2002	EB develop the prototype of LAIS, the first prototype system was based on the conceptual model of LRSS and the “four eyes” principle Head Office presents LAIS to the major Regional Offices and Branch Managers for feedback Head office starts building the Regional Credit Center (RCC) in Region A	I approached SEA Bank with the possibility of conducting case study research at the Bank
4	January 2003	The LAIS prototype was tested at Head Office and 4 major Regional Offices Head Office decides to run a LAIS pilot project in Region A (with 14 Main Branches and 63 smaller Branches) The Bank forms a project team to function as the RCC in Region A	My application to undertake case study research within SEA Bank was approved by the Bank's Vice-President
5.	February 2003	Introduction LAIS version 1 within Region A LAIS Version 1 deemed not good enough for implementation	Timetable for initial interview determined
6	March- April 2003	EB improves LAIS and launches version 2	Approval received from the University to undertake a two-month offshore case study
7	May 2003	Implementation of the LAIS version 2 in Region A	May 2003 – July 2003 Conducted preliminary interviews at SEA Bank Head Office Selected the LAIS project as the focus of my case study research
8	June- July 2003	Preparation for the implementation of LAIS in Region B (with 12 main branches and 52 smaller branches)	Conducted interviews and field research in Region A Attended Company meetings, including the Annual Shareholder meeting Collected relevant documentation (both paper-based and electronic) Observed work practices of SEA Bank staff
9	August - September 2003	Implementation of the LAIS version 3 Region B	

Index	Date	LAIS implementation	Researcher Involvement in the empirical field study
10	September-October 2003	Implementation of LAIS version 3 in Region C	
10	January 2004	Implementation of LAIS version 4 in Regions A, B and C	
11	February-April 2004	Pilot implementation of web-based LAIS in Region C	February 2004 – April 2004 Conducted interviews and field research in Regions A, B and C Attended Company meetings Collected relevant documentation (both paper-based and electronic) Observed work practices of SEA Bank staff
12	December 2004		Conducted a final interview with the LAIS Project Manager at Head Office Obtained relevant documentation (both paper-based and electronic)

Open coding involved reading through printed copies of interview transcripts and documents in their original language, highlighting interesting texts and comments made by the interviewees, and tentatively classifying them under ad hoc categories or 'codes'. As my coding progressed I needed to define new codes and redefined existing codes. I also had to create relationship between codes as some form tree structures. These codes included, for example, 'Work environment', 'Problem with the Account officer role', 'Learning and adapting to LAIS', 'Quality Group Meetings', 'New ideas and concepts' and 'Mindset change and metaphor', among others. In the early stages of coding I used QSR NVIVO (version 7) that enabled me to create my code structure and connect codes with texts from my empirical data. My later stage included formulation of major themes (categories) from the codes, for which I used Mindjet MindManager 6. The end result was 66 pages of coded quotes (identified by themes, codes and sub-codes). These quotes were then translated into English. Although this process sounds straightforward, it was iterative, extremely complex and time-consuming. Coding was not a linear process, and as my understanding of the situation grew, the codes, sub-codes and categories were constantly revised and reorganised until a satisfactory representation was reached.

Once this had been completed, I began my first-level analysis. This involved telling the 'story' of the implementation and use of LAIS using the words and perceptions of the SEA Bank staff and managers involved. This practice of telling the story from the point of view of the people studied, using their 'voices', is commonly referred to as first-level analysis. My retelling of this story relied mostly on the views of the participants and facts from documents, so as to ensure validity and authenticity of the narrative. Through this retelling, key concepts, events and issues were further elucidated, which served to once again advance my own understanding of the events that had unfolded during the implementation and use of LAIS. This understanding informed my second-level analysis or theory-based interpretation, which involved using theories of organizational learning and the sensemaking view of organizations to reinterpret the empirical data – participants' views, documents and events.

I approached my theoretical interpretation by first identifying the timeline of the LAIS implementation and the key points that were for whatever reason relevant to the issue of organisational learning. Specifically I was interested in each case of LAIS implementation and use (in different regions) to determine when account officers started actually using LAIS and changing their behaviour. This was an indication that LAIS started to impact on their learning, which first showed characteristics of the single-loop learning. Furthermore, I searched for signs of changing mind sets and double-loop learning resulting from LAIS use. In such a way I identified the events and evidence showing LAIS' effects on organizational learning. This then needed to be explained. By using the sensemaking theory of organising I interpreted the sensemaking processes during LAIS implementation and use resulting in the emergence of organizational learning. Such theory based interpretation enabled me to develop my own theoretical explanation of how individuals and groups engaged in intra-subjective, extra-subjective, generic-subjective and extra-subjective (or cultural) sensemaking that in turn affected organizational learning during the implementation and use of LAIS.

3.4 Limitations

There are limitations to all research projects, and these arise, in part, from the methodology selected and limited resources available to any research. A common limitation to all research is the possibility of researcher bias contaminating the data collection and analysis phases. Although I attempted to control for this, I might still have been influenced to some degree by my own biases. Shipman (1981) observed that because researchers are human, they are involved in the interpretation of the actions they study and cannot part themselves from their observations. Shipman (cited in Farmbry, 1999, p.48) notes:

Consciously or not, they [researchers] also interpret the events they are observing. In their field work they have to interpret and record the action, and particularly the language of those being investigated. This means getting to know the conventions of the group in order to understand the meanings they are giving to situation. The interpretation involves both the use of language and of everyday meanings. In many

cases, it means interpreting what the subjects of the investigation meant, or what those who reported the behaviour of others meant. Just as the historian is necessarily involved in assessing the real meaning of documentary evidence from another age, so the social scientist is involved in sorting out the meaning of what has been seen, written, or said. Both have to ask about the meaning to the person being studied, to others who collect the information together, and to themselves as they sort it out in a meaningful way. At each stage, a person involved in one culture, one class, one period of time, may have to give meaning to words spoken by people in others (p.32)

As I conducted the field study in my native language and in a cultural and social context I was familiar with, I would consider that my ability to understand the people I studied was superior compared to somebody coming from different culture and language. However, I faced the problem of translating the meanings into English, and presenting situations and events in a way comprehensible by a western reader. This was a challenge for me and in my view was a major limitation of my work.

Being trained to conduct an interpretivist study I developed and incorporated precautionary measures to maximise objectivity, and minimise my own influence on the data I gathered by following Klein and Myers' 'principle of suspicion' (1999). Despite this, however, some subjectivity remained. It is part of the nature of interpretive research and needs to be acknowledged.

The second potential limitation also arose from the nature of interpretativism. As Burrell and Morgan (1979) argue, interpretivism suffers to a degree from a phenomenon of ontological fluctuation, and this phenomenon is common in hermeneutical and phenomenological research works. Farmbry (1999) argues that theorists who work in these areas frequently:

...stress a highly subjective stance which denies the existence of social structures and concrete social reality of any form. Yet the attempt to operationalize their ideas within an empirical context frequently leads them to admit a more realist form of ontology through the back door...(O)ntological oscillation is prevalent in all forms

of phenomenological sociology which attempt to illustrate its basic propositions through the empirical study of situations drawn from everyday life (Burrell and Morgan, 1979, p. 266).

This occurrence, while difficult to manage, was accounted for in ‘the fundamental principle of hermeneutic circle’ and ‘the principle of interaction between the researchers and the subjects’ (Klein and Myers, 1999). These provided me with a framework for understanding the existence of social structures and reality in the field study. My internal realist view was constantly questioned as I encountered different views and judgements of the same events, different social constructions of reality in different regions. Going through hermeneutical circle though helped to improve my understanding and reaching sufficiently convincing explanation.

Validity and reliability aspects of research are also important issues to plan for. Kiddler (1981) identifies four aspects of validity and reliability to be considered during research design – construct validity, internal validity, external validity, and reliability – appropriate for positivist, quantitative studies. Instead I used Yin’s (1994) approaches to address these issues and examine and ‘test’ the validity and reliability of this research.

Construct validity consists of establishing operational procedures for the concepts being studied. I used the approach of obtaining multiple sources of evidence and creating a tracking mechanism to keep accurate records of the chains of evidence. I also used key employees who took part in interviews to review drafts of my initial transcriptions. Internal validity is primarily concerned with causal effects within a study, and with enabling the researcher to make valid inferences. I used hermeneutic circle as a way of achieving internal validity and ensuring that my inductive development of theoretical explanation were valid.

To ensure external validity and reliability in interpretive and qualitative research requires a different approach to quantitative and positivist research. In the case of positivism and quantitative research, it is important that the research findings are repeatable ('reliability') and that the conclusions of research can be generalized ('external validity') to the population studied (based on the investigation of a sample). However, the main purpose of my interpretive and qualitative approach is to obtain an in-depth understanding of a single case, an organisation and a project, and to develop a theory or theoretical explanation of the case. In my case, I aimed to develop a rich understanding of the LAIS implementation and use and how it affected organizational learning; I also developed a theoretical explanation how this happened. Uniqueness of this case (like any other case) in principle limits the developed theory to the case – this is why it is called a substantive theory. However, as Yin (1994) argued, a theoretical generalization is possible from a single case study. I could see LAIS as a type of IS, as well as events and situations encountered in its implementation and use as types of events and situations, and then draw some tentative generalizations. By identifying patterns in learning processes in the three regions (the sequence of types of learning emerging) and by interpreting the nature of learning, organizing and sensemaking in each type of learning, I was able to draw some more general conclusions about the relationship between IS implementation and organizational learning. In such a way I was able to theoretically generalize and propose some knowledge claims applicable beyond the case. These claims can and should then be further tested in case studies or survey-based studies. To achieve this I followed the 'principle of abstraction and generalisation', the 'principle of dialogical reasoning', and the 'principle of multiple interpretations', as formulated by Klein and Myers (1999).

3.5 Ethical Issues

My research received ethical clearance from the University Human Research Ethics Committee prior to proceeding with the research project. In my study I followed the ethical principles of integrity, respect for persons, beneficence and justice. I also

signed a Confidentiality Agreement with the Case Company and complied with both the Company's and the Central Bank's confidentiality regulations. All interview participants agreed to their comments being used in the study by signing an Individual Consent form from the University. I obtained the permission of each individual participant to take part in the research, record interviews and use their comments in this thesis. All participants were informed about the purpose, methods, demands, possible outcomes, probable consequences and reporting procedures involved in this research, as well as the voluntary nature and confidentiality of their involvement. Only those employees who were comfortable with face-to-face interviews were interviewed. I was always sensitive to the potential discomfort of the interviewees, and ensured that negative consequences did not occur. Due to nature of this research, interviewees were not selected on the basis of race, age, sex, disability or spiritual beliefs, but on their specific role within the Company and their involvement in the case project.

With regard to the Company, the Case Study relates to a commercial project, which will not reach completion until 2009. Although the data in the thesis has been de-identified, and pseudo names have been used consistently, the Bank could be easily identified by knowledgeable readers. Because of this, and as there are sensitive data contained within the thesis, which could have negative commercial implications for the Bank, access to this thesis will be restricted until the case project has been completed by the end of 2009.

3.6 Conclusion

This Chapter has stated my underlying ontology and epistemology, and justified my choices of theoretical perspective, research methodology and data analysis methods. These choices were made with the intent of answering this thesis' research questions, and have been justified by my research objectives, the existing theoretical and substantive literature in the field of IS and the history and background of the Case Company. This Chapter has also made transparent my data gathering and analysis

techniques, which involved interviews, observation and document analysis. Although this research has its limitations, I have argued that in the context of the situation, these limitations were unavoidable; however it is imperative they are recognised such that this thesis' audience has an adequate understanding of this thesis' results and conclusions. The results from the first level analysis of this study will be described in Chapter 4 to be presented next.

4 Findings

4.1 Introduction

This chapter tells the story of the implementation and use of LAIS as seen through the eyes of the research participants. I will firstly present the background of LAIS, including the factors contributing to its initiation, subsequent development and its ultimate implementation within SEA Bank. I will then present the implementation strategy used, and the impact this strategy had upon the Company's employees, organisational structure, work practices, productivity and market presence, as perceived by the research participants and expressed in the official SEA Bank presentations and documentation. Specifically, this chapter presents the above detail in narrative form, retelling the story through the eyes of the participants by following the implementation of LAIS in three separate Regions, and discussing the results of each Region in turn.

4.2 Background to the Case

The SEA Bank is a large South East Asian bank that is a market leader in transactional business, being awarded *Best Retail Bank* by the Asian Bankers' Club for the four-year period spanning 2003 to 2006. Despite this, SEA Bank's lending and credit processes were unsophisticated, unproductive and did not comply with their country's Central Bank regulations, or the Basel II Accord recommendations on banking laws and regulations issued by the Basel Committee on Banking Supervision. Darius, the National Head and General Manager of SEA Bank's IT Division explained SEA Bank's situation at the time:

If we're being honest, we're still learning at SEA Bank when it comes to loan business – it's a very new area for us. We don't really have a system to support our loan business; we don't have a sophisticated end-to-end system... What I mean by 'end-to-end' system is something to support the process from its inception, through

to the final payment of the loan and the loan's closure... Traditionally, SEA Bank has specialised in transactional banking and we are very mature in that area; however, we now want to build a presence in other areas...

Prior to the Asian Economic Crisis, the bulk of SEA Bank's loan customers were its business partners and subsidiary companies.

...Previously, SEA Bank was owned by a family, and lending during that time was decided by only a few people, most notably, the owner, and probably 80% of these loans were given to group-owned companies only. So at that time, there was no proper lending culture... (Luke, Deputy General Manager, IT Division)

After the Asian Economic Crisis, ownership of SEA Bank changed, its subsidiaries were sold off and new regulations implemented by the Government preventing the SEA Bank from lending money to its former subsidiaries and business partners (both former and current). Compounding these changes was the fact that during the first few years after the Asian Economic Crisis, SEA Bank invested most of its available funds into government bonds, and as such, it became imperative that the Bank to develop a sophisticated loan portfolio and supporting processes to cater for the new economic and financial environment, as explained by Rudi, an SME (Small-to-medium enterprises) Loans Manager within SEA Bank:

We need to be braver in giving loans because we're going to encounter a lot of problems in banking if we can't distribute loans. We all know about the government bonds. Originally, the interest rate was 12%, and we gave 8% interest back to our customers, so our profits were quite substantial. Now, however, government bond interest rates are 7%, or more accurately, 7.49% and it continues to decline ... and we can only give customers 5% interest on their deposits, whereas other banks are giving 7.25% on deposits and are making virtually no profits. So now the business of distributing loans has become very important, and SEA Bank management realises that.

Hence the SEA Bank decided to significantly enhance and expand its SME loan business as it was seen as relatively low-risk, and with the high-volume customers

had the propensity to generate significant profits, as explained by Darwin, SEA Bank's Vice President:

When it comes to corporate loans in Indonesia, we are very selective. After the Asian Economic Crisis most of the major corporations in Indonesia collapsed. The largest corporations did collapse, so in terms of corporate loans, there was no business potential in developing them any further. As a matter of fact, SME loans have the most potential for future development.

The existing system used to assess SME loan applications was the Descriptive Loan Application System (DLAS). DLAS had several limitations, as perceived by the Bank's executive:

1. It did not comply with the Central Bank's proposed new regulations or the Basel II Accord.
2. It was a descriptive system that did not rate prospective customers in a quantitative manner, but instead relied on qualitative indicators that were dependent upon the competence and rigour of the individual credit analysts assessing each application.
3. The extensive data collection for each SME loan and the descriptive nature of assessments were time consuming so a large workforce was needed for relatively small SME loan numbers approved monthly.

Due to these reasons the Bank could not expand its customer base and the SME loan business without increasing employee numbers in the loan application assessment and approval processes. The Bank however could not afford workforce expansion and also realized that the productivity in the loan assessment and approval processes had to be significantly increased. It became clear to the Bank's management that in order to be successful in their proposed SME loan business expansion the SEA Bank needed a new loan application assessment system that could support an increased volume of customers, as well as ensuring compliance with the mandates of both the Central Bank and the Basel II Accord.

The SEA Bank knew they did not have the experience necessary to design and implement an appropriate strategy to address these existing shortcomings and meet their proposed goals, so they hired new staff with experience in the area:

You can see that Tony (Chief Risk Officer), most of the senior managers in the credit divisions and I have all been recently recruited from outside SEA Bank. Currently, our main problem is that we have large amounts of government bonds. To address this, we recruited Euro Bank to help us with a new risk scoring system (Ruud, National Head of SEA Bank's Credit Division)

SEA Bank enlisted Euro Bank, one of the world leaders in global banking, to assist them in redesigning SME loan system and its risk management. Euro Bank was charged with the responsibility of redesigning SEA Bank's lending business and developing the new Loan Application Information System (LAIS), which would assess all loan applications based on a predefined and quantitative credit score. Euro Bank's mandate would be no mean feat, not least of all because it would require a huge amount of change at all levels of the Bank, as explained by Ruud, SEA Bank's National Loans Manager and Head of Credit Division:

...There is going to be a lot of change, both organisational change and a change in mindset for our staff. Account Officers will be at the forefront of this change, and I'm worried about their change in mindset. The changes will directly affect more than 1,000 staff members, and they need to learn a lot and change the way they think when it comes to using LAIS for SME loans. It will be a huge change from using DLAS, because DLAS does not take a risk management approach to loans.

Initially, Euro Bank began their development of the newly proposed system by analysing both the Bank's existing credit policy and DLAS. Based on this input, they proposed new business processes to support SME loan growth, the cornerstone of which was the 'four eyes' principle and a system of 'credit risk scoring'. The 'four eyes principle' in practice meant the separation of the credit analysis and marketing functions. It also meant the final credit decision must be performed independently, meaning the decision required agreement from both the marketing and credit analysis functions; however, both functions must be performed by separate and independent

bodies. Euro Bank also developed a new organisational structure for SEA Bank’s loan business, the cornerstone of which was Regional Credit Centres that would oversee loan assessments and approvals in the Branches. This new organisational structure is shown in Figure 4.1. The purpose of the Regional Credit Centres was to function as intermediaries between the Branches and Head Office and coordinate marketing in the regional Branches. The Branches, which before performed credit analysis and marketing functions, would now focus on marketing only and LAIS would ensure a shorter workflow than that which previously existed using DLAS (refer Figure 4.2).

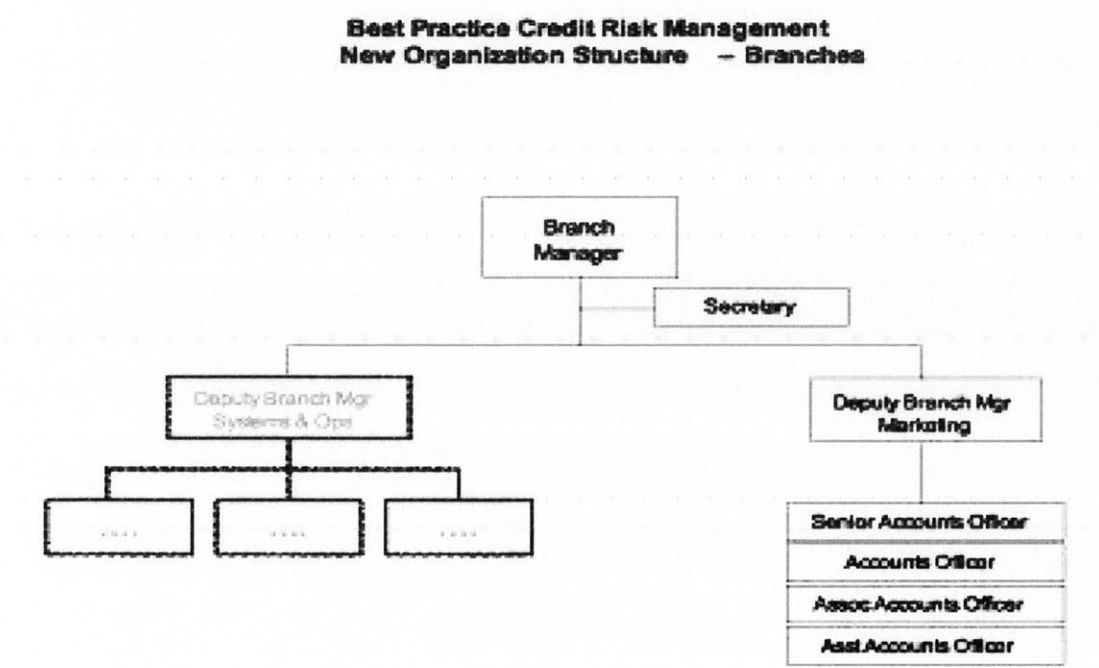


Figure 4.1 New Organisational Structure (Chart 2, p. 6 & 7, South East Asia Bank, 2004a)

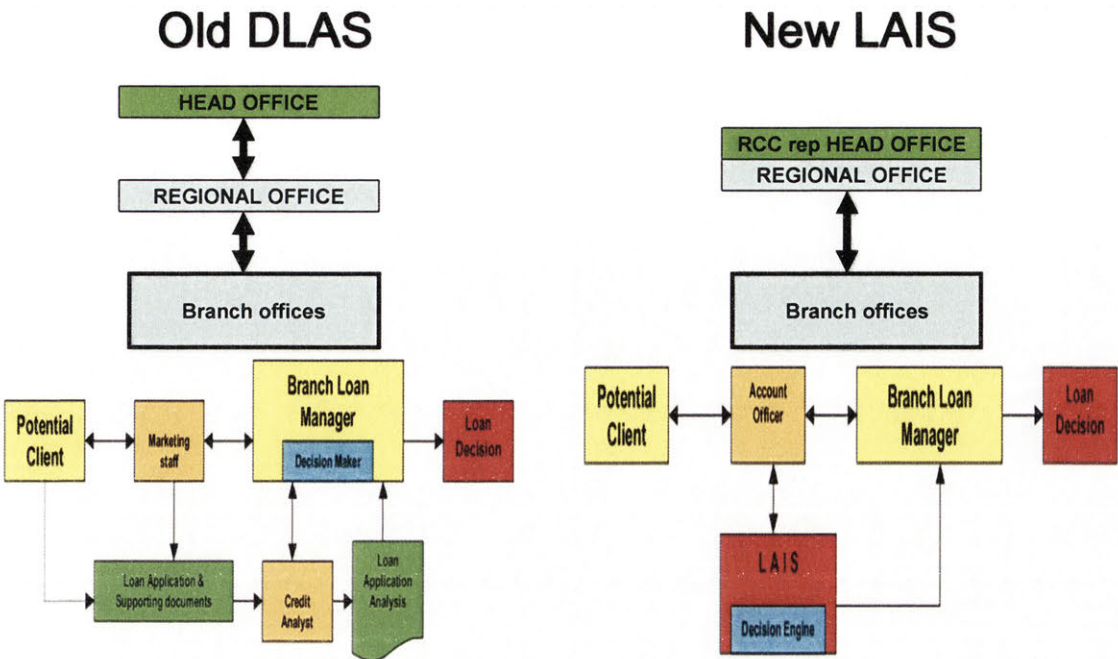


Figure 4.2 Comparison of Old DLAS vs. New LAIS Organisational Structure

Region A (and the Branch in the Alpha city) was chosen as the first Region to undergo a pilot implementation of LAIS, and Lian, SEA Bank’s National Head of SME Loans was appointed as the LAIS Project Manager. Lian explained the reasoning behind Region A’s selection for the pilot project:

In my opinion, the Alpha city branch was chosen because of its Head of Region. The Regional Heads for Alpha [Region A] and Beta [Region B] are always keen to be involved in any new projects within the Company. They accept change more easily and volunteer to test pilot projects in their Regions ... We would be in a lot of trouble if the Regional Heads didn’t accept the new system, because then the Branches would reject the new system. But when we gave our initial presentation to Mr Surya [Head of Region A], he invited all his Branch Managers to the presentation as well, and he was keen to support the new program...

As Lian also explained, since SEA Bank could not risk the failure of the LAIS project, LAIS would be implemented in Region B as soon as the implementation in Region A had been finalised:

...After Alpha, we’ll continue with Region B in Beta city because the Regional Head Mr Harson is also extremely cooperative, and he also used to be my superior.

The initial version of LAIS was developed as a simple Microsoft Excel spreadsheet. Ms Lian tested this initial version of LAIS (Version 1) with her project team at the Bank's Head Office and decided to move forward with the project. Head Office's Credit Division formed a Regional Credit Centre in Alpha city, which was headed by Andrew, a Senior Manager from within the Head Office Credit Division. SEA Bank's Senior Executive and the Board of Directors closely followed all changes undertaken in preparation for the implementation of LAIS. This pilot project was intended to set an example for the rest of the Company, and its failure would severely compromise the success of SEA Bank's intended expansion of the SME loan business.

The next stage of the pilot project implementation involved training staff in Region A, and educating them with regard to the Bank's new strategy, credit policy and information system. The first training session involved an introduction to best practice in credit risk management, the new SEA Bank organisational structure and the business processes intended to support this best practice at the Branch level. Specifically, this involved introducing staff to the new concepts of the 'four eyes principle' and 'credit risk scoring'.

After this first training, the next step was to finalise the new organisational structure required to support the new business processes. Previously, loan initiation was handled via two separate roles – the marketing staff who sought out new and managed existing customers, and the credit analysts who assessed the customers' loan applications and determined whether or not they should be granted a loan. The new organisational structure abolished these two roles and merged them into the one 'Account Officer' role. Account Officers would be responsible for seeking out and managing customers, in addition to assessing their loan application using LAIS. The point of difference, however, would be that the recommendation as to whether or not a loan application would be approved or not, would be made by the scoring engine within LAIS.

The various Branch Managers began preparing for the formation of the new Account Officers with the help of the Human Resources Department and Andrew in the Regional Credit Centre. These new Account Officers were recruited from the former Marketing and Credit Analyst roles. Once the Account Officer roles had been assigned, Ms Lian and her staff began a second round of training sessions for these new Account Officers. These training sessions encompassed the content of the first round of training; however, they also included specific LAIS training and loan assessment simulations, based on real-life data collected from the field. After this second round of training sessions, and based on the simulations undertaken during training, the new Account Officers offered valuable feedback to the LAIS developers regarding the LAIS and its weaknesses. Based on this feedback, John Chen, a Euro Bank Consultant assigned to the LAIS Project, improved and updated LAIS Version 1 to develop LAIS Version 2. Once Version 2 had been developed, Head Office formally commenced the LAIS pilot project implementation in Region A.

4.3 First Level Analysis

4.3.1 LAIS Implementation in Region A

Version 2 was finalised during February 2003, and the Alpha city pilot project commenced, with staff re-inputting all existing DLAS data into the rudimentary form of LAIS Version 2. At the same time, SEA Bank was preparing to modify the Company's organisational structure to better adapt to the LAIS implementation, that is, they were preparing to form the Alpha city Regional Credit Centre and arrange everything required to accommodate the new 'Account Officer' roles. In reality, the preparations for these organisational changes commenced in November 2002, when the initial idea to develop the SME loan business was first conceived. Andrew, second in charge of the National Credit Division in Head Office, was assigned the responsibility of ensuring the necessary organisational changes took place. From the beginning, staff experienced many problems inputting the existing customer data into LAIS. Many, especially those in the newly formed Account Officer role, resisted the system. Andrew noted:

Within my organisation, it's important that I ask people to change only a little at a time. With the new Account Officers, who work closely with the Regional Credit Centre, it's evident that while many of them are worried about their new role, some of them are actually quite happy with the change. I did a simple survey, and it appears that Credit Analysts especially are worried about approaching customers – they basically find it difficult to communicate with people because they're used to working behind a desk. Whereas the former Marketing people, although they initially had problems using LAIS, they have quickly adapted to it due to its simplicity. In the end, I have seen a transformation on both sides, but in my opinion, overall it has been easier for the former Marketing people to become Account Officers, but for the former Credit Analysts, there have been some problems and things are dependent on the individual's attitude.

The Alpha city Branch Loan Manager, Mr. Hendry, also noted the Account Officers' need to adapt to the changes in the organisation:

We need to change, and it's important that we all realise that. If the new Account Officers can't change, they'll lag behind the others, and we can't have that, although between the Account Officers there are differences – they're not all the same in terms of product knowledge, intelligence or prudence in their work. At the moment, we only have Account Officers in Alpha city. We trained them in a special training centre, and I was one of the instructors...

Despite these problems – the perceived weaknesses of LAIS and the difficulties many of the Account Officers were having adapting to the changes around them – Head Office made the decision 'go live' with the project in April 2003.

SEA Bank began implementing LAIS Version 2 in Region A on 1st May 2003. Initially, LAIS was only implemented in Region A's largest Branch in Alpha city, and over the next few months, LAIS was implemented in the other Branches. Whilst these implementations were taking place, Euro Bank was simultaneously improving LAIS Version 2, based on feedback from users in the Branches since many Account Officers felt LAIS wasn't suited to the workings of the real world. They felt they were being forced to use a system in which they had no confidence, as explained by Sian, an Account Officer in Region A:

I only use LAIS because I've been told I have to use it. But to be honest, I don't believe in it. How is it possible to evaluate client loan applications using this very simple analysis? I used to do far more rigorous analyses on these applications, and now I'm being asked to take responsibility for decisions made by a system I do not agree with. So now, we have implemented LAIS, and we use it, but we continue to use our old, manual DLAS to support its results. And I was told to do this by our Branch Credit Manager, and the Senior Account Officers.

Mrs Sian also noted that she did not agree with the level of detail with which LAIS examined loan applications:

I would always look at the company's bank account activity over the last three months, and it gave me the confidence I needed to either approve or reject an application. ... Using the new system, LAIS still examines all these points ... but not with the same level of detail. LAIS uses colours – white, grey and black – to signal whether or not a loan has been approved. If the result is white, then the loan is approved. But if I look at the last three months of bank account activity, as I used to do with DLAS, I might not feel comfortable approving the loan, and would investigate the company further... and this is one of the main differences between DLAS and LAIS.

Although the Branch Manager in Alpha city supported the new system, he made the decision to continue using DLAS simultaneously with the new LAIS because the Account Officers were having problems understanding how to use the new system. Despite the perception from Account Officers that LAIS *hindered* their ability to work, Mr Surya, Head of Region A, believed LAIS was developed to *support* the processing of SME loan applications, since these loans are considered 'straightforward' anyway, requiring 100% or more collateral to be approved:

...Our staff, the newly formed Account Officers, used to process SME loans extremely rigorously using DLAS, but they didn't understand the nature of SME loans, which requires that the customer provides at least 100% collateral. As Mr Smith [SEA bank's CEO] has told us on several occasions, [Account Officers dealing with] SME loans are like general practitioners treating a common illness, and we don't need a specialist doctor to treat a common illness. SME loans are not complex, so LAIS is a good solution to the problem.

The Account Officers still felt LAIS was inadequate and too simplistic a tool to aid them in their decision-making process. This, they felt, was especially true when the oversimplified LAIS was compared to the extremely comprehensive DLAS. Sian also noted:

When I was using DLAS as a Credit Analyst, I found it to be very comprehensive. It detailed an SME's business activity, the raw materials, suppliers, telephone number, payment terms, production reserves, operational budgets and revenues. So in DLAS, we could see everything – we had the whole picture. But if we look at LAIS, it is not as comprehensive. ... When making a decision using DLAS, we could see the detail behind everything. How healthy is the business? How much is the mortgage value? What is their credit history? How much income do they earn? What is their bank account activity for the last three months? ... Using the new system, LAIS still examines all these points ... but not with the same level of detail. LAIS uses colours – white, grey and black – to signal whether or not a loan has been approved. If the result is white, then the loan is approved. But if I look at the last three months of bank account activity, as I used to do with DLAS, I might not feel comfortable approving the loan, and would investigate the company further. But in LAIS, only the average monthly activity is analysed, and this is one of the main difference between DLAS and LAIS.

The Account Officers wanted a system that would improve their productivity, but without compromising their decision-making abilities, but they weren't convinced that LAIS could achieve these goals. Agustinus, a Senior Account Officer expressed concerns that quality in the decision-making process was being sacrificed in the name of speed:

When I look at the new system from Euro Bank, my wish is that we can complete our work more quickly so we remain competitive with the other banks. That is what I want. Secondly, I want accuracy. When we make decisions with the new system they need to be prudent. This depends on the new system and the skill of the Credit Analyst, because any loan is risky. ... Now that we've started using LAIS, we need to adjust the way we do things. LAIS is faster, but in terms of making good decisions it is lacking something. Management wants to achieve higher turnover and process more loans ... and I understand we are being pushed in that direction, but it is my hope that the quality of the decision-making process is not ignored. ... I can see the Board of Directors' point of view in wanting to increase turnover, but in the

field we still need to consider loan quality. So my wish is that the loan approval process is quick, but that we remember to guard our risks as well, because we don't want any increase in our non-performance loans. Let's look at it this way: non-performance loans can't be any higher than 3%. Even the Central Bank limit is 5%, but our Bank has always been very cautious. This is our wish.

Contrary to the Account Officers' view, the Regional Credit Centre never viewed LAIS as too simplistic a tool to process SME loans, and they did not feel they were sacrificing quality and prudence in their decision-making process when they replaced DLAS with LAIS. Andrew responded to the Account Officers' concerns as follows:

Is this [view that quality is being sacrificed] coming from the Branches? I think it depends on the Branch itself, and how diligent they are in gathering information [to enter into LAIS].

But back to [the Account Officers'] question: "If we don't understand the underlying mechanisms of LAIS, how can we maintain our bad debt ratio?"

I can tell you here and now, that this perception of the situation is incorrect. The Account Officers think that they fill in the data, LAIS does the work and out comes a result, but I think it's more complicated than that. It's not just fill in the screen, wait for a result, then use the result – we also need to know what other information is involved in making these decisions.

I understand that to a certain extent LAIS is simple and concise, but it is only LAIS that's simple. In their own minds, the Account Officers need to think about what factors contribute to our low levels of bad debt – they need to think about their past experiences.

If this is what they're claiming to be their understanding of the situation, in my opinion, I think it's because for some reason, they just want to let us know about their annoyance and disappointment with the system – so they're saying they don't understand as an excuse to refuse using it.

They're just using the final results and not thinking about the data they're entering, because although Euro Bank did keep the LAIS formula a secret, the Branches can easily figure it out. If they do simulations and fill in dummy data, I really do believe they can figure out the inner-workings of LAIS, and from that they can tell for themselves whether or not it's making accurate decisions. It seems like they just want to refuse responsibility.

Andrew also felt there were misconceptions regarding the perceived superiority of DLAS over LAIS:

The Account Officers used to do narrative reports in DLAS that even included production processes. DLAS was an old system. It probably came about years ago because Head Office needed to educate the branches in loan approval processes, but they didn't have time to do it case-by-case, so instead they created DLAS. DLAS was in a memo format, it was very long, very complete, and the Branches just swallowed it whole without really thinking about what was needed on a case-by-case basis. This is why when the Credit Analysts were using DLAS they were filling in everything, no matter the type of loan. So their habit was to just blindly follow DLAS, and they thought that this was the reason they only had bad debt of 2%, they thought it was necessary, but I can tell you that a lot of the information in DLAS was irrelevant. Now, the important thing is to be quick and to analyse only the points that pose a real risk to the Bank.

Compounding the negative views the Account Officers felt towards LAIS were the many technical problems experienced. There were complaints that there weren't enough character spaces to adequately fill in certain fields, the character sets of printouts were too small to read and there were many software bugs, for example, sometimes data that had been input by the Account Officers was not accurately represented by the system. Moreover, there were many aspects of standard loan applications that LAIS didn't address, including back-to-back loans¹ and contractor

¹ A *back-to-back* loan is a form of business loan that meets the following conditions: For the loan to be approved, the client must have savings equal to or greater than the loan under application. The benefits of back-to-back loans are chiefly complex and substantial reductions in interest repayments, based on the amount of borrowed money being utilised at any given time.

businesses, which were usually grouped as part of the SME loans, but were not catered for in LAIS.

The accumulated problems, combined with fast approaching deadlines and time pressures, created strong feelings of resistance towards the LAIS implementation, subsequently forcing the Branch Manager to continue allowing the Account Managers to use DLAS and LAIS in parallel.

While this was going on, Lian and John Chen (Euro Bank's consultant) were responding to feedback from Alpha city, and frequently visiting the Branches to address issues and solve problems. This approach proved fruitful, and LAIS Version 2 was able to evolve and adapt to the 'real' SME loan conditions operating in Alpha city. This in turn led to many improvements, which were reflected in the many variants of Version 2 released by Euro Bank, as noted by Lian:

... When Euro Bank was developing the program, John would send the application through via email, and he sent it dozens of times – there were hundreds of changes. When we did the initial training, we still didn't have version 1 – we used the trial versions x1, x2, x3, etcetera. Only then did we develop version 1, then after the June review in Alpha city we developed version 2, which we started using in July.

The improvements made in LAIS Version 2 enabled the Account Officers to gradually reduce their parallel usage of DLAS, which can be seen as the 'adaptation' period of LAIS in Alpha city. Senior Account Officer Agustinus mentioned this when he said:

... We've had a lot of changes from the first version to the current version – not just two changes. Even the first version we had became 1A, 1B, then 2 then 4 – that was in May. Before July we had already done what was called a "pilot" project. We did some simulations, then we raised issues and discussed them, then Euro Bank improved the system.

We discussed our issues with Lian, who came here with her team from Head Office, and also with John Chen from Euro Bank. He came here to look at the system and see for himself the problems we'd been facing.

The Euro Bank system was taken from overseas, and it wasn't a good fit for our country and its conditions. Based on the feedback we gave him, many different versions were developed.

Finally, LAIS Version 4 was implemented in October 2003 (Alpha city skipped the implementation of LAIS Version 3), and usage of DLAS all but ceased, save for one or two components, which were still required to support the processing of loan applications, as explained by Agustinus:

It is true that when we first started using LAIS [we continued using DLAS as well]. So we were still using DLAS as a counter. But now we can see that a lot of DLAS functions we consider important are now available in Version 4 of LAIS. Version 2 had some of these functions, but it still lacked features like back-to-back loans, or the limit of up to \$1 million (AUD).

Gradually, we've reduced our use of DLAS. Initially we were using the two systems and the Account Officers at the time were complaining that LAIS was supposed to make things quicker, but it was actually slower than previously. So we had an internal discussion and agreed that "OK, we would reduce our use of DLAS". And now DLAS is probably just a document detailing the client's company profile – like who has shares in it. And that's it.

LAIS Version 4 was big improvement as Sian explained:

The current Version of LAIS [Version 4] is much better than the earlier versions. For example, there were lots of weaknesses in the earlier versions – there was limited character input and the text on the printouts was too small, but now all of this has been fixed. Back-to-back loans are now possible, and the newer Version differentiates between cash, the mortgage of back-to-back loans, and building and land mortgages. It's all much clearer now.

The Account Officers were now more adept at using LAIS, and LAIS Version 4 covered almost all the SME loan data requirements as noted by Agustinus:

When we were using DLAS and LAIS in parallel, we raised our issues with Miss Lian – “these items are not available, but are very important, please put this functionality in the next version” and she passed this input on to Mr John Chen. We asked that the minimum standard of LAIS should include what we consider to be very important for decision-making, and Euro Bank improved the system several times, adding more functionality and making changes. Every time they added new functionality, we reduced our usage of DLAS, and that was the improvement process. So that now we feel LAIS meets our needs and we have confidence in the system.

This outcome was the result of hard work and dedication within the Branches, combined with strong collaboration and teamwork between staff at all levels. Regular meetings, both formal and informal, between Account Officers facilitated this teamwork and collaboration. The formal meetings were called ‘Quality Group Meetings’ and ‘Quality Management Meetings’. Account Officer Miss Lily explained the Quality Group Meetings thus:

...Every month we have a QG – Quality Group Meeting – and during this time we formally share our LAIS experiences, but in reality, we discuss our experiences informally, every day, within our group.

Head of Regional Credit Centre Andrew noted:

...We do have a forum where people can put forward their thoughts and ideas. If, say, it were just a small idea to improve our internal workflow, I would socialise this idea, explain it to the others and perhaps implement it. If we need to alter the original idea, then we can all discuss it and socialise the idea further before we implement it.

In addition to this, the attention and dedication displayed by Head Office and the Region A Regional Office ensured continual and reciprocal support between the new Account Officers and their superiors. There had been no project in SEA Bank history

that commanded such dedication from top management, and the amount of support shown to the Branches was unprecedented. This high level of commitment from the SEA Bank Executive was indicative of the fact that this pilot project needed to be successful to ensure LAIS uptake at a national level. Andrew explained the reasoning for this as follows:

[In Head Office] we have organisational development plans and strategies regarding which Region we need to invite to be a [LAIS project] collaborator, and after this [Region], which Region is next, so that in the end, any difficult Regions will have no choice but to follow the example of the others ahead of them. We need to be very careful and set good examples – this project, the pilot project, is very important, and we need to be able to show the other Regional Heads that LAIS is workable and will be successful.

Andrew described the unfolding of the project's success throughout the Company:

[Deputy Managing director and Chief Risk Officer] Tony seems to be more relaxed now. Last year he looked really tense, but now, probably because the [Alpha city] project is [successful he's no longer tense]. Now, LAIS only has to be implemented in areas outside of Java, and this only account for about 10% of our circulation, so it's only a matter of time. The critical area was Java, because if we failed in Java then we would have really been in trouble. There was a time when we were really worried about [the] Omega city [a "difficult" Region], but now it's OK. I think that after [Region A in] Alpha city and [Region B in] Beta city ran well, so Omega had no excuse to refuse the LAIS implementation – [the Head of Omega region] was smart and he quickly got things moving. Overall, I think it'll take three or four years for the organisation to fully adjust.

LAIS was extremely successful in Region A, and six months after the initial implementation of LAIS Version 4, it was evident that the productivity of SME loans processing increased substantially. The Account Officers had already met their annual financial targets set by the Branches, and the Branches themselves had met their targets for the 2003 financial year. In addition to this, Region A had achieved the highest growth in loan business compared to any other Region in SEA Bank history. It was now that the Account Officers felt generally comfortable using LAIS,

and understood the reasoning behind its development, in addition to the underlying requirements for the approval of SME loans, which are actually very simple, compared to other loan types. This understanding is evident in Lily's changed opinion:

My mindset has changed because I now understand that we're only dealing with SME loans, and there hasn't been any increase in bad debt over the past year. The different versions of LAIS don't make that much of a difference to me – they probably help a little bit, but not a lot.

Sian's opinion and understanding also changed:

Yes, using DLAS as a Credit Analyst has made me feel more confident in using LAIS, but the real reason my mindset has changed is because now we have to use LAIS. Before LAIS, I was more confident with DLAS (laughs). ... And even now, if someone asked me which system gives a more complete analysis, I'd have to say it was DLAS. At the moment, we use LAIS when making decisions or recommendations for loans, and we can't say that it's wrong. And I don't mean to say that the system isn't informative – we can't say that either. It depends on how large the loan application is.

If the loan application is under \$1 million [AUD], we now only look at the mortgage amount when conducting our analysis. If the business isn't going as well as we'd like, but the mortgage will cover our risk, then we'll approve the loan. To use a metaphor, general practitioners are different to specialists. General practitioners only look at general things, but specialists, which in our case would be a loan of more than \$1 million [AUD], requires a more detailed analysis, because the mortgage will only cover 50% of our risk. So we need to make sure that the business applying for the loan is 100% solid, so that we feel confident that we're making a prudent decision. So I think that using LAIS is OK, so long as the loans are no greater than \$1 million [AUD].

... Mr Hendry was right when he said that DLAS is very complex. But as I said before, LAIS is only used for SME loans less than \$1 million [AUD]. It seems that there is a tacit understanding for approving loans less than \$1 million [AUD], and the mortgage is the key factor. So if the mortgage covers the loan, and the business

seems viable, then the result will be white [an approval]. LAIS is not complex because it is only concerned with loans less than \$1 million [AUD]. ...

The Account Officers' change in opinion and understanding had also led to an increase in their confidence in LAIS as a viable system to process SME loan applications. Sian noted the following:

Yes, my confidence in LAIS has increased. If we're talking about bad debt, as an Account Officer, we can't really predict anything. But if it is about the prudence of the loan approval, we know this when we are going through the approval process – we have a feeling, and this is probably a result of experience. When I meet a customer, I get a feeling about whether or not this person has a good business or not. And after the implementation of LAIS, the bad debt hasn't increased, so I think LAIS is as good as DLAS.

Agustinus, who as a Senior Account Officer was the direct superior of the Account Officers Sian and Lily, agreed with his staff:

Let's look at this way: I think the way my views have changed is normal. All the Account Officers here have extensive experience in this area, and when we first started using LAIS, they had it in their minds that to analyse a loan we needed to go through the whole DLAS process.

When LAIS was first implemented, we didn't know what the system was, what it contained, and even when we were shown the prototype and compared it to the work we did, we couldn't understand why the system was so ridiculously simple.

We used to be like "specialist doctors", which was what Mr Surya called us at the time. We were used to analysing everything from all aspects – so complete, so detailed. When we approved a loan application, we felt very confident about its prudence. Anything we needed to know, any information we needed, was all there to see in our decision-making process.

But with LAIS, it wasn't like that. When I was making final decisions it was very difficult because I was comparing LAIS to DLAS. When I was making decisions based on LAIS I was very confused and not at all confident, because what the

system contained was so simple. That was the early version. That was what we thought probably – (laughs) – that we can't trust the system.

Hendry, the Head of SME Loans for the Alpha city Branch summed the success of the LIAS implementation when he said:

Generally speaking, I think the LAIS implementation has been good – it was only in the beginning that we had a lot of problems. After about six months, though, everything was running smoothly. We began preparing for LAIS in September 2002, and the project started in April 2003. Now it's been one year, and although we had problems in the beginning, we've changed the versions several times up to Version 4, which we are using now. When we first started using LAIS, we had a lot of problems with it, and LAIS itself had a lot of problems with accuracy as well. I think one of the main problems was that Euro Bank did not properly understand [our culture]. For example, in developed countries, business' financial reports should be 'fair and honest', but in [our country], business people never reveal their true financial status. Moreover, SME's don't even write financial reports. Things like this were what forced Euro Bank to keep on revising and updating LAIS, all the way up to Version 4.

The next stage in the LAIS project was to demonstrate that the success in Region A was not a one-off situation, and prove that LAIS could also be successful in other Regions of the Bank. As such, the next stage of the LAIS project was to implement LAIS in Region B, Beta city.

4.3.2 LAIS Implementation in Region B

Region B in Beta city was selected as the second Region to undergo LAIS implementation, commencing in July 2003. Although the LAIS project was ultimately viewed as the responsibility of the Branches, both the Branches and LAIS were strongly supported by the Regional Credit Centre. In the case of Beta city, Regional responsibility for the LAIS project fell upon Victor, a former Senior Credit

Manager in Head Office, who was appointed as the new Head of the Region B Regional Credit Centre.

When compared to Region A, the LAIS project was run differently in Region B. The Region A implementation was prepared for by Andrew (Second in charge of Head Office's National Credit Division) for six months up until the pilot project's commencement date. Victor actually expressed his annoyance with regard to this, as he felt Region B wasn't given the same levels of support from Head Office as Region A. On the other hand, however, he acknowledged that he did like the challenge, because he had to build the Regional Credit Centre from scratch with relatively little help from his superiors. As he noted:

[NOTE: The participant requested that this section of the interview not be recorded, and was as such transcribed verbatim at the time of interview]

I complained last year when I was assigned as the Head of the Regional Credit Centre in Region B. He [Andrew] spent six months preparing everything in Alpha city before he was assigned as the Head of the Regional Credit Centre in Region A. I had the same position in Head Office as Andrew, yet I was assigned directly to Beta city and there was no preparation for me, and I felt that this was unfair... But on the positive side, I really had to start from scratch – we had to do every aspect of the job ourselves, including facilities, computers, communication with Head Office, the Branches and the Regions... Here in Beta city, we're closer to Delta city [head office] and we have better human resources ... As for the amount of time it took us, yes, we were very quick, it took us less than two months to formally and fully implement LAIS [whereas it took Alpha city six months]! Yes! Yes! It was all finished on the 1st September, so this was excellent. From the beginning, we had a strong understanding of what LAIS was, what the Regional Credit Centre was supposed to achieve, and we got everything working – the people, the facilities and the training. Of course, we had to do a lot of extra work – for the last ten months I've been living in the Holiday Inn!

In September 2003, less than two months after Victor began developing the Region B Regional Credit Centre, LAIS was implemented in Beta city. The Region B

Branches first started processing SME loan applications using LAIS Version 3. The required LAIS training and the organisational changes necessary to support LAIS had already taken place during the first two months of initial preparation, led by Victor. The would-be Account Officers had been trained in the use of LAIS, performing simulations based on real-life data and loan applications. The training was conducted in two main groups, as explained by Victor:

Miss Lian and Euro Bank came here several times, and after we'd mobilised the staff to work on our new credit business, we commenced the LAIS training. We ran the training in two batches – one was for SME loans and the other was for non-SME loans and the Branch Managers. All the Account Officers in Region B attended the SME loan training, which took three days, and then they started practising using LAIS with real-life cases. Basically, we had a three-week transitional period where we stopped using DLAS and started using LAIS, even though at the time the Branches still had not mastered LAIS. We helped them out for a few weeks, perhaps a month. We started with LAIS Version 3, which was in early August, and 1st September was our cut-off date to cease using DLAS.

Victor's comment that the Account Officers had not mastered LAIS at the end of the transitional period was echoed by Harry, a Senior Account Officer, who believed the LAIS training provided was inadequate:

I think my staff and I prefer DLAS in part because of the mistakes made in our initial LAIS training sessions. All we were taught was if it's 'grey', refer it to the Regional Office, if it's 'white' you can do it yourself. But after LAIS was implemented, we came across many problems, many complex problems that we had not been prepared for. And the Regional Office doesn't understand these problems – they're not immersed in the field, and if we ask them questions, they just tap their hands on their desks and say "just do it like this" or "you need to do 'this' and 'that'" – they're all talk. What we need from them is real involvement – they need to come into the field and assist us, but that has never happened. They don't even ask us whether or not we're having problems.

Victor also recognised these problems, despite the fact that Region B had less training than Region A and still managed to yield better results, he noted that the

Account Officer training was inadequate in absolute terms (in both its preparation and its execution) and Head Office failed to provide sufficient support in this area. This lack of resources, however, led to an innovative solution from Victor. He felt the Account Officers in the Branches needed more on-the-job training, and to accommodate this he organised for all Account Officers from every Branch in his Region, to spend a set amount of time in the main Branch in Beta city completing on-the-job training with him and his staff. This solution was developed since both the Regional and Head Offices could not afford to spend time running the amount of training actually required for the Account Officers, and neither could they afford to run training sessions for Beta city in the same way they were run in Alpha city. As Victor explained:

We had many problems in the beginning. One significant problem was that the Account Officers with marketing backgrounds didn't understand credit analysis. We reported our problems to the Board of Directors and they undertook two or three reviews of the system. We had meetings here with Mr Tony [Chief Risk Officer] and Mr Smith [CEO], all the Branch Managers and Managerial Staff would come as well to discuss what the problems, difficulties and constraints were.

At first, the Board of Directors wanted to mobilise a team that would train all the Branches, but we didn't have the people to do that – we couldn't spare any of the staff that had already mastered LAIS, we couldn't let them go around to all the Branches. But although it was a very good idea, to send one or two people around to each of the Branches, it just wasn't possible. So I changed the idea, and decided we would instead invite Account Officers, two at a time to do on-the-job training here in the Regional Credit Centre. Everyone from each Branch has been doing three days of training here, and we're now in our eleventh month, and have almost finished all the training for our Branches in Region B.

Victor started his on-the-job training program in November 2003, and by April 2004 all Account Officers in the eleven Beta city Branches had undergone their required training, and were able process SME loans much faster and more adeptly than before. As Victor explained, he worked hard to ensure the Account Officers understood the

reasoning behind LAIS, because he felt this was crucial to their acceptance of the new system:

When new on-the-job training Account Officers arrive on Monday mornings, I first have a talk with them – I try to understand their problems, we share ideas and discuss the role of the Regional Credit Centre, why we use LAIS, the current condition of the Regional Credit Centre, the best way to undertake analysis and how to get the right results. Then I ask them to observe others using LAIS, before they practice using LAIS themselves. During this practice we figure out what mistakes they make and what inadequacies they have. There are many variants of LAIS results in the different Branches, and because of this, the Account Officers often make mistakes... I'm not expecting zero mistakes – that's not possible – this is all related to people and people have different perceptions and understandings. Sometimes, an Account Officer might think a loan application is good, but from our point of view it doesn't have a high enough score. In the end, the result will be different, but we don't see this as a big problem – it's just a difference in judgement and meticulousness.

After spending three days here learning about LAIS, I ask the Account Officers to write up a report and from these reports we have seen that they learn a lot, they take away new knowledge, and I always ask that they try not to make the same mistakes again. This really has been an effective program, and we are being asked to run these sessions on a routine basis. It seems that this way of doing things is the same as training eleven Branches simultaneously, with all the value of discussion and real-life practice. Yes, Head Office is going to adopt my idea and implement it in other Regions.

The training program was a huge success, and according to Ruud, Head of the National Credit Division in Head Office, Beta city achieved the highest percentage growth in the first three months post-LAIS implementation, than any other Region in SEA Bank. This form of training was later adopted by Head Office, and was implemented in all the newly formed Regional Credit Centres to support other new LAIS implementations.

In terms of the cutover strategy Beta city used when moving from DLAS to LAIS, it differed significantly from the strategy used in Alpha city. Beta city had only four weeks to adapt to the new system before they had a direct cutover to LAIS, and the Account Officers ceased to use DLAS altogether, as explained by Rudi, the SME Loan Manager in Beta city:

I never did what they did in Alpha city, I just did a direct cutover from DLAS to LAIS. Perhaps Alpha city was using an earlier version of LAIS and there were a lot of bugs, so they couldn't see the value in it. But here in Beta city, I just did a direct cutover....

This is in contrast to Alpha city, where DLAS and LAIS were utilised in parallel for a significant amount of time post-LAIS implementation. From the outset, the Account Officers in Beta city were using a newer version of LAIS, compared to the version Alpha city initially used. Despite the newer version, however, the Account Officers in Beta city still complained about the incompleteness of LAIS as compared to DLAS. Harry, a Senior Account Officer made the following complaint:

I prefer DLAS – plain, old DLAS. Why? Firstly, LAIS can be quick, but it can also be very slow. Secondly, LAIS only caters for the one type of business, for example, contractors and property developers don't fit into LAIS. And I have asked the Regional Credit Centre why this is the case. I've asked ... Mr John whatever-his-name-is from Euro Bank and he can't tell me why either. Thirdly, LAIS is very limited in what we are able to say. No matter whether we think a loan is good or bad, we still have to enter the same details and I really don't like that... Moreover, LAIS was probably [originally] developed for the Europe market anyway. As for small family businesses, they don't have accounting [reports] or [formal] salaries – everything's in the one basket. We can't force these companies to draw up financial reports...

Despite the resistance and complaints on the part of the Account Officers, LAIS became a huge success, resulting in significant efficiency improvements and decreases in loan turnaround times. Although many people attributed the success of the new loan approval process to the perceived superiority of LAIS versus DLAS,

Rudi, the SME Loan Manager in the Beta city Branch, expressed a different opinion. He believed that it didn't matter whether the Account Officers were using DLAS or LAIS; what mattered was whether or not the Account Officers had a strong understanding of the underlying risk associated with SME loans. In fact, despite the popular belief amongst Account Officers at the time that LAIS was inferior to DLAS and subsequently hindered their ability to consider and understand the loans they were processing, he believed LAIS actually offered Account Officers *more* opportunity to think and understand:

On the contrary, I don't think LAIS impedes the Account Officers' ability to think – no, not at all. In fact, I think LAIS is sharpening their minds. My question is this: Did DLAS have any boundaries or parameters? No. So the quality of DLAS was dependent on the quality of the Account Officers. There was no underlying logic in DLAS, but LAIS is different – there are clear definitions that work towards a goal... We need to understand why we get 'black' ['reject'] outcomes, and we need to relate that to the data we input into LAIS in order to develop our experience and understanding. We didn't have that in DLAS, we just accepted good wording and 'bang' [claps hands] that's it. I think LAIS will automatically sharpen the Account Officers' minds. I'm confident that if you don't have the right background or experience, you won't be able to use LAIS, but anyone can use DLAS without the right experience, easily. LAIS demands better qualifications and understanding from our Account Officers – not everyone will be able to do it. But having said that, it's also about quality, what level of quality do we want to achieve in our work? I don't want my staff to just fill in the form without thinking about it. I expect better. Filling in a form is easy, mister, even an office boy can do it! But that's not what I want. It's not about characters and words; it's about understanding the underlying scoring system in LAIS.

In addition to understanding the underlying logic operating within LAIS, Rudi also noted the need for the Account Officers, and their superiors, to accept the changes within SEA Bank and alter the way they had previously viewed both the loan approval process, and their roles within the Company:

We have to remember that Head Office has approved LAIS and it hasn't just been developed by anyone. We need to understand the essence of LAIS. We can't just keep looking for problems because it'll never end and it will be our staff that

suffers. We need to set an example in accepting LAIS so our staff can follow, because if we keep complaining about LAIS, “why this?” and “why that”, of course our staff will do the same thing and we’ll never move forward.

Region B upgraded from Version 3 to Version 4 in November 2003, two months after their initial implementation. They didn’t experience the same high level of issues as Region A when switching versions. It is believed that this was in large part due to the fact that Rudi never mandated that the Account Officers re-input existing Version 3 customer data into Version 4. As Rudi himself commented:

... When we changed from Version 3 to Version 4, we just abandoned Version 3 and went straight to Version 4. We never re-entered existing data – there’s just too much data! Who wants to do that, mister? Tell me – do you? I can tell you we don’t – we’d die! But of course we do back up all our data. I back up and back up – I’m paranoid about viruses... But we have thousands of data records in Version 3 – it’s just not possible... We would have serious resistance if we had to do that, no one would want to do it. Wow, I get scared just thinking about it! I never did that; I just cut the old Version and changed to the new Version. When we get anything new, we just make the change, abandon the old Version, and that’s it... Let me give you an example: we never rework old data. If, say, we are using Version 5 of LAIS, and we have a customer with data in Version 3 who wants to extend their loan, we just use Version 5 – that’s it. If for some reason we need to look at their original data again, we just open it in Version 3.

In the end, and despite the initial resistance from the Account Officers in Beta city and Region B, the Account Officers learnt to use LAIS, and generally believed they had met their goals, which had been set by Head Office. They were pleased with the progress they had made, and had accepted the new system into their work culture. As one Senior Account Officer, Harry, noted:

In the beginning, I think we were all a bit confused, but it wasn’t a problem because we were all in the same boat – we were all confused! We were still only learning – would you say that was our ‘learning curve’? ... Now, seven months after LAIS was implemented, we’re starting to see the results...

And so, after a period of no more than eight months, LAIS preparation and implementation had successfully taken place in Beta city, and the Account Officers in the Region had reached levels of LAIS productivity and understanding that had taken 16 months to achieve in Alpha city and Region A.

4.3.3 LAIS Implementation in Region C

Region C, a Region in the Greater Delta City Area, with its main Branch being in '46th Building', began preparing its LAIS training and organisational changes in August 2003, and actually commenced its implementation of LAIS Version 4 in October of the same year. Sophia, the Loan Manager for Delta city, led this implementation.

Region C had a different organisational structure, as compared to Regions A and B. Region C was in the Greater Delta City Area, which was densely populated and subsequently made up of four separate Regions (one of these Regions being Region C). These four Regions were all in close proximity to both one another, and SEA Bank's Head Office. Based on these geographical considerations, a single Regional Credit Centre was formed within SEA Bank's Head Office to serve all four Regions. Region C was also slightly different to the other Regions because it had a higher calibre of staff. Many of the Account Officers in Region C were originally recruited from the elite MDP (Management Development Program) group, who are high-achieving university graduates SEA Bank trains especially to take on future management positions within the Bank. These graduates learn quickly and more easily adapt to changes, as explained by Lian:

If we consider the new MDP staff, it's easy for them to learn anything quickly. Like with the Euro Bank program [LAIS], after I showed it to them once, they understood it really quickly. But the problem is that we also have other staff who are not from the MDP, like our existing staff, and they're not as fast to learn and adapt to new things. And we can't avoid this – what can we do with these people? That's why in my department, I always ask for MDP staff.

The Region C staff involved in SME loans commenced their training in August, two months before the October implementation date. The training was not as intensive as the training administered in Alpha city or Beta city. This was mainly because LAIS was no longer a pilot project, operating outside the normal parameters of SEA Bank's business operations. It had become a system which had proven to be successful, and the onus was no longer on Lian and her project team to ensure it was a success – the onus was now on the individual Regions to prove that they too were competent enough to implement LAIS, in the same way Regions A and B had been successful in implementing LAIS. Lian also noted that the implementation in Region C was less successful than those in Regions A and B because she was no longer afforded the time and resources required to comprehensively manage and oversee the implementation of LAIS in Region C, as she had other responsibilities to attend to within the Bank:

In my opinion, Alpha city [Region A] and Beta city [Region B] are different to the other regions, such as Delta city [which includes Regions C] ... In Alpha city and Beta city John Chen and I were able to run full training for all the Account Officers. Andrew [Head of Region A Credit Centre] followed the training, and Victor [Head of Region B Credit Centre] attended all our sessions – they always made time to attend training, even though they were extremely busy – and they always knew and understood what we were talking about. This is why Beta city and Alpha city did so well with LAIS... They did very well compared to the Delta city area. Here in Delta, I had too many other responsibilities and my immediate superior wouldn't give me permission to run the training sessions full-time. The entire area took two months to train, and I was only able to attend the training for half-days to answer questions, then I had to go back to my office, and even then, I didn't finish work until 9pm. So I had to ask my staff to run the training.

This lack of a comprehensive and dedicated training regime caused many issues within the Region, and created barriers that hindered the Account Officers' acceptance of the new system. Sophia, the Loan Manager in charge of the LAIS implementation in Region C noted that many Account Officers experienced problems transitioning into their new roles:

I must admit that this transition has been very difficult. The Marketing Staff used to attract new clients, and they were very good at this – they would find a new customer and then pass them on to the Credit Analysts. On the other hand, the Credit Analysts only ever concentrated on the analysis side of things. Now we've merged these two roles, the Marketing Staff are learning analysis skills, and the Credit Analysts are learning marketing skills – how to open new accounts, how to maintain accounts, etc. In my opinion, it should not be the role of the Account Officer to find new loans... Account Officers should concentrate on analysis only... So there are problems and clashes, but I think overall, these are normal. Any change within an organisation will always raise issues, so we need to stay positive and always strive to improve the way we do things.

One advantage Region C *did* have over Regions A and B, however, was their influence over Head Office, and faster communication channels, thanks to its close proximity to Head Office. This meant Sophia was able to communicate quickly with most of the management and staff involved in LAIS project. Sophia noted that her branch did not adopt the Beta city strategy of cutting over directly from DLAS to LAIS. Instead, Region C adopted a phased implementation, similar to that in Alpha city, where the Account Officers continued to use DLAS to support their analyses in LAIS:

We started using LAIS a few months back. I think we started with Version 3 or 4 – we have Version 4 now, so we started with Version 3... We're now no longer working with the thick DLAS reports, but we still use the attachments with LAIS because it is required. And we're doing this in the same way they did it in Alpha city – using LAIS, but adding the DLAS attachments...

Sophia noted that if she or her Account Officers did not intuitively agree with the decision generated in LAIS, they would immediately re-process the application using DLAS:

In DLAS, risk was never explicitly addressed and we relied on our experience and intuition to make decisions. And now we use LAIS, plus our own intuition, and our intuition needs to be strong, because LAIS is only a machine, and machines are easily deceived. [For example,] when we're analysing customers, we usually have a

strong feeling based on their industry, what kind of a person they are, their business – this all creates a certain sense about a person's [business]...

Initially, the Account Officers in Region C did not have confidence in LAIS and its ability to accurately assess loan applications. They still believed DLAS was a better and more reliable system, although they did appreciate the simplicity of LAIS:

I understand that ensuring 100% collateral is the most important aspect of SME loans, and it has a dominant impact on the final score in LAIS. Having said that, I personally don't feel 'safe' using this rating model, and I would much rather focus on the health of the business. Recovering the collateral is a very difficult process, and because of this I feel that a healthy business that's running well is more important than 100% or more collateral in ensuring the loan is paid back. Because of this, I feel 'safer' using DLAS. Ideally, I would like a simple system, which is simple like LAIS and quick to use, but also includes qualitative information, which ensures a prudent decision is being made. That would be the 'best' system – one that can process applications quickly, and still include convincing evidence to make us feel sure about the final decision. (Meiky, an Account Officer in Region C)

Another issue hindering the acceptance of LAIS in Region C was the fact that LAIS was only able to suitably assess retail businesses. While this wasn't such an issue in the other Regions, it caused a lot of problems in Region C because the variety of business types being assessed in the Region was far greater than that of Regions A and B. Sophia raised this issue with Lian, Euro Bank and Tony, SEA Bank's Chief Risk Officer, asking them to develop different instances of LAIS to address different SME businesses types. This request, however, was refused by Tony because it contradicted SEA Bank's overarching loans policies.

By the first quarter of 2004, the Account Officers had begun to fully understand the LAIS and its functionality. Edison, an Account Officer, explained how he had come to understand and accept LAIS as a valid tool for processing SME loan applications:

In my current position as an Account Officer, I don't feel there's any difference [between LAIS and DLAS], but I can't speak for my manager who's the actual

decision-maker, because I'm not in their position. They're both the same to me – when I began using DLAS, I studied it carefully and went over the analysis again and again. It was the same with LAIS – I rechecked the data, repeated the analysis – it's all the same thing, but it's just using a different format... The main difference is the spreadsheet calculation versus the manual calculation, but having said that, I still do some manual calculations if I need to crosscheck anything, and I think I'm starting to understand what's going on inside LAIS. If the outcome doesn't seem logical, then I know what aspect of my analysis needs to be adjusted...

Any new system, like LAIS, is built to make things better... I'm confident that LAIS will make life easier for us, but it needs time. Probably in a few years, LAIS will be very good, but I can't say exactly how long it will take. Let's put it this way: with the culture we have at SEA Bank, and the high quality of our people, I'm sure LAIS will ensure a better way of doing things... Of course, we're very optimistic – we need to keep progressing and changing. There's no way our Company would invest so much money in something only to make the situation worse – there's just no way. From a very simplistic point of view, it can be said that already by using LAIS we're using better technology; therefore it will logically follow that this will improve things. So yes, of course we need to support this, and we also need to give it more time.

The Account Officers' acceptance and understanding of LAIS was also echoed by Sophia, who had finally come to consider the LAIS implementation a success, despite initial setbacks:

In the beginning... last October, everyone was very nervous. The Account Officer role started in Beta city on 1st September, and we were to follow Beta city. But yes, they were nervous about doing a new job they hadn't done before. In the beginning, we taught each other –the Marketing Staff passed their skills onto the Credit Analysts and vice-a-versa. The 'Account Officer' idea wasn't new; in fact, we tried to prepare by switching roles – one month as a Credit Analyst, one month as a Marketer, back and forth. Even though we prepared as much as possible, we were still shocked by the new role. Here, my motto is 'positive thinking'. We can succeed if we try hard, because if others can do it then we can too. Everyone needs to learn from this... As for myself, I'm confused by a lot of this as well, but I always share ideas with other managers, the Regional Office and Head Office as well, because I'm the head of SME for this Branch, and I need to set a positive example for

everyone else... We used to process all sorts of loans, but now we only process small loans, and I think some of us are suffering from 'post power syndrome' – we all have high levels of education and experience, but we're only working on small credits... This is why we need a positive attitude – we need to change, we need to adjust to the changes around us. Everything can be learnt – nothing is impossible.

Region C had changed their way of working to accommodate the new system. The Greater Delta Area, including Region C, marked the implementation of LAIS in SEA Bank's largest and most important area. It also meant that LAIS had been successfully implemented across 80% of the country in terms of land area and 90% of the country in terms of economic activity. The only Regions yet to implement LAIS were those in smaller, less populated areas, which combined only accounted for only 10% of SEA Bank's business activity.

4.3.4 Reflections upon the LAIS Implementation

Throughout the collaborative development and implementation process of LAIS, John Chen from Euro Bank was responsible for LAIS development and Lian was responsible for LAIS training and implementation. In essence, John Chen was accountable to Lian, and Lian was accountable to her superiors within SEA Bank (including the Board of Directors). Lian and her staff ensured all versions of LAIS underwent extensive testing before they were implemented in the Branches, and all subsequent versions of LAIS were the result of extensive testing from Lian and her staff, in addition to comprehensive input and feedback from the Branches. Although this process seemed to work effectively, Lian noted the inability of Euro Bank (namely John Chen and his team) to adequately understand the real requirements of LAIS and SME loans in general. She also noted John Chen's apparent lack of systematic and defined methodologies, processes and documentation in dealing with the changes required of LAIS:

The problem with LAIS maintenance is that if we change anything we have to test it thoroughly before it can be implemented, but having said that, we can't do as much testing as we would like. And this is a problem, because sometimes when we

implement something new, we test it and we're sure it's all right, but then when we apply it, the users find there are problems we didn't pick up during testing.

I think these problems arise because John [Chen from Euro Bank] doesn't have a suitable system to track changes. Sometimes he makes changes to one aspect of LAIS, but that aspect is linked to something else, but it's not always easy to see these linkages because he has no documentation.

The situation should be like this: he should make notes and keep up-to-date documentation so that if he changes one aspect of the system, he always knows what it will affect. Because I think he often forgets what he's done, and the way the different components are linked within LAIS – and this isn't helped by the fact that he sometimes makes changes to LAIS on-site. For example, when we were doing training in Alpha city, we were having problems with data input. We told John about these problems, and he made changes to the system straight away – on-site – and he didn't even make notes.

Another recurring issue encountered across all Branches during LAIS development and implementation was the Account Officers' repeated rejection of LAIS. This rejection was generally the result of their initial belief that the system was too simplistic to adequately process SME loan applications, and the widely held view that DLAS was superior to LAIS.

Although the Account Officers initially rejected LAIS and refused responsibility for its decisions, over time, they could not deny the results being yielded. For example, before Region A implemented LAIS, the average turnaround time to make a decision regarding a loan application using DLAS was 22 days at the Branch level, and 39 days if the application required referral to the Regional Office. Specifically, in the Alpha city Branch in Region A, pre LAIS implementation it took 22 days to process a loan application within the Branch and 37 days to process a loan application if it required referral to the Regional Office. In the three months post LAIS implementation, however, the equivalent turnaround times were 27 and 40 days respectively. Six months after implementation, the time required had dropped to 19

and 28 days respectively, and nine months after the original LAIS implementation, the time to process a loan had plummeted to 4 and 12 days respectively. The most extreme example of the improvement LAIS generated in Region A is evidenced in the Gamma city Branch. Pre LAIS implementation it took 42 and 57 days to process loans at the Branch and Regional level respectively. Six months post LAIS implementation; however, it took only 4 days to process an application at Branch level and 12 days if the loan required referral to the Regional Office. On average, the time taken to process loans in Region A fell from 22 and 39 days to 6 and 14 days, a phenomenal improvement that spoke for itself. John, a Manager in the Region A Regional Credit Centre explained how these times could be shorter still, if SEA Bank had more sophisticated communication processes in place:

... We've drawn up a graph over the last year, showing the average time taken to process a loan application. Before we implemented LAIS, the average time was 13-18 days, but now using LAIS it's at most 6-8 days. Processing times are cyclical, and you'll see differences in each branch from January to February to March, but there are significant differences between the time before LAIS was implemented, and the time after – we've moved up a level. Now, our processing times are significantly faster than before. The average is 6-8 days because some branches are far away and we require 2-3 days to transport our documentation. Overall, it's safe to say that we now only need at most four working days to process a loan application.

Similar improvements were noted in Regions B and C as well. Region B pre LAIS implementation required 14 and 16 days to process loans on average, however after LAIS was implemented it required only 6 and 8 days; and Region C pre LAIS implementation averaged 21 and 30 days, whereas post LAIS implementation required only 6 and 13 days.

Rudi, an SME Loans Manager in Region B noted that LAIS did not only speed up the time it took Account Officers to do their work, but it also forced them to work more productively:

The new LAIS implementation did speed up the approval process, it's true. But for me, productivity is more important than speed. I'll give you an example: Formerly, when someone processed a loan using DLAS, they needed at least a week because they had to put in a lot of blah, blah, blah information. But now, that same person can process three applications in the same amount of time because it's all so simple – they just need to go 'tap, tap, tap' on the keyboard and it's done. Moreover, if we're working in the same business sector things get really repetitive because empirically it's all the same – all that's required is to put in the input, copy and paste – it's that simple... I've seen productivity at least double in my Account Officers, and I know one person whose productivity has quadrupled. So in terms of speed, yes, it's up.

In addition to this, the dollar amount in loans being dispersed more than doubled in less than two years. These improvements, combined with relatively static and extremely low levels of bad debt ensured the LAIS project was proclaimed a success, and even its detractors within the Bank were forced to concede that LAIS was working and did yield better results than the old DLAS.

4.3.5 The Future of LAIS

At the end of this research's data collection, SEA Bank was looking to build on the success of LAIS through the development of a web-based version of LAIS. This time, Region C was chosen as the pilot Region and it was decided that SEA Bank's internal Information Technology (IT) Department would handle the development of the new web-based LAIS. Region C was selected because of its more sophisticated IT infrastructure, relative to other Regions within the Bank.

During the original LAIS project, SEA Bank's Board of Directors made the decision to exclude the internal IT Division from the project because like the rest of the Bank, they lacked the required knowledge and skills to build a loan assessment system. Luke, a Senior Manager from within SEA Bank's IT Department, also acknowledged this assertion:

...Euro Bank developed LAIS to support the SME loan process. If someone asked me when I first discovered Euro Bank's involvement in LAIS, I tell them, "We knew about it from the beginning." But to be honest, as we said before, we're not experts in this. We basically gave up all knowledge and responsibility to Euro Bank so they could develop LAIS and give input to our end-users, while we followed them from behind. Although we did have what we called a 'Loan System' at the time, it only supported loan administration... It didn't support our marketing and it didn't increase our processing times, no ...

SEA Bank's IT Division believed they had an advantage over Euro Bank in that they had seen the LAIS project develop, seen the mistakes made by Euro Bank, and knew how to do it better. Despite the mistakes that were made by Euro Bank, Luke did concede that the original LAIS *did* improve productivity:

...[The IT Division] is building an end-to-end application, but we can still see that LAIS has helped in speeding up the SME loan approval process, which previously took weeks to complete, but now takes only a few days. This has been helpful because it has showed us what the Account Officers need, and if we can somehow centralise the system it will help them more. We've created a small project to do this, but this project has already improved upon LAIS; it has workflow information, and we are building this from the perspectives of both the Account Officers, and SEA Bank risk management.

At the time of final data collection, a pilot version of web-based LAIS had been implemented in Region C. As with the implementation of the original LAIS, many problems were encountered and there was strong resistance on the part of the Account Officers. Account Officers made constant complaints about the performance of the system, despite the fact that it worked, and had all the functionality of LAIS Version 4. Edison, an Account Officer in Region C complained that the web-based LAIS didn't work, although he couldn't prove this and admitted that the problem could be with the data being inputted by user:

... I have noticed a few problems with the web-based version... There is one case with web-based LAIS where one of my colleagues kept complaining that the system was returning inaccurate results and inconsistent printouts, even after he had rechecked everything and made corrections. So I tried it – I went through everything

step-by-step and sure enough, the system came back with the wrong output. In this case, I think the account officer must have made a mistake; otherwise I need to better understand how the actual program works... so I can't tell you what the problem was.

...We also had problems when we were in the web-based LAIS training, because it took between seven and 15 minutes to save each page, but since it's been implemented in the branch, I've never seen it take longer than one minute. If you're asking me about the benefits of the web-based LAIS, I can't really see them yet. The only difference I can see is that it requires the input of your user ID.

When data collection for this research ceased, the web-based LAIS project was still going ahead, and despite these complaints from the Account Officers, it was anticipated that the project would continue until the end of 2005, after which time it would be integrated into SEA Bank's broader 'loan origination' system, which will centrally maintain all of SEA Bank's credit arms, from small personal loans to large corporate loans.

4.4 Conclusion

The findings presented in this Chapter have provided a contextual overview and detailed progression of the LAIS implementation case in three separate Regions of SEA Bank over time, from the point of view of Account Officers, and Branch, Region and SEA Managers. In order to convey their authentic experiences and their uncensored and often contradicting views, I let their 'voices' being heard and their stories being told. The implementation of LAIS was a complex change process that triggered individual and collective learning, which ultimately produced evidence of organisational learning. Based on the rich evidence from the field and the this first level analysis of the LAIS implementation process, presented in this Chapter, I am now presenting my own interpretation informed and guided by Argyris and Schön's (1978, 1996) learning theory and the sensemaking theory of organisations. My aim is to develop a rich understanding and explanation of how and why the

implementation and use of LAIS first prevented and ultimately engendered learning within SEA Bank.

5. Analysis and Interpretation

5.1 Introduction

The story of LAIS in Chapter 4 was told by the people studied (first level analysis). They expressed their views, experiences and interpretations of events and processes of LAIS implementation and gradual use. Their stories indicate that after about a year the SEA Bank successfully implemented LAIS and as a result considerably changed its SME loan approval processes. The change has been evident at branch, region and the Bank levels at which performance measures showed significant improvements. Compared to pre LAIS implementation, the time to approve SME loans was cut on the average to one third and a significantly larger amount of money dispersed while lowering the bed debt. The evidence from the field suggests that the Bank managed to learn through LAIS implementation and use. This raises the question how did this happen and how did the Bank learn? This is answered through the second level analysis in which I aim to re-interpret the empirical material using theoretical lens.

The theoretical lens emerged from the literature as well as from iterative processes of theoretically based interpretation and re-interpretation. As explained in Chapter 2, the theoretical lens was primarily developed by infusing the sensemaking theory into the Argyris and Schon's organizational learning theoretical framework with further enrichment from other organizational theories (such as communities of practice, . The difference between this analysis and that found in Chapter 4 is that the second level analysis explores the case through the eyes of the researcher informed by and aiming to contribute to theory.

While analysing the empirical evidence from the implementation and use of LAIS I aim to identify and understand instances and processes of learning and explain how and why they emerged using the sensemaking perspective. The focus on

sensemaking enables understanding the experiences of actors expected to use a new information system that causes uncomprehensive and unpredicted changes in their work practices and organizational meanings. Typically taken for granted, sensemaking is central to actors' search for answers to the questions: *What is the meaning and purpose of LAIS? How is our practice changing and what are the implications of these changes to us and our organization?* The invisible and seemingly transient nature of sensemaking "belies its central role in the determination of human behaviour. Sensemaking is central because it is the primary site where meanings materialize that inform and constrain identity and action" (Weick et al., 2005, p. 409; Mills, 2003).

The centrality of sensemaking can be seen in all 3 cases of LAIS implementation and use (in Regions A, B and C) described in Chapter 4. By focusing on actors' making sense of LAIS implementation and use in each region, and by linking various sensemaking processes with the nature of organizational learning I aim to answer a more specific research question: What are the ways and mechanisms by which LAIS implementation and use engage sensemaking in organisations, and how does such engagement affect organisational learning? In this Chapter I answer this question by developing a substantive theoretical explanation of the emergence of learning (single and double loop) instigated and enabled by LAIS depending on the engagement of sensemaking processes. The new theoretical explanation of the emergence of organizational learning instigated and enabled by LAIS through sensemaking processes, can be seen as an expansion of Argyris and Schon's organisational learning theory.

5.2 LAIS Implementation Instigated Organisational Learning

As I detailed in Chapter 4, the SME loans project was the key initiative in SEA's new strategy. The President and Vice President of the SEA Bank explained the importance of the loan business to the organisation by stating the following:

We have done very well on the funding side but are aware that we need to improve other aspects of our business to strengthen our role as a financial intermediary. In

this respect, we continue to boost our lending business while reducing our reliance on Government bonds. (Company President, 2002 SEA Annual Report)

After the Asian Economic Crisis ... in terms of corporate loans, there was no business potential in developing them any further. As a matter of fact, SME loans have the most potential for future development. (Company Vice President, Interview 2003)

An important principle labelled the ‘four eyes’ principle was introduced in response to a new strategic initiative by the SEA Bank to fulfil the Central Bank’s regulations regarding credit risk management. In fact the organisation introduced the ‘Best Practice of Credit Risk Management’ symbolically named the ‘four eyes’ principle and started using a scoring system to assess credit risk.

LAIS implementation was the key to the instigation of the new SME loan business: the new organization structure and process for loan approvals and the new risk management policy. The implementation of LAIS can thus be seen as a significant change in organisational structure, norms and rules that determine SME loan approval practices. In other words the introduction of LAIS produced a change of organization structure which in turn implied the change of generic meanings in SME loan business (located at the generic sensemaking level in Cecez-Kecmanovic’s, 2004, model). Previously the generic meanings and sensemaking – exemplified by the norms and rules underpinning DLAS and mostly manual practices – were in relative harmony with individual/collective sensemaking and embedded in the Bank’s organisational culture (cultural sensemaking). The replacement of DLAS by LAIS disturbed this harmony and caused some evident friction between Account Officers that were comfortable with and trusted DLAS and managers and project officers that introduced LAIS. Account Officers and managers faced unsettling differences between the well-known norms and rules that governed their behaviour (such as thorough analysis of loans and loan approval criteria) and the new norms

and rules imposed by LAIS that seemed strange, dubious and threatening for them and for the Bank.

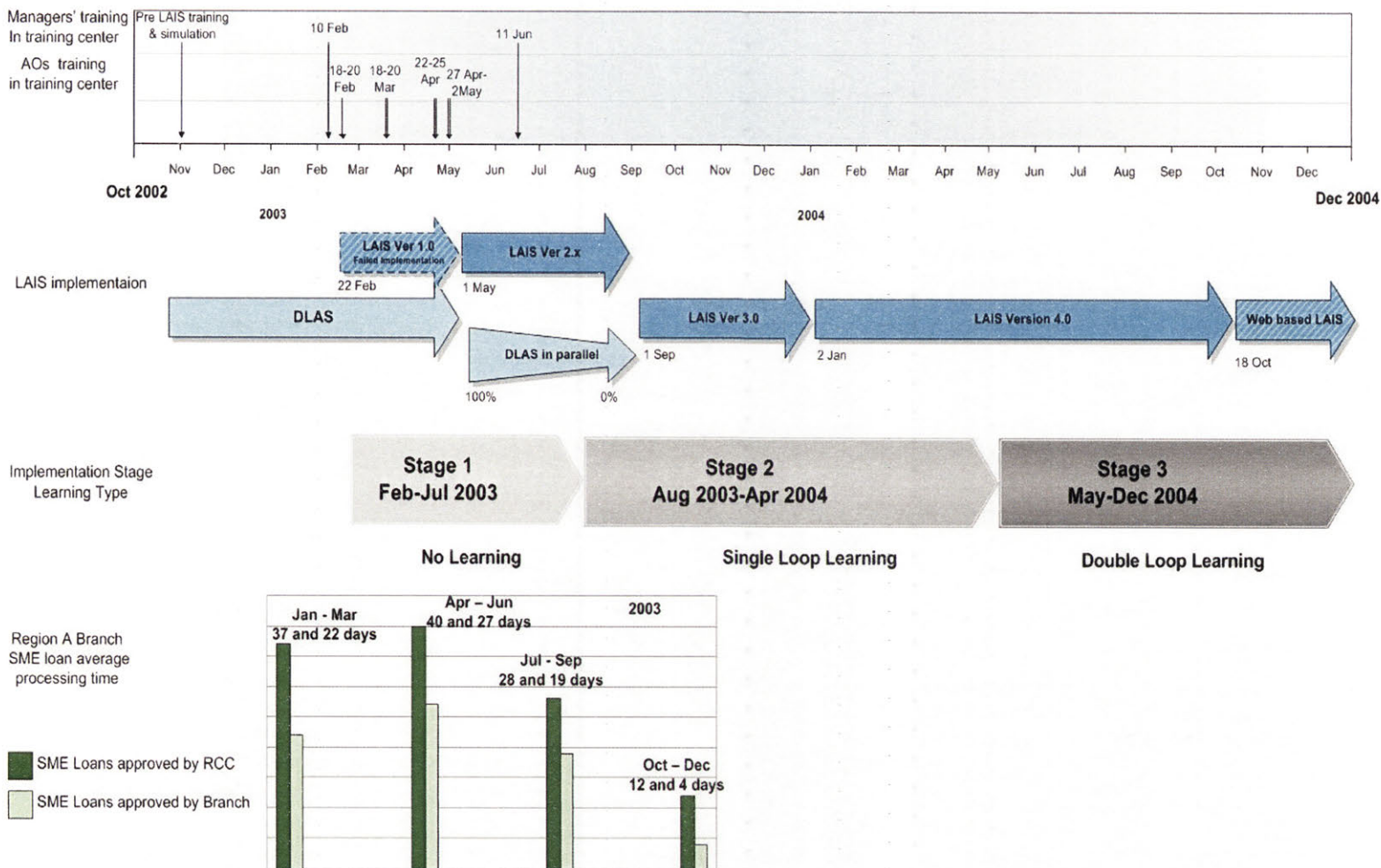
As it often happens, such unsettling differences and the lack of an obvious way of engaging LAIS in their work context prompted a search for meaning. The search for meaning initially involved individual, intra-subjective sensemaking (Account Officers and managers trying to make sense of the changes based on their experiences, knowledge, beliefs and attitudes). This search for meaning however soon grew to be a collective, inter-subjective sensemaking process. As these sensemaking processes enfolded Account Officers' and managers' understanding of LAIS – its purpose and its meaning in their work practices – got improved, thereby enabling the emergence of organizational learning. In the rest of this Chapter I interpret and explain how the learning in each region emerged through sensemaking. The Chapter ends by deriving conclusions about the relationships between LAIS implementation and organizational learning as they emerged through sensemaking. Further theorizing about the relationship between IS implementation and organizational learning and the ways in which both emerge through sensemaking, is the subject of the Discussion section.

5.3 Learning through LAIS in Region A

LAIS implementation in Region A started on 22 Feb 2003 with LAIS version 1. As we have seen in Chapter 4 this first attempt at implementation failed as the software of version 1 was immature, with obvious discrepancy between the actual conditions for SME loans and those implied by the software. Based on the lessons learned and the feedback from Account Officers LAIS version 2 was developed and implemented the 1st of May 2003. This was followed by versions 3 and then 4 used until 18 Oct 2004 when a Web-based version of LAIS was implemented (see Figure 5.1). This whole process of LAIS implementation can be interpreted from the organizational learning perspective. By drawing from Argyris and Schon (1978) organization

learning theory and in particular by applying criteria for specific learning process developed by Snell and Chak (1998), we can identify three major stages of learning.

FIG 5.1 LAIS IMPLEMENTATION IN REGION A



These stages were identified using the characteristics of ‘not learning’, ‘single loop learning’ and ‘double loop learning’ defined by Snell and Chak (1998), as presented in Table 2.1.

Generally, **Stage 1** is characterized by individuals feeling isolated and failing to understand new ideas and information; they cannot establish a link between the new situations and their previous experiences and mental models. This is why this Stage is named ‘not learning’. In **Stage 2** or single loop learning stage individuals demonstrate ability to understand the connection between their actions and the resulting outcomes; this enables them to adjust their actions so as to achieve the goals. This does not however mean that their mental models are necessarily changed. The change of mental models signals the beginning of **Stage 3** that is ‘double loop learning’ and broader understanding of their previous problems and failures. Double loop learning is connected with achieving deeper insight and seeing their work and their environment from a new perspective. While these are common characteristics of the three stages of learning they have concrete and specific meaning in case of LAIS implementation in the three regions, discussed next.

Note here that triple-loop learning has not been observed and hence is not discussed here.

5.3.1. Absence of Learning in Stage 1 of LAIS Implementation

Stage 1 is characterised by the absence of learning and lasted from the introduction of LAIS version 1 on 22 Feb 2004 to the second half of July 2004, that is, about 5 months. This is determined based on the evidence of Region A’s performance not improving in the first 5 months (see the bottom diagram on Fig 5.1 that shows RegionOA performance measured during 2003). In fact, performance first got worse. Compared to January-March the average loan processing time increased in April-June period: for SME loans approved by the RCC it increased from 37 to 40 days

and for loans approved by the Branch from 22 to 27 days; and then in July-September period the average loan processing time improved: it dropped to 28 days and 19 days respectively. This suggests that some time in late July Account Officers and managers started to learn and improve performance. This also coincides with diminishing use of the old DLAS and a more confident use of LAIS. However, based on the available evidence it is not possible to determine more precisely the end of not-learning and beginning of the learning period. More frequent measures of performance might have given me a better indication of the transition period but the transition itself was not sharp or clear cut. In fact there is an intrinsic indeterminacy in separating single-loop learning from not-learning period.

During Stage 1 LAIS implementation focused on individual training intended to prepare managers and Account Officers to adopt the system. The training for managers was conducted over two separate one day sessions covering some general aspects of LAIS use, while the Account Officers received four separate three-day sessions focussing on more detailed aspects of LAIS (see top of Figure 5.1). Being the pilot project, LAIS implementation in Region A involved frequent changes of the software (LAIS version 1 underwent hundreds of changes), majority of which resulted from objections and criticism by Account Officers. This made the training less effective but increased confidence that the issues raised would be addressed (by LAIS developers). Overall training helped Account Officers understand the fields and the screen forms they were expected to fill in but, as several Account Officer explained, they faced problems with data input and the lack of understanding how the data are processed in the system.

After the initial problems with version 1 were resolved and version 2 implemented it became evident that the Account Officers were still not able to use LAIS in their everyday assessment of SME loans due to the disturbance caused in their work practices:

We have seen a big difference between DLAS and LAIS – DLAS used a story, while LAIS uses a score. I can see that not everyone is familiar with this yet. In DLAS, we were able to put in everything, but using LAIS we have to choose, and there are only three choices – good, good enough and not good at all. And I think this way of doing things is difficult for someone with no experience... If we look at LAIS – and this is just my personal opinion – there are a lot of limitations, and these limitations are guiding the way the Account Officers do their job. I admit, LAIS will make us faster, but on the other hand, there will be no growth in the Account Officers' experience and knowledge because they're only using the one limited system. (John, Manager and Senior Account Analyst in the RCC)

Account officers were not able to make sense of the changes introduced by LAIS – the scoring system, simplified data set required for assessing a loan, lack of thorough investigation and the way final decisions were made. While they did understand the data required (the fields to be filled in are practiced in training sessions) they could not grasp the idea behind LAIS and the purpose of its imposition. This is expressed among others by Sian:

I only use LAIS because I've been told I have to use it. But to be honest, I don't believe in it. How is it possible to evaluate client loan applications using this very simple analysis? I used to do far more rigorous analyses on these applications, and now I'm being asked to take responsibility for decisions made by a system I do not agree with. So now, we have implemented LAIS, and we use it, but we continue to use our old, manual DLAS to support its results. And I was told to do this by our Branch Credit Manager, and the Senior Account Officers. (Sian, Region A Account Officer)

Most of Account Officers felt they were forced to use the system even though they didn't believe in it. In fact they refused to use the system and more or less overtly continued to use DLAS in their everyday work. The Branch manager and senior Account Officers seem to have been in agreement in this regard.

Agustinus, a senior Account Officer confirmed Sian's claims but adopted a more conciliatory approach:

Let's look at it this way: we were doubtful, but the board of directors had decided that LAIS was going to be implemented. And Mr Hendra mandated that we must use the system. So yes, OK, we have to use the system – but how? ... When we first started moving from DLAS to LAIS, we needed a transition strategy. Our strategy was that if LAIS did not have the functionality we needed then we would use DLAS... When we were using DLAS and LAIS in parallel, we raised our issues with Miss Lian [Head of SME Loans in Head Office] – “these items are not available, but are very important, please put this functionality in the next version” and she passed this input on to Mr John Chen [EB Consultant]. We asked that the minimum standard of LAIS should include what we consider to be very important for decision-making, and EB improved the system several times, adding more functionality and making changes. Every time they added new functionality, we reduced our usage of DLAS, and that was the improvement process... (Agustinus, Senior Account Officer, Region A)

While Agustinus' explanation does not show any deeper understanding of LAIS, it demonstrates openness to the use of LAIS and willingness to cooperate with the Head Office and LAIS developers (Euro Band consultants) to further improve LAIS and ensure “minimum standards”.

Despite the training and some understanding of LAIS interface, Account Officers' and managers' initial experience with LAIS did not make the system intelligible nor did it make its mandated use justified. They kept asking “What does this mean? Why are we forced to abandon a well established and demonstrably successful DLAS practice with something unknown, risky and confusing?” These questions however had the force of brining LAIS implementation into existence as Weick et al. explain:

... when people confront something unintelligible and ask “what's the story here?” their question has the force of bringing an event into existence. When people then ask “now what should I do?” this added question has the force of bringing meaning into existence, meaning that they hope is stable enough for them to act into the future, continue to act, and to have the sense that they remain in touch with the continuing flow of experience. (2005, p. 410)

By asking questions about the meaning and purpose of LAIS John, Sian and Agustinus were at the same time bringing LAIS into existence, making it real for them in their work practices. This was their first attempt at sensemaking that in Stage 1 did not proceed to the question “what should I do?”. In this Stage LAIS became real but only as a tool with limited functionality that was ostensibly comprehensible, believed to be inferior to DLAS, producing non-credible outcomes (recommendations). It is of note that problems with LAIS were framed as an individual-level sensemaking issue: a search for meaning and for a plausible story to make it comprehensible. Even as Account Officers continued to use DLAS and in de facto rejected LAIS, they did not articulate this as their deliberated decision but rather their inability to comprehend and make sense of it in their work context and within their interpretive frameworks.

It is also of interest to explain why performance declined in the April-June period (see graph at the bottom of Fig 5.1) and presumably started slow improvement in the second half of July (which denoted the end of Stage 1 and beginning of Stage 2). As LAIS was mandated and not trusted Account Officers used both systems in parallel during this Stage. They continued with thorough investigation and analysis of each loan application according to DLAS and at the same time uploaded the required data into LAIS. As a result they became less efficient and needed more time to process each loan as Agustinus explained:

Initially we were using the two systems and the Account Officers at the time were complaining that LAIS was supposed to make things quicker, but it was actually slower than previously.

These efforts however were not wasted. Through parallel use Account Officers continuously compared the outcomes of the two systems and gradually improved both their understanding of and their trust in LAIS. In June-July they tended to rely more on LAIS and less on DLAS, which led to gradual performance improvement towards the end of July, thus indicating the start of Stage 2 (single-loop learning).

5.3.2 Single-Loop Learning – Stage 2 of LAIS Implementation

Stage 2 of LAIS implementation denotes single-loop learning where the key actors – Account Officers and managers – learned to adjust their actions so as to improve their performance and achieve goals. The first indication of some performance improvements appeared in July-September quarter of 2003 while a significant improvement was shown in the October-December quarter 2003. Although the Bank did not publish further evidence of performance improvements Account Officers reported that they continued to further reduce the average processing time during Jan-April 2004, but at a slower rate. Furthermore, as a senior credit analyst from the Regional Credit Centre confirmed, Region A reached its SME budgetary targets for 2003 while maintaining low level of bad debt. Single-loop learning therefore emerged from the late July 2003 and continued till April 2004 when first signs of mindsets change were observed.

As noted earlier there is no a single, clear-cut moment of the transition from “not learning” to “single-loop learning” Stage. The use of LAIS in parallel to DLAS helped Account Officers’ understanding as well as continuous improvements of LAIS version 2 based on their feedback. The need for DLAS documents backing loan approval decisions thus declined and from late July Account Officers tended to use LAIS more confidently. When on 1 September 2003 a more advanced version 3 was implemented DLAS was officially abandoned. Agustinus, Senior Account Officer, explained the final switch to LAIS:

It is true that when we first started using LAIS [we continued using DLAS as well]. So we were still using DLAS as a counter. But now we can see that a lot of DLAS functions we consider important are now available in version 3 of LAIS. Version 2 had some of these functions, but it still lacked features like back-to-back loans¹, or the limit of up to \$1 million [AUD]. Gradually, we’ve reduced our use of DLAS...

¹ A *back-to-back* loan is a form of business loan that meets the following conditions: For the loan to be approved, the client must have savings equal to or greater than the loan under application. The benefits of back-to-back loans are chiefly complex and substantial reductions in interest repayments, based on the amount of borrowed money being utilised at any given time.

Now [end of 2003] the Account Officers use LAIS to analyse loan applications for SMEs and they can process these applications faster. When we first used LAIS it was a trial and error process because we were still learning how to use the new system – we constantly needed to read the manual and we had a lot of problems compared to the old DLAS. But now, we are already accustomed to using LAIS ... the Account Officers are familiar with the system and our problems are now very few, so the process is very fast.

While in the Stage 1 the focus was on training in Stage 2 they more readily embraced ‘learning-in-working’ (Brown and Duguid, 1991) while using LAIS in their work context, carrying out their daily work processes.

The transition to single-loop learning Stage is also characterized by actors’ orientation to action and achieving targets. Account officers in particular have to achieve certain targets:

Account officers have annual loan targets, and as an Account Officer I have to reach these targets. To do this, I have to create new loans and handle existing customers as well. There are many different kinds of customers – some are easy to deal with and some are more difficult. ... The Account Officer is under pressure all year – not just on the 31st December, which is when our final evaluation occurs. We work the whole year to reach our financial targets, and we have to make sure our customers have utilised their entire loan by the 31st of December, [else the unused balance will be deducted from our total loans in the Account Officer financial target]. (Sian ,Account Officer)

While making sense of LAIS in their new work context – new loan business process, loan targets, variety of customers – an Account Officer asks the questions “What should I do?” “How can LAIS help me achieve my targets?” As Weick et al. (2005) suggest these questions have the force of bringing the meaning of LAIS into existence and making LAIS part and parcel of loan approval practices. Such Account Officer’s sensemaking involves the interplay of interpretation and action, that leads to achieving targets, or in other words single-loop learning.

Unlike Stage 1, in Stage 2 sensemaking was not limited to individual, intra-subjective sensemaking processes. Making sense of LAIS in context involved everyday social interaction, sharing of experiences and meanings within both formal and informal groups:

We've been trained to use LAIS – we don't have a problem with it – we just fill in the form and that's it. .. [But more importantly] every month we have a QG – Quality Group Meeting – and during this time we formally share our LAIS experiences, but in reality, we discuss our experiences informally, every day, within our group. (Lily, Account Officer Region A)

The Manager of SME Loans in Region A, who himself was an instructor in LAIS training, confirmed that learning through socializing was more important:

I was one of the instructors ...I feel that socialising between Account Officers is far more important [for LAIS implementation] than formal training sessions.

Through socializing, including everyday informal workplace interaction and regular QG meetings, Account Officers and their managers shared their interpretations and meanings attributed to LAIS and its use in loan approval practices, as well as their expectations and fears regarding performance implications. Account Officers' learning was primarily social, emerging through intertwined intra and inter-subjective sensemaking. Learning through socializing, knowledge sharing and collective sensemaking was possible due to good mutual relationships and non-competitive work situation:

We never have any problems between the Account Officers, never. Of course not. ... it's because we don't get paid any commission based on our achievements. We're not competing against each other for commission, so we're all happy to share information. This is how it has been set up for the newly implemented LAIS. (Sian, Account officer)

The experiences and observations from the field confirm the social character of organisational learning (Broendsted and Elkajar, 2001) and the importance of the

social context of learning (Robey, 2000). Learning-in-working and a non-competitive work environment was conducive to sharing of actors' experiences and knowledge and their collective making sense of the new system and new practices, thereby enabling achievements of performance targets.

So far it's OK, but we still don't know for sure. For this first year, it's been OK ... When we were using the DLAS system to process SME loans it was a thirteen to eighteen day process. Now, using LAIS, it's a five to seven day process and yesterday we were able to process an urgent application in only one day.

We all use LAIS and it isn't too bad ... Our branch has achieved one of the highest national targets across BCA, but we still need to keep learning. And we have won many new clients – we're not just maintaining our existing clients. (Agustinus)

Targets were reached by the whole Region A as John, Senior Credit Analysis, RCC, explains:

We almost reached our SME budgetary targets this year, and of all the BCA Regions, we achieved the highest results. This achievement has been a complex process – our levels of customer service, as well as the bank's image have been very important.

Before we implemented LAIS, the average time was 13-18 days, but now using LAIS it's at most 6-8 days. Processing times are cyclical, and you'll see differences in each branch from January to February to March, but there are significant differences between the time before LAIS was implemented, and the time after – we've moved up a level. Now, our processing times are significantly faster than before. The average is 6-8 days because some branches are far away and we require 2-3 days to transport our documentation. Overall, it's safe to say that we now only need at most four working days to process a loan application.

Achieving targets confirms that the learning took place. But more than that it also suggests that through their interaction and inter-subjective sensemaking Account Officers and managers reduced equivocality and developed plausible meanings of LAIS in their work context. As a result confidence in LAIS and the new processes increased:

... my confidence in LAIS has increased. If we're talking about bad debt, as an Account Officer, we can't really predict anything. But if it is about the prudence of the loan approval, we know this when we are going through the approval process – we have a feeling, and this is probably a result of experience. When I meet a customer, I get a feeling about whether or not this person has a good business or not. And after the implementation of LAIS, the bad debt hasn't increased, so I think LAIS is as good as DLAS. (Sian, Account Officer)

Increased confidence also demonstrates the linking of past experience and expertise with new conditions with LAIS-based loan evaluation and approval.

5.3.3. Double-Loop Learning -- Stage 3 of LAIS Implementation

While developing their meanings and advancing their confidence in LAIS in Stage 2 actors relied on their acquired experiences and used their trusted frameworks. Their existing frameworks and mindsets were both enabling and constraining: enabling, as they assisted them in understanding and achieving targets; but also constraining as they prevented them from gaining novel insights and testing new frameworks. The first signs of doubts towards the existing interpretive frameworks and explicit referencing to the 'old' understanding of loan processing were identified towards the end of March and beginning of April 2004 – indicating the emergence of double-loop learning (see Figure 5.1).

The change of mindset and the need for all Account Officers and managers to develop new interpretive frameworks as part of LAIS implementation have been identified by all top managers as key problems from the very beginning. LAIS was seen as the major catalyst for organizational change. The change of mindsets and interpretive frameworks in an organization are by definition characteristics of double-loop learning.

The concerns regarding the persisting ‘old’ way of looking at loan assessment and processing are expressed by Ruud, General Manager, National Credit Division, later in 2003:

I know that many Account Officers are still looking at things in the ‘old’ way, or at least looking at things simultaneously from both a DLAS and a LAIS perspective. They need to understand that LAIS was developed for them, to help them better adapt to their workload and give them the ability to speed up their approval process and handle more customer accounts. In the end, they ultimately have to accept the new way of doing things...

While Account Officers in Region A managed to accept ‘the new way of doing things’ throughout Stage 2, the transition to new mindset and the ‘new way of looking at things’ required further and deeper changes in organisational sensemaking.

First it required bridging “gaps in knowledge [that] exist between what Head Office knows and what the Branches know” as the General Manager expressed it. The gaps in knowledge included different understanding of the SME loan business, risk management policy and the role of Account Officers – all of which was encoded in and enforced by LAIS. From the sensemaking perspective these gaps in knowledge can be seen as discrepancy between, on the one hand, the new generic, organizational knowledge (at the generic-subjective sensemaking level) espoused by ‘collective agents’ (top management) and, on the other, existing experiences and individual and collective knowledge by Account Officers and branch managers (at intra- and inter-subjective sensemaking levels). This discrepancy caused tensions most evident during Stage 1 when LAIS – the bearer of the new generic meanings and knowledge – was first introduced. The tensions to some extent diffused during Stage 2 when discrepancy in knowledge lessened as Account Officers and managers learned about and practiced LAIS application and changed their behaviour. However it is not until Stage 3 that knowledge discrepancy diminished and the tensions eased as Account Officers demonstrated the change of their mindsets.

The change of mindset is evident from Account Officers' realization that the key changes introduced by LAIS are in fact the risk assessment in SME loan approvals and risk management policy enforcement. Ms Sian, among others, explained that she became more confident in using LAIS as her mindset changed. She became aware of the differences in risks and risk policy between small (under \$1 M) and larger loans (above \$1 M). Once she understood that in small SME loans what matters is that "the mortgage will cover our risk" her mindset had changed.

Secondly, a deeper change in organizational sensemaking occurred in relation to the Account Officer's role. In fact, as Andrew (Head of Region A Credit Centre) explains, the goal of creating the new Account Officer role (and abolishing the credit analyst and marketing officer roles) was "to change the staff's mindset".

As credit analysts and marketing staff became Account Officers their roles, tasks and responsibilities changed:

We consider the new Account Officer role to be more focussed on marketing than credit analysis. 75% of the Account Officer's time is spent on marketing, and 25% of their time is spent inputting data into LAIS (Lian, Head of National SME Business / LAIS Project Manager)

When she visited a branch in Region A in June with the Board of Directors they explained

that the purpose of LAIS was to allow the branch more time to recruit new customers, because previously, where the split of time was 25% marketing efforts and 75% credit analysis, we wanted to flip the split so that the Account Officers spent 25% of their time on standard analysis, and 75% finding new customers. After this meeting, the branch finally understood our aims ...

Maintaining existing and sourcing new customers was for many overwhelming:

From last May, all credit analysts and marketing staff became Account Officers. ... I'm more stressed now than I used to be. Before LAIS I only processed data, but now I need to maintain customers as well – not to mention if overdrafts happen. ... (Sian, Account officer Region A)

When we started as Account Officers, we were given 30 accounts, plus we needed to source new accounts by either pursuing new customers, or getting 'drop-in' customers that came into the branch themselves. I haven't had any luck bringing in new customers from outside BCA. I tried cold calling, but it's not easy and I never got a customer out of it. Then, I started approaching existing customers, asking if they wanted to extend their loans, and from their recommendations, I was also able to approach their associates – suppliers and buyers, for example – and this is how I've brought in new business. When we bring in customers this way, we don't need to entice them with other incentives – all we need to do is give them good service. Our only capital is a good smile and good service! [Laughs] (Sian, Account officer Region A)

These quotes illustrate the degree of change and the implications for credit analysts and marketing staff who became Account Officers in terms of the nature of role, tasks involved, skills required and personal identity.

The transformation of Account Officers' role was part of the organization structure change which implied the change of generic meanings. With the change of role and normative expectations Account Officers had to change their own identity and reconstruct who they were. The change of role as defined by top management in the Head Office expresses what they thought Account Officers had to be as organisational actors. This meant a change of image that destabilized Account Officers' identity. From the sensemaking perspective this new image was part of new generic meanings that were supposed to shape actors' interpretation and action. This can be interpreted as 'sensegiving' which Gioia and Chittipeddi (1991) define as creation of meanings for a target audience. Top management did create new meanings for Account Officers: new image of Account Officer role within the new organisation structure and SME loan approvals processes. It is these processes of top

management sensegiving and the way they got intertwined with Account Officers' individual and collective sensemaking that led to understanding and enactment of these new meanings and in turn enabled the Bank to re-define itself (Gioia and Thomas, 1996).

The change of the mindset and socialization of staff into the new role was assisted by proliferation of a metaphor: Account Officers dealing with SME loans are compared to 'general practitioners' who treat common illnesses, for which 'specialist doctors' are not needed. This metaphor was first coined by the SEA Bank President as the very beginning of LAIS project and later on cascaded down to regions and branches. For example Surya, Head of Region A used it when he argued that LAIS is a good solution for SME loans:

Our staff, the newly formed Account Officers, used to process SME loans extremely rigorously using DLAS, but they didn't understand the nature of SME loans, which requires that the customer provides at least 100% collateral. As Mr Smith [president and CEO] has told us on several occasions, [Account Officers dealing with] SME loans are like general practitioners treating a common illness, and we don't need a specialist doctor to treat a common illness. SME loans are not complex, so LAIS is a good solution to the problem.

Account officer Sian used the same metaphor to explain her interpretation of risk management and her role:

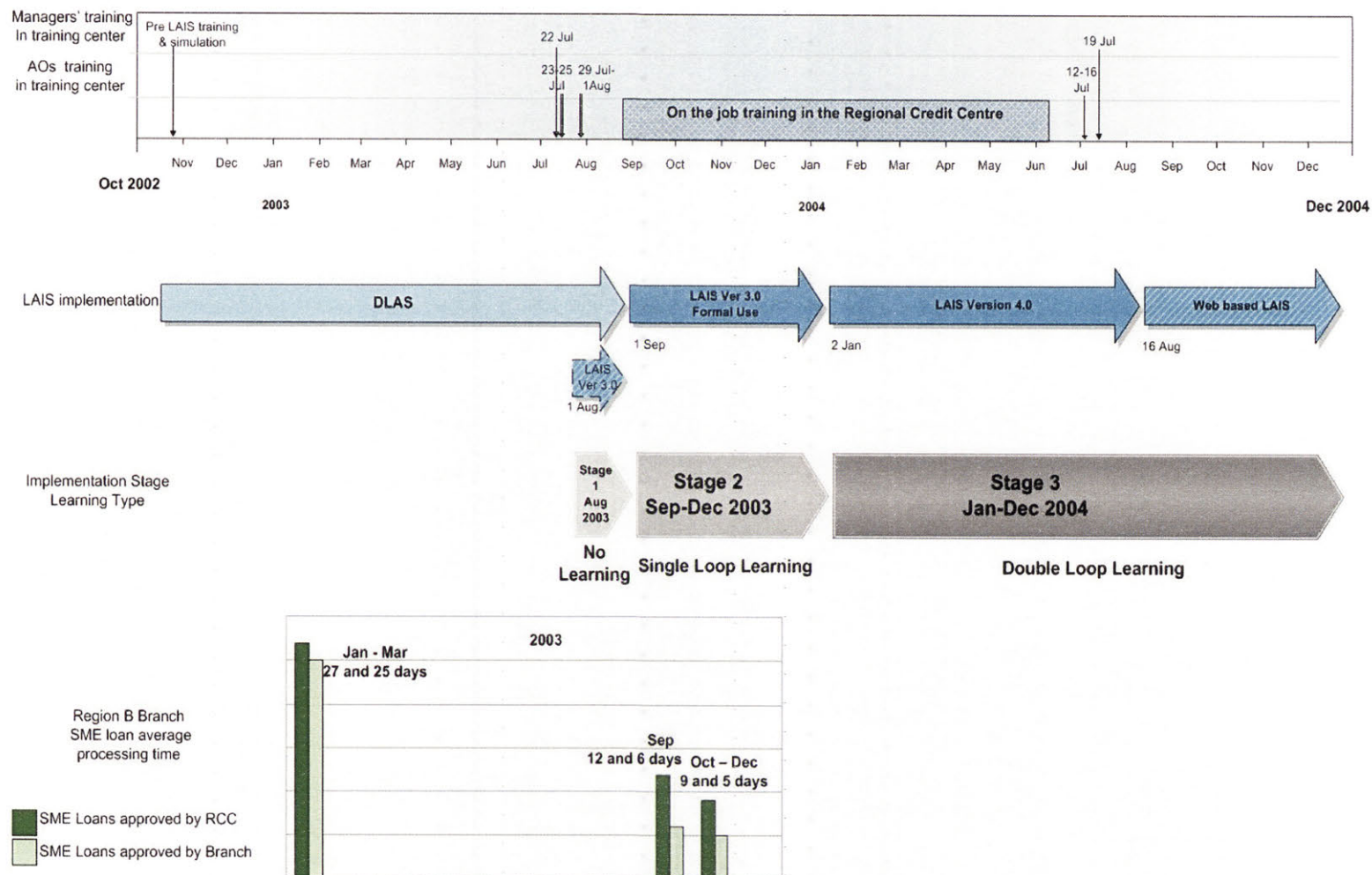
If the loan application is under \$1 million [AUD], we now only look at the mortgage amount when conducting our analysis. If the business isn't going as well as we'd like, but the mortgage will cover our risk, then we'll approve the loan. To use a metaphor, general practitioners are different to specialists. General practitioners only look at general things, but specialists, which in our case would be a loan of more than \$1 million [AUD], requires a more detailed analysis, because the mortgage will only cover 50% of our risk. So we need to make sure that the business applying for the loan is 100% solid, so that we feel confident that we're making a prudent decision. So I think that using LAIS is OK, so long as the loans are no greater than \$1 million [AUD].

The proliferation of the ‘general practitioner vs. specialist doctor’ metaphor shows that the change of extra-subjective or cultural meanings had taken place. This was also the case with the four-eye principle mentioned earlier. Like company stories, myths and metaphors are part of organizational culture that is by definition extra-subjective (see section 2.4, Cecez-Kecmanovic, 2004). Belonging to extra-subjective sensemaking, proliferation of metaphors provided common language that enabled actors understand each other especially with regards to major organizational changes going on. Staff in branches appropriated the new interpretive framework which helped them change their mindsets, appreciate the change of processes and roles and also re-construct their own identity.

5.4 Learning through LAIS in Region B

LAIS implementation in Region B was the second pilot project. Its implementation started unofficially on the 1st of August 2003 but formally it was the 1st of September 2003 with LAIS (version 3). Since then the implementation went through three stages as presented in Figure 5. 2.

FIG 5.2 LAIS IMPLEMENTATION IN REGION B



5.4.1 Not Learning -- Stage 1 of LAIS Implementation

Compared to Region A, the ‘not learning’ Stage was very short, one month at most. In fact this was the period they trialled LAIS version 3 before embarking on its exclusive use. From the very beginning Region’s managers had confidence in LAIS and were highly motivated to implement it efficiently and effectively. To this end they organised training sessions (two 3-day sessions for Account Officers and one day session for managers) prior to implementation.

Training outcomes however were not dissimilar to Region A. Account officers in particular were disappointed with the training and ensuing LAIS implementation. In an Account Officer’s view:

As for my personal view – are you asking me my personal view and my personal view only? I prefer DLAS – plain, old DLAS... I think my staff and I prefer DLAS in part because of the mistakes made in our initial LAIS training sessions. All we were taught was if it’s ‘grey’, refer it to the Regional Office, if it’s ‘white’ you can do it yourself. But after LAIS was implemented, we came across many problems, many complex problems that we had not been prepared for. And the Regional Office doesn’t understand these problems... – they’re not immersed in the field, and if we ask them questions, they just tap their hands on their desks and say “just do it like this” or “you need to do ‘this’ and ‘that’” – they’re all talk. What we need from them is real involvement – they need to come into the field and assist us, but that has never happened.

After we had our training, we were just asked to give some input and that was it – we were abandoned. The Account Officers are all different, and we’ve all experienced different problems – we’re all new at this (Harry, an Account Officer).

As this view illustrates, LAIS training in Region B showed some similar problems to training in other regions. LAIS is presented as a tool whose screens, data fields and functions had to be learned. The purpose, content and the essence of change that is introduced by LAIS implementation in loan application processing have not been discussed. Furthermore, the training was focused on individual Account Officers,

their comprehension, and understanding of the system. Such an approach is based on the assumption that their jobs of processing and evaluating loans are solitary activities except when they talk to customers. After the training Account Officers felt abandoned as no further support for LAIS implementation was provided.

During this trial period Account Officers did not learn. While this ‘not learning’ Stage in Region B was much shorter than in Region A, characteristics are pretty similar. Account officers were confused as Harry honestly admits:

In the beginning, I think we were all a bit confused, but it wasn't a problem because we were all in the same boat – we were all confused!

Account officers did not believe in LAIS nor did they understand the purpose of its implementation. Their extensive experience in loan approval processes using DLAS made them view and assess LAIS from the perspective of DLAS-based practices. LAIS was not good because you cannot do the same kind of assessment as you do in DLAS. So they did not trust the new system and were convinced that it is actually wrong. For instance, Harry claimed that LAIS is prone to error:

... LAIS uses a scoring system... And I can tell you; this only happens in LAIS, that using this scoring system, the bad customers get good results. We're working on this here in [Region B]. When we get bad results in DLAS, we reject the loan; but in LAIS, sometimes the result is good and the scoring is good, but the company is bad... It's happened here that bad customers can get a good result in LAIS – it happened to one of my colleagues, but I can't be sure whether or not it was because of bad inputs. I don't understand why, but many people have said there have been good results where they should have been bad...

These claims however were never substantiated. Harry, like others, could not make sense of LAIS and why would the Bank want to implement “such a bad system”. This is an example how Account Officers struggled to understand the meaning of LAIS and its value to the Bank.

The manager of the main branch in Region B, Rudi, appreciated that his staff had legitimate objections during the trial implementation of LAIS:

There were people on my staff who had a lot of trouble learning to use LAIS, and many of these people wanted to learn, but they didn't have the time, they were overloaded with work, everything was too rushed – it was too much.

The 'not learning' period was characterized by Account Officers struggle to understand LAIS and their attempts to learn to use it and make sense of it in their practice. Despite their willingness to learn they failed to understand why LAIS was implemented and remained sceptical of its worth for loan assessment process. Failure to learn can be partially attributed to insufficient and inadequate training that focused on data entry skills by Account Officers and their individual cognition processes, without considering the broader work context and the social nature of work. This was further complicated by the work overload pressures to improve performance.

5.4.2 Single-Loop Learning -- Stage 2 of LAIS Implementation

Rudi, the manager of the main branch in Region B and his superior, Victor, the manager of Regional Credit Centre of Region B, were both very much aware of the problems faced by Account Officers in the branches. They both learned about the experience from Region A where the introduction of LAIS took six months without signs of learning (no improvement of performance). So they were both keen on moving fast and switching completely to LAIS without allowing DLAS in parallel. Rudi who adopted Victor's strategy in his branch explains how it worked:

I never did what they did in Region A, I just did a direct cutover from DLAS to LAIS. It's true in Region A they used an earlier version of LAIS and there were a lot of bugs, so they couldn't see the value in it. But here in Region B, I just did a direct cutover. It was difficult, very difficult.

All the Account Officers in Region B attended the SME loan training, ... and then they started practising using LAIS with real-life cases. Basically, we had a three-

week transitional period where we stopped using DLAS and started using LAIS, even though at the time the Branches still had not mastered LAIS. We helped them out for a few weeks, perhaps a month. We started with LAIS version 3, which was in early August, and 1st September was our cut-off date to cease using DLAS.

This effectively meant that as of 1 September 2003 Account Officers could only use LAIS for their SME loan application processing. One problem that did surface was that the Account Officers were not adequately skilled to perform the credit analysis. There was insufficient staff and time to adequately train the Account Officers to do their tasks. To assist in this changeover (and also to overcome issues encountered in previous official training) Victor introduced on-the-job training and invited Account Officers from all the branches to the Regional Credit Centre:

Some of the Account Officers had trouble with the changes and felt inferior, I think, so we had to go to them and help them one-on-one. When this happened, I moved everyone into the one place, which made it easier to look after the Account Officers and it encouraged communication and the exchange of information and knowledge amongst one another. This could not have been done if they were all alone in their offices. We got a real benefit out of this, they very quickly began to share work, it was like ‘bang, bang, bang’ – very fast.

On-the-job-training was done on a rolling basis so that at any point in time two Account Officers from each branch were involved for three days in the Regional Credit Centre. The way they organized the three days of training had a very positive outcome, not only to make the Account Officers more skilful in the implementation of LAIS but also to share and learn the ‘how’ and ‘why’ of the LAIS implementation from more experienced staff. Victor explained the process:

When new on-the-job training Account Officers arrive on Monday mornings, I first have a talk with them – I try to understand their problems, we share ideas and discuss the role of the Regional Credit Centre, why we use LAIS, the current condition of the Regional Credit Centre, the best way to undertake analysis and how to get the right results. Then I ask them to observe others using LAIS, before they practice using LAIS themselves. During this practice we figure out what mistakes they make and what inadequacies they have. There are many variants of LAIS in the different

Branches, and because of this, the Account Officers often make mistakes... I'm not expecting zero mistakes – that's not possible – this is all related to people have different perceptions and understandings. Sometimes, an Account Officer might think a loan application is good, but from our point of view it doesn't have a high enough score. In the end, the result will be different, but we don't see this as a big problem – it's just a difference in judgement and meticulousness.

This really has been an effective program, and we are being asked to run these sessions on a routine basis. It seems that this way of doing things is the same as training eleven branches simultaneously, with all the value of discussion and real-life practice... Yes, Head Office is going to adopt my idea and implement it in other Regions.

On-the-job-training proved to be highly effective. Account officers completed their regular jobs while getting help from experienced staff and discussing all the issues they had with LAIS application. Furthermore, training, working and collaborating were target oriented: everybody was aware of the goals to be achieved, both individually and collectively (at branch and Region levels).

Performance improvements in the Region B were seen very soon after the cutover: for loans approved by a branch the average loan processing time dropped from 25 days in Jan-March 2003 period to 6 days in September 2003; and for loans approved by RCC from 27 days and 12 days (see Figure 5.3). At the same time more loans were processed so the volume of money landed increased. Victor oversaw performance improvement for the whole Region B:

I've done the calculations and analysed the data from different branches, and things are definitely faster now that we've implemented LAIS. When we first implemented LAIS, the difference in speed wasn't that significant, but now that we've standardised the process we can approve loans more quickly. Let me give an example: using DLAS, it took 2-3 weeks to process a loan, at least 2-3 weeks. After implementing LAIS, however, our initial reductions in time taken were probably only 20-30% ... it depends on the Branch you're looking at. Here in the main Branches we were much faster, but in any given Branch in Region B, the average volume of output had

increased by more than 50%. So in the same amount of time as it took before LAIS, we were processing more loans and even though we were making better use of our time by about 20-30%, we were yielding 50% more results...

From the above evidence it can be argued that the first-loop learning period started soon after the transition to LAIS on 1st September. First-loop learning was enabled and stimulated by on-the-job-training that engaged both intra- and inter-subjective sensemaking. This is because Account Officers are not left alone to their individual comprehension but instead took part in a communal, collaborative practice. The intensity of communication and collaboration among all involved was very high. A collaborative working environment that was created was conducive to the convergence of individual views into shared views and insights. The evidence from the field confirms what Brown and Duguid conclude from their analysis of Orr's (1990) example of service technicians' work:

Not only do we see ... that the learning is inseparable from working, but also that individual learning is inseparable from collective learning. The insight accumulated is not a private substance, but socially constructed and distributed (Brown and Duguid, 2001, p. 46)

This raises some further questions: how are shared insights created and how do individual and collective learning emerge? From the evidence and observations in Region B it can be derived that shared insights are created to the extent that actors engage in interactive talk, exchange their views and their personal interpretations of an issue at hand using common language, then question them and re-articulate them in a simpler and more communicable form. In such away they make their insights explicit and public, collectively authored, as well as simpler and orderly. In other words individual experiences and insights into a situation are *talked* into collective insights. As this occurs the situation acquires *shared existence* (to paraphrase Taylor and Van Every, 2000).

As Account Officers engaged in on-the-job-training and continued use of LAIS in practice the emergence of shared meanings and insights was not limited to the group residing in RCC at any point in time. Rather Account Officers themselves reported their continued sharing of knowledge within a branch, among branches and between branches and RCC. But it is important to understand that the key instigator of such a sharing is revolving gathering of Account Officers from different branches in RCC (during on-the-job-training.

The making sense of organizational practice and the way it is transformed by an IS can be seen similar to medical sensemaking that Weick et al. (2005) talk about, which is "much a matter of thinking that is acted out conversationally in the world as it is a matter of knowledge and technique applied to the world", (p. 412) The emergence of single-loop learning is thus shown to involve both individual knowledge and intra-subjective sensemaking as well as the convergence of intra-subjective into inter-subjective sensemaking and understanding.

Although successfully adopting LAIS and significantly improving performance Account Officers did not change their mindsets. Their individual and collective views and believes remained embedded within their long acquired interpretive scheme. They mastered the use of LAIS, changed their practices and became highly efficient but still failed to understand the essence of LAIS and the depths of change in the SME loan business. Being in close contact with Account Officers Rudi, the manager, understood that persisting mindsets are limiting further improvements:

...It's about understanding the underlying scoring system in LAIS. We need to understand the essence of LAIS. ... [if we don't learn further and change mindsets] of course our staff will do the same thing and we'll never move forward.

And learn they did. The first signs of mindset changing surfaced towards end of 2003 and begging of 2004.

5.4.3. Double-Loop Learning -- Stage 3 of Implementation

Double-loop learning was characterized by changing mindsets, further performance improvements and decreasing tensions between the Head Office and branches in relation to structural changes imposed by LAIS introduction. Both managers and Account Officers also demonstrated deeper learning and reflexive attitude towards their past interpretations and ways of seeing the SME loan business.

The challenge for Account Officers was to understand the new approach to risk management which is encoded in LAIS as a scoring system and also the four eyes principle adopted in LAIS-based loan approval process. As Rudi often pointed out, it is not about mastering technique, it is about “understanding the underlying scoring system in LAIS”. This is because, he argued, LAIS and DLAS are essentially different:

My question is this: Did DLAS have any boundaries or parameters? No. So the quality of DLAS was dependent on the quality of the Account Officers. There was no underlying logic in DLAS, but LAIS is different – there are clear definitions that work towards a goal... We need to understand why we get ‘black’ outcomes, and we need to relate that to the data we input into LAIS in order to develop our experience and understanding. We didn’t have that in DLAS – we just accepted good wording and ‘bang’ [claps hands] that’s it. I think LAIS will inevitably sharpen the Account Officers’ minds.

Convincing evidence of performance improvements without increasing bad debt (in some cases bad debt even decreased) enhanced Account Officers’ confidence in LAIS and the new practice of loan processing. These experiences and enhanced confidence with LAIS-based practices puzzled them and made them question and doubt their previous convictions and ways of seeing loan processing through DLAS. This was the prerequisite for changing their interpretive schemes and adopting a new mindset.

The new mindset that emerged in early January 2004 was characterized by a broadly shared view that LAIS does not only imply the “change of loan processing technique” but more importantly a “change of underlying philosophy of SME loan business” as one Account Officer put it. In other words LAIS was not only entailing “a new way of doing things” but also “a new way of seeing things”. Its meaning was re-constructed out of actors’ intense engagement with LAIS in practice and accumulated experiences, communicated and shared within and across branches and between branches and the RCC. This was a particular phenomenon observed in Region B. The convergence of individual into collective sensemaking and the change of mindset by actors in a branch characterized double-loop learning in other regions. However, in Region B simultaneous convergence of meanings and mindsets among all actors – Account Officers and managers – took place on a larger scale, across the Region. Within a branch actors’ learning can be seen embedded in and contributing to ‘communities-of-practice’ (Love and Wenger, 1990).

In Region B where Account Officers from all branches continually circulated through RCC’s training – in Victor’s words “this way of doing things is the same as training eleven branches simultaneously” -- ,formation and emergence of new mindsets were not limited to a branch but also happened across branches. Through shared training and practice individual actors changed their own interpretive schemes as part of their building collective, inter-subjective understanding while staying in RCC. This in turn triggered further, distributed (individual and collective) sensemaking once they return to their branches. Circulating participation from the branches and continuing contribution to the distributed community meaning making and interpretation led to the emergence of ‘community of interpretation’ in the Region. Brown and Duguid (2001) propose that it is “through the continual development of these communities that the shared means for interpreting complex activity get formed, transformed, and transmitted” (p. 47).

An important enabler of such an emergence of community of interpretation is shared language. In Region B “We speak the same language because we openly discuss our problems, and often, we all experience the same issues” – explains Harry. This is to a large degree a result of a non-competitive and cooperative work environment.

It is important to note that the convergence and reciprocal co-creation of collective sensemaking throughout the Region appropriated generic meanings embedded in LAIS and new loan business processes. This appropriation however was not in the form of abstract knowledge and rules. Rather generic meanings, such as risk management policy, were understood within their work context, infused with the intricacies of practice.

Implications of double-loop learning were visible quite soon. Account officers achieved their work targets very quickly, as demonstrated by Victor’s testaments:

Everyone has accepted the new system and there are only a few minor technical constraints – there was a gap in technical knowledge and some detail, but now it’s much better... We have only been doing this for eight months, but already our service levels have increased, and what I mean by LAIS ‘service levels’ is the time required to approve a loan. Currently, the time taken to approve a loan is only two or three days.

... [Overall] we’ve had incredible growth, and some of our branches have already reached their 2004 annual targets in less than four months, and in general the other branches have almost achieved their targets.

The advanced knowledge and the changing mindset have also a liberating effect. Actors had become more reflective towards the use of LAIS and its meaning in practice. For instance, Rudy re-interprets the ‘four eyes’ principle and puts it in a broader perspective in relation to prudence in loan decision making by taking an example of the local textile industry:

Currently, our country's textile industry is at a standstill. There's probably only one company that's technically still viable, and LAIS would approve its loan application. Having said this, however, I can see that this company cannot survive a loan – the moment one of this company's business associates collapses, this company will collapse as well. This is what happens in the field, and because of this, I will prevent the loan from being approved, even though LAIS says it's 'OK'. The final decision regarding the prudence of a loan is always on the human. And yes, I understand the importance of the 'four-eyes' principle. It's good in that there is a 'push-pull' between the two perspectives, but on the other hand, the final decision is always coming back to the human being, and we can't change this using a paper trail – we just can't. This is my opinion on the matter...

Another example of reflective attitude towards LAIS and the 'four-eyes' principle comes from Nur, a senior Account Officer:

... It's been eight months since the initial LAIS implementation and everything is OK now. We still have some problems, but these are caused by external factors which we can't avoid or control. But internally, we try to do our best and all our staff has done really well when you compare our current situation to how things were when we first started [in August 2003]. Ever since we implemented version 4 in December [2003] things have been running really smoothly... In my opinion, I think the concept of the 'four eyes' principle is really very, very good, and it's good because I'm not just creating something out of nothing, what we're doing is tangible, and the SEA Bank is really a step ahead of the game. At the moment, we have to disperse a great deal of credit, and it's like a race for us to disperse these credits. Just like the throttle in a car we need a break, and the 'four eyes' principle is our break.

Nur's use of the 'car throttle-break' metaphor indicates a deeper understanding and a way of re-articulating the major principle underling LAIS and the new practice. She uses everyday language to express hers and her fellow Account Officers' new understanding of the changes as well as her satisfaction with the changes. Both Nur and Rudi use metaphors and stories to convey their insights into the new reality of the SME loan business. These examples also indicate that the extra-subjective or cultural sensemaking got involved in the Region's double-loop learning.

In summary, Region B was highly successful in their implementation of LAIS and achieving targets. Victor was very proud of their successful transition to LAIS:

As for the amount of time it took us, yes, we were very quick, it took us less than two months [including the formal training] to formally and fully implement LAIS, whereas it took Region A six months! Yes! Yes! It was all finished on the 1st September, so this was excellent. From the beginning, we had a strong understanding of what LAIS was, what the Regional Credit Centre was supposed to achieve, and we got everything working – the people, the facilities and the training.

The successful implementation of LAIS in Region B, as Nur explains, has prompted further organizational changes:

The success of the LAIS implementation has been the catalyst for the formation of new Regional Administration Centres, which will aim to better support work in the Branches. In May 2004, Region B will become the pilot Region for the first Regional Administration Centre, and it's hoped that this will make other more general staff working in the Branches available to focus on marketing and service work, and some of them may even become Account Officers.

The success in Region B has been noticed and commended by General Manager, National Credit Division:

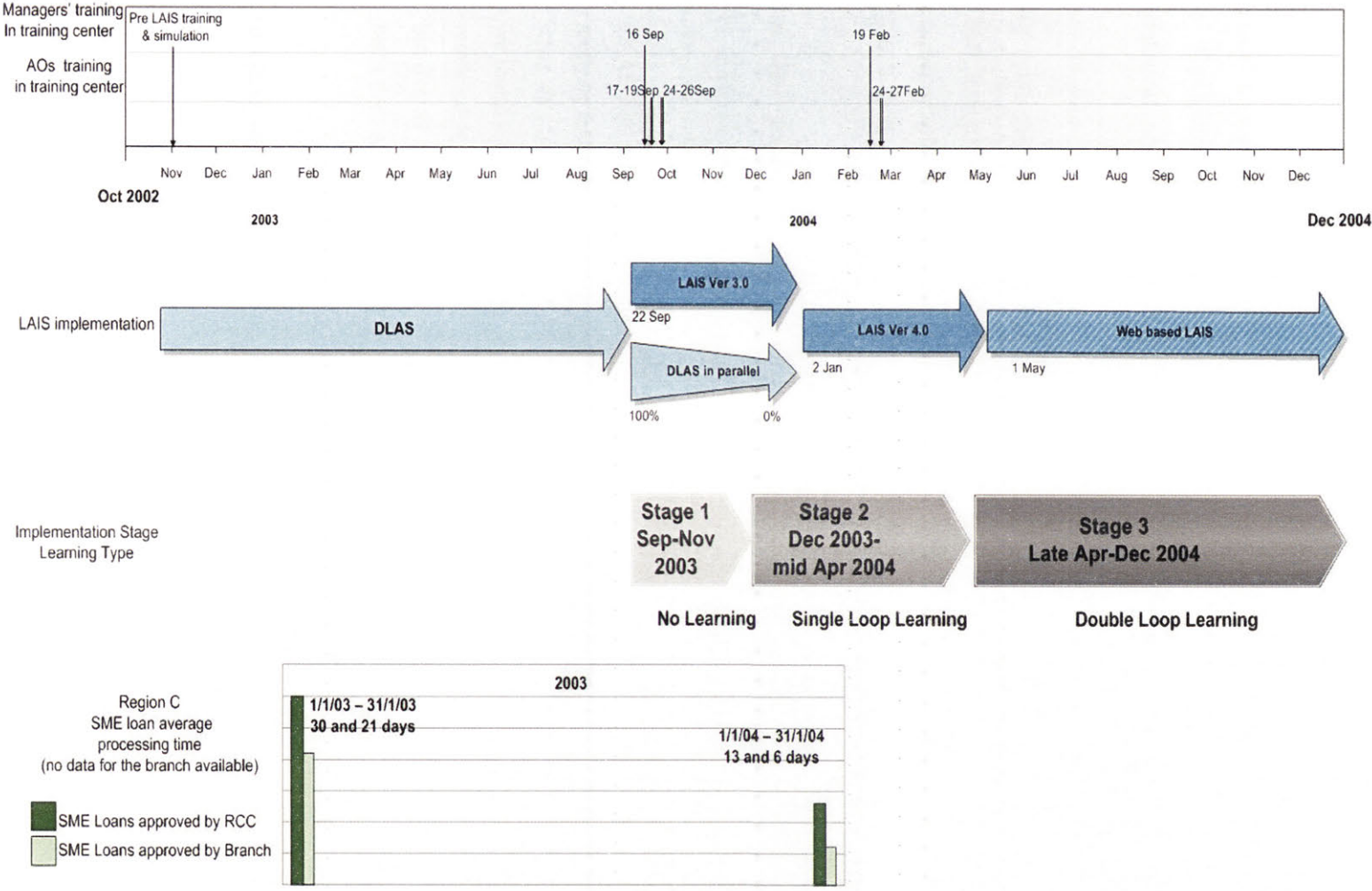
Victor had a great idea though, he has started calling in two Account Officers at a time and getting them to do on-the-job LAIS training in the Regional Credit Centre. He's kept it rolling continuously, so he's constantly bringing in new Account Officers to train. We want to apply this idea to all our Regions to ensure each Branch has the same understanding as their Regional Credit Centre...

5.5 Learning through LAIS in Region C

LAIS implementation in Region C was part of the “third wave” that included other four regions. Implementation started in 22 September 2003 with LAIS version 3 which was a quite mature version already field-proven in Region A and recently

implemented in Region B. Since then the implementation went through three stages as presented in Figure 5.3.

FIG 5.3 LAIS IMPLEMENTATION IN REGION C



5.5.1 Not Learning - Stage 1 of LAIS Implementation

While LAIS version 3 spared Region C a lot of difficulties associated with earlier versions, the adoption of LAIS was unexpectedly slow with Account Officers experiencing problems and raising objections not dissimilar to Region A. First issue was related to the initial training. The training for managers was conducted over one day regarding general aspects of LAIS, while the Account Officers received two separate three-day sessions focussing on more detailed aspects of LAIS implementation (see Figure 5.3).

Resulting from the training Account Officers were able to understand the elements (fields) that had to be filled for a loan application so that LAIS could process it and provide a recommendation – *white* (low risk, loan can be approved), *black* (high risk, loan should not be approved) and *grey* (medium risk, application should be assessed by the Regional officer). However, the nature of the LAIS calculation and the very algorithm that produced the output (recommendation) were not explained nor revealed. Edison, an Account Officer from Region C expressed his view of LAIS compared to DLAS:

DLAS was a ‘conventional’ system that used a descriptive approach. We as credit analysts made observations and conducted interviews, then wrote a story based on what we saw and the impressions we made – we put it all together like a paper, and we found it very informative. LAIS, on the other hand, is a scoring system and we are restricted in our capacity to input information. The final score is what’s important, but overall it’s not as informative. I don’t think LAIS produces accurate decisions, but it does speed up the process.

Similar to other regions the first attempt at implementing LAIS was dubious. Like Edison, Account Officers were suspicious of LAIS’ outcomes, and its ability to ‘replace’ DLAS. He continues:

The main difference is the spreadsheet calculation versus the manual calculation, but having said that, I still do some manual calculations if I need to crosscheck anything,

and I think I'm starting to understand what's going on inside LAIS. If the outcome doesn't seem logical, then I know what aspect of my analysis needs to be adjusted.

Edison used to calculate manually the expected risk and compared it with LAIS outcomes as he could not learn what kind of calculation was inside LAIS – this was not revealed in the training. While Edison, like other Account Officers, drew on his knowledge and experience he could not fully comprehend LAIS. In other words, his intra-subjective sensemaking focused mostly on the comparison between DLAS and LAIS. His crosschecking of recommendations helped him understand some elements of LAIS but prevented his full comprehension and LAIS and the purpose of its introduction. He was concerned that he did not know how the actual LAIS program worked and what was the whole purpose of introducing it.

Secondly, as Account Officers attempted to use LAIS they identified several problems and voiced objections to the system:

There are also weaknesses in LAIS. For example, if we have a transportation company, such as a bus company, this is a service-based business and LAIS cannot adequately assess its loan application. In short, LAIS only works for retail businesses.
(Edison)

This situation was not helped by the Manager of the Main Branch in Region C, Sophia, who herself had no trust in LAIS and was ambivalent towards it. Unlike Region B where the transition was complete and resolute from day one, in Region C the transition from DLAS to LAIS was wavering and indecisive which played no small part in preventing or slowing down the learning process:

We're now no longer working with the thick DLAS reports, but we still use the attachments with LAIS because it is required ... sometimes we even use photos... I still believe DLAS is more complete, and we need to use the DLAS attachments in LAIS... We also have problems with leasing... In fact, LAIS is only suitable for small retail businesses...

Lack of understanding of the essential functioning of LAIS, the lack of trust in its outputs, and a conviction that LAIS is not appropriate for some loan types, prevented Account Officers from learning and provided “good reasons” for “reverting” to DLAS:

... The LAIS implementation is still in its early stages, and it's too soon to say whether or not LAIS is 'good', it's still unclear whether or not it's effective... If we have a problem that needs to be solved quickly, we just revert to using DLAS for that case. (Account officer)

Slow progress with LAIS implementation and the lack of learning during the first 3 months (Stage I) in Region C was unexpected as they started with version 3 which was seen by the Bank's Managers as a significant advantage compared to Regions A.

The above analysis of evidence from Stage I of LAIS implementation in Region C suggests several key contributors to their failure to learn:

1. The training and the initial attempts to use LAIS draw from Account Officers' knowledge and experiences and engaged only their intra-subjective sensemaking. The claimed benefits of the simplified process and minimal data set collected for each loan were not convincing to the Account Officers as they could not make sense of the ways LAIS calculated risks and produced outputs (this essential processing algorithm remained hidden).
2. On the other hand, their understanding of the SME loan business and their commitment and loyalty to the Bank made them confident that DLAS was inevitable and that it should be preserved.

These were they key moments that prevented them from learning.

5.5.2 Single-Loop Learning – Stage 2 of LAIS Implementation

Transition to Stage 2 was not sharp but nevertheless 3 months after implementation started there were signs of Account Officers' changing attitude towards LAIS and their attempts at learning. The change was signalled by Sophia's "positive thinking":

In the beginning... last October [2003], everyone was very nervous... [but] my motto is 'positive thinking'. We can succeed if we try hard...

This is echoed in the Account Officers' attempts to test the system in practice and learn "how the system actually works".

Gaining experience with LAIS use in practice was of vital importance to Account Officers' attempts at making sense of LAIS and of the new business process of lean approval. The use of LAIS in practice prompted discussions and collective sensemaking of both the new system and the new practice:

We have Quality Group Meetings here, where we discuss LAIS and any associated issues we're having in the field. If we have any problems that we can't solve amongst ourselves, we contact the Regional Credit Centre... (Edison)

The sharing of ideas and experiences went beyond Region C Account Officers. They shared ideas and experiences with Account Officers from the Region A and Region B as well as within the four Regions that started the implementation of LAIS at the same time as Region C. Sophia, the Manager of SME Loans in Region C, gave the example of how she collaborated with Region A:

As for myself, I'm confused by a lot of this as well, but I always share ideas with other managers, the Regional Office and Head Office as well ... We also share our ideas and experiences, like what's been happening in Region A, we share this. I also have a staff member who moved to Theta city [one of the Main Branches in Region A] and he always gives me positive feedback concerning improvement, and we need that... So we're constantly sharing information, we're a unified group.

Sophia is referring here to recurring social interaction through which inter-subjective sensemaking emerged, both within Region C and with other regions. Their collective making sense of LAIS included sharing of information and experiences, comparing the results, and providing feedback at a local level and across regions. Similar to Region B (although achieved differently) this collective sensemaking could therefore be seen as ‘communities of interpretation’ distributed geographically and across levels. It also involved the sense of unity and camaraderie that assisted in their sharing of experiences and collective meaning making.

Another important sign of single-loop learning was Account Officers’ orientation to achieving goals as Edison, emphasised:

The LAIS implementation is still in its early stages, and it’s too soon to say whether or not LAIS is ‘good’, it’s still unclear whether or not it’s effective. Our main goal is to speed up the loan application process, but we’re yet to see this happen. This is probably because we’re still learning; the Account Officers still need to fully learn and familiarise themselves with the new system. We probably won’t see the expected outcomes for another six months at least...

And this did indeed happen, even sooner than Edison predicted. In January 2004, when LAIS version 4 was implemented they abandoned DLAS and relied on LAIS for SME loan processing. Compared to previous year (first measurement in January 2003) their performance in January 2004 improved considerably (see graph at the bottom of Fig 5.3). The average loan processing time of loans processed by the branch only decreased from 21 to 6 days, and for loans processed together with RCC, from 30 to 13 days. They also increased the number of loans approved and the amount of money landed.

While better understanding of LAIS and the on-the-job practice of using LAIS in processing SME loans led to performance improvements – the faster processing of loans and increased amount of money dispersed – most of Account Officers in Region C still believed DLAS practice was better than LAIS-based practice. At this

Stage the Account Officers still did not have thoroughly understanding of LAIS and were unsure as to why the SEA Bank opted to implement LAIS to process SME loans in the first place. In other words they did not change their mindsets. This delayed their transition to double-loop learning.

5.5.3 Double-Loop Learning - Stage 3 of Implementation

After four months of working with LAIS version 4 the SME loan Manager and Account Officers showed signs of double-loop learning. First, there was recognition that DLAS did not address risk management explicitly:

In DLAS, risk was never explicitly addressed and we relied on our experience and intuition to make decisions. And now we use LAIS, plus our own intuition, and our intuition needs to be strong, because LAIS is only a machine, and machines are easily deceived. (Manager, SME loans)

Introduction of a scoring system in LAIS, the SME loans Manager as well as other Account Officers conceded, in fact meant that ‘an explicit calculation of risk’ became a basis for decision making. The essence of organizational change taking place with LAIS, they started to realize, was the change of risk management policy and the management of the SME loans business processes. The scoring system in LAIS obviously worked based on the data input by Account Officers. Given that some data were not hard facts and required judgements the Manager is referring to ‘intuition’. The Manager is actually concerned that any laps in data input could lead to potentially wrong decisions which ‘the machine’ could not detect. This indicates deeper understanding of LAIS and its implication for practice.

Further evidence of double-loop learning is seen in actors’ reflection on previous meaning making and reframing of problems from the position of a deeper insight. For instance, the Manager often emphasised that for small loans like SME loans all they ‘want [was] good customers with good collateral’; a quote from Meiky, the Account Officer, illustrates the change of attitude and understanding of LAIS:

If we are talking about LAIS version 4, the old DLAS versus the new system, I prefer LAIS because it's simpler. In DLAS, we had to perform manual calculations and all our documents had to be written up manually using a lot of detail. What I'm trying to say is that we don't always have to analyse the customer's business in that much detail. The new system is really, really focussed on the business prospects, the condition of their buyers and suppliers and how healthy their credit history is. OK? That's it. Not too much information and no insignificant details.

Meiky's account not only indicates a deeper understanding but also suggests the change of mindset and approach in assessing SME loans. The intentions of LAIS-based loan assessment and the change of content and process are well understood.

The change of mindset was a key issue in the creation of the Account Officers' role. Taking on the new role was challenging for staff, previous marketing and credit analysts, as Manager of SME loans explains:

I must admit, this transition has been very difficult. The marketing staff used to attract new clients, and they were very good at this – they would find a new customer and then pass them on to the credit analysts. On the other hand, the credit analysts only ever concentrated on the analysis side of things. Now we've merged these two roles, the marketing staff is learning analysis skills, and the credit analysts are learning marketing skills – how to open new accounts, how to maintain accounts, etc.

Now it's completed. In the beginning... last October, everyone was very nervous. The Account Officer role started in Region B on 1st September, and we were to follow them. But yes, they were nervous about doing a new job they hadn't done before. In the beginning, we taught each other –the marketing staff passed their skills onto the credit analysts and vice-a-versa. The 'Account Officer' idea wasn't new; in fact, we tried to prepare by switching roles – one month as a credit analyst, one month as a marketer, back and forth. Even though we prepared as much as possible, we were still shocked by the new role.

The transition to the new role however was assisted by collaborative working environment and sharing of experiences within and across the branches. Through practice and positive feedback (achieving performance targets) they not only learned

to perform their roles successfully, they also developed new identity as ‘Account Officers’. Similar to other regions, they refer to themselves as ‘general practitioners’ dealing with common problems (SME loans) and having broad knowledge and understanding of the loan business.

That they understood the purpose and limitations of LAIS and new ways of doing business is illustrated by an exception case when Account Officers required overruling LAIS’ recommendation:

For example, I have a customer who’s been with us for seven or eight years now. He applied for a new loan, we put his details into LAIS, and the final result is black. I think this was because during the Crisis, he had a loan in US dollars, and so suddenly, when he did his revised financial report, his debts were inflated, when in reality, his company was performing very well. So, his score was black, when previously we’ve had a very good business relationship with him, I found it very difficult to refuse him. When this sort of situation arises, we need to convince new staff that this customer should be approved. The Regional Credit Manager [Miss Megan] shouldn’t be surprised when we ask for a black application to be approved – we need to convince them and explain the customer’s history with us... Miss Megan is very experienced in the credit business – she understands these situations and approves those sorts of loans. (Account officer)

The case of a SME loan approval against the ‘automatic’ recommendation by LAIS (‘black’ meaning ‘reject’) demonstrates an insight into LAIS logic of calculation and also the limitations of this logic. LAIS recommendation is put in a historical context and Bank’s interest in developing relationships with customers, which helped building mutual agreement between Account Officers and the regional manager. This further demonstrates how individual intra-subjective and collective sensemaking by Account Officers (obviously well advanced in this Stage) interacted with that of the regional manager leading to an agreed view and action. In addition as the manager’s sensemaking exemplified the official Bank’s policy, that is organizational generic meanings, this case also shows emerging harmony between the generic meanings and individual/collective sensemaking.

5.6 Conclusion

The analysis of LAIS implementation in the three regions provides insights into the relationship between LAIS adoption in practice and organizational learning. LAIS introduction, training and understanding are investigated as the Bank progressed through the stages of organizational learning – not learning, single-loop and double-loop learning. The relationship between LAIS adoption in practice and organisational learning is explained and theorized using the sensemaking perspective. Specifically the sensemaking model of knowledge in organizations (Cecez-Kecmanovic, 2004; Weick, 1995) provided useful concepts and enabled me to link actors’ sensemaking processes involved in LAIS implementation and use with observed organizational learning processes. These linkages and explanations are summarized in Table 5.1.

[Table 5.1]

This Chapter provides the theoretical explanation of the emergence of learning (from not learning to single and double-loop learning) instigated and enabled by LAIS implementation via the reciprocal and intertwined processes of sensemaking. The analysis of the subtle and often invisible processes of sensemaking, as I have demonstrated, enabled exposure of actors’ behaviour and meaning making throughout LAIS implementation that led to a more refined explanation of its relationship to organizational learning. In this sense it explained the relationship between LAIS and organizational learning based on an expansion of Argyris and Schon’s learning theory. Most importantly the analysis is this Chapter provides a novel way of conceptualizing the relationship between an information system implementation and organizational learning to which I turn next.

Table 5.1 Engagement of sensemaking in organizational learning emerging through LAIS implementation
(AO - Account Officers)

Learning Sensemaking	Not learning	Single loop learning	Double loop learning
Individual, intra-subjective sensemaking	AO training focused on LAIS as a tool that helped them understand data but not the purpose of loan assessment change AO couldn't make sense of LAIS and considered it a 'ridiculously' simple scoring system that lacks thorough and rigorous analysis practiced in DLAS AO did not trust LAIS' outcomes and could not take responsibility for LAIS-based loan decisions While AO felt under pressure to use LAIS they de facto rejected it and continued to rely on DLAS (in agreement with their managers); this was not their deliberate decision but rather their inability to comprehend and make sense of LAIS in their work context and within their interpretive frameworks The 'gaps in knowledge' between the Head Office and branches (Account Officers and managers) created tensions AO's search for meaning of LAIS and a plausible explanation brought its implementation into existence, making it real in their work practice	AO and managers focus on their actions and achieving personal performance targets through LAIS Increasing use of LAIS and decreasing reliance on DLAS improves AO competence and confidence in LAIS; a decisive switch to LAIS in Region B accelerated learning and fasten performance improvements Individual views and insights merged into and were influenced by collective views of LAIS and the changes experienced in practice The tensions somewhat diffused between individual understanding of LAIS-based loan assessment processes and the generic meanings espoused by institutional actors Despite increasing reliance on LAIS and 'doing things new way', AO maintain the 'old' view of SME loan approval processes seeing it effectively through the lens of DLAS (no change in mindset)	Successful adoption of LAIS and performance improvements gradually prompted AO to question and doubt previous convictions and ways of understanding the SME loan business This led OA to change their mindset which was exhibited in their critical attitude toward their old views, revision of understanding of LAIS and the new practices, reflection on the differences between the old and the new, and appreciation of new risks and challenges The change of AO's role meant change of image that destabilized their identity which had to be re-constructed; AO rebuilt their identity as 'general practitioners' that deal with common issues requiring general and broad knowledge (as distinct from 'specialist doctors') The 'gaps in knowledge' between the Head Office and AO in the branches was diminishing
Collective, inter-subjective sensemaking		The use of LAIS in the work context and 'learning through socializing' (in Quality meeting groups and informal interaction) help AO co-create shared meanings and plausible interpretations of LAIS practice	Successful mastering of LAIS practice in turn increased further AO confidence and their sense of community and collective identity

		On-the-job-training and using LAIS in practice (learning-in-working) in a non-competitive environment were conducive to knowledge sharing and emergence of joint insights into the new LAIS-based practice; Improved collective knowledge and shared understanding in using LAIS improved loan approval processes and lead to significant performance improvements in branches and regions	Social interaction among the actors within and across the branches contributed to the distributed community meaning making and interpretation, leading to the emergence of 'community of interpretation' An important enabler of the emergence of 'community of interpretation' is the shared language.
Organizational, generic-subjective sensemaking			Implementation of LAIS involved new AO roles within the new organization structure and SME loan approval processes (involving new generic meanings) The focus of AO role was expected to be 75% marketing and finding new customers and 25% analysing and data input into LAIS The new role of AO was created to change the staff mindset The change of AO's role meant the change of image that destabilized their identity
Organizational extra-subjective (cultural) sensemaking			The stories of the four-eye principle implementation in practice have been told in all the regions studied The metaphor proliferates through the Bank: Account Officers approving SME loans (up to \$1M) are like general practitioners, who treat ordinary illnesses for which specialist doctors are not needed. The change of mindset has been assisted through Account Officers' socialization into the new role of 'general practitioner'

6 Discussion: A Theoretical Account of How IS Implementation — Impacts on Organizational Learning through Sensemaking

6.1. Introduction

The quest for understanding is a fundamental feature of actors' participation in organized activities. In particular when faced with new and incomprehensible information systems that unpredictably change their work context and disrupt ways of doing things, actors seek to make sense and continue to work and act in a meaningful way. The evolving sensemaking processes enable their moving to new levels of understanding that are recognized as stages of learning. In this Chapter I seek to draw some lessons learned from the SEA Bank case, making an attempt at limited theoretical generalization of the relationship between IS and organisational learning (Lee and Baskerville, 2003).

The empirical study of LAIS implementation in the SEA Bank indicates that an IS—induced organisational change and the IS relationship with organisational learning cannot be well understood without deeper insights into a complex dynamics of sensemaking. The rich and subtle processes of sensemaking are central to such understanding and can be seen as an analytical bridge between an IS implementation and organisational learning. A theoretical account in this Chapter aims to link IS implementation, the ensuing change of practice, and organisational learning through the concepts and the model of sensemaking and thereby propose a unifying theoretical model. In so doing I aim to provide a more concise and to a degree generalized answer to my research question: What are the ways and mechanisms by which information systems' implementation and use engage sensemaking in organisations, and how does such engagement engender or prevent organisational learning?

6.2 IS Implementation Produces Changes of Generic Meanings at the Social Structure Level

Looking to LAIS implementation and its relationship with learning through the lens of sensemaking focuses attention on individual and collective engagement in work practices and sensemaking involved. As LAIS exemplifies the essential changes in structural arrangements of work (business processes of SME loan approval and management), routines and procedures, including norms and rules governing work practices (e.g. the new risk management policy), its implementation inevitably implied the change of generic meanings at the organisation structure level. I have to note here that the very purpose of developing and implementing LAIS was the strategic change in the SME loan business: the SME loans were to become a core business of the Bank; the Bank set targets to significantly increase SME loans and disperse \$9 billion in 5 years; the Bank was committed to radically change its risk management strategy (to comply with the BASEL II Accord and allow higher levels of risk). Within the sensemaking model (presented in Chapter 2, Table 2.3) such a change takes place at the organisation structure level where generic-subjective meanings are created, re-created and maintained (see Figure 6.1).

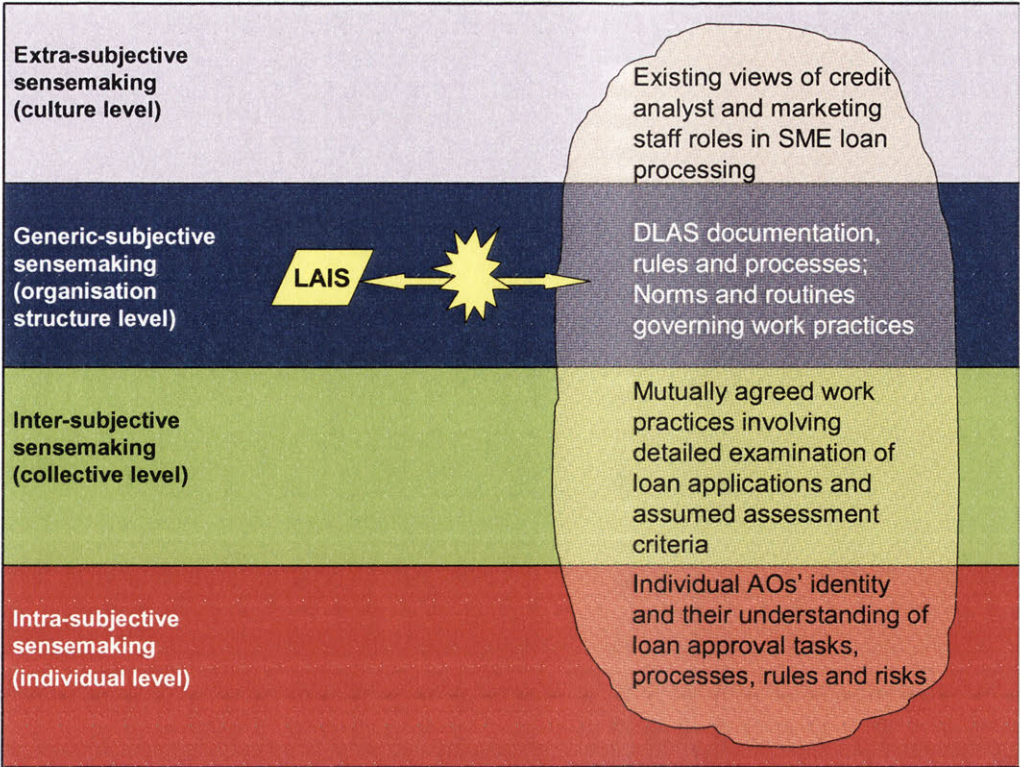


Figure 6.1 LAIS implementation clashes with generic meanings implied in DLAS approach and practice (AO – account officer)

By introducing the new loan approval business process, that included

- a) the new model of assessment with a prescribed set of variables and the algorithm for processing recommendations embedded in LAIS
- b) new organisation unit Regional Credit Centres and their relationship with branches, and
- c) new division of responsibility between a branch and a region (the four-eye principle)

LAIS implementation effectively introduced a new organisational structure for SME loan business and new generic meanings in loan approval practices. Compared to existing structures and practices of loan approval processes throughout the Bank, the implementation of LAIS required dramatic organisational changes. These changes were met with various levels of resistance initially, but as we have seen, the Bank

eventually successfully implemented LAIS and learned, which was evidenced in practice.

The official Bank evidence shows that one year into LAIS implementation the Bank achieved significant performance improvements: much faster loan approval processes (cut to 1/3 on average) and up to 60% more money lent while still preserving low percentage of bad debt (in some cases it was reported even lowering percentage of bad debt). As the analysis of LAIS implementation and use in three regions in Chapter 5 shows organisational learning emerged through stages from not learning, to single-loop learning, to double-loop learning (as presented in Figure 5-1; 5-2; 5-3). While the emergence of learning showed a similar pattern in all three regions, the dynamics of change and the length of comparative stages varied among the regions. The theoretical account of LAIS implementation and the emergence of organisational learning in this Chapter are based on a comparative analysis that explores both similarities and differences across the three regions.

6.3 Engagement of Sensemaking in IS Implementation and Implications for Organisational Learning

Introduction of LAIS produced a discrepancy between the generic meanings embedded in the new SME loan business processes and the meanings shared by actors involved in these processes. In such circumstances actors felt that their regular involvement in the work processes and their actions had become inappropriate. The work and organisational environment had become different from what they knew and expected. And they could not see obvious ways to engage with the new system and make productive use of it. This is a typical situation that prompts attempts at sensemaking to search for meaning, reduce equivocality, and find plausible explanations to guide future actions.

The engagement of different sensemaking processes throughout LAIS implementation, as demonstrated in Chapter 5, enabled the emergence of

organisational learning (from not learning to single, to double-loop learning). More generally, an IS implementation can be seen to prevent or instigate organisational learning depending on the engagement of various forms of sensemaking (at different levels). The sensemaking in organisations, including intra-subjective, inter-subjective, generic subjective and extra-subjective, provide a conceptual frame and a missing link for understanding the relationship between IS and organisational learning. This is graphically presented in Figure 6.2 using the same graphical symbols to distinguish between different sensemaking levels as in Figure 2.5.

While IS implementation, sensemaking and learning are in fact intertwined they are here conceptually distinguished for analytical purposes. The meaning of this Figure 2.5 is that IS typically affect intra-subjective, inter-subjective and generic subjective sensemaking and that in turn the engagement of sensemaking in IS implementation prevents or instigates organisational learning. This leads to the question of how does this happen and under what conditions organisational learning is instigated and supported and when it is prevented. This is examined in the rest of this Chapter.

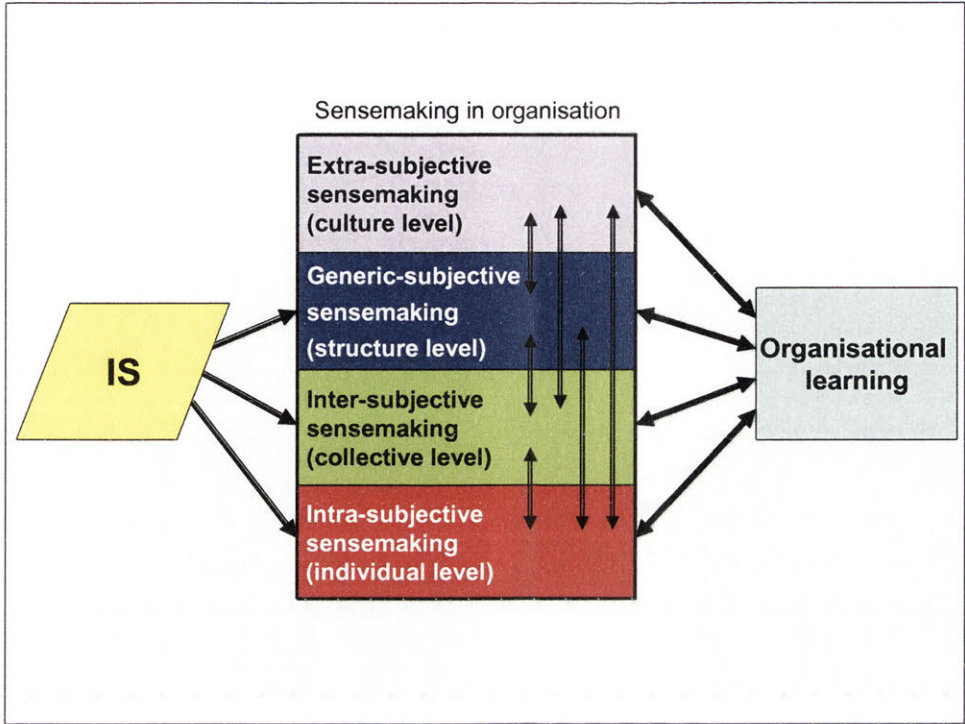


Figure 6.2 Sensemaking in organisations as a conceptual tool that enables linking IS implementation and organisational learning

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6.3.1 IS, Sensemaking and ‘Not learning’

When LAIS was first introduced in a branch, account officers tried to make sense and seek coherence in an apparently non-sensible (thoughtless) imposition of the system (LAIS) that forced them to abandon their vast experience and knowledge, and to replace their high quality work practices with what were seen as far inferior ones. That their loan approval practices were exceptionally good was not just their subjective conviction – they maintain they had a hard proof for it. Their bad debt was very low, up to 2%, which was much below the tolerated 5% defined by the Central National Bank. Now they were forced to give it all up and adopt LAIS’s “ridiculously” simple and “inferior system”. Transition to LAIS was, in their view, threatening the Bank’s future as it involved the drastic change of work practices, the change that was “certainly leading” to lowering the quality of the loan approval decisions. And staff members did not want to be responsible for such practices.

The President and managers in the Head Office predicted difficulties with LAIS implementation and the required organisational change. This is why they organised training before starting LAIS implementation in the regions. This was a common practice considered crucial for the success of any IS. LAIS training was conducted 1-3 month ahead of implementation. Such training involved explanation of software features, fields on the computer screens to enter data, processes of data entry and what to do when LAIS gives an assessment of a loan (white, grey, and black). LAIS training helped staff members understand the mechanics of the system's use and 'What to do' but not 'Why'. The concept and algorithm of the loan assessment encoded in LAIS was not transparent because (EB insisted it remained confidential) and even more importantly they were nothing like account officers' existing practices. The training could not bridge the gap between the LAIS-based practice as required by the Head Office and what account officers' community actually did. This approach failed and account officers did not learn. They more or less openly rejected to use LAIS and continued with their DLAS practice.

Despite the training account officers failed to make sense of LAIS and why it was needed when their existing practices were so successful. "Why is the Head Office forcing us to do a poorer (inferior) job?" – was the question they could not find a meaningful answer to. Their interpretive scheme – derived from their past experiences and accumulated knowledge, their views of the loan business, and more broadly the tradition in the banking system – did not enable them to make sense of LAIS and the new practice and prevented them from learning. Continuing with the symbolic representation of the sensemaking model (at four levels as in Figure 2.3) this situation is graphically presented in the 'Not learning' column in Figure 6.3. This indicates that while LAIS changed the generic meanings it remained understood by the actors as a tool, engaging only intra-subjective sensemaking.

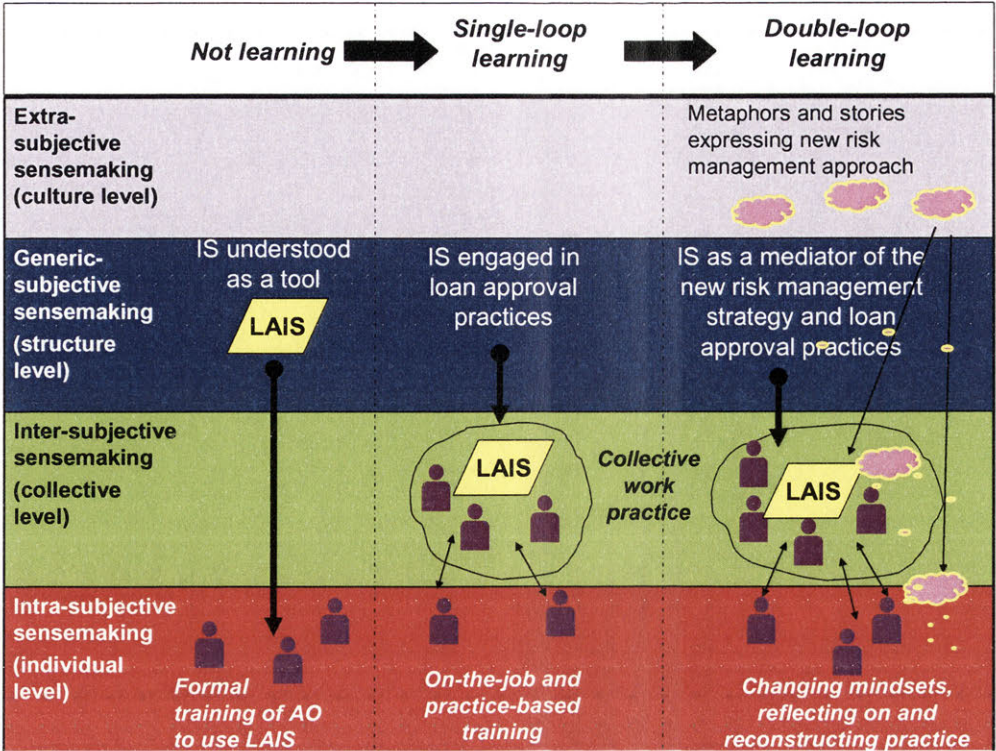


Figure 6.3 LAIS implementation and the emergence of organisational learning through progressive engagement of sensemaking

LAIS training and implementation also assumed uniformity of account officers identity and prior knowledge, which was not the case. When the new role of account officer was created as part of the new structure, they recruited former credit analysis and marketing staff from the Bank. Account officers with credit analysts’ experience felt threatened by LAIS which “ridiculously” simplified loan assessment and diminished their identity and authority as “loan experts”. Account officers recruited from marketing staff, on the other hand, accepted LAIS as a tool more readily as they did not know much about the job done by credit analysts anyway. Unlike account officer they did not have to ‘unlearn’ accepted practices. They, in a way, rather naively accepted the new role and identity, without real understanding of the job and its depth. For account officers the threat to their identity and their job was a key contributor to comprehending LAIS and accepting change. They felt threatened and concerned for their jobs and the future of the Bank.

The resistance to LAIS implementation and the length of not learning stage were not the same across the three cases. In all cases LAIS was administratively imposed from the Head Office but the attitude of managers and their tolerance of DLAS running in parallel differed. In Region A, the Regional Manager himself suggested DLAS be used while account officers learned about and tested LAIS. It took them 6 months to switch completely to LAIS and about 5 months to reach single loop learning. In contrast, in Region B the Regional Manager made the decisive move to LAIS after one month of trials which proved stimulating for account officers' learning and achieving performance targets. After this first month they advanced fast from not learning to single-loop learning. In Region C simultaneous use of DLAS and LAIS took 5 months but they managed to improve performance (and move to single loop learning) in about 3 months. The more managers understood LAIS and its purpose and the more decisive their transition from DLAS to LAIS was, the shorter the not learning period happened to be.

The nature of sensemaking engaged in this stage of LAIS implementation can be seen by looking more deeply into underlying assumptions and characteristics of the before-implementation training and subsequent account officers' attempts to apply LAIS in practice:

- The job of account officers is seen as an individual, solitary job performed by skilled staff; thus re-skilling and change of individual comprehension, implicitly relying on their intra-subjective sensemaking, are needed to adopt LAIS.
- LAIS is seen as a 'tool' that account officers (should) use to do their jobs; when account officers master the tool they are expected to be able to use it and do their job (presumably more efficiently).
- Learning about LAIS and applying it in practice – it is implicitly assumed – engages only individual cognition and therefore requires only intra-subjective sensemaking.
- Uncertainty surrounding account officers' role and a threat to their identity as knowledge experts made LAIS more alien and beyond comprehension.

- Doubts and ambivalence by managers in the regions and branches regarding abandoning DLAS and transferring to LAIS were yet another contributing factor in account officers’ perceptions and attitudes that discouraged learning.

Drawing from this analysis a more general proposition can be suggested: an IS implementation (training and use) that engages only individual cognition and intra-subjective sensemaking is likely to prevent organisational learning and discourage adoption of the system in practice. This proposition is graphically presented in Figure 6.4. It shows that while IS implementation by virtue of its role in practice, should affect individual, intra-subjective, then collective, inter-subjective as well as generic-subjective sensemaking, this will not materialize if in reality such implementation engages only the individual, intra-subjective sensemaking. The shading of all other levels of sensemaking is meant to indicate that engagement of other sensemaking types has not happened and that these options are shut down. As a result organisational learning is prevented.

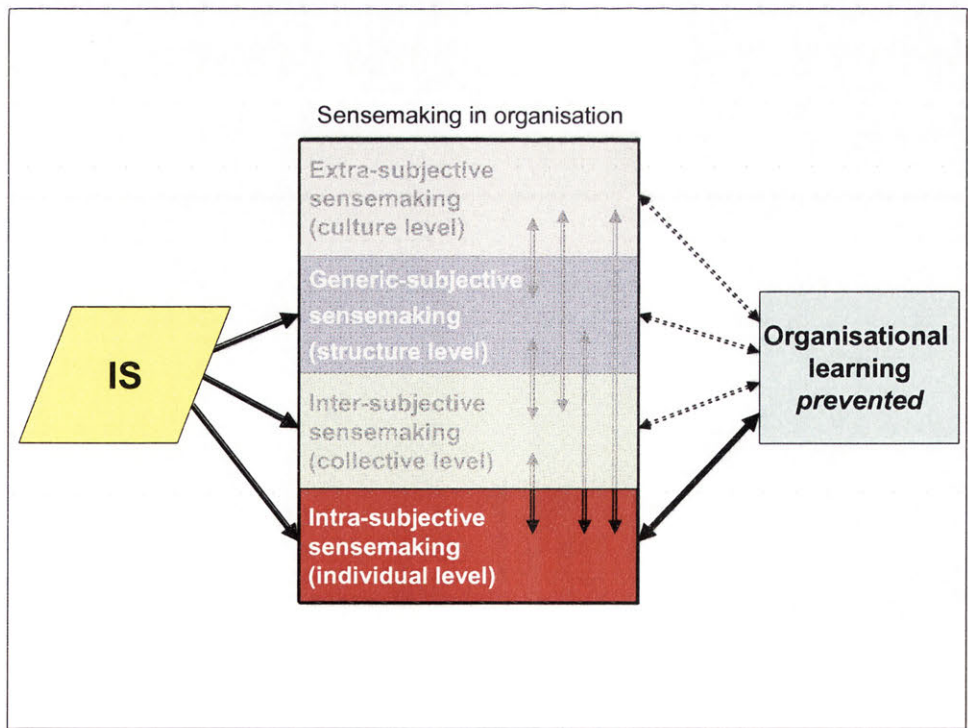


Figure 6.4 When an IS implementation engages only intra-subjective sensemaking chances are organisational learning is prevented

Furthermore, the length of the not learning period and likelihood of IS rejection are increased in case of managers' ambivalence and indecisiveness in transferring to the new system.

6.3.2 IS, Sensemaking and Single-loop Learning

Single-loop learning emerged in all three regions but most slowly in Region A. It is only in Region A that started implementation with an early, immature version of LAIS (ver 1) which completely failed. The following version 2, which was much better, was implemented and tested in parallel with DLAS for 4 months. The transition from not learning to single-loop learning happened approximately 5 months after they started (see Figure 5.1). In Region B the implementation past the not-learning stage much faster due to both the advanced version of LAIS and also on-the-job-training that encouraged collective engagement and sensemaking. Unlike initial training that treated LAIS as a tool in an abstract way, on-the-job training provided conditions for LAIS testing in the work context and for account officers' open discussions about LAIS use in particular circumstances in different branches. Importantly account officers were able to work together and interact and thereby gain both individual and collective experience in LAIS testing and use (this is symbolically depicted in Figure 6.3, single-loop column). By intense communication and sharing of stories they were able to relate previous practices with DLAS to practices implied in LAIS, helped them use LAIS more meaningfully and skilfully.

Although the process of adopting LAIS was slow, and many account officers clung to their old DLAS practice in parallel, empirical evidence demonstrates improved understanding and learning at both individual and collective level.

The learning that emerged in the second stage was a single loop learning characterized by changed practices and achievements of desired outcomes (lower average number of days to process a loan application) but without changing the mindset. Account officers did learn to process loans faster using LAIS fluently but they were not convinced that this was the better way of working. They still believed

that their old DLAS work practices were superior but accepted the necessity for adopting new LAIS based practices not only because LAIS was mandated but also because it enabled performance improvement.

The key features of single-loop learning through LAIS implementation are:

1. LAIS was conceived as an essential component of loan approval practice seen as collective or social practice; in certain respect LAIS implementation could be seen as a transfer of ‘best practices’
2. As part of collective or social practice LAIS implementation involved individual and collective sensemaking intertwined in complex ways – through social interaction, sharing of stories, experiences and knowledge, and collective engagement in problem solving (see Figure 6.3)
3. The collective, inter-subjective sensemaking processes and social work practices involved in LAIS implementation have many similarities with what Lave and Wenger (1990) call ‘communities of practice’ and Brown and Duguid (2001) call ‘community of interpretation’.

Account officers’ collective sensemaking and cooperative work practices provided social environment within which they constructed both the new vision of their job and the new shared context for LAIS use. This new context in turn helped them develop their new shared identities as account officers. As Brown and Duguid (2001) observe “members of such groups collectively develop an outlook on work and the world” that may reflects, on the one hand, the organisation structure and generic meanings (imposed by LAIS) and, on the other, the emergent collective sensemaking and meaning co-creation. This emergent process involved merging of individual account officers’ intra-subjective sensemaking into their collective making of sense and working, thus leading to their collective learning. This suggests that communities of practice and collective sensemaking are creating a vital link between the IS implementation and emergence of single-loop learning. In summary, the engagement of intra-subjective and inter-subjective sensemaking in IS implementation is likely to lead to single-loop learning which is presented in Figure 6.5.

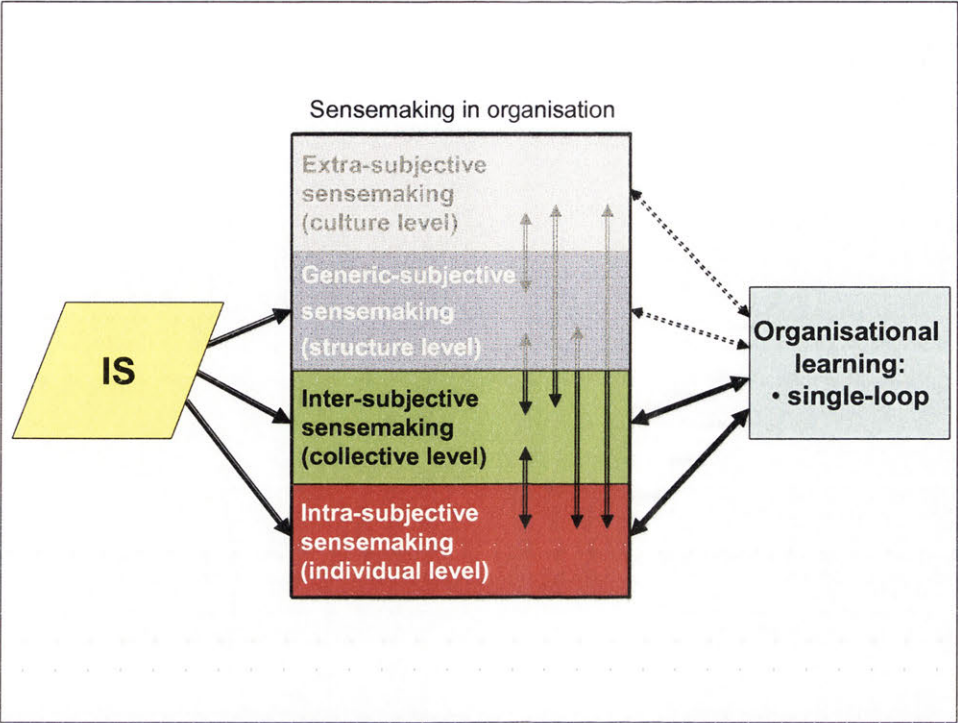


Figure 6.5 The engagement of both inter- and intra-subjective sensemaking in an IS implementation is likely to instigate and assist single loop learning

Community of practice based learning is significantly richer than the formal, individual based LAIS training. It involves not only explicit knowledge of LAIS and its use but also sharing and co-creation of tacit knowledge of LAIS as practice through shared work and social context. Training of LAIS features as a tool can be seen as teaching about *know that* (about the explicit facts, rules, procedures) while communities of practice based learning is about *know how*. Acquiring *knowing that* does not necessarily lead account officers to apply this knowledge as demonstrated in the not-learning stage. Importantly, *knowing how* may not be defined or acquired in terms of *knowing that* (Ryle, 1949, p. 32). *Knowing how* needs to be learnt through practice.

It is in the making sense of and adopting LAIS in work practices where the single-loop learning processes differed in three regions. In Region A, the emergence of communities of practice, sharing of experiences and stories and development of new

identities was comparatively slower thus prolonging the transition to single-loop learning. In Region B on the other hand, these processes were much faster leading to transition to single-loop learning and achievement of performance improvements in one month.

6.3.3 IS, Sensemaking and Double-loop learning

The transition from single-loop to double-loop learning was marked by the change of account officers' mindsets or mental models. Such change happened gradually as they came to understand the essence of LAIS as a new risk management and decision making practice and its meaning within the Bank's new strategy in SME lean business. The new view of LAIS-based loan approval process made much more sense to their abandoning of the old DLAS practice. The new risk management was much more clearly visible as part of LAIS adoption together with inefficiencies and inappropriateness of the old DLAS practices.

This change of mental models happened when intra- and inter-subjective sensemaking embraced organisational generic meanings as well as those culturally communicated (through extra-subjective sensemaking). The embracing of generic meanings embedded in LAIS – the concepts, data fields, rules, algorithms, processes – meant not only their comprehension but also their internalizing into the individual and collectively shared worldview as well as language. Instead of being something account officers understand and accept as imposed (which is the case in single-loop learning), the change of mindsets includes a deeper engagement and internalization of generic meanings embedded in LAIS.

Furthermore, the change of mindsets is assisted by socialization into the new cultural and symbolic meanings, transmitted via stories, metaphors, myths, etc. In my case study, the metaphors and stories that I heard from General Manager at the beginning of the study found their way throughout the Bank, proliferating down to account officers. General Manager for instance explained to me that the essence of change intended with LAIS implementation was to transform the role of account officers

from being one of a ‘specialist doctor’ to the role of a ‘general practitioner’ (GP). He described account officers’ traditional role in the SME loan approval processes as similar to ‘specialist doctors’ treating simple, ordinary illnesses. For the Bank it was not only a waste of resources but also inherent inefficiency that prevented performance improvements and the expansion of the business. LAIS implementation enabled a much more rational, standardized and simplified SME loan approval process – however well measured in terms of risk – which can be performed by GPs. When account officers used this metaphor and talked about themselves as “becoming GPs rather than specialists”, it indicated that the cultural knowledge has penetrated throughout the regions and branches.

Furthermore, the transition to double-loop learning was characterized by a more reflective attitude of account officers and managers. They were capable of critically reflecting on their previous practices, the long time spent in collecting data for each loan, no matter how small. They also saw that their old DLAS practice was informal and idiosyncratic, without much standard descriptions and with no structured measures of risk. The reflective attitude was also visible in their deeper understanding of limitations of the new LAIS-based practices and their new thinking how to deal with situations then LAIS-based decision making should be overruled.

The emergence of organisational learning instigated by LAIS follows the pattern from not-learning to single-loop to double-loop learning as graphically presented in Figure 6.3. Figure 6.3 describes LAIS introduction as a tool at the social structure level (in the not-learning stage); LAIS as integral to collective work practices developed through collective and inter-subjective sensemaking (in the single-loop learning stage); and LAIS as the new risk management strategy and collective work practices that engaged cultural or extra-subjective sensemaking level (stories, metaphors, language). The length of each stage did vary but the pattern of change leading to the emergence of learning was the same in all regions. The pattern of learning is derived from empirical data but is also theoretically explained and argued.

A more general conclusion drawn from this analysis can be articulated in three propositions:

1. The emergence of organisational learning when instigated by an IS implementation is likely to follow the pattern from not learning, to single-loop to double-loop learning.
2. An IS implementation is likely to instigate the emergence of organisational learning if: a) it engages intra-subjective and inter-subjective sensemaking to achieve single-loop learning, and b) in addition engages generic subjective and extra-subjective sensemaking to achieve double-loop learning (illustrated in Figure 6.6).
3. If an IS implementation engages only intra-subjective sensemaking it is not likely that the organisation would past the not learning stage.

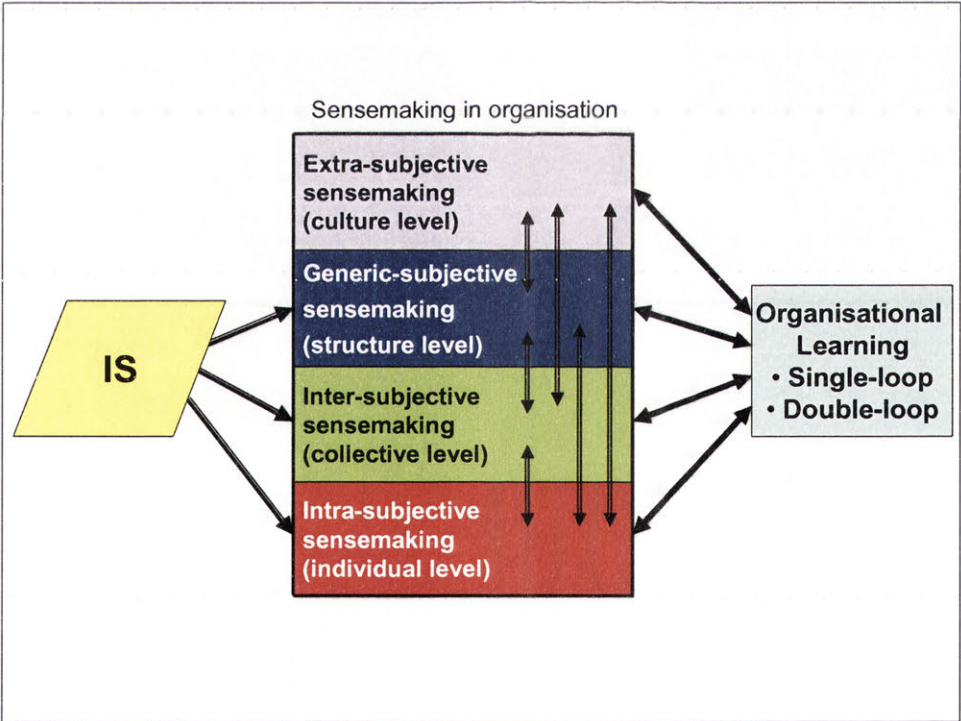


Figure 6.6 IS implementation is likely to instigate the emergence of organisational learning when all sensemaking levels are gradually engaged

6.4 Concluding remarks

LAIS can be seen as a critical mediator between the Bank's new business strategy and loan approval work practices. LAIS implementation enabled and advanced successful organisational learning when all levels of sensemaking – intra-subjective, inter-subjective, generic subjective and extra-subjective – have been productively engaged. Within the period of about 1 year LAIS implementation, account officers in the branches and regions made an observable progress from not-learning to single-loop and to double-loop learning. In every region studied the emergence of learning followed the pattern: a) the not-learning stage characterised by account officers' engaging only in an intra-subjective sensemaking; b) the single-loop learning stage when both intra-subjective and inter-subjective sensemaking were intertwined; and c) double-loop learning when all four levels of sensemaking got engaged, involving the change of mindset and reflective attitude toward past and current practices. The pattern of emergence of organisational learning instigated by LAIS is graphically presented in Figure 6.3.

This Chapter also provides a more concise and theoretically argued answer to my research questions: What are the ways and mechanisms by which information systems' implementation and use engage sensemaking in organisations, and how does such engagement affect organisational learning? Propositions regarding an IS implementation and the engagement of sensemaking at different levels that determine whether the IS implementation is likely to prevent or instigate organisational learning, are derived from the case study (illustrated in Figures 6.4, 6.5 and 6.6). These propositions result from analytical or theoretical generalisations from empirical material (Yin 2003, 1994; Walsham, 1995, Lee and Baskerville, 2003). Such generalisations are in accordance with Klein and Myers (1999) principle of "abstraction and generalization".

7 Conclusion

7.1 Introduction

This chapter provides a brief summary of the thesis and outlines its major theoretical and practical contributions to the field of information systems, especially to the relationship between implementation and use of information systems and organisational learning. It also describes research limitations and suggests possible future research directions.

7.2 Summary of the Thesis

This thesis set out to examine the relationship between information systems (IS) and organisational learning. The extensive literature review presented in Chapter 2 suggests that IS implementation is related to and can affect organisational learning. IS implementation and use are seen as having a potential to enable and support as well as to disable and prevent organisational learning. This is an under-researched domain in the IS literature which draws from organisation studies, especially the organisation learning literature. The problem however is the lack of a comprehensive and widely accepted theory and theoretical fragmentation in the organisational learning literature. It either focuses on the individual as a learning entity and conceptualizes learning as a property of an individual or alternatively focuses on the organisation and sees learning as a property of an organisation.

In any IS implementation the implications are felt by individuals, groups and the organisation as a whole and cannot be fully understood if studied as isolated phenomena. The objective of this thesis was to explore the relationship between IS and organisational learning in an integrative way, by including different views of learning from the individual up to the organisational. This is achieved by drawing from two different theories: organisational learning theory by Argyris and Schon

(1978), still dominant and influential in organisation studies, and a Sensemaking view of organisations (Weick, 1995). By defining types of organisational learning Argyris and Schon's (1978) theory does not explain how individuals and organisation actually learn and engage in different types of learning. Nor does it include the link with information systems – how IS impact on organizational learning. However, it does provide a framework that allows inclusion of other theories as I demonstrated in my study. Namely, I proposed the infusion of the sensemaking model of organizing (specifically the model by Cecez-Kecmanovic, 2004, that builds on Weick, 1995, and Wiley, 1984) into the Argyris and Schon's (1978) organisational learning theory thus providing a link with information systems. The Sensemaking perspective offers an understanding of human sensemaking as an essential individual, collective and organisational ingredient of organising and learning. Especially, the sensemaking model adopted fills an important gap in linking information systems, organizing, and learning.

By integrating Argyris and Schon's (1978) founding theory of organisational learning with the sensemaking model of organisations (Weick, 1995; Cecez-Kecmanovic, 2004), this thesis proposed a more comprehensive view for examining the relationship between IS and organisational learning. Specifically this thesis examined the following research question:

What are the ways and mechanisms by which information systems' implementation and use engage sensemaking in organisations, and how does such engagement engender or prevent organisational learning?

This research question was investigated through an interpretive, longitudinal case study of the implementation and use of LAIS – the SME loan approval information system – in the SEA Bank. The two-year field study involved an extensive collection of data from the Bank headquarters and its branches, including 43 interviews, strategic and operational documents, IS project documents and informal discussions.

Information Systems implementation and use and its relationship with organisational learning examined through the lens of sensemaking focuses attention on individual and collective learning engaged in work practices as well as organizational learning involved in changing structures and cultures. In this case study LAIS exemplified the essential changes needed to structural arrangements of work (SME loan approval and management), routines and procedures, including norms and rules governing work practices. Within the sensemaking model, its implementation can be seen as the change of generic meanings at the organisation structure level. In fact, the very purpose of developing and implementing LAIS was to facilitate strategic change in the SME loan business. The implementation of LAIS and the ensuing changes in the loan processing, including the new risk assessment encoded in the LAIS algorithm for loan approval recommendations, were incomprehensible by account officers who were to use it. The new generic meanings implied by LAIS-based practices clashed with existing meanings assumed DLAS-based practices operating in the Bank for over a decade.

Throughout a year of LAIS implementation, the Bank eventually succeeded in adopting LAIS in SME loan processes and demonstrated organisational learning. The resulting changes in the business practices of loan approvals led to considerable productivity and performance gains. As LAIS was the key instrument through which this was achieved it can be seen as a critical mediator between the Bank's new SME loan business strategy and the transformation of work practices in the branches. How such mediation happened and how LAIS implementation enabled and advanced organisational learning was explained by an in-depth analysis of sensemaking processes in the Bank.

It is important to reiterate that sensemaking plays a central role in organizing, working and learning. "People organize – Weick et al. (2005) write – to make sense of equivocal inputs and enact this sense back to the world to make that world more orderly" (p. 410). Making sense of LAIS and enacting this sense back to their business practices led to the emergence of learning, evidenced in all the branches involved in LAIS implementation. As the detailed analysis of LAIS implementation

in the three regions showed, account officers made an observable progress from not-learning to single-loop and to double-loop learning. In every region studied the emergence of learning followed the pattern: a) the not-learning stage characterised by account officers' engaging only in an intra-subjective sensemaking; b) the single-loop learning stage when both intra-subjective and inter-subjective sensemaking were intertwined; and c) double-loop learning when all four levels, the intra-, inter-, generic-subjective and extra-subjective sensemaking got engaged, involving the change of mindset and reflective attitude toward past and current practices. This pattern is graphically presented in Figure 6.3.

The next section details the contribution of this research to the IS and organisational learning literature, followed by the limitation of this research and implications for future research.

7.3 Summary of Contributions

The theoretical interpretation and explanation in Chapter 6 focuses on LAIS implementation and the ways in which it instigated organisational learning in the Bank. First the theoretical interpretation of LAIS implementation and learning processes in the three regions studied led to identification of patterns: from not learning, to single-loop to double-loop learning. It also included analysis of sensemaking during implementation stages and how the branches moved from one stage to the next, from not learning, to single-loop to double-loop learning. Second, from the theoretical interpretation of the case study material, further and more general claims were made by applying the principle of abstraction and generalization (Klein and Myers, 1999). In such a way, this thesis provides an empirically grounded and theoretically argued answer to the research question studied: "What are the ways and mechanisms by which information systems' implementation and use engage sensemaking in organisations, and how does such engagement engender or prevent organisational learning?"

More general claims to knowledge are made while being informed by discussions in IS literature regarding the nature and risks involved in generalizing from empirical data (Lee and Baskerville, 2003). I draw from Walsham's (1995) position that the researcher can generalize from empirical data and the rich description of the case to concepts, to a theory, to specific implications and to rich insights (p. 70-80). Furthermore, in their highly cited paper, Klein and Myers (1999) recognize that generalising from empirical statements to theoretical statements is an important part of interpretive research and that theory in field study research plays a crucial role. Application of their principle of abstraction and generalisation helped me derive more general propositions from the case study.

A major proposition, grounded in empirical data, is that the likelihood of an IS implementation to instigate and enable organisational learning depends on the engagement of sensemaking at different levels (illustrated in Figures 6.4, 6.5 and 6.6). This is further explained by two more detailed propositions:

1. The emergence of organisational learning when instigated by an IS implementation is likely to follow the pattern from not learning, to single-loop to double-loop learning;
2. An information system's likelihood to instigate organisational learning depends on the nature of sensemaking involved: a) if an IS implementation engages only individual, intra-subjective sensemaking organisational learning is not likely to occur and system is at risk of being rejected; b) for single-loop learning to emerge the engagement of intra- and inter-subjective sensemaking, mutually intertwined during an IS implementation, is required, and c) the change of mindset and double-loop learning can be achieved through the interplay of all sensemaking processes (intra, inter, generic-subjective and extra-subjective) in an IS implementation.

These claims to knowledge are important for both IS practice and IS theory building. Being informed by such theoretical claims IS practitioners may become more acutely aware of the intricacies and subtleties of sensemaking involved in IS implementation

and develop better strategies for rolling out new systems. There are many lessons that practitioners can learn from this case. Among others, why IS training is notoriously problematic was explained in great depth; the social nature of training, on-the-job training and communities-of-practice based introduction of IS are shown to be among the key contributors to success; this is extended to the notion of ‘communities of interpretation’ that enables broader knowledge sharing and collective meaning making beyond the immediate working group (among account officers across branches); successful IS implementation would include organisational learning if the implementation strategy provides opportunities for collective sensemaking and sense-giving by all actors affected; IS implementation would benefit from effective stories and metaphors that assist actors in making necessary transitions including changes of individual identities.

In terms of contribution to theory building this thesis proposed a new theoretical framework to study IS implementation and its relation for organisational learning. This may be named a sensemaking theory of IS and organisational learning. It draws from and extends Argyris and Schon’s (1978) organizational learning theory by incorporating the sensemaking view of organizations (Weick, 1995) and a sensemaking interpretation of knowledge and information systems (Cecez-Kecmanovic, 2004). The rich empirical material from my longitudinal case study provides grounding for the proposed sensemaking theory of IS and organisational learning and demonstrates its explanatory power in practice.

7.4 Limitation

The empirical research study presented in this thesis is limited in a several ways. First, I was not able to investigate the entire process of implementation and use of LAIS, which is scheduled to continue after the initial two years I studied for the next two years to include the entire SEA bank. Secondly, the development of LAIS was outsourced to EB and I was not able to interview staff in this organisation – partly due to their dislocation but also due the lack of willingness to participate in this research. Interviews with EB staff would have contributed to my understanding of

how EB viewed the whole process of learning especially in the first year of implementation, which includes the pilot project in Region A. The agreement, which I negotiated with SEA bank, did not include an investigation of the LAIS project from EB's perspective and they had considered it confidential. Thirdly, given the time constraints of my thesis and inability to be truly embedded within the LAIS project limited the insights I was able to gain in my study.

Fourthly, given the evolutionary nature of LAIS development, not all Regions of SEA Bank were using the identical version during my data collection period. However, of prime concern was the investigation of what the organisation learnt because of the implementation of LAIS and not necessarily about the version of LAIS. As a result, I was unable to compare the implementation effects on learning for each version of LAIS.

7.5 Future Research

Further research is called for to examine and test the theoretical propositions put forward in this thesis. It will be particularly interesting to apply the proposed sensemaking theory of IS and organizational learning in different settings and different organisational and cultural contexts. Such application may include further field studies, preferably of longitudinal nature, cross-case comparative studies, and perhaps meta-studies of published cases. Questioning and grounding the theoretical propositions regarding the nature of learning through IS implementation and the engagement of sensemaking at different levels would contribute to the advancement and testing of the theoretical model.

Another contribution can be made in future research by extending the proposed sensemaking model of IS and organizational learning, for example by drawing from IS and organisation strategy research, change management and innovation literature.

8 Bibliography

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9 Appendix

Table A1 List of SEA Bank interviewees

No	Job Title	Pseudo Name	First interview (2003)	Second interview (2004)	Notes
1	Vice-President and CIO	Darwin, Mr.	Session 1, 03-06-2003, 11.00-11.50 Session 2, 11-06-2003, 09.00-11.00	07-05-2004, 11.00-12.00	Provided Documents
2	General Manager, Information Technology Division	Darius, Mr.	03-07-2003, 16.00-17.30	11-05-2004, 11.00-12.00	
3	Senior Manager, IT Engineering Sub Division	Jeff, Mr.	Session 1, 09-07-2003, 10.00-11.00 Session 2, 09-07-2003, 15.00-16.30	NA	
4	Senior Manager, IT System Development Sub Division	Luke, Mr.	NA	12-05-2004, 14.00-15.00	
5	Manager, IT, 2003 LAIS project	Vincent, Mr.	10-07-2003, 13.15-13.50	21-04-2004, 9.45-10.45	Provided Documents
6	Manager IT, 2004 LAIS project	Kunt, Mr.	NA	Session 1, 21-04-2004, 9.45-10.45 Session 2, 11-05-2004, 10.00-11.00	Provided Documents
7	Senior Manager, Retail Business Credit Development Sub Division, National LAIS Project Manager	Lian, Ms.	18-07-2003, 08.30-10.00	Session 1, 06-05-2004, 10.20-11.00 Session 2, 11-05-2004, 12.20-13.00 13.30-14.30	Provided Documents, including the summary of LAIS project in Dec 2004
8	Managing Director of Human Resource Development and Compliance	Chan, Mr.	22-07-2003, 15.30-17.00	NA	Had no direct involvement with LAIS project
9	General Manager, Human Resources Division	Indy, Mr.	22-07-2003, 15.30-17.00	NA	Had no personal involvement in the LAIS project

No	Job Title	Pseudo Name	First interview (2003)	Second interview (2004)	Notes
10	Manager, Human Resources and LAIS Project (Branch level) in Region A	Liza, Ms.	17-07-2003, 15.00-16.30	NA	Involved in the initial LAIS pilot project, however had no involvement in the LAIS project thereafter
11	Managing Director of Credit and Loans, Chief Risk Officer	Tony, Mr.	Session 1, 24-06-2003, 15.00-16.30	NA	
12	General Manager, Credit/Lending Division	Ruud, Mr.	Session 1, 24-06-2003, 15.00-16.30 Session 2, 01-07-2003, 14.45-16.00	11-05-2004, 16.00-17.15	
13	Senior Manager, LAIS project, RCC project in Region A (2003), 7 regions RCC Project (2004)	Gunn, Mr.	10-07-2003, 15.20-16.30	30-04-2004, 10.00-11.30	The second interview was a joint interview with Ricky (#14)
14	Senior Manager, LAIS project, RCC project in Region B (2003), 7 regions RCC project (2004)	Ricky, Mr.	10-07-2003, 14.15-15.15	30-04-2004, 10.00-11.30	The second interview was a joint interview with Gunn (#13)
15	General Manager, Region A	Surya, Mr.	15-07-2003, 17.00-19.00	28-04-2004, 10.00-11.00, 11.15-12.15	Provided Documents
16	Senior Manager, Head of RCC in Region A	Andrew, Mr.	15-07-2003, 14.15-15.15	26-04-2004, 10.20-12.00	
17	Manager, RCC Officer for Region A	Henry, Mr.	15-07-2003, 15.30-17.00	NA	Had moved to another division in 2004
18	Branch Manager, in Region A	Tien, Ms	16-07-2003, 15.00-16.30	NA	Had no direct involvement in the LAIS project
19	Vice Branch Manager for LAIS in Region A	Hendry Mr.	16-07-2003, 09.20-10.20	27-04-2004, 09.20-10.20	
20	Senior Account Officer in Region A	Agustinus, Mr.	16-07-2003, 11.20-12.20	NA	Provided Documents

No	Job Title	Pseudo Name	First interview (2003)	Second interview (2004)	Notes
21	Account Officer in Region A	Sian, Ms.	16-07-2003, 14.20-14.40	27-04-2004, 12.00-12.35, 17.00-17.20	
22	Account Officer in Region A	Lily, Ms.	16-07-2003, 09.20-10.20	Session 1, 27-04-2004, 14.20-15.20 Session 2, 28-04-2004, 15.30-16.30	Provided Documents
23	Account Officer in Region A	Silvy, Ms.	NA	16-07-2003, 09.20-10.20	
24	Account Officer in Region A	Alyssa , Ms.	NA	16-07-2003, 09.20-10.20	
25	Manager and Senior Credit Analyst, RCC in Region A	John, Mr.	NA	26-04-2004, 15.20-16.30	Provided documents
26	Associate Credit Analyst, RCC in Region A	Neumann, Mr.	NA	26-04-2004, 16.45-17.45	
27	Associate Credit Analyst, RCC in Region A	Lilik, Mr.	NA	26-04-2004, 14.20-15.20	
28	General Manager, Region B	Harson, Mr.	NA	04-05-2004, 10.30-12.00	
29	Manager, LAIS project, Region B (2003) Senior Manager, RCC in Region B (2004)	Victor, Mr.	10-07-2003, 16.30-17.30	04-05-2004, 18.30-19.45	Provided Documents
30	Vice Branch Manager for LAIS in Region B	Rudi, Mr.	NA	05-05-2004, 08.30-09.30	
31	Senior Account Officer in Region B	Nur, Ms.	NA	04-05-2004, 15.00-16.00	
32	Account Officer in Region B	Harry, Mr.	NA	05-05-2004, 14.50-15.50	
33	Account Officer in Region B	Ayu, Ms.	NA	05-05-2004, 10.00-11.00	
34	Account Officer in Region B	Robby, Mr.	NA	05-05-2004, 16.00-16.30	

No	Job Title	Pseudo Name	First interview (2003)	Second interview (2004)	Notes
35	Credit Analyst, Region B	Marcelina, Ms.	NA	04-05-2004, 16.20-17.30	
36	Vice Branch Manager for LAIS in Region C	Sophia, Ms.	NA	10-05-2004, 15.00-15.50	
37	Account Officer in Region C	Meikey, Ms.	NA	10-05-2004, 16.00-17.00	
38	Senior Account Officer in Region C	Edison, Mr.	NA	10-05-2004, 17.00-17.50	
39	Account Officer in Region C	Eka, Ms.	NA	10-05-2004, 18.00-18.30	