

**MULTIPLE PERSPECTIVES FRAMEWORK TO MODEL
COMPLEX SYSTEMS**

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I dedicate this thesis to my parents,

Bong Jae and Ok Hee Yoo

for their unconditional love,

for always believing in me and

for never letting me fall.

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I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

.....

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ABSTRACT

The growing complexity of organisations has resulted in collaboration between multiple stakeholders becoming a demanding and critical issue, which organisations must then manage in order to ensure their systems are sustainable. The challenge is to tackle the complex issues facing contemporary organisations and their stakeholders. There is a necessity to settle upon a modelling method that can be used to analyse change management and to improve its adaptation. This study addresses the area of Information Systems (IS) design, in which it is difficult to identify new characteristics of systems in complex environments. Thus the system design framework is recognised prior to modelling a complex system at various points in the organisation's development and in managing system evolution. However, the framework would not succeed without a full understanding of the significant changes occurring across organisations. The use of a multiple perspective framework to improve understanding of the complex relationships affecting such systems has been examined. A multiple case field study was conducted in order to demonstrate the suitability of the proposed methodology, and effect the analysis and examination for knowledge-based systems in an actual organisational setting. The results have suggested that the use of a multi-perspective framework is appropriate and that there is a need for attention to be paid to the economic perspective.

Keywords: Complex Systems, System Design, Organisational Complexity, Organisational sustainability, Visualisation.

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CHAPTER I

INTRODUCTION

1.1 Motivation

The researcher's involvement as a Quality Systems manager in the disciplinary area of business process management has enabled him to research and identify the experts in the field, and determine the criteria and effective methods for both the operations and control of processes. Furthermore, his role is to ensure the availability of current and forthcoming information that is necessary to review business processes for continuous improvement and maintaining the quality management system in an organisation. In exploring these areas he has become interested in organisational learning, understanding how current and future knowledge can be created and shared amongst multiple stakeholders.

This is why the researcher has begun to focus on the role played by self-organisation and adaptability in the rapidly changing environment which can lead to greater challenge in improving complex processes for organisational planning and policy; that is, examining its demands for better methods by which to manage system evolution. However, current research has shown that the implications regarding the evolution of an organisation to a position where it can adapt to a new and collaborative architecture, can be challenging. Thus, the focus here is placed on the identification and development of the framework to tackle complex problems, which is critical for organisations to achieve sustainability.

The project covers several issues, but of particular concern is the need to develop a model that will be composed in such a way as to be beneficial in helping to analyse complex issues. A multiple perspective framework is considered here as it is a particularly interesting case in this regard. Organisations are complex and require collaboration to function effectively across multiple stakeholders; as a consequence they are familiar with collaborative projects and participate consciously in processes for the accomplishment of a particular goal. In the business partnership of cooperation, organisations could use the model based on a multi-perspective approach to identify new characteristics and to gain an understanding regarding how they can establish and maintain stable relationships with other organisations and strategic alliances. The benefits of the new multi-perspective model could be utilised for the collaboration of multiple stakeholders and to drive future organisational change.

The researcher's work has been recognised by leading Information Systems (IS) conferences thus supporting the development of new insights into the IS research field. The conferences which have refereed the researcher's publication are listed as followed;

- 2013 International Conference on Information Systems (ICIS), Milan, Italy.
- 2013 Pacific Asia Conference on Information Systems (PACIS), Jeju Island, Korea.
- 2012 The Australasian Conference on Information Systems (ACIS), Geelong, Australia.
- 2011 European Conference on Knowledge Management (ECKM), Passau, Germany.

1.2 Background

Information systems are becoming more complex because they are increasingly required to support what are known as ‘wicked problems’ (Rittel & Webber 1973). Rittel and Webber have defined ‘wicked problems’ as being highly resistant to resolution; offering no definitive or immediate solution; every ‘wicked problem’ can be expressed as an indication of another complication. The resultant social complexity can make communication and interaction between multiple stakeholders difficult. Organisational complexity, then, is often defined as ‘the measure of diversity with regards to internal and environmental factors’ (Mason 2007, p. 10). Whilst complexity as a theory has been the subject of research, complexity science has only recently been used to interpret behaviour in other fields, including organisational studies (Maguire et al. 2006).

The study of organisational complexity is based on disciplines that examine requirements for change and aim to understand complexity and the types of processes that lead to it (Heylighen 1999; Keirse 1999). As a consequence of globalisation, organisations are becoming more diverse in terms of their customer base and employees, and are also more dispersed. However, an alternate view of complexity may provide the knowledge required for organisational architecture.

The dynamics of complex theory have been the subject of extensive research, but this has not yet been systematically applied to social networking communities. Boyd and Ellison (2007) state that a social network creates a list of other users who share a common view whilst supporting the relationships formed by other individuals within the system. Some researchers have argued that complexity theory only attempts to find

patterns in computational systems, rather than seeing growing complexity as a result of system evolution (Heylighen 1989).

This study outlines a conceptual framework based on the role of different organisational forms and suggests open models which could be used to better manage and understand the complexity of organisations. The majority of current modelling methods are suitable for structured systems. However, there is also a need to explicitly address new emerging organisational structures, such as complex systems, wicked problems in a social network structure and self-organisation, in order to improve the collaboration process. This requires strong knowledge-sharing networks and an understanding of self-organisation in order to work constructively in search of innovative solutions to complex issues. According to Zhuge (2004), 'knowledge flow is a passing of knowledge between people and it enables people, roles and devices to cooperate effectively' (p. 174). Sorenson, Rivkin and Fleming (2006) describe that knowledge plays an important role in the development of a collaborative network.

Heylighen (2001) defined self-organisation as 'the spontaneous emergence of new structures, (p. 11) and continual adaptation to a changing environment. Efficient self-organisation reinforces the importance of newly emerging structures that involve multiple levels of complexity (Merali 2006) in organisations. Moreover, he described complex organisations and processes that may refer to organisations that have many people, processes, rules, strategies and basic units in the emergent domain.

Modelling methods need to be introduced in such a way as to consider the need to analyse the management of change and to improve adaptation to it; this involves an examination of existing methodologies and organisational complexity. This section will

consider how the introduction of innovative methods causes difficulties in organisations that are familiar with a pre-existing model. The subsequent emergence of self-organising social and economic networks introduces issues that are then linked with complexity (Merali 2006). In order to analyse and provide for the nature of complexity, the following questions have been addressed in this study:

What are the modelling methods needed to understand ‘wicked problems’? And how do they cater for complex characteristics? This study approaches these issues from both an empirical and theoretical viewpoint.

A number of studies (Dagnino 2004; Head & Alford 2008; McElory 2000; Smith & Humphries 2004) have highlighted complexity and transformation as key issues from an integrated multiple organisational perspective. Much discussion of complexity has implied that the modelling method used should be the focus of the study, regarding how organisations adapt to changing collaborative environments. Nevertheless, the integration of perspectives and underlying assumptions in each perspective often increases the complexity of the dynamic social system, creating further requirements so as to improve the behavioural perspective. Therefore, the creation of complexity, poses difficulties in integration, and so arises only out of necessity. An analysis of the emergent issue arising from complex organisations, that is, wicked problems and their characteristics, will be provided in the subsequent section.

1.3 Wicked Problem

A ‘wicked’ (Rittel & Webber 1973) problem is one which has no definite solution, thus cannot be resolved easily. Each attempt to formulate a solution for the problem may also lead to the emergence of other wicked problems.

Rittel and Weber defined seven characteristics of wicked problems:

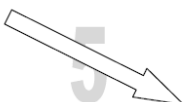
- You don't understand the problem until you have developed a solution, i.e. no definitive statement of a wicked problem.
 - Wicked problems have no stopping rule, i.e. no definitive solution.
 - Solutions to wicked problems are not right or wrong, simply 'better' or 'good enough'.
 - Every wicked problem is essentially unique or novel, i.e. no two wicked problems are alike.
 - Every solution to a wicked problem is a 'one-shot operation'; you can't learn about the problem without trying solutions, but every solution you try is expensive and has lasting unintended consequences which are likely to spawn new wicked problems.
 - Wicked problems have no given alternative solutions; there may be no solutions, or there may be a host of potential solutions that are devised.
 - Every wicked problem can be considered to be a symptom of another problem.
- (Rittel & Webber 1973, p. 161-166)

In an organisational context, a wicked problem creates the social complexity which makes communication and interaction difficult among multiple stakeholders. An example of this situation may be a network of construction project management firms planning to establish a large social housing development. Thus, it requires a clear understanding of how knowledge flows through an organisation and self-organisation for working collaboratively across boundaries.

Head and Alford (2008) have emphasised that challenges to tackle wicked problems often lead to social complexity. They demonstrated a typology of problems as described in Table 1-1 below and techniques to manage the complex issues with wicked elements. Roberts (2000) distinguishes that ‘Type 2 problems have the definition but not the solution, whereas in Type 3 problems there are no agreements over either the definition or solution’ (p.1). In the literature, the key finding around wicked problems is that they cause social complexities rather than technical complexities.

Dealing with the wicked problems, there is a collaborative diversity that takes many different shapes (Imperial 2004) among multiple stakeholders. According to Camillus (2008), the description of wickedness is not a degree of difficulty. Wicked issues such as public, community and social housing requirements by priority, political, social and ageing issues are different because traditional processes cannot resolve them, but organisations can learn to cope with them. To manage the wickedness of strategy involves stakeholders, documented opinions, and communication.

Table 1-1. Typology of a problem

Diversity → Complexity ↓	Single party	Multiple parties, each having only some of the relevant knowledge	Multiple parties, conflicting in values/interests
Both problem and solutions known (Heifetz Type 1)	Tame problem 1	2	3
Problem known, solution not known (relationship between cause and effect unclear) (Heifetz Type 2)	4	 5	Wicked problem 6
Neither problem nor solution known (Heifetz Type 3)	7	Wicked problem 8	Very wicked problem 9

Source: adapted from Head and Alford (2008)

Complexity and diversity dimensions can be merged to reveal the characteristics of problem types as shown in Table 1-1. Where problems are the same, both problem and solutions are known (Type 1).

The more complex and diverse the situation, the more wicked the problem (Type 3). This typology suggests that there are different kinds of wicked problems, and by implication that there are different types of responses to them. In particular, it suggests that there is more to tackling wicked problems than engaging in some form of collaboration (Head & Alford 2008, p.8).

The literature review will examine the previous research regarding complexity theory as described by (Merali 2006), followed by new characteristics from dynamic complexity which identifies essential criteria for new requirements. Additionally, the use of a multiple perspective framework to address the ways in which organisational structures are formalised, and the process of change and social interactions within communities and in complex organisations, will also be analysed. Consequently, the conceptual model is analysed with reference to social networks and the roles of complexity and sources of knowledge, including analytical models. Implications and future research directions are discussed in the conclusion.

There is a need to adopt many perspectives including from the viewpoints of organisation, business, knowledge and the social perspective, where these become integrated to help tackle such problems through an identification of the origin and eventual processes leading to the output of solutions.

1.4 Statement of the Problems

Understanding a wicked problem:

There is a need to understand more about wicked problems in self-organisation of complex systems. In the collaborative innovation literature, a wicked problem often leads to social complexity and there are several approaches dealing with the different design models to support the new process implementation over self-organised business processes.

Recent research has emphasised that tackling ‘wicked problems’ often results in social complexity (Conklin 2005; Head & Alford 2008).

Social complexity is a function of the number and diversity of players who are involved in a project. The more parties involved in a collaboration, the more socially complex it is. The more different those parties are, the more socially complex. (Conklin 2005, p. 14)

Head and Alford illustrated in Table 1-1 that;

the typology of problems and techniques; both problem and solutions known (Type I), problem known, solution not known (Type II) and neither problem nor solution known (Type III). The more complex and diverse the situation, the more wicked the problem (Type III). This typology suggests that there are different kinds of wicked problems, and by implication that there are different types of responses to them (Head & Alford 2008, p.8).

By identifying similar problems, both the problem and solutions can be analysed to resolve a wicked problem more effectively (Type 1).

A distinguishing characteristic of wicked problems is that they induce the emergence of social rather than technical complexities. In order to solve wicked problems effectively co-operative action from various stakeholders and organisations is required (Imperial 2004). For example, in order to provide solutions to issues regarding public housing, action and input from both government and non-profit community organisations are needed.

Camillus (2008) has argued that the description of wickedness is not predicated on degree of difficulty. Wicked issues cannot be resolved through traditional processes, but rather organisations can learn to cope with them. Managing the wickedness of a strategy involves stakeholders and requires the documentation of opinions and communication. In order to tackle the wicked problem, it is important that new knowledge is needed for an integrated perspective model.

Essential design criteria of complexity theory

New characteristics have resulted from complexity, for example new experiences for learning organisations; a lack of boundaries for virtual organisations; new knowledge from social network structures and self-organising systems that require constant feedback from the rapidly changing environment.

McElroy (2000) has described the importance of complexity theory in offering the knowledge acquired in human social systems. McElroy has also illustrated the relationship between knowledge management, organisational learning and complexity theory in human organisations, when quickly adapting to changes; and has focused on second generation strategies for the creation of new knowledge for organisational demand. Merali (2006) has supported the argument of new characteristics in understanding complex organisations, stressing the significance of adaptation and self-

organisation in a dynamic environment. However, proposing a model capable of capturing the emergent dynamics of complex systems is difficult and using traditional methodologies to analyse the complex issues involved is almost impossible.

Insufficient integration of the multiple perspectives

The work of Linstone (1985) is of value in understanding the multiple perspectives model, which includes technical, personal and organisational perspectives for decision making. Merali (2006) has noted that the emergent domain creates complexity from the social behavioural perspective. Many studies have stressed the importance of adopting a multiple perspectives approach (Ferlie 2007; Imperial 2004; Imtiaz & Ikram 2008; Linstone 1985; Merali 2006) for the purpose of understanding complex processes and explaining social behaviours. However, without the integration of perspectives into a holistic model to manage system evolution, self-organising efforts to achieve sustainability are likely to prove difficult. Hence, it becomes difficult to manage wicked environments with the absence of an integrated model.

1.5 Aims and Objectives

The main aim in conducting this study is to identify and develop a multiple perspective framework to model complex services across organisations.

The aim will be achieved by meeting the following key objectives, to:

- Develop a model made up of a number of perspectives which will help to tackle the complex issues;

- Structure the multiple perspectives framework to show how perspectives are integrated into a holistic model to effectively adapt to change and knowledge flow; and to
- Identify perspectives that influence the modelling constructs to facilitate change.

The goal of the research is to develop a multiple-perspectives model that could manage the collaborative environment and knowledge flow in complex organisations. Moreover, an exploration of the literature review should allow for a greater in-depth understanding of organisational complexity which in turn will lead to the validation of the model by case studies.

1.6 Significance of the Study

This study will offer a substantial contribution to both social perspective research and the modelling of multiple-perspectives techniques, and provide significant support to prove the effectiveness of the emergent structure for improving organisational collaboration. The results from this study are expected to make several contributions to the current literature:

- First, providing further analysis of methods in relation to integrating complexity theory (McElroy 2000);
- Second, addressing new characteristics of the organisation, noted by Merali (2006); and
- Third, showing that a multiple perspective will improve collaborative architecture in a complex environment, further enabling the visualisation of knowledge flows.

The researcher has examined the strategy for improving complex processes which is significant for developing the model. Additionally, the process of self-organisation occurring through diverse practices enables organisations to adapt rapidly to changing environments. The behavioural perspective of the social system is not entirely recognised in the existing models which are based on the cognitive approach. In contrast, the multiple-perspectives model attempts to combine self-organisation with different dimensions of the organisation's architecture for easy management when significant changes occur. For example, an organisation tackles complex problems by examining the business processes and strategic goals rather than making an effort to change a behavioural relationship between the roles and activities that take place in the environment. The thesis also describes the benefits of the multiple-perspectives framework with regards to the complex organisation.

1.7 Thesis Structure

In this introductory chapter, the importance of using the multiple-perspectives framework to tackle wicked problems in a complex organisation was proposed. Consequently, an overview of the 'wicked' problems was presented, followed by the aims and objectives of the research, and then the significance of the study was summarised. The remainder of this thesis is structured as follows.

Chapter II: A review of the literature is provided and the researcher investigates issues related to the individual perspective and gaps in the literature. In addition, modelling methods for organisational complexity and characteristics of emerging, collaborative issues are highlighted.

Chapter III: The researcher proposes the conceptual framework for collaborative environments whilst outlining the role of research questions for the development of the multiple-perspectives model. Moreover, an investigation of how the multi-perspectives framework displays the relationship between the different roles and their boundaries, is also presented.

Chapter IV: The researcher explains the methodology used in the study and an overview of the applied research design.

Chapter V: The researcher discusses the results and findings to address the research questions.

Chapter VI: The researcher draws conclusions and also describes some of the interpretations, limitations, and implications.

CHAPTER II

LITERATURE REVIEW

2.1 Introduction

Organisations are now more complex as they have been transformed into extensive, collaborative networks promoting the development of valuable interrelationships between stakeholders. As a consequence more effective approaches to model knowledge flows in complex organisations are required in order to achieve active and efficient collaboration across multiple stakeholders. Furthermore, this influences how organisations analyse Information System (IS) methods to design new models that are distinct from the majority of existing modelling solutions primarily suited to structured systems. Therefore, model knowledge flows become limited as a result of using current methodologies, which indicates that organisational complexity has to be examined. The literature indicates that developing the innovative method (Aversano et al. 2004; Moller 2007) can be difficult compared to the existing models. Further, the kinds of processes and tools needed to design an IS system are not clear. Hence, a literature review of modelling method with combined perspectives is necessary to solve wicked problems.

The literature review will focus on the related works of the main thesis and address some of the shortfalls in the integration of multi-perspective dimensions as later mentioned in section 2.9 which draws upon ‘Gaps in the literature and research questions’. The chapter first provides an overview of organisational complexity and how it relates to the multiple-perspective approach. This will offer an in-depth understanding of the concepts of complexity theory, wicked problems, self-

organisation, living systems theory and its impact on knowledge flows. Second, gaps in the literature are explored in order to support the development of a model for understanding the relationship between complex organisations and its knowledge network. Recent research indicates that modelling method is important for addressing complex problems. For complexity and change, McElory (2000) highlights the integration of multiple organisational perspectives as a key issue in the literature. Much discussion of complexity issues implies that the focus should be placed on the modelling method and how organisations adapt to changing environments. In particular, this review will discuss the validity of multiple perspective views and its significance in extending links across organisations.

Complexity theory, wicked problems and self-organisation (Head & Alford 2008; Kaufman 1995; Mason 2007) can be used to describe current trends in organisational and competitive contexts. However, in this research, the multiple perspectives modelling method is applied in the context of knowledge and social networks where collaboration occurs across all government agencies in Australia. In the second section, a review of existing literature of organisational complexity in dynamic system is discussed. In the third section, multi-perspective dimensions are introduced as linkages for analysing knowledge flows and relationships.

In this chapter, the researcher searched for clarification of what modelling methods are needed for people to understand how to manage complexity and wicked problems. Moreover, how the new model caters for complex characteristics of unanticipated events and justifications to develop a new multi-perspective framework are also discussed. This study will explore the new method of design model in correspondence

to the research questions mentioned previously in Chapter I. In conclusion, a theoretical model is proposed together with research questions for understanding the relationship between organisation, business, knowledge and social perspective in a collaborative environment.

2.2 General Description

The literature of collaborative innovation suggests several approaches to dealing with different design models to support new process implementation in self-organised business processes. It is often defined as the creation of knowledge and coordination across organisational boundaries (Gasson & Elrod 2006; Lichtenstein & Brian 2006). Placing value on collaborative innovation, dimensions of new multi-perspective performance are explored and examined so that new ways of modelling will be able to assist in resolving the issues posed by new organisational process implementation and enable swift responsiveness to change. A number of studies (Cohen 1999; Dagnino 2004; McElroy 2000; Smith & Humphries 2004) have highlighted the importance of complexity theory and concluded that it is difficult to translate into dynamic system environment practice. Andriani (2005) specifically notes that in practice, adaptive strategies are required to detect changes in the environment and that diversity and self-organisation are important. Similarly, Arthur, DeFillippi and Lindsay (2001) describe diversity within organisations having to realign with continuous environmental changes based on self-organisation. Therefore, a model combining a holistic model may be developed using a number of perspectives to model the complex system. This approach focuses on describing the behavioural perspective of social system dynamics and organisational structures.

Research by Heylighen (2001) and Andriani (2005) is of value in understanding the emergence of new structures and adaptability in a dynamic environment. For example, organisational structures have the option to control the importance of continual adaptation to a changing environment (Heylighen 2001). Moreover, organisations ensure that new structures emerge in a consistent way and achieve the benefits associated with effective operations. In the current competitive and ever-changing enterprise environment, the need for organisational change demands better business processes, particularly social behaviour, which requires sensitive assessment of impacts on overall performance. For example, social perspective focuses on the collaboration between multiple users enabling them to openly share what they have developed (Hippel 2005). However, the implications of adopting the new perspective models in the management of system evolution have only been partially addressed.

Researchers in Information System (IS) have emphasised the significance of self-organisation (Andriani 2005; Arthur et al. 2001; Heylighen 2008). On the other hand, the development of a model to capture the emergent dynamics of a complex system is difficult and it would prove almost impossible to use traditional methodologies to analyse complex issues (Ritchey 2005). In practice, adaptive strategies are required to sense change in the environment and to assess the significance of diversity and self-organisation.

2.3 Characteristics of Modelling Techniques

The critical factor of success is to understand complex processes and systems that can accomplish more effective and flexible business models (Aversano et al. 2004, p. 2).

The authors approached their critiquing techniques to design a tool to support complex processes and explained the definition of a complete strategy. As well, their findings are also significant because they highlighted the strategy supported by complex modelling and critiquing processes. Moreover, many current modelling methods only consider one perspective.

Moller (2007) defines innovation as a technique to build integrated process models. According to Moller, models are recognised in an organisation using two principles to lead to the process innovation and new work practices which is conceptual modelling and experimental learning (Moller 2007, p. 118). The innovation strategy is assisted by a method including a supporting framework and techniques to manage the process innovation. In order to find development implications using this framework, we gather all the necessary information required to perform the evaluation of existing processes. The relationship between complex processes and the organisation as a whole is widely debated (Moller 2007). The objective of this work is to develop a combined perspective as an exemplar represented by enterprise information systems. Thus, he draws a list of factors needed to create a framework that acts as a tool to initiate and manage complex processes. Scozzi et al (2005) identify six main ontologies that characterise modelling techniques, as listed in Table 2-1.

Table 2-1. Perspective of analysis and related ontology

Process Modelling Perspective	Ontology
Sequence of tasks	Activity, states, roles
Decisions that evolve over time	Decisions, data flow, states
Strategic process	Visions
Political process	Impact, authority

Interpretative process	Analysis, understanding
Creative process	Data flow, ideas
Communication and information flow	Data flow, roles

As all of the information is related to complex processes, the implementation of such modelling techniques is difficult to manage.

2.4 Organisational Complexity Theory

Complexity as a theory has been studied over past years. It is only lately that complexity science has been used to interpret behaviour in other fields, including organisational studies (Maguire et al. 2006). For example, organisational complexity is becoming more relevant in solving wicked problems and it needs understanding of relationships between all components of the organisation. Organisations operate in a way that they are more diverse and dispersed. However, there could be the appearance of another view of complexity which possesses the essential inferences needed for organisational architecture. Anderson et al. (1999) indicate that the dynamics of complex theory have progressed into the highest point of study but have not systematically been applied to the social networking communities. Some of the traditional research states that the complexity theory only tries finding the patterns by computational systems. In contrast, growing complexity is a result of system evolution (Heylighen 1989). For example, organisation collaboration leads to the emergence of social interactions (Palloff & Pratt 2005).

Complexity as defined by McElroy (2000) is the degree of variation in factors within and outside an organisation including those listed by Duncan (1972) and Mason (2007,

p. 10), suppliers, technology, customers, socio-politics and departments Complexity theory places an emphasis on the ways in which ‘elements within a complex system at a micro-level can influence emerging behaviours and final outcomes that may surface at the macro-level’ (McElroy 2000, p. 198). The capacity to understand and use existing information to plan adaptation of a new organisation structure becomes challenging as the complexity of the system increases (Kalkanci, Chen & Urhun 2011).

The organisational environment according to Mason (2007) is composed of ‘factors beyond the control and management of the organisation as well as a system of relationships between stakeholders’ (p. 10).

With the ever increasing complexity of the organisational environment, the systems concept no longer seems adequate due to the management of knowledge flow and social interactions in dealing with complex phenomena (Amagoh 2008, p. 1). This drawback, in addition to others, has prompted complexity theory to surface which attempts to emphasise the occurrence of new structures and patterns. Furthermore, the complexity paradigm is underscored by systems that self-organise themselves into something new and constantly evolve (Byeon 2005; Ferlie 2007; White 2000).

2.4.1 Complexity Theory Concepts

Complexity theory came out of the physical sciences in the twentieth century (Allen, Strathern & Baldwin 2006). This knowledge has entailments for how people examine and understand the world. In a scientific context, the unexpected behaviours of matter can cause new patterns to appear.

Holland (1995) explains that interaction between the functional units and agents (Lin & Debenham 2001) within an organisation results in complex processes. Likewise, Kauffman (1993) points out that complex systems behave randomly to self-organise and usually provide structure and order. For example, Gloor (2006) indicates that the relationship between knowledge and social networks is reliant on self-organisation. Nevertheless, Granovetter (1990) notes that ‘...no part of social life can be properly analysed without seeing how it is fundamentally embedded in networks of social relations’ (p. 15). Hence, understanding of self-organisation requires convergence in the social perspective.

In particular, political impacts and sudden changes in government policy can cause the management of decision-making processes to be more difficult in the face of unexpected events. Therefore, self-organisation is critical to maintain order and stability within an organisational perspective. According to Lewin (1993) ‘disproportional and uncertain response to environmental change is the trademark of complex systems’ (Lewin 1993, p. 61).

2.4.2 Characteristics of Complex Systems

Research needs to place more emphasis on exploring a new framework to evaluate a design model and investigating appropriate modelling methods to identify knowledge flows in unanticipated events. In fact, multi-perspective views are the main element of complex process modelling whilst it also evolves to help collaboration across the organisation.

Complex systems usually share several common features. A large network of ‘elements within the system which interrelate and interact with one another is one such characteristic’ (Ackoff 1981, p. 15). The interactions that occur between these elements relate closely to the feedback mechanisms that exist in the system (Morel & Ramanujam 1999, p. 289; Price 2004, p. 43; Sherif 2006, p. 77). It is about understanding connectivity, feedback, emergence and self-organisation (Mitleton-Kelly 2003, p. 7), which are characteristics of a complex evolving system to sustain the organisation in fast changing environment.

Connectivity

Mitleton-Kelly (2000) describes connectivity in terms of application to ‘the inter-relatedness of individuals within a system, as well as to the relatedness between human social systems, which include systems of artifacts such as information technology (IT) systems and intellectual systems of ideas’ (p. 25). Seamless connectivity contributes significantly to infrastructure functional efficiency (Uschold & Gruninger 2004). In fact, connectivity deals with organisation perspectives but it is limited in a deeper understanding of enterprise social network with boundary roles between the functional units. Thus, a new model focuses on the integration of perspectives to cater for human social systems effectively.

Feedback

Feedback refers to the evaluation of a system generated by a new perspective on systems. For example, when organisations have just gone through a restructuring, it may cause a loss of productivity and morale or result in new ways of working processes. According to Mitleton-Kelly (2003), constructive ‘feedback processes underlie such transformation and they provide a starting point for understanding the constant

movement between change and stability in complex systems’ (p. 16). Thus, a new model should be able to represent the business perspective dimension in order to demonstrate how organisations may adapt to change quickly and efficiently in complex environments.

Emergence

Emergence refers to the creation of structures, relationships and organisational practices, which relates to the existence or formation of collective behaviours and in turn affect the evolution of those entities (Padgett & Powell 2012). For example, the ‘generation of knowledge and of innovative ideas when a team is working together could be described as an emergent property in the sense that it arises from the interaction of individuals and is not just the sum of existing ideas, but could well be something quite new and possibly unexpected’ (Mitleton-Kelly and Land 2004, p. 7).

Self-organisation

In an organisational context, self-organisation identifies the evolution of a system structure into an organised form without obvious limitations or pressures deriving from outside the system. Stacey (2003) describes self-organisation as an ‘aspect of causality of an organisation related to its movement into the future which results from learning and knowledge creation in the transformation of the organisation’ (p. 3). For example, as shown in Figure 2-1, the organisation can evolve either in dimensions of organisation or approaches to identifying stable forms such as enterprise social networking and knowledge communities. Moreover, Lucas (1997) states that the objectives of self-organisation can be outlined as seeking to identify the conditions under which structure emerges, the forms which it can take, and strategies to predict changes to the structure that are caused by modifications to the underlying system.

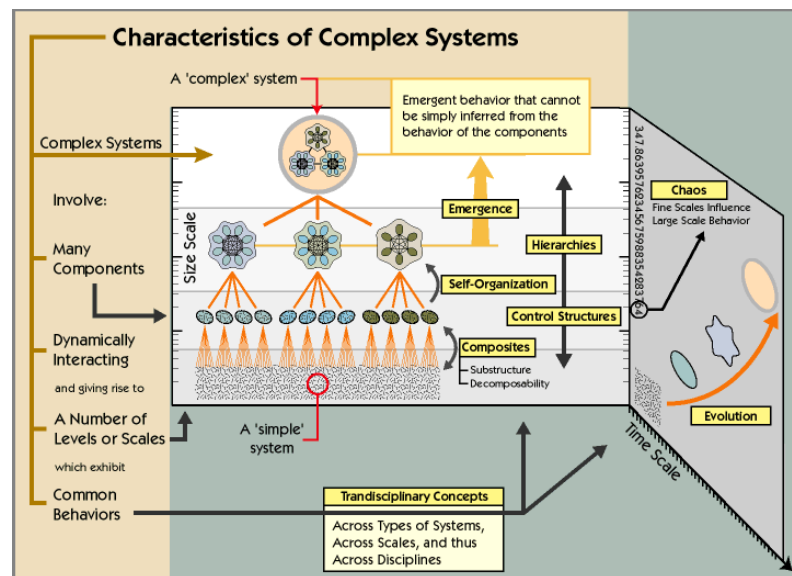


Figure 2-1. Characteristics of complex systems

Source: From New England Complex Systems Institute (<http://necsi.edu/projects/mclemens/viscss.html>)

Therefore, a greater insight into the features of complex systems will allow organisations to develop better plans to manage organisational knowledge more effectively and in a sustainable manner. On the other hand, Conklin (2005) describes how greater collaboration between stakeholders generates a more socially complex environment. From a different perspective, Millett (1998) compares organisational behaviours to living systems based on stakeholder's interactions across the boundaries as well as regeneration and growth of groups.

2.4.3 Complexity in Social Systems

As social systems are complex we need to redraw knowledge flows from emerging environments which become important for social perspectives. A number of scholars apply the understandings of complex systems, and apprehensions of human beings to;

complex systems, operating far-from-equilibrium to human social interactions in two major ways. The first includes the creation of artificial intelligence

applications and is outside the interest of this study. The second includes the utilisation of knowledge of humans as complex systems to apprehend, get involved in, and explicate social systems (Eppel 2009, p. 15).

A number of scholars have researched the appropriateness of complexity concepts such as emergence and self-organisation (Plowman et al. 2007) for apprehending and explicating social systems. A concept of social systems was proposed in the 1970's by Churchman (1967), where boundaries were explained to be social constructs specifying knowledge deemed to be appropriate to the human agent engaged in social interactions (e.g. collaboration between a broad set of stakeholders) as well as to the system itself (Kurtz & Snowden 2003).

Individuals heighten or suppress human behaviour as a result of mutual actions that arise between the system and its environment or within the social system (Midgley 2000, p. 114). In human social systems, individuals respond to phenomena that make complexity less complicated by specifying boundaries and producing assumptions.

People use the concept of 'sense-making' to describe the methods of comprehending experienced patterns (Weick 2001). Moreover, Cilliers (1998) describes human interactions in dynamic relationships where the continual flow of information between individuals allows for knowledge sharing.

In relation to the evolution of new organisational form, the researcher will explore the enterprise social networking and collaboration as it demonstrated the effects on social interactions and growth of knowledge networks.

Allen and Strathern (2003) describe how knowledge flows from a complex process of mutual action between global information and a network of relationships developed through former mutual actions. For example, Fuchs (2005) states that the internet can be perceived as the largest network system that is capable of self-organising.

The motivations for new knowledge acquired through study of the diversity of people are key aspects of human interaction. Stacey (2003) outlines the perceptions that complexity theory delivers to the dynamics within human relationships. Such examples of knowledge distribution include the sharing of information and development of communication skills. Therefore, Stacey's theory demonstrates the characteristics of human relationships and how the dynamics of the network are able to stabilise. As a result, organisations may self-organise once changes and knowledge flows have been identified (Allen & Strathern 2003). The most important of these characteristics is the knowledge creation (Nonaka, Krogh & Voelpel 2006) in the enterprise social network therefore a multiple perspectives model helps to identify the knowledge flow between the different dimensions.

Midgley (2000) argues that;

intercession in complex social systems calls for a multiple perspective based on 'process philosophy'. Process philosophy establishes the identity of subjects and objects by making bound judgments. Stating the precise meaning of subject boundaries requires the inclusion of definitions, namely those of the related conscious beings and an explanation of the 'knowledge generating system' (Midgley 2000, p. 79).

According to Midgley and Richardson (2007), the concept of ‘critical boundary critique’ for researching the boundaries between communities is accomplished by addressing in the following characteristics:

- Identification of organisational systems;
- Defining the objectives of organisational systems;
- Capability and limitation of the decision makers control;
- The world view involving the configuration and structure of the system.

These characteristics relate to the identification of the boundary roles within collaboration amongst multiple stakeholders. Therefore, they ensure the best possible output of solutions relevant to understanding organisational complexity. Similar to the Living Systems Theory (LST), complex social systems were thought to have had some significance to the development of the model in the preliminary states of research. Extensive investigation during the literature review revealed that this theory was relevant to the development of a multiple perspectives model because it helps to identify knowledge flows within social systems. As a result of knowledge identification, an understanding of the social systems and interactions, taking place in complex environments, will be heightened.

2.4.4 Organisations as Complex Systems

As mentioned by Morgan (1997), organisations are associated with social communities, hence can be viewed as complex systems. The notion of ‘systems’ appearing in the literature of organisations can be perceived in two distinct ways. The mechanical notion (Morgan 1997) explores the functional units which do not interrupt the activities and

processes occurring within organisations. Additionally, the other notion of systems is associated with complex social networks and culture (Schein 1992).

Morgan (1997) provided a comprehensive account of organisational complexity and their characteristics such as, business rules, policies and organisational structures. Such characteristics are considered significant to the sustainability of the organisation.

In summary, the literature indicates the significance of the Complexity Theory to the development of the new model which identifies new characteristics of the emergent systems. These new characteristics comprise wicked problems and social systems which enable organisations to manage organisational complexity more effectively. Moreover, the construction of the new model should help to visualise knowledge flows and processes arising in collaborative environments.

2.5 Self-organisation and Adaptation

Complex systems have the capacity for self-organisation and adaptation (Heylighen 2008). Self-organisation refers to the evolution of new complex structures which occurs when a complex system adapts to its environment (Lin & Hui 1997). Moreover, self-organisation involves the appearance of structure or pattern without explicit constraints from outside the system (Heylighen 1999). Adaptation describes the system's ability to withstand and survive changes in its environment due its individual behaviours and characteristics. The process of adaptation is thus concerned with the system's overall responsive behaviours to fluctuations in its internal and external environment (Byeon 2005). It specifies the system's capability to alter its environment or itself in response to

conditions that pressurise its efficiency. Once an organisation restructures its internal processes, adaptation occurs with the purpose of enabling the organisation to heighten its competition (Fioretti & Visser 2004, p. 15).

A number of creative responses may emerge from changing environments as a result of sustained adaptation and self-organisation (Morel & Ramanujam 1999, p. 287). One of the most significant aspects within complex systems that increases the proficiency of organizing systems are feedback loops (McKenzie & James 2004, p. 36). As a result of the system's components working efficiently, patterns may emerge more distinctly and frequently. The emergent properties may be observed independently whilst patterns in the system can be verified analytically (Ferlie 2007; Meek, De Ladurantey & Newell 2007). Once the system begins to head towards disorder causing the system's parameters to modify, the process of emergence ensues. Subsequently, the crisis which follows this sequence of events, pushes the organisation in a certain direction (Pascale, Millemann & Gioja 2000) whilst prompting changes to the behaviours of the organisation.

At this point, the system could collapse, steering the organisation towards its eventual downfall otherwise a substantial improvement to one of many new states could surface from the self-organisation within the divisions of the organisation (Kaufman, 1995, p. 98).

As the organisation adapts to its environment, new emergent structures may appear and the system's components begin to realign by adopting new behaviours that were not evident before (McElroy 2000). Examples of self-organisation and emergence include expansion of marketing plans which are essential to the vision of self-directed teams,

growth of innovative strategies and development of strategic partnerships (Meek et al. 2007).

In summary, the literature shows that self-organisation can often cause the breakdown of effective knowledge flows due to rapidly changing environments. It is important for the organisation perspective and the enterprise to realign its strategy for sustainability.

2.6 Living Systems Theory

The researcher also connected Living Systems Theory (LST) with self-organisation that help to integrate multi-perspective views to a holistic model for living organisation and as a means of improving organisational perspective. The organisation is a living system, it evolves and self-organises to adapt to changing environments. As a result, change at any one point will eventually have an impact on the total system and its component parts (Napier & Gershenfeld 2004). The objective of the developing multiple perspectives model is to help the ways organisations can begin re-establishing themselves in a complex environment.

Living systems theory (LST) commonly relates the organisation to a living system which includes organisational structure, social interactions, behaviour and development (Miller 1995).

Miller (1995) highlights seven critical features defining a living system:

- They are open, with the entrance, passage and exit of matter, energy, and information clearly identifiable;

- They maintain a stable condition of negtropy; that is, they are able to maintain this condition even when entropic changes occur;
- They contain specific schematic messages relating to the organisation and its operation;
- They have regulatory mechanisms, or mechanism for the management of the system;
- They are composed of a specific number of necessary sub-systems;
- These sub-systems are integrated into one whole;
- They can only survive in an adequate environment (Adapted from Knezevic 1998, p. 50).

For example, organisations' system processes define how information flows, and are exchanged, via interaction and formation of relationships taking place through the system's structure (Knezevic 1998). Organisational behaviour is concerned primarily with three of the eight levels of living systems, namely organisation, group and organism as shown in Figure 2-2 (Miller & Miller 1990). The diagram below displays how organisations can be likened to living systems as the growth and continuation of groups evolves in alignment with emerging environments.

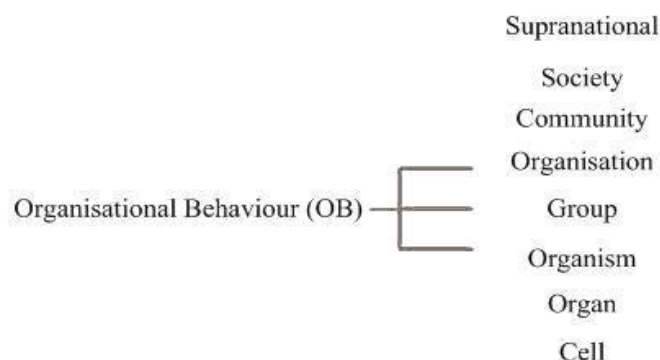


Figure 2-2. Levels of living system (Miller & Miller 1990)

For instance, Tracy (1994) points out that the concept of motivation (individual) is not easily associated with communication networks (group) or with organisational power and politics (organisation structure and processes), even though these higher level phenomena might be better understood as motivated behaviour. The life of all living systems is a cognitive process and therefore our social organisations must become Learning Organisations (Senge 1990), where people have the opportunity to increase their collective intelligence through individual level, continue to group level and then to organisation level. Consequently, Living Systems Theory (LST) provides a way to model emergence in a complex system. For example, a new group forms from the business activity and promotes collaboration between multiple stakeholders to address emerging knowledge. The extensive growth and interconnection between business activity groups also enables organisations to achieve common objectives successfully, therefore forming a complex network of social interactions.

In the initial stages of research in the Living Systems Theory (LST) was considered by Miller (1995), to have an essential relevance to the proposed model. However, it was only significant to an extent as it provided a way to model complexity in organisations and allowed new forms of knowledge groups to emerge. As mentioned earlier, the organisation evolves and self-organises to adapt to changing circumstances as a living system. It is possible to suggest that these characteristics may enable effective collaboration to take place across a community of practice.

LST offers a multi-layered system of complex organisational systems and provides a theoretical and practical framework for organisational behaviour (Tracy 1995). LST also provides identification of complex organisation structure, essential processes and

capabilities needed to succeed in human systems at every level. Hence, in accordance with the emergence of evolving environments, the living systems theory can be used to identify and address organisational complexity.

2.7 Enablers and Barriers of Information Technology (IT)

Information Technology (IT) provides the connection between the organisation and social perspectives across different role boundaries for knowledge flow. Even though there are many benefits of IT such as internet and social networking, appropriate strategies are needed to resolve the many issues and problems aroused by unstructured management of knowledge. The following are a few problems that can be addressed with business partners, vendors and stakeholders when organising the deployment of a new process or system in an organisation. It is crucial to consider and to understand that new technology cannot be an alternative to legacy systems (Light 2003), which have been accountable and used for many businesses globally over several years.

According to Alavi and Leidner (2001), IT allows for the greater dissemination and collection of information and data used for organisational learning. Therefore, IT promotes connectivity across the boundaries of functional units for shared knowledge creation. Moreover, Barson et al. (2000) outline the work of Schwartz (1999) where he recognises legacy systems as inhibiting the implementation of new processes. He notes that ‘the knowledge management products currently available are not yet fully mature and that organisations have to *cobble something together*’ (Barson et al. 2000, p. 369).

Aversano et al. (2004) summarise by noting that a comprehensible explanation of the technologies, information, systems and controls in use by the redesigned process is

more adaptable in a new model. Consequently, the development of an appropriate model is critical to the survival and continuation of organisations. In order to implement new approaches to deal with emergent changes, identification of enablers and barriers of complex systems is critical for effective self-organisation.

2.8 Enterprise Knowledge in Dynamic System

Narvekar and Jain (2006) explain that an organisation's knowledge influences the development of more effective relationships which improves performance. They also indicate that the capability to recognise new information is an important variable to prove the effectiveness of knowledge for enterprise performance. For instance, enterprise knowledge systems assist the demonstration of different views which support communication and skills to support decision making (Monahan 2000).

For knowledge models to support the communication of the organisation's vision and criteria for decision making it must link to the organisational perspective (Brooks 2003). On the other hand, operative models make clear knowledge and ideas to assist in obtaining the knowledge of actions (Heller 2000). Models can also build a strong customer relationship by understanding their problems and needs. Particularly, the use of models for designing is important for small-medium sized enterprises because the need for resources makes the designing stage critical. Scozzi, Garavelli & Crowston (2005) also state that models for learning and development consideration provide a foundation for reasoning, and for knowledge communication (Corbitt, Bradley & Thanasankit 2005) between the different functional units.

2.9 Gaps in the Literature and Research Questions

The literature defines complexity theory (Mason, 2007) in self-organisation, emergence and other perspectives on social complexity, as an approach to understanding knowledge flows created through collaborative interactions. In particular, the framework to be discussed in Chapter III will focus on the linkage of multi-perspective dimensions to better manage complex processes. Gaps in the literature highlight the necessity for the integration of social and knowledge perspectives. Some gaps remain, providing an effective groundwork for analysing knowledge flows in complex organisations. Hence, the gap represents the absence of methods to holistically combine perspectives.

The current modelling methods fall short of being a complete integration of perspectives because it does not incorporate all dimensions of perspective as described in Figure 2-3. The existing methods are not properly combined for a holistic approach. Although the existing modelling methods are believed to be compatible with current systems, they are not relevant to solving wicked problems.

The need for organisational change demands better business processes and the social behaviour which requires a sensitive assessment of their impact on overall performance. However, the implications of adopting the new perspective models as a management of system evolution (Lindgren & Wallström 2000) are fragmentarily addressed. Related to the new characteristics of complexity, the work of Heylighen (2001) and Adriani (2005) are valuable to understanding the emergence of new structure and adaptability in a dynamic environment. Their findings are significant as they motivate the development of a new framework that helps organisations to adjust to changes fluently. Merali (2006)

argues the significance of self-organisation and also points out that a model is required to capture the emergent dynamics of a complex system. Third, complexity theory and self-organisation, as well as tackling the wicked problems of literature suggest that it is challenging to apply the complexity theory to practice (Cohen 1999; Dagnino 2004; McElroy 2000).

The way to develop a model combining the holistic model is to use a number of perspectives to model the complex system. However, integrating the multiple perspectives dimension for the decision-making process remains challenging. Smith and Humphries (2004) state that complexity theory is important and requires new approaches not limited to behavioural perspectives of social network and organisational structures. In summary, recent research (Heylighen 2001; McElroy 2000; Merali 2006; Smith & Humphries 2004) indicated that there is a need for the integration of multiple perspectives to understand the complex problems in a rapidly changing environment. A key area of this research is to validate the use of a multi-perspectives framework and its impact on knowledge flow analysis (Alman 2003; Ferlie 2007; Linstone 1985; McElroy 2000).

2.10 Individual Perspective Approach

An individual perspective works from four different dimensions (Yoo, Hawryszkiewicz & Kang 2012) with each assisted by varying modelling techniques as outlined in the subsequent section.

Organisational Perspective

The organisational perspective anticipates an environmental uncertainty which includes complexity and sustainability. Thompson (1967) describes a complex organisation as ‘a set of interdependent parts, which together make up a whole that is interdependent with a larger environment’ (p. 6). With regard to organisations, Anderson et al (1999, p. 216) describes complexity as a structural variable that characterises both organisations and their environments. Participants in this study were asked about the importance of the organisational perspective in controlling changes in the face of unforeseen circumstances. The modelling techniques involved in this perspective are strategic (Jemison 2007), political (Mason 2007) and decision-making processes (Courtney 2001).

The current study investigates the need for dimension of perspectives to understand organisational complexity. According to Seel (2000), changes in organisations may vary to include complex systems and its structures. In particular, an organisation perspective is the most essential part in conceptual modelling and a co-creating pattern of relationship (Seel 2000). Seel indicates that the term pattern can refer to some regularities and consistencies where unpredictable relationships are likely to occur. Further, Maturana and Varela (1987) point out that the notion of relationship is core in human organisation and they observe that ‘organization denotes those relations which must exist among the components of a system for it to be a member of a specific class’ (p. 47). While organisational structure will emerge, it is usually imposed from external influences such as the political, economic and environmental. It is important to be aware of which functional units and different boundaries of roles are being changed.

In terms of the system change, Amagoh (2008) claims that the ‘open systems approach views the organizations’ interaction with the external environment as vital for organizational survival and success’ (p. 2). On the other hand, the closed systems view the focus as on the internal environment. Thus, an organisation perspective approach helps transformation of an organisation’s architecture and information by use of the systems and social interactions and produces the best results (Yoon & Kuchinke 2005, p. 17).

Business Perspective

The business perspective of cooperative activities describes the objectives in a business plan required for a group to share goals (Rosenthal 2000). Business activities, which include task identification and investigation, provide an insight into the organisational context of the business culture. Cravens, Piercey & Shipp (1996) argue that activities lead to learning and discovery, which in turn inspires innovation and knowledge to enable problem-solving. Participants in this study were asked how the business perspective is an important factor in responding to unforeseen circumstances in a rapidly changing environment. The modelling techniques involved in this perspective are business culture and activities.

Hammer and Champy (1995) describe the business process as ‘a collection of activities that take one or more kinds of input and create an output that is of value to the customer’ (p. 35). In the question of how work gets done, a business perspective approach helps to identify the flows of steps that translate the inputs to generate the outcomes. Moreover, this approach identifies the procedures to achieve the tasks and

manage with the focus on the business activities and objectives. Schulz (2005) contends that:

Workers are able to perform required tasks properly and to correspond with their direct working environment... Furthermore, the majority is not able to deliver adequate reasons for what they are doing and how they do it. (p. 498)

Lave and Wenger (1991) hold that solving problems within a social group can be enhanced through long term processes. Thus, the business perspective approach helps to understand business activities and cultures, offering an insight into the relationship between organisation and processes.

Knowledge Perspective

The knowledge perspective controls the flow of information and access to the right information for sharing and reuse. Therefore, the purpose of this perspective is to alleviate the difficulties in identifying the experts involved in a community of practice and communication among business units and other agencies. Wenger (1998) refers to communities as the containers of competences, and explains how learning occurs on different levels. Wenger further states that interactions between communities' members play an important role in social learning systems. The modelling technique involved in this perspective is the creative process.

In a new knowledge management paradigm and its support framework (Li et al. 2004), the multiple dimensions of perspective approach is suitable for the collaborative knowledge flow in the wicked problem solving process. Li et al (2004) define the knowledge flow as 'a process of knowledge objects changing between people or knowledge processing mechanism in organizational memory' (p. 896). They also

describe the knowledge objects as continuously changing in the collaborative environment such as knowledge acquired from a range of information sources permitting widespread collaboration throughout a community of practice (Li et al. 2004, p. 897).

Nevertheless, organisational structure and systems are shared by all workers for resources and information within a complex environment. Thus, a knowledge perspective approach helps to improve the accessibility and accuracy and illustrates the interaction of processes across a collaborative workplace.

Social Perspective

The social perspective focuses on the roles and responsibilities that change in the diverse culture and social interactions between business units and among all stakeholders. In particular, it is difficult to identify integration through roles and adaptation to changes. This study particularly focused on the social complexity and networks that possess the role of the functional units and multiple stakeholders (Conklin 2005; Prahalad & Krishnan 2008). The modelling techniques involved in this perspective are communication and information flow.

Lave and Wenger (1991) describe a community of practice as ‘a set of relations among persons and activities in relation to other tangential and overlapping communities’ (p. 98). The term community of practice (Brown & Duguid 1991; Orr 1996) can refer to the growth of social interactions where an individual becomes affiliated with existing professional groups. Thus, real cooperation relations can be demonstrated (Wenger & Snyder 2000). Furthermore, communities of practice ‘emerge where collective activity

takes place; they represent the social system for activity and learning' (Schulz 2005, p. 496).

Recent research indicates a paradigm shift towards a social perspective in the way people interact within a social situation. Engestrom (1987) and Rogoff (1990) explain that this phenomenon is recognised in social theories of learning. According to Baum and Ingram (2002), organisational practice is 'socially constructed programs of action that embody the knowledge, capabilities, beliefs, values, and memory of the organization and its decision-makers' (Ingram 2002, p. 11). The social content of interorganisational structure creates the dimensions of perspective (Baum & Ingram 2002). It intends to equip organisation leaders with a plan outlining how collaboration and social interactions occur between different boundaries of the organisation. Examples include the cultivation of trust relationships and social networking for collaborative work. Thus, this emerging field raises important organisational challenges, but little research has explored the integration of other perspectives.

As noted above, it is widely acknowledged that each perspective is independent of each other, however when integrated they can offset each other's drawbacks and become part of an emerging perspective in a complex organisation. It is, therefore, important to develop a multiple perspectives framework and to examine its performance.

2.11 Multi-perspectives Approach

From earlier descriptions current modelling methods are understood to be segregated from one another. Examining a perspective in isolation from the others thus presents the

challenge of solving wicked problems appropriately. A major goal of this study is to develop a multiple perspectives framework that would combine all of these individual perspective methods into one integrated model. The proposed framework is a holistic model consisting of organisational, business, knowledge and social perspectives. As a result of combining these four perspectives, a clearer visualisation of relationships and interactions within organisations can be achieved. Merali (2006) and Ferlie (2007), as shown in Table 2-2, suggest the importance of looking at one or two perspectives in conjunction with one another. They also highlight the significance of a multi-perspective approach; however a gap still exists, as an integrated model which successfully combines all four perspectives has not been developed. Furthermore, this may lead organisations to become more aware of knowledge flows and more specifically how it may facilitate decision-making processes. The innovation behind the proposed model is that it focuses on the development of a holistic perspective that allows collaboration to be established upon a common platform. Despite the isolation of activities and individual roles among stakeholders, the model allows for greater reduction and elimination of unnecessary strategic planning. Consequently, organisations are better prepared to achieve shared goals more efficiently and effectively. In summary, this thesis outlines a design method that uses a multi perspective framework as a tool for modelling and will help to tackle wicked problems.

The literature reviews (Ferlie 2007; McElroy 2000; Merali 2006) critically suggest the need to integrate the multiple perspectives which could be used to better manage and understand the complexity of organisations as well as the need to explicitly address innovative, emerging structures with the purpose of enhancing collaborative practices.

Current solutions are not integrated and derive from a single perspective. On the other hand, the holistic approach taken in developing a multiple perspectives model consisting of organisation, business, knowledge and social perspectives proposes that changes in circumstances have a positive effect on knowledge flow. Moreover, a multiple perspective approach will complete the gaps regarding the integration of different views to understand complex issues.

2.11.1 From the Theory to Practice

Existing views of approaches to deal with organisational complexity appear to fall into three groups: behavioural perspective; social complexity perspective; and, multiple perspectives. The three approaches offer different methods to adapt changes in complex systems. Table 2-2, below indicates that a method based on a multiple perspectives framework will provide more advantages to use the model for complex organisations. Heylighen (1999) points out that a successful model of complexity depends on how rapidly the strategies of reconfiguration take place, based on dimensions of distinction and connection.

A number of scholars test whether the different perspectives approach helps to identify the knowledge in its sociological context. Approached from a behavioural perspective, Burrell and Morgan (1979) collated data from interviews and employee outcome records. Findings from this qualitative case study confirmed that use commonality of perspective helps to identify the knowledge people seek. Approached from a social perspective, Cil, Alpturk & Yazgan (2005) gathered data from interviews and surveys. Results from the case study confirmed that the multi-perspectives approach supports organisational learning in a collaborative environment. The employees who use the

multi-perspectives approach gained more confidence in their ability to identify knowledge flow in unforeseen circumstance than the employees who didn't use the multi-perspectives approach.

Another study by Courtney (2001) explored the influence of the knowledge perspectives approach on knowledge creation in an unanticipated event. This approach resulted in identifying knowledge by critical self- and organisational-reflection and inquiry.

Table 2-2. Comparison of different approaches to model complex organisation

Approach	Authors	Advantage
Behavioural perspective	• Maguire 2006	• Distinct from other perspectives • Explores the relationship between complexity and organisational behaviour • Uses complexity science • Focuses on organisational studies
		Disadvantage
		• Lacking connection to other perspectives
Social complexity perspective	• McElroy 2000 • Schulz 2005 • Reka & Barabasi 2002; Watts 2003 • Head and Alford 2008	Advantage
		• Distinct from other perspectives • Focuses on the social communities aspect • Only applies to the human social system • Explores the dynamics of self-organisation

		Disadvantage
		• Lacking connection to other perspectives
Multi perspective	• Merali 2006 • Imperial 2004 • Ferlie 2007 • Imtiaz & Ikam 2008 • Linstone 1985	Advantage
		• Distinct from other perspectives and has the capacity to combine with others • Ability to apply adaptive strategies for sensing change • Ability to rapidly configure links based on self-organisation • It involves technical, personal & organisational perspective for decision making
		Disadvantage
		• Emphasis is not placed upon social and knowledge perspectives

The development of systems and the social networking application have provided a range of tools for digital media technology. These tools are employed primarily for the creation, facilitation and sustenance of new and existing social ties. The aforementioned questions that currently challenge philosophical notions of the relationship between organisation, knowledge and social network and its impact on complex adaptive system are thus:

Does a multiple perspectives framework improve the ability to manage change in complex business processes? How are perspectives integrated into a holistic model to effectively adapt to change and knowledge flow?

While there is currently a lack of literature that ties these three constructs together in a coherent form, it is important that these constructs are explored holistically. The following section describes the use of the multiple perspectives approach for modelling the different dimensions of organisational architecture for collaboration.

2.11.2 Theoretical Model of Multi-perspective Dimensions

The multi-perspective framework includes four dimensions namely: the first dimension, organisation perspective, refers to the positions in the organisations; the second dimension is knowledge perspective which illustrates the knowledge shared in the communities of practice; the third dimension is business perspective, which shows how business activities are formalised, the interaction with different roles in the organisations; the fourth dimension is social perspective that illustrates the social complexity and process of change within and across other perspectives.

Innovative perspectives arise to identify and capture the different dimensions of emergent structures as shown below in Figure 2-3. The diagram gives a semblance of how greater visualisation can be achieved through the use of a multi-perspective framework. Moreover Figure 2-3 highlights the transfer of knowledge as well as displaying the interactions between each perspective:

- Position to position in Organisational Perspective;
- Different activities in Business Perspective;
- Communities of practices in Knowledge Perspective;
- Different interactions between the roles within the Social Perspective.

The transformation of the self-organisation (Ferlie 2007) to a new structure thrives on the interaction within and across organisations from various perspectives. It shows the collaborative infrastructure platform across the entire organisation and the knowledge flow from one to the other perspectives. A multi-perspective model displays the relationship between the activities and the roles that change in a dynamic environment (Yoo et al. 2012). Moreover, a multiple perspectives approach will complete the gaps in the integration of different views to visualise wicked problems and significant changes in the nature of emergence within collaborative environments.

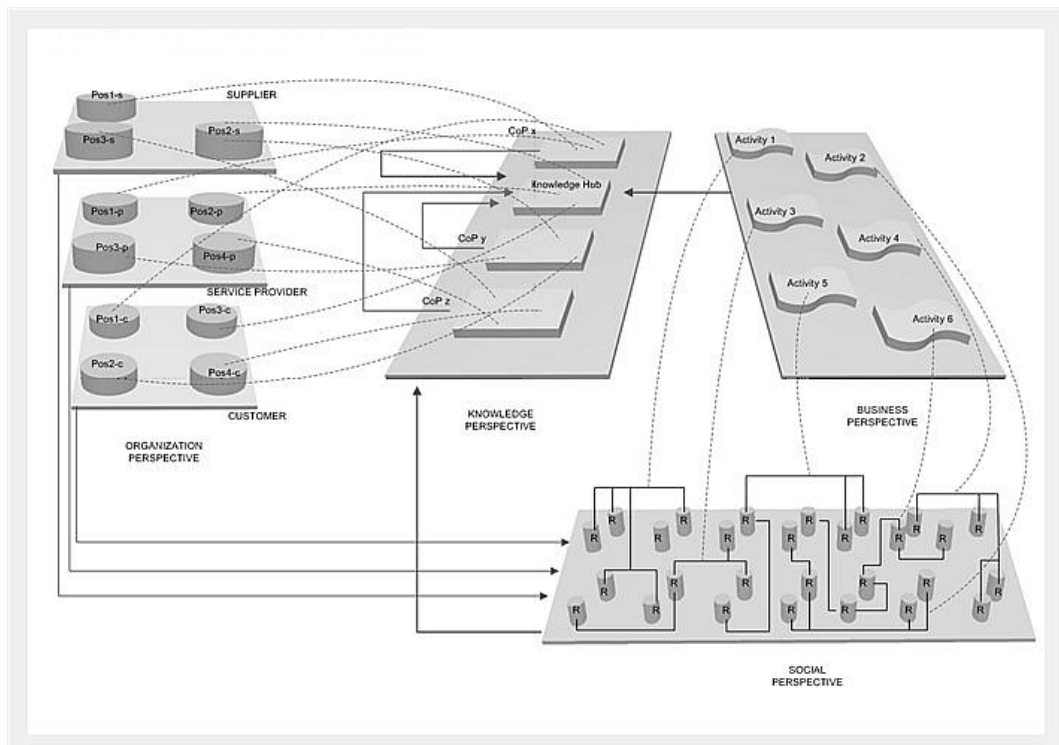


Figure 2-3. Multi-perspective dimensions

Within social complexity boundaries between the different roles may lead to the difficulty in effective communication (Conklin 2005). For example, various project groups involved within a social network may be disconnected due to a lack of understanding of shared objectives. Hence, a standardised framework is required to enable greater collaboration between social communities.

Prahalad and Krishnan (2008) emphasise the importance of social networks that encourage innovative behaviour. From a social perspective, roles can be identified as an imperative dynamic to adapt to changes in organisational structures. For example, this method displays the ways in which people interact and create knowledge. Furthermore, it demonstrates how initial knowledge infrastructure is created and how it adapts to evolving systems. A model of the social perspective draws on techniques used in social networking but extends them into an organisational framework by focusing on roles, responsibilities and relationships between these roles. A business social network may support different types of responsibility, such as coordinating decision making. It requires the creation and use of enterprise knowledge in order to continuously improve the performance of organisational processes that manage interactions among the members. Enterprise social network modelling encourages the formation of formal and informal relationships and places emphases on roles, complexity of activities and organisation (Schulz 2005).

2.12 Multiple Perspective Approach and Knowledge Flow

Hall and Davis (2007) examined the use of the multi-perspectives approach. The goal of the study is to examine if the multi-perspectives approach helps to create knowledge in an unanticipated event. Hall & Davis (2007) found that the multi-perspectives approach resulted in better identification of knowledge to support the decision-making process.

Turpin, Phahlamohlaka & Marais (2009) researched the effects of the multi-perspectives approach to analyse social complexity and create knowledge. They found

that the multi-perspectives approach helped to create knowledge flow in unanticipated events. They also found that the multi-perspectives approach showed a significant increase in a manager's ability to manage change in complex organisations.

These studies illustrate that multiple perspectives had a positive effect on the ability to manage change in complex organisations. However, there has been limited research on the integration of perspectives, which further supports the need for a multiple perspectives framework to solve wicked problems in a complex organisation.

2.13 Conclusion

Current studies indicate that efforts to improve the collaborative process require new solutions to complex issues. Nevertheless, in order to achieve effective collaboration between the different dimensions of perspectives from the theoretical to the practical, some additional tools are required. Thus, a further aspect of dynamic complexity can be evaluated which will support higher levels of adaptability to manage system evolution. The framework attempts to promote:

- Challenges to tackle wicked problems often lead to social complexity and techniques to manage the complex issues with wicked elements;
- Multi-perspective approaches focus on describing the behavioural perspective of social system dynamics and organisational structures;
- Strategies to deal with the wicked problems allowing for collaborative diversity to take many different shapes among multiple stakeholders.

Even though theoretical and empirical understanding of self-organisation is the key for significance within and across organisations, it remains limited. An examination of self-organisation alone is inadequate to identify emergent changes as the key aspect of organisational complexity lies within the social and knowledge perspectives. Therefore, a new approach which combines the social and knowledge perspective should enable organisations to gain greater insight into tackling wicked problems. Further studies are needed to improve the behavioural perspective of social system dynamics. Complex processes are to be extended to the support elements of the organisation and for further adoption in the system evolution.

In summary, literature reveals that none of these individual perspectives have provided an output of a successful solution for effective modelling of knowledge flow as each is a divergent and isolated approach.

CHAPTER III

A PROPOSED MULTIPLE PERSPECTIVES MODEL

3.1 Introduction

From a survey of the literature, the researcher proposes here a conceptual model that can help to analyse complex issues and create innovative solutions. In particular, an important aspect of design thinking is visualisation (Martin 2009). Visualisation takes on a significant role as the model becomes a tool to help understand organisational complexity. The growing complexity of organisations is characterised by collaboration between multiple stakeholders. This collaboration becomes a challenging and critical issue that organisations must address in order to ensure their practices are sustainable. Kotter (1990) defined leadership as being about coping with complexity and change. Organisational complexity calls for leadership to successfully manage change in an organisation (De Meyer 2011). However, providing leadership in order to manage change requires a collaboration framework. The system design framework is thus recognised prior to modelling a complex system and managing system evolution. Thus, the researcher will look at how to combine the individual perspectives aforementioned in section 2.10.

In the collaborative innovation literature there are several approaches dealing with different design models to support the new process implementation over self-organised business processes. Hawryszkiewicz (2010) states that in order to define large collaborative systems models that show the interaction between a number of

perspectives are required. Such models must include multiple perspectives of collaborative innovation. The dimensions of new multi-perspective performance are explored and examined such that new ways of integrated modelling through this study can help in detecting the issues of organisational process implementation and rapidly adapting to changes. Existing models only address single perspectives.

The researcher has addressed the gaps that were identified in the literature as follows:

- Introducing a multiple perspective because the current modelling methods do not incorporate all dimensions of the perspectives;
- Understanding more about wicked problems because the existing modelling methods are believed to be theoretically self-dependent but are not relevant for solutions to wicked problems;
- Developing a model combined for a holistic approach is to use four perspectives to model the complex system.

The benefits of implementing the new model are as follows:

- Reduction and elimination of redundant planning and work flow;
- Formation of stronger inter-relationships, enhanced compatibility amongst stakeholders across different boundaries in addition to increased exchange of information and ideas;
- Clearer visualisation of knowledge flows and the direction in which information is distributed.

In this study the researcher focuses on describing the use of a multiple perspective model to show complex relationships and its ability to adapt the structured systems (object modelling) to unstructured (rich picture scenarios) planning of organisational

structures. This approach differs from existing methods insofar as all perspectives are considered and integrated.

The following sections will describe the requirements for a multiple perspective model, criteria for the framework, and approaches to overlapping activities, and a proposed new multiple perspectives model which will be used to frame the case study.

Section 3.2 will focus on the development of research questions for multi-perspective modelling derived from the literature and theoretical foundations. The thesis will therefore also generate hypotheses after the data is collected which can then be used to validate the proposed model in Chapter IV. According to Auerbach and Silverstein (2003), ‘qualitative hypothesis-generating research involves collecting interview data from research participants concerning a phenomenon of interest, and then using what they say in order to develop hypotheses’ (p. 8). Therefore the development of hypotheses will help the researcher to analyse the outcomes of each research question more closely as well as strengthening the evaluation of interview data collected.

3.2 Role of Research Questions for the Validation of the Model

To address the issues facing contemporary organisations and their stakeholders, there is a necessity to settle upon a modelling method that can be used to analyse change management roles and responsibilities as well as to improve adaptation. This can be achieved by examining existing methodologies and organisational complexities; however, developing an innovative method that compares the benefits of existing models, is challenging.

In response to this problem, the following research questions are to be investigated through the use of case studies that aim to resolve organisational complexity within collaborative environments:

Does a multiple perspective framework improve the ability to develop a change strategy for complex business processes? (RQ1)

The researcher will address this main research question (RQ1) by examining the following sub-questions:

- Does the model based on a multi-perspective approach help to create knowledge flow in unanticipated events? (RQ1a)
- Does the model help organisations learn how to discover knowledge? (RQ1b)
- How can changes in event affect knowledge flow in organisations? (RQ2)
- How does the organisation respond to the unanticipated event required for better knowledge flow? (RQ3)

In order to address the questions above, the researcher will take a qualitative approach that will ensure the collection of data deriving from interviews held with participants. More specifically, a data analysis tool will be employed to assist the researcher to collate and organise information.

Creswell (2005) describes qualitative research as best used for ‘research problems in which you do not know the variables and need to explore’ (p. 45). He also states that ‘a central phenomenon is the key concept, idea, or process studied in qualitative research’ (p. 45). According to Burck (2005), it is important that the research questions are open-ended in order for the researcher to develop hypotheses from the analysis of collected

data. Ohman (2005) agrees that qualitative questions should be open-ended and allows 'informants to tell their story' (p. 275).

In summary, the participants' interviews are transcribed and then analysed by the researcher. After analysing the interview data, the researcher generates hypotheses to validate the multiple perspectives model. This validation process enhances the researchers' understanding of the participants' experiences thus allowing the model's effectiveness to be determined.

3.3 Real World Application of Multiple Perspectives Model

In the literature, currently there are gaps in the integration of different perspectives. The gaps have been identified previously in Chapter 2, thus the researcher proposed a holistic model that consists of organisation, business, knowledge and social perspectives. These were chosen to describe the evolving environment and the self-organisation needed to manage the complex processes within that environment.

Therefore, there is a need to engage with many dispersed stakeholders and to facilitate collaboration across organisational boundaries (Briggs 2007). The distribution of Australia's Federal and State government natural resource management plans is a prime example (Briggs 2007, p. 22). Furthermore, collaboration may be facilitated across different organisational boundaries where Briggs proposes that:

Working more successfully across organisations relies on better information-sharing and requires structured approaches to the collection and sharing of information and data. On a practical level this includes continuing the progress towards the adoption of common information policies, standards and identifying

information management needs early in the planning process around wicked problems. (Briggs 2007, p. 17)

Hence, this study focuses on the development of a new model to solve wicked problems.

3.4 Criteria for the Framework

In building a research framework, the researcher begins to identify a collaboration environment to support multiple stakeholders across agencies based on living system theory. There is a need to consider three areas of research direction.

- First, understanding wicked problem theory and the social complexity design needs to be explored;
- Second, the aspect of new characteristics for self-organisation and complexity theory need to be studied;
- Finally, the research focuses on development of a common framework for collaboration across organisations to understand complex processes and explain social behaviours.

In addition, the researcher also focused on developing a model that helps to manage the growing complexity of Information Systems. Four case studies were conducted to distinguish new characteristics of a complex system and methods to manage the dimensions of organisational performance. An enterprise social network supports different types of responsibility such as coordinating decision making in collaborative environments. It requires the roles to use and create enterprise knowledge to continuously improve the performance of organisational processes. For example, in

order to successfully deliver decision-making processes requires a new model to enable effective workflow and efficient reuse of data. A system design framework is recognised prior to modelling a complex system at various points in the organisation's development and in managing system evolution. However, the framework would not succeed without a full understanding of significant change across the organisation (Kotter 2003). Therefore, this study will explore the processes required to be undertaken in order to understand complex systems. By understanding organisational complexity, new methods to develop a framework can be proposed. A research question arises as to whether the model based on a multi-perspective approach allows easier management of system evolution. To illustrate this, the researcher proposes an approach where the modelling of complex systems uses a multiple perspectives framework. This approach will improve and ease the understanding of collaborative relationships in complex systems.

3.5 Approach to Overlapping Activities & Wicked Problems

The researcher investigated through multiple case studies that collaboration is a concern, as a result of organisations working to increase the integration of their processes, which must be integrated both internally and with the key business partners. Three different government agencies and nine external business organisations are transforming the way they conduct business embracing the concept of a service-oriented environment. Shared services are the realisation of a robust, locally interconnected network environment that includes infrastructure, people, processes, systems and services (Pilbersek, 2011). As a result, the study has to find out how to share services in different levels and roles in organisations to better manage knowledge flow.

The researcher applied Head and Alford's (2008) techniques to manage the wicked problems by modelling the different perspectives to recognise complex issues. In particular, their approach focuses on the social system dynamics. Based on this method, the researcher was able to transform the collaborative relationship of organisations to multiple perspectives framework as represented in Figure 3-1.

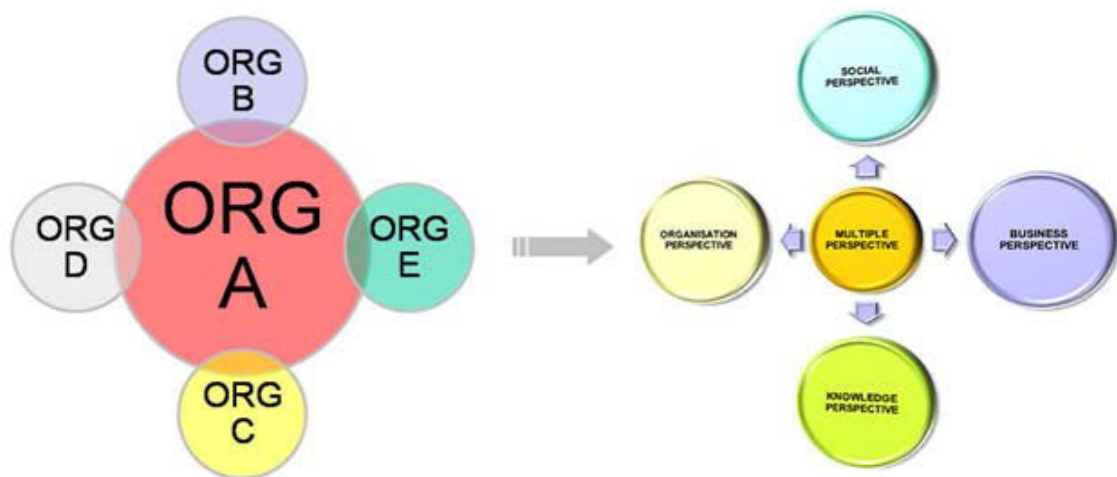


Figure 3-1. An approach to overlapping activities

As shown in Figure 3-1, the collaborative practice focuses on four major perspectives: organisation, business, knowledge and social perspective. The diagram explains how overlapping activities may result in the emergence of wicked problems as well as how they may serve as a common platform for further collaboration. Difficulty may arise throughout collaboration as each organisation conforms to a specific set of policies and governance. As a consequence, the transformation of shared collaboration between different organisations into a multi-perspective model offers improved efficiency through the agreement of terms to complete a given project. Four different perspectives are used to transform the collaborating organisations to multiple perspectives framework proposed earlier for examining complex systems. The aim is to identify

leading practices in government and understand how organisational, cultural, business process and social knowledge can contribute to a successful collaboration across multiple stakeholders. For example, a multiple perspectives approach for making better decisions in the way something happens in an organisation perspective, understanding each other's cultures in the business perspective, establishing knowledge to share in a knowledge perspective and promoting interactions amongst stakeholders whilst building trust from a social perspective (Kang 2007). The subsequent section describes the use of this approach to model the different dimensions of organisation architectures for collaboration.

3.6 A Conceptual Model – Multi-Perspective Model

As illustrated in Figure 3-2, the multi-perspective framework has the overall task of developing new knowledge through integration and adaptation to changes. It is also capable of identifying requirements and social complexities. This study extends these perspectives by identifying new characteristics for the effective system design of the common framework. Integrating the multiple perspective views is in the process of understanding organisational complexity and improving knowledge flows in the complex environment (Yoo, Hawryszkiewicz & Kang 2011). This new model provides a way for analysing, defining and managing the interdependencies across agencies engaged in a partnership alliance. The relationships formed between service providers, customers and suppliers are directly related to business partnership. Figure 3-2 illustrates the common framework in which the multiple perspectives approach of the researcher helps to understand organisational complexity. As a result, the multi-perspective

framework sets shared guidelines for collaborative activities in order to improve business processes.

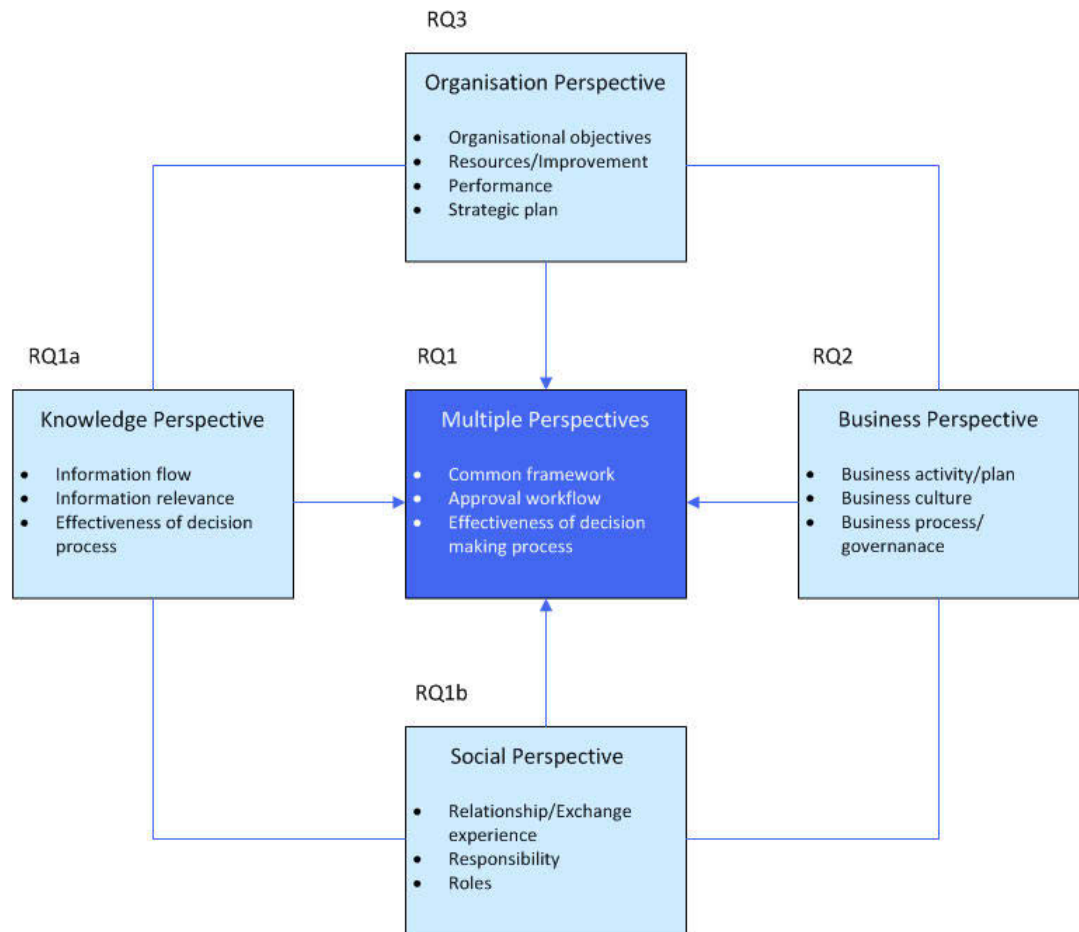


Figure 3-2. Integration of different dimensions for collaborative architecture

The schematic shows the combined four dimensions of the multiple perspectives model which can be used in collaborative organisations. Moreover, it displays how the perspectives are affected by one another and exist in relation to each perspective with important key factors as follows:

- Organisation perspective: organisational objectives, resources/improvement, performance and strategic plan;
- Business perspective: business activity/plan, culture, process and governance;
- Knowledge perspective: information flow and relevance, and effectiveness of

decision process;

- Social perspective: relationship, exchange experience, responsibility and roles.

From an organisational perspective, policy may refer to particular standards or rules and the actual practices of governance (Colebatch 2002). Successful organisations need to understand how each functional unit interacts with other units and how policy is derived from expert groups. Recognition of business cultures is particularly important for organisational changes. For example, the organisational perspective approach helps to understand the current state of play through the use of performance measures and to easily identify the change in culture due to the strategic direction in question. Moreover, this method provides an organisational learning process and is used for business relationships. It also recognises the interaction between organisational units and their activity and responsibility.

From a business perspective, activities may be categorised as services that are required to build successful organisations. The objective of this perspective is to enable activity groups to understand how they can achieve and deliver key business goals (Rosenthal 2000). For example, the business perspective method enables change to be made for the benefit of a business and assists interactions between stakeholders. It also generates knowledge that can be used to build better relationships between government agencies.

From a knowledge perspective, second generation knowledge management (McElroy 1999) may be defined as organisational practices that create knowledge processes to produce organisational learning. The knowledge perspective supports unstructured communities and enables them to share knowledge, for example between control,

expert, policy and governance groups. It also facilitates collaboration and innovation to support emergence. The knowledge perspective also uses rich pictures from soft system methodologies (Hawryszkiewicz, 2010) to describe the knowledge-sharing and learning that takes place within collaborative environments.

From a social perspective, adjustment in roles and responsibilities for organisational change may be categorised as services that require building strong relationships and corresponding between the functional units and communities. This method provides the system with greater adaptability when handling collaborative tasks and is affected by the living systems theory (Knezevic, 1998) that the network of stakeholders' interaction occurs across the boundaries. For example, the social perspective method promotes collaboration and improves connectivity which establishes closer relationships amongst multiple stakeholders across organisations (Conklin 2005).

3.6.1 Complexity and Diversity in a Social Context

The researcher's conceptual model is based on different dimensions of organisational structure for collaboration. Consequently, the complexity and diversity dimensions described below lead to the development of knowledge creation and flow model shown in Figures 3-3 and 3-4. Head and Alford's (2008), two dimensions namely, complexity and diversity are the key features of wickedness emerging from complex collaborative systems which have the ability to identify knowledge flow and improve visualisation of social interactions.

- The complexity dimension refers to:

The difficulties in acquiring knowledge of the wicked problem and of potential

solutions. These difficulties arise from a patchy knowledge base; complex interdependencies of processes and structures; uncertainties arising from the contingent and dynamic nature of social issues and processes; and the incommensurability of many of the risks and potential trade-offs. (Head & Alford 2008, p. 7)

- The diversity dimension refers to: ‘the number and variety of actors involved... both entail diverse sets of knowledge relevant to the issue which need to be shared in order to identify/define problems and consider appropriate responses to them’. (p. 8)

There are two important concepts in the organisational complexity literature which are knowledge creation and flow in a social context. In this study, the conceptual model provides the framework for developing the multiple perspectives model which may allow for easier management of complex systems. Subsequent sections describe the role-play relationship for knowledge flow and how knowledge creation provides networks across various organisations. Moreover, the researcher’s conceptual model deals with the complex issues in collaborative environments.

3.6.2 Knowledge Flow in Social Context

The social perspective model draws on techniques used in social networking but extends them into an organisational framework by focusing on roles, their responsibilities and relationships between different organisations. According to Rouse et al. (2009), an enterprise social network may support the responsibility of coordinating decision making. It requires the roles to use and create enterprise knowledge to continuously improve the performance of organisational processes which manage interactions among the members. Enterprise social network modelling efforts can be

categorised as their emphasis is based on models of roles, complexity of activities (Schulz 2005) and organisation. Thus, the model based on social perspective can help to construct an in-depth understanding of social networks.

Figure 3-3 is intended to demonstrate the social work group model as a role-based network and the framework is outlined as levels of roles which are explained in the following sections. It also indicates that there are three work groups existing in the social network model, namely: work, task and steering committee group. These groups have the responsibility of carrying out specific tasks for the expert group while the steering committee group performs high level management in a firm. Furthermore, it shows the interaction relationship across different roles within varying organisations. The moderate to strong interactions demonstrate how knowledge flow effectively occurs between organisations. The figure below reveals three functional units that relate to different expert groups; for example, the steering committee which is the management functional group and the task group which represents the middle management group.

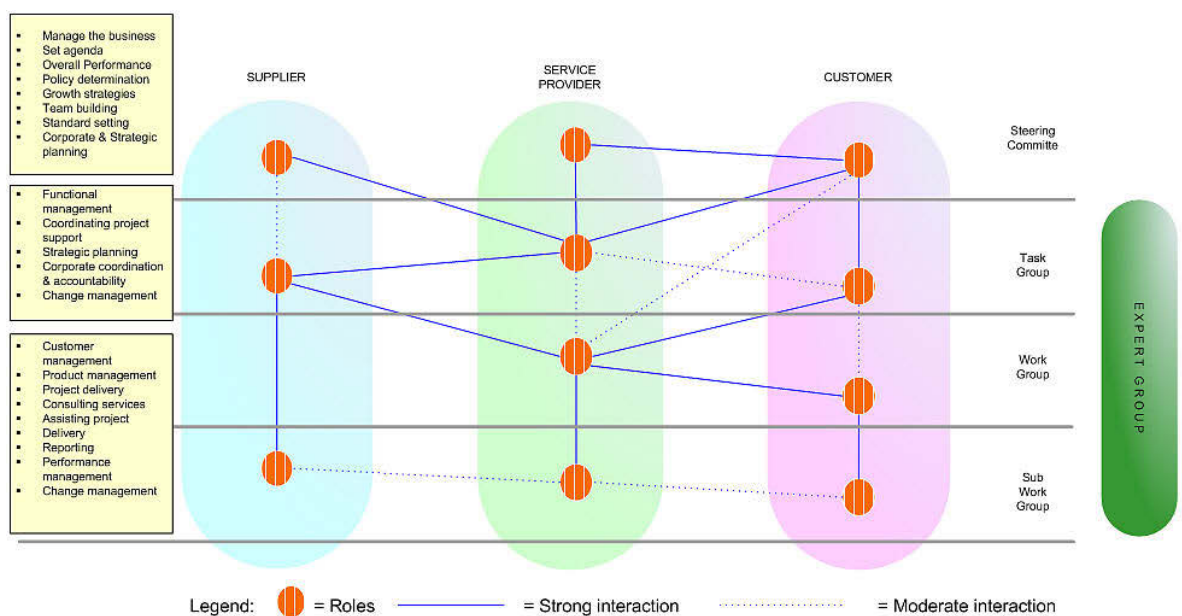


Figure 3-3. Model of social network with roles

Figure 3-3 shows how knowledge management supports the communication of the organisation's vision and criteria for decision making. The strategic model as represented in the diagram above can also build a strong customer relationship by understanding their problems and needs. It also displays the different responsibility of the management and expert groups.

The integration of strategic communities (Reka & Barabasi, 2002; Watts, 2003) enables complex organisations to create new knowledge and connects the business activities and roles in a cooperative process (Daneshgar, 1997). The integration also improves relationships between collaboration, social network and business partners in a dynamic environment.

For instance, the model in Figure 3-3 displays the manner in which different views are demonstrated to support communication and skills employed for decision making. In particular, models of strategic and operative planning require an understanding among the tasks involved in complex development and the relationship between business partners and organisational units.

The other components of the framework are the roles played in the organisational structure which characterise social working groups, as listed in Table 3-1. The table shows three organisational units; namely, Senior Management, Support Management, and Service Delivery.

Table 3-1. Roles in different units of organisation

Senior Management	Support Management	Service Delivery
Senior Management	Functional Management	Customer Management
Manage the Business	Coordinating Project Support	Product Management
Set Agenda	Due Diligence	Project Delivery
Overall Performance	Strategic Planning	Consulting Services
Policy Determination	Corporate Coordination & Accountability	Assisting Project
Growth Strategies	Change Management	Delivery
Team Building		Reporting
Standard Setting		Performance Management
Corporate & Strategic Planning		Change Management
		Library
		Mail

Table 3-1 reflects the organisations of the participants engaged in this case study. The roles within each organisational unit correspond to the steering committee, task and work groups as shown in Figure 3-3. The next section illustrates the model which can identify the knowledge activity and the behaviour of a complex structure.

3.6.3 Knowledge Creation in Business Activity

Through business activities organisations can identify common goals which lead to the development of knowledge networks (Jarillo 1993). The current situation, as modelled by the researcher, proposes the creation of knowledge networks through business activities providing a holistic approach. The situation further includes roles involved in social perspectives and organisational architecture, as well as communication to identify the knowledge hub and business activity workflow. This model can be seen as a proposed conceptual model for business activities. For example, Figure 3-4 illustrates

the relationship between organisations with the groups; namely, the steering committee, task, work and sub-work group.

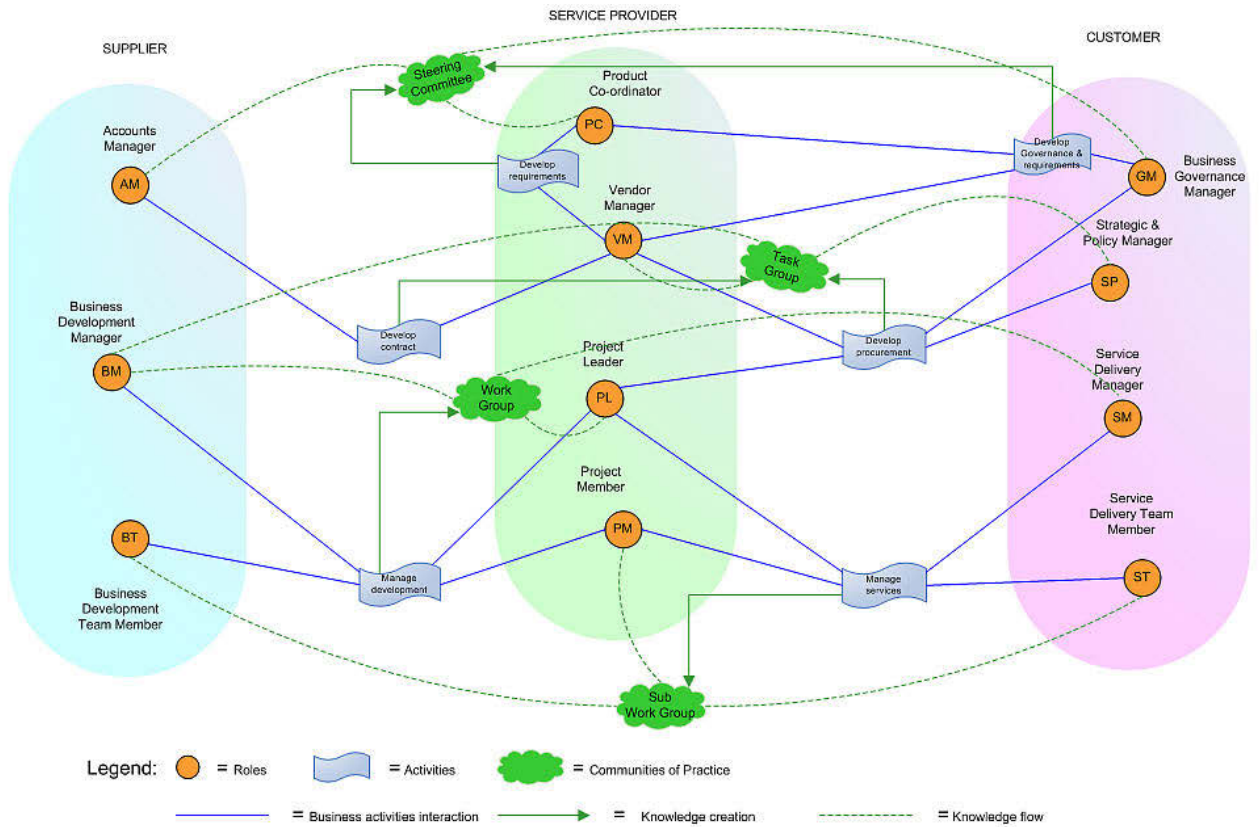


Figure 3-4. Knowledge networks involved in business activities

Figure 3-4 exhibits the holistic relationships between the perspectives as well as the distribution of knowledge across the different organisations. This conceptual model will essentially lead to the development of a multi-perspective framework.

The business activity model (Figure 3-3 and Figure 3-4) that the researcher has developed is part of a multiple perspectives approach to organisational complexity and the collaboration of multiple stakeholders. As a result, self-organisation requires rapid reconfiguration of links based on dimensions of distinction and connection (Heylighen, 1999). This method helps to understand how knowledge flows and changes with the

responsibility of the role in a complex organisation. Thus, the conceptual models of business and social perspectives support the construction of a holistic model of multiple perspectives. Table 3-2 summarises how communities of practice facilitate the linkages and relationships between the roles and activities, which vary depending upon the different organisations involved, as well as reflecting Figure 3-4.

Table 3-2. Business activities with roles

	Role	Activity	Work Group
Supplier	Accounts Manager	Develop new contract/ Client relationships management	Involves steering committee group and focuses on organisational perspective.
	Business Development Manager	Presentation on products and services that meet clients' objectives	Involves work/sub work group of community of practice. Focuses on business and social perspective.
	Business Development Team Member	Manage existing accounts/ Build relationships with new client	
Service Provider	Product Co-ordinator	Interact with suppliers and customers to understand product requirements clearly	Involves steering committee/task group. Focuses on organisational and business perspective.
	Vendor Manager	Manage and coordinate vendor processes	
	Project Leader	Works with the key stakeholders to set the major objectives	Involves work/sub work group of community of practice. Focuses on social perspective.
	Project Member	Works with project leader	

		to manage services for all stakeholders	
Customer	Business Governance Manager Strategic & Policy Manager Services Delivery Manager Service Delivery Team Member	Develop organisational structure that defines accountability and responsibilities for decision-making Formulating policies and business plans for organisational goals Interact with the service provider on a regular bases to deliver the quality services to stakeholders Works with the service delivery manager to creating and maintaining client relationships and delivery of quality services	Involves steering committee/task group. Focuses on organisational and business perspective. Involves work/sub work group of community of practice. Focuses on social perspective. All work groups mentioned above are involved in knowledge creation and this relates to the knowledge perspective of the organisation.

Several efforts have been made to define and transform the process to enable seamless connectivity across shared services organisations. This continuous flow of knowledge underscores how information is exchanged amongst organisations that are working towards a shared goal. D'Auray, Flumian & Valeri (2003) describe a seamless

organisation as a means of changing business requirements and collaborating across organisations. It means finding new processes for the organisation and their key drivers to work together in order to maximise the value of their relationship. When successfully implementing the process strategy, the organisation is able to devote more time to defining a requirement framework which categorises the type of business activities required and provides a quality approach to review collaboration opportunities. The following section discusses in detail the use of a modelling tool to visualise collaboration within a practical environment.

3.7 Open Model

The open modelling tool called ADOxx for business process modelling was developed by a team led by Prof. Dimitris Karagiannis from the University of Vienna in Austria (<http://www.omilab.org>). The open modelling project involved development of a methodology for collaboration. Furthermore, the researcher collaborated with the University of Vienna to develop and further enhance an open source modelling tool ADOxx platform based on MeLCa methodology. The methodology emphasises the large scale collaboration found across organisations to facilitate the exchange of knowledge.

The subsequent section demonstrates some possible open modelling techniques used in the different perspectives which focus on the boundary roles. These draw on existing methods currently employed in organisations and the researcher's multiple perspectives framework approach facilitates the realisation of modelling goals catering for evolution and self-organisation.

The diagram below displays the combined perspectives helping business operating in complex environments to clearly identify the relationships and collaboration taking place across various organisations.

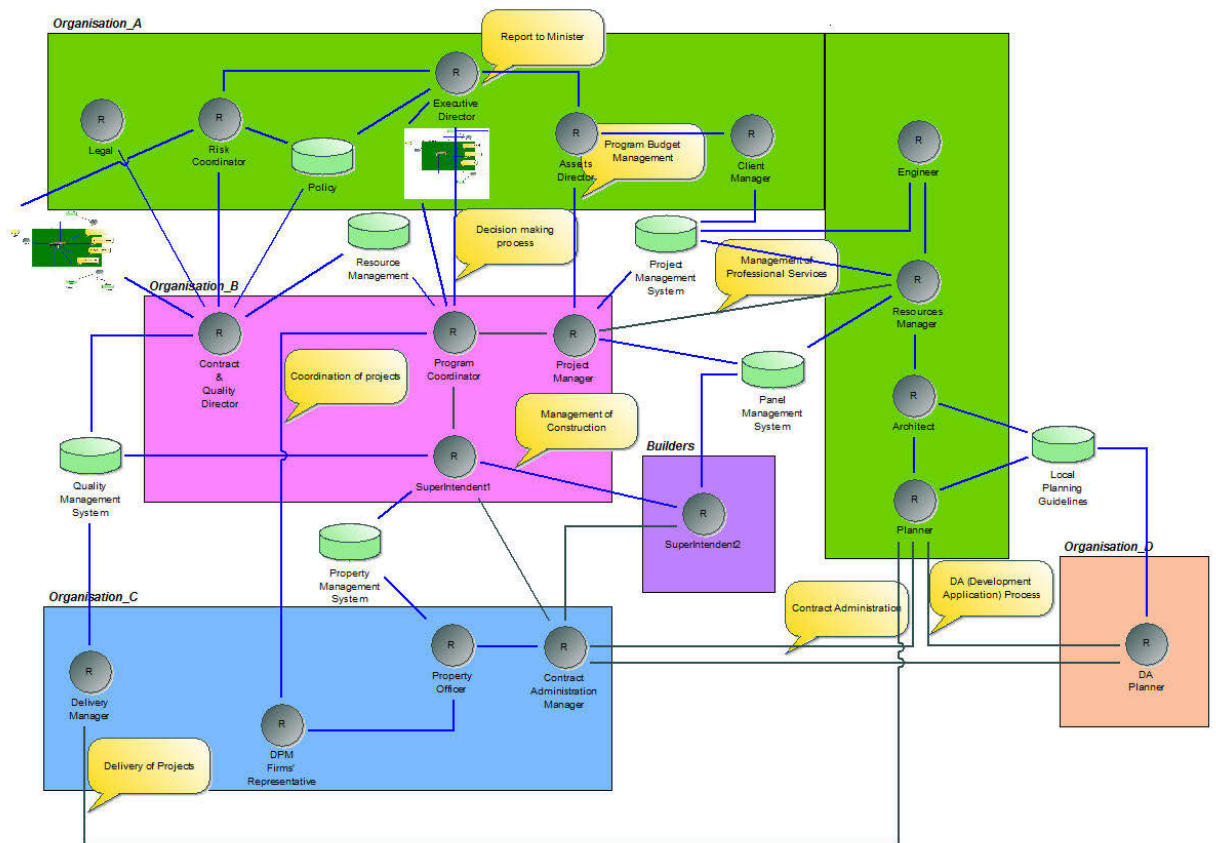


Figure 3-5. Enterprise boundary knowledge flow model

Figure 3-5 illustrates the enterprise model framework using methods for designing large scale collaborative processes (MeLCa). As mentioned in Section 3.7, the open modelling tool ADOxx was employed to formulate the conceptual model shown in the diagram above. There are three major government agencies with two external organisational boundaries comprising the local government and contract builder. These three anonymous government bodies which deal with social housing mentioned in Figure 3-5 are namely; organisations A, B and C. The model above also reveals the boundary roles that exist between the organisations. Boundary roles refer to the

positions held by individuals which encourage direct interaction for collaboration. The open model demonstrates the distinct relationships between the stakeholders and artefacts they share in order to acquire information. In particular, Figure 3-5 highlights the detailed activities undertaken by key stakeholders such as creating and sharing knowledge in order to achieve common objectives. Moreover, the open model allows organisations to identify any role changes which may arise within a collaborative environment.

The model displays the collaboration amongst multiple stakeholders and organisations. These comprise the executive director at organisation A, the program coordinator at organisation B and the DPM firm representative from organisation C, who are all identified as key stakeholders. In particular, it visualises the characters and the relationship between the boundary roles (see Appendix B). Based on the multiple perspectives framework, the open model shows an easier understanding of organisational complexity and effective identification of knowledge flow where organisations face emergent changes resulting from unanticipated events. The open model design methods focus on processes that support knowledge sharing (Hasan 2003) and creation through collaboration. According to Hawryszkiewicz (2010), processes and tools are necessary for the recognition of social structures which in turn support the growth of a complex organisation.

Table 3-3 describes the boundaries of roles, activities and artefacts, and collaboration levels across different organisations in the researcher's study. This table corresponds to and is diagrammatically represented in Figure 3-5. Outlined in Table 3-3, Organisations A, B, C, and D were involved in the case studies.

Table 3-3. Enterprise boundary roles and collaboration

	Role	Activity & Artefact	Collaboration
Organisation A	Legal Support	• Develop new contract and provide legal support	Interact with other department
	Risk Coordinator	• Analysis on risk management and policy implementation • Use policy system	Coordinate the project with internal and external stakeholders
	Executive Director	• Report to Minister for progress on programs • Use policy system	Interact with internal and external key stakeholders
	Assets Director	• Monitoring and maintaining the program budget	Interact with other department
	Client Manager	• Managing the clients' project • Use project management system	Interact with internal stakeholders
	Resource Managers	• Provide and maintain all professional services • Use project management system • Use panel management system	Interact with internal and external key stakeholders
	Engineer Architect Planner	• Provide professional services • Use project management system • Use local planning guidelines	Interact with internal stakeholders Planners interact with other department
Organisation B	Contract & Quality Director	• Contractual dispute • Use quality management system • Use Policy system • Use resource management system	Interact with other department
	Program Coordinator	• Coordination of programs • Use resource management system	Coordinate the project with internal and external stakeholders
		• Manage and delivery of	

	Project Manager	- projects • Use project management system • Use panel management system	Interact with internal and external key stakeholders
	Superintendent	• Administration of construction • Use quality management system • Use property management system	Interact with internal and external key stakeholders
	Superintendent2	• Administration of construction (as contractor) • Use panel management system	Interact with other department
Organisation C	Delivery Manager	• Manage and delivery of projects • Use quality management system	Interact with other department
	DPM (Development Project Management) firm's representative	• Coordination of projects and programs	Interact with internal and external key stakeholders
	Property officer	• Acquisition & Disposal of properties • Use property management system	Interact with internal stakeholders
Organisation D	Contract administration manager	• Administration of construction and superintendents • Use property management system	Interact with internal and external key stakeholders
	DA Planner	• DA application and development approval • Use local planning guidelines	Interact with other department

Figure 3-5 may be difficult to interpret visually due to the complex nature of enterprise boundary relationships. To a certain extent it is also difficult to distinguish the

individual relationships formed between stakeholders working in collaborative environments as the entire flow of knowledge cannot be depicted in a single diagram. Alternatively, the researcher explored and demonstrated in the case study, single perspectives to simplify the holistic model of the multiple perspective approach.

The holistic model of multiple perspectives was initially approached with an individual perspective that applied for identifying the critical factors to be considered in complex projects. The researcher describes the following perspectives as a distinct aspect of the combined model including organisation, business, knowledge and social perspectives. Table 3-4 provides information about the symbols involved in each individual perspective.

Table 3-4. Symbols used in the model

Legend:	
 Organisations	= Three government agencies and head contract builder
 Roles	= Roles from the different organisations
 Knowledge	= Strategic knowledge
 activities	= Business activities
 Partici pants	= Collaboration occurring between participants
 Document	= Create knowledge and share information
 Artefact	= Create knowledge and share information

In the first organisation perspective, the researcher showed Figure 3-6 below to participants for discussion about who were the main stakeholders in each department. Initially, the researcher identified a few key stakeholders using the open model tool called MeLCA which was further verified by participants. Consequently, the researcher managed to modify the MeLCA through clearer identification of relationships between main stakeholders within different organisations. For example, the researcher interviewed the program coordinator from Organisation C and discovered that he proactively interacted with the executive director from Organisation A for strategic planning. Furthermore, he also collaborated with the superintendent from Organisation B for progress on the construction projects. Consequently, the organisation perspective identifies key stakeholders to be engaged where information will continue to flow between organisations.

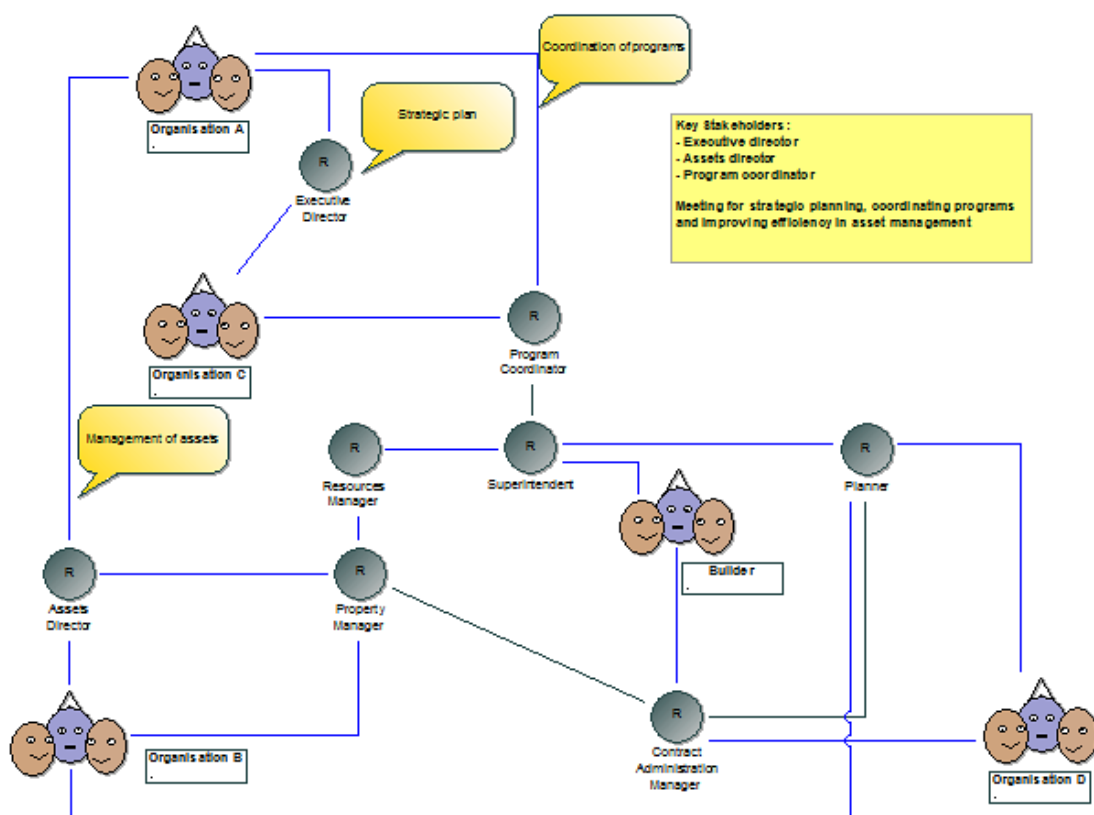


Figure 3-6. Organisation perspective with key stakeholders

In the business perspective as shown in Figure 3-7, the model illustrates the collaborative business activities carried out to achieve the objectives and goals. This was usually performed by arranging meetings and generating discussion on the development of action plans. In the early stages of the study, the researcher then focused on the technical services unit in order to deliver professional services to customers effectively. As a consequence, the participants acknowledged that some key business activities were able to be achieved through regular collaboration. For example, there are regular plan meetings to discuss the progress of the projects undertaken by the technical services unit. This ultimately leads to the development of a broader relationship shared between organisations which enable them to work towards common goals. However, it is limited to display where to find the information the organisation needed for effective operations. The researcher showed participants in the case study that the business perspective can be used for identifying the shared goals and for recognising the different business cultures between organisations. As a consequence, the researcher draws particular attention to the knowledge perspective to improve the information flow regarding where information comes from and how to capture the necessary knowledge that organisation needs.

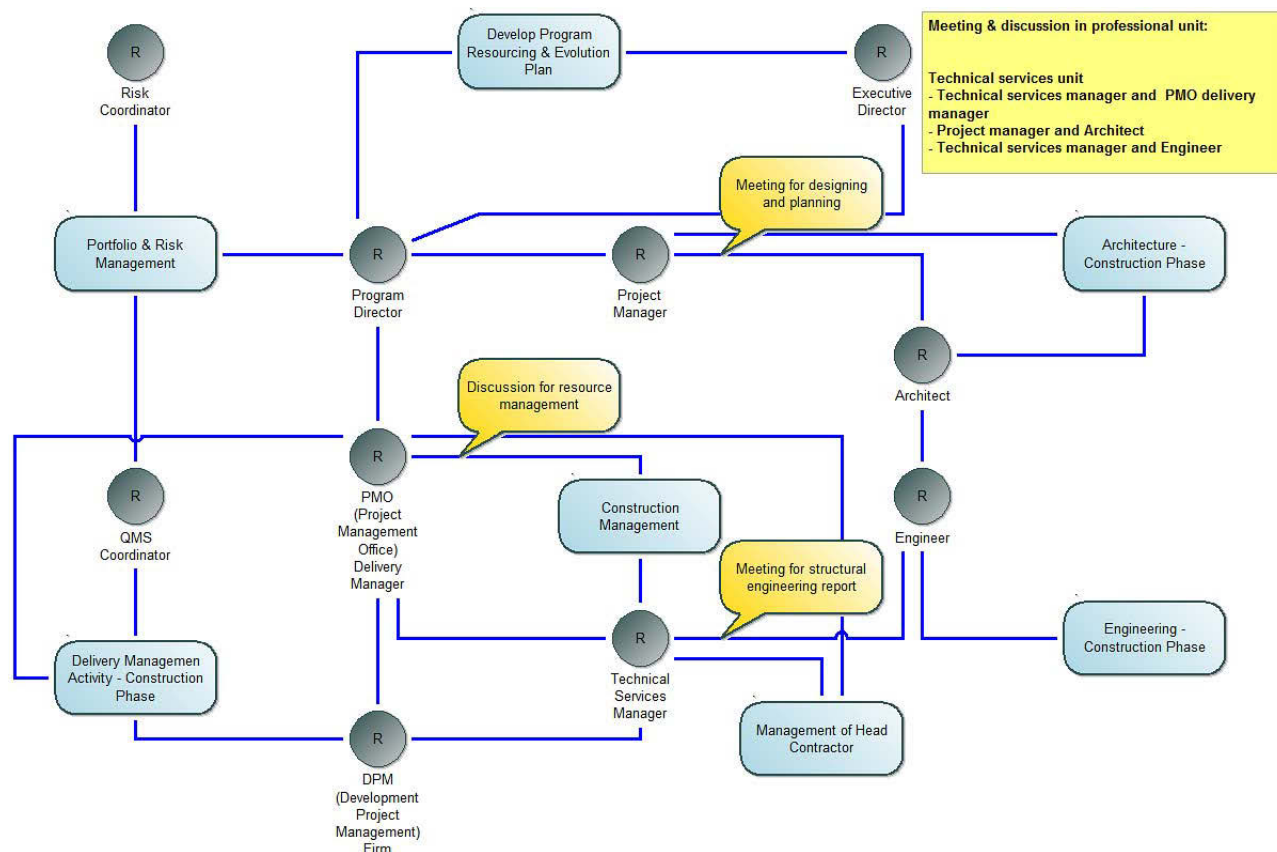


Figure 3-7. Business perspective on activities involving roles

In relation to the knowledge perspective, the process by which knowledge is created between the roles and participants is displayed in Figure 3-8. While demonstrating the capability of the knowledge perspective, participants expressed the view that this approach would help to identify how knowledge is created and stored in the artefacts for sharing information. Based on the participants' responses the researcher generated a model displaying knowledge flows. For example, a risk coordinator works with participants from other organisations to create knowledge for all stakeholders in collaborative environments. The model further allows organisations to distinguish other parties involved in knowledge creation.

Furthermore, knowledge can be stored in the artefacts to generate the business rules, guidelines and project management plans for effective operations. The difference

between the document and artefact is the primary and secondary source of information for collaboration respectively. Some participants agreed that the form of documents would be created from the collaboration and then stored it in the artefacts for record keeping and future sharing.

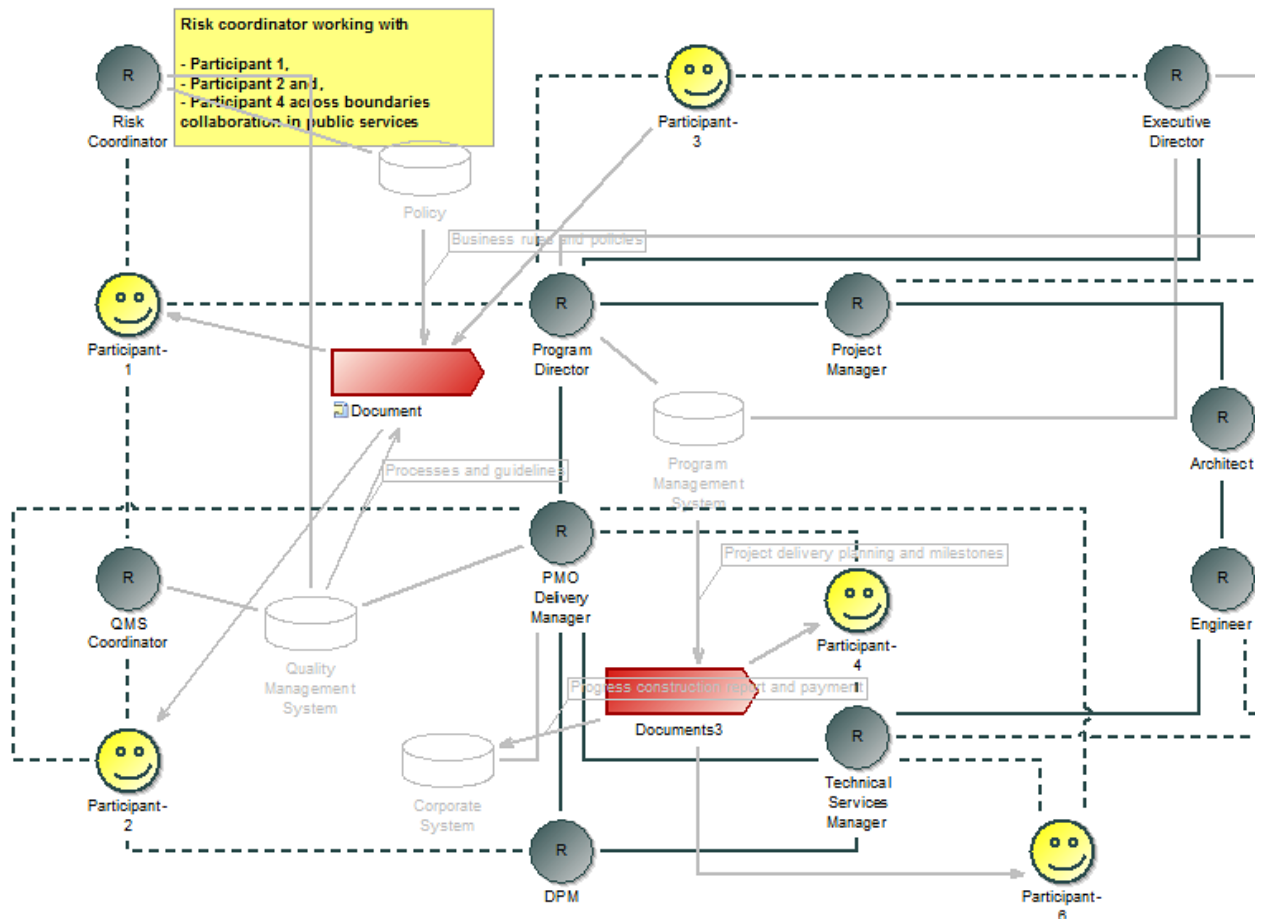


Figure 3-8. Knowledge perspective on knowledge creation

Lastly the social perspective, as revealed in Figure 3-9 displays the interaction between the different roles. The researcher focused on the formation of social gatherings where the model indicates the varying modes of interaction. Following discussion with participants the researcher was able to formulate a model that revealed how social interaction takes place across organisations as shown in Figure 3-9.

For example, project managers interact with architects and engineers to improve the design and procedure of the projects; for instance, a project manager faced with the

environmental issue of removing a heritage listed tree for building social housing within a given timeframe. As well as the PMO (project management office) the delivery manager consults the technical services manager to allocate professional resources for all projects. It indicates the different roles and collaborator interactions where the social network will be created and where it can be useful for adapting changes effectively in the context of the unanticipated events.

Therefore, the social perspective is important for collaboration and participants agreed that organisations must recognise the formal and informal social behaviours in order to work together effectively.

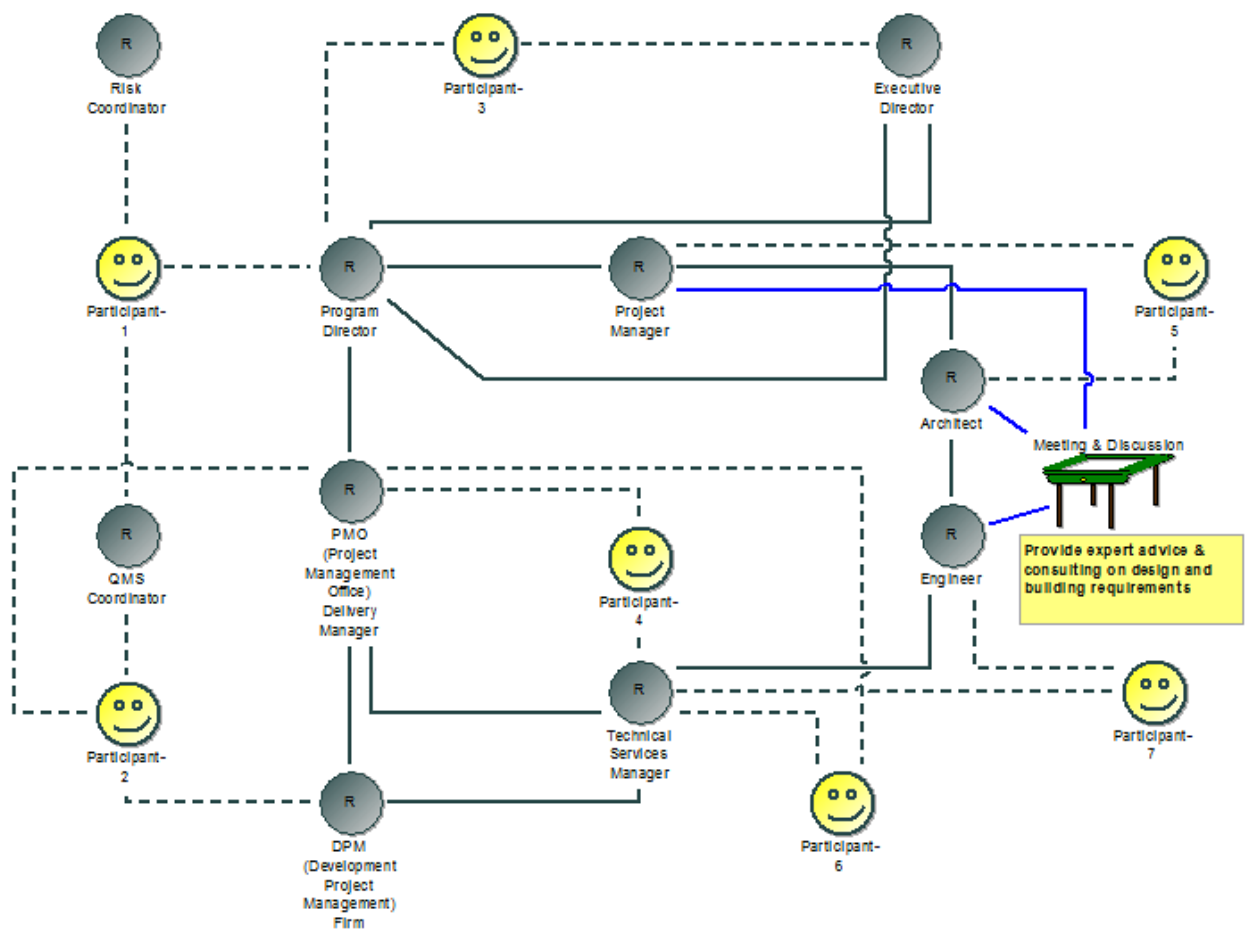


Figure 3-9. Social perspective on relationships

In summary, this chapter focused on a proposed multiple perspectives framework which includes four dimensions. The organisational perspective shows top management positions in different organisations; the knowledge perspective refers to the knowledge exchanged between communities; the business perspective refers to how people achieve common goals through business activities and the interaction with different roles in organisations; the social perspective, illustrates the social complexity and process of change within and across the other perspectives. In the process of building the framework, the researcher initially analysed four single perspectives and the gaps existing in literature to present an integrated model designed for complex systems. The amalgamation of these single perspectives forms a holistic view to tackle wicked problems which arise within collaborative work places.

As a result, the multiple perspectives model is beneficial to emergent organisations as it promotes social interaction between stakeholders across different boundaries. Therefore, it does support effective decision-making processes and visualisation of knowledge flows. The detailed findings represented in Section 5.5 further outline the effectiveness of the framework within a collaborative context.

CHAPTER IV

RESEARCH DESIGN & METHODOLOGY

4.1 Introduction

This chapter presents the research methods and design, participants, and the instruments used for data collection, analysis, validity and reliability.

The main purpose of the qualitative study was to understand the complex processes and collaboration issues being faced by participating organisations. A semi-structured interview protocol to establish perceptions and search the perceptions and opinions of the participants was included in this study. The study is directed to answering the research questions previously mentioned in Chapter 1. This study explored how participating organisations are influenced by wicked problems. The researcher used the case study research method to provide rich descriptions of complex phenomena to address the research questions and the characteristics of the case were based on Yin's (2003) research methodology. According to Yin, the case study protocol is an important element of a research project as a qualitative approach to examine the experiences of organisations more closely. Further, Stake (1995) explains that multiple methods of data collection are often used in case study research which includes interviews, observations, documents, and questionnaires. Stake also clarifies that the case study report will provide a holistic description of the case and address the research questions.

4.2 Research Methods and Design

4.2.1 Qualitative Research Approach

The goal of qualitative research is to provide a view of issues and show the researcher's ability to report the phenomenon (Creswell 1994). To analyse the data, the researcher conducted the interviews in the premises of the NSW State Government. The researcher made notes and observations during each interview, along with individual responses to structured questions. To compile and analyse the data, the researcher coded all of the responses. More specifically, this research method correlates well with the intent and central objective of the study to understand complex systems and wicked problems being faced by participating organisations. Additionally, the participants' responses in context of the research questions contribute to the research value of qualitative studies.

The research design proposed four case studies involving interviews and examinations of complex organisations for knowledge-based systems in real organisational setting. In particular, the case study focused on the Australian Government's Nation Building Economic Stimulus Plan (NBESP) which involved three government organisations working co-operatively within a complex collaborative environment. The researcher employed a common set of questionnaires to gather data from the participants' organisations. The outcome of the research has been presented as guidelines in Chapter V for describing an organisational complex within business processes.

In contrast, a phenomenological research design offers an apprehension of the themes and patterns represented by the participants. The researcher asked the participants open-

ended interview questions to identify their specific experiences. As Moustakas (1994) stated:

The empirical phenomenological approach involves a return to experience in order to obtain comprehensive descriptions that provide the basis for a reflective structural analysis that portrays the essences of the experience. (p. 13)

According to Groenewald (2004):

The aim of phenomenological research is to describe as accurately as possible the phenomenon, refraining from any pre-given framework, but remaining true to the facts. The phenomenologist is concerned with understanding social and psychological phenomena from the perspectives of people involved. (p. 5)

In phenomenological research, the researchers can use a range of methodologies such as interviews and focus group meetings. At the root of phenomenology, 'the intent is to understand the phenomena in their own terms to provide a description of human experience as it is experienced by the person allowing the essence to emerge' (Cameron, Schaffer, & Park 2001, p. 34). Further, phenomenological research facilitates the study of directors' and managers' experiences and perceptions towards the investigation of an existing situation in an organisation. Creswell (2005) state that 'it will measure the participant's experience and the contexts or situations in which they experience it' (p. 130).

However, according to Lester (1999):

Phenomenology involves gathering deep information and perceptions through inductive, qualitative methods such as interviews, discussions and participant

observation, and representing it from the perspective of the research participant.
(Lester 1999, p. 1)

This method discovers the awareness of people from an expression of their views. Lester (1999) criticises the phenomenological empirical study. He describes it as generating a lot of papers, notes, and audio tapes for analysis and that people may not understand what it is, expecting similar parameters to apply as for quantitative research (Lester 1999, p. 2).

Thus, the case study research method was used to evaluate the issue of organisational complexity arising within collaborative environments and was considered the most suitable approach to understand the complex social and organisational phenomena of knowledge flow. The researcher followed the case study approach as described by Yin. According to Yin (2003), 'analytical data generally samples a defined population in addition to a theory of the phenomenon being examined'. Yin argues that 'it resembles experiments in the physical sciences, which make no claim to statistical representativeness, but instead assumes that their results contribute to a general theory of the phenomenon' (2003, p. 32).

The rationale behind the choice for case study research is that it helps to identify how a multiple perspectives framework may improve the ability to manage change in complex business processes. The researcher used inductive, qualitative methods to identify this information.

4.2.2 Research Design

The researcher used various data collection methods to amass and identify the research data. The interview process consisted of two phases. During the first stage, the researcher began with general questionnaires and then moved on to specific questionnaires to understand and clarify answers. The researcher made notes and observations during interviews and these, along with the individual responses were transcribed after the completion of each interview.

The researcher developed a model to identify new requirements and the capability to adapt it to a changing environment quickly. The social network aspect describes the model's ability to manage system evolution and provide a practical approach for integrating multi-perspective views. Moreover, from the guidelines of complexity theory, this thesis highlights the emergent structure, and self-organisation, with the multiple perspectives modelling method to tackle a complex problem.

4.2.3 Questionnaire Design

For this research, the participants were asked questions through interviews about complex project coordination across organisations. Data was systematically collected and analysed. In particular, semi-structured interviews were used as a data collection method to obtain primary data on working practices within dynamic organisations. Thirty five participants were involved in the case studies to complete fifty eight interview questionnaires within the duration of a one and a half hour session for each participant. It took an elapsed period of eight months to complete the interviews. The recording of each participant's interview was transcribed and then analysed using the NVivo[®] software.

The structured questions provided a context for each business, specifically with complex project coordination across organisations. Furthermore, a questionnaire was designed to obtain information of relevance to the research. For example, during an interview, participants were asked about the impacts of individual perspectives, namely, organisation, business, knowledge and social perspectives, on the unanticipated events. This interview was conducted in order to examine the effectiveness of the combined perspective model. Moreover, the participants were asked whether the use of an open model to visualise the relationship across a multiple stakeholders' environment, enabled them to understand organisational complexity. The participant's responses from this interview will ultimately help to identify additional perspectives for consideration in the researcher's future study.

The researcher analysed the open-ended responses of each individual to determine how the interviewees perceived complex project coordination across organisations. Responses to open-ended questions were necessarily subjective, but the concept of validity can be extended to the phenomenological method (Giorgi 2002) using methods described by Hycner (1985) and Groenewald (2004). The researcher combined their preconceived ideas and beliefs about the interview topic to ensure a neutral perception. After the interviews, the researcher converted a transcribed text of the verbal interview to ascertain its meaning, by first obtaining an overall sense of the interview and then deconstructing it into its general components of meaning and finally reconstituting themes from those general components of meaning (Hycner 1985).

4.2.4 Sampling Techniques

The sample was obtained as a part of the research into the multiple perspectives framework of preferences in tackling the wicked problem in organisations as indicated in Chapter I. The public sector was the preferred environment, as it better related to the researcher's workplace and practice. The plan was to gather a sample from three Australian government agencies. In accordance with Yin (2003) and Stake (1995) the case studies served as a context for data collection by helping the researcher to examine the issues experienced by participants within their organisation.

4.2.5 Instrument

A case study research method was employed as a qualitative approach using personal interviews as a means to collect data to articulate the four constructs: organisation perspective, business perspective, knowledge perspective, and the social perspective for incorporation in the model proposed in Chapter II.

The questionnaire comprised eight sections (see Appendix E): (1) Satisfaction measures; (2) Model quality measures; (3) Model content measures; (4) Model use measures; (5) Policy impact measures; (6) Process development impact measures; (7) Information flow measures; and (8) Collaboration impact measures.

4.2.6 Demographic Information

The background information questions were used to identify and scope the participants and to summarise the relevant information about their organisations. Three demographic measures were used: the respondent's position in the organisation, their responsibility and authority, and the activities they participated in.

The researcher asked all questions for each participant, but also probed each participant's experiences in greater detail to explore where complex problem occurred and observed the participants in their workplaces. If interviewees agreed, the researcher taped and subsequently transcribed the interviews.

In this research, the researcher utilised these methods to address the research questions. As such, the focus of this multiple case study research was to understand the complex processes and collaboration issues being faced by the participating organisation.

The subsequent section provides information about the data collected from the government department's respondents. This section, first, presents demographic data of the government departments that responded to the interviews. Second, the research instruments and case study design to address the research questions are covered. Third, information about the variables of relevance to the research model are explained, namely, the organisation, business, knowledge and social perspective variables.

4.3 Participants

Four different perspectives were shown to the participants and discussion ensued regarding the impact of each model. The researcher addressed the importance of integrating the multiple perspectives to display the relationships between the different boundaries of roles for collaboration.

Thirty-five participants completed interview questionnaires, where the duration of each session ranged from one to one-and-a-half hours approximately. The project took the

researcher an elapsed eight months to complete. The questionnaire consisted of fifty-eight questions designed to validate the research questions. The researcher conducted the interviews on the premises of the NSW State Government. The researcher recorded individual responses to the structured questions and made notes during the interview session, as well as audiotaping proceedings. Table 4-1 provides a summary of the participants involved in the case study. In particular, project managers collaborated with numerous people working across nine different project development firms. The researcher interviewed thirty-five participants individually, indicating that the responses were reasonably balanced as there was great variation in the roles and positions across three different organisations.

Table 4-1. Participants in the study

Organisation	Participants (Interviewees)	Role	Number of Participant
NSW State Government Site 1			12
	Program Director	Supervise project managers/ recommend business rules and regulation	1
	Director, Project Delivery	Report to higher authorities	2
	Program Manager	Manage program of projects	1
	Project Delivery Manager	Delivery to projects	5
	Manager, Planner	Urban planning/ Development application	1
	Manager, Acquisition & Disposal	Acquisition & disposal of properties	1
	Contracts & Policy Coordinator	Dispute and negotiation of contracts/ maintenance of policies	1
NSW State Government Site 2			18
	Project Director	Supervise project managers/ report to higher authorities	1

	Client Manager	Manage regions	2
	Manager	Provide professional services	1
	Senior Project Manager	Manager projects/ mentoring	2
	Project Manager	Management of projects	5
	Engineer	Structure engineering	2
	Architect	Urban design	1
	Senior Town Planner	Town planning/ supervise	1
	Town Planner	Town planning	1
	Senior Quantity Surveyor	Construction cost	1
	Property Acquisition Coordinator	Coordination of property sales	1
NSW State Government Site 3			5
	Director	Strategic planning	1
	Project Director	Supervise project managers	2
	Project Coordinator	Coordination of project program	2

In particular, the responses from higher authorities (directors and senior management) indicated that the multiple perspectives framework is important for an organisation's strategic direction and objectives.

Multiple case studies were conducted on complex projects in three anonymous Australian government agencies. The case studies included:

- NSW State Government A – two case studies
 - Special Projects – twenty five participants; and

- Community Projects – seven participants (out of seventy staff).
- NSW State Government B – one case study
 - Community Projects – two participants (out of eighteen staff).
- NSW State Government C – one case study
 - Special Projects – one participant (out of three special project managers).

In particular, the case study focused on the Australian Government's Nation Building Economic Stimulus Plan (NBESP) which provided \$1.9 billion to construct social housing across the State over two years. The NBESP involved three government agencies and nine development project management (DPM) firms working together in a complex environment. It was quickly recognised that the scale and timeframe of the program required an innovative approach to deliver capital works programs that had evolved over many years. An initial testing of resources associated with a business-as-usual approach to the program budget suggested an unattainable pool of project managers and contract administrators. This and the Australian Government's requirement that base programs be delivered at the same time demanded a fresh approach that stretched contemporary views of what would be achievable. Innovation immediately became essential. The specific objectives of this initiative were to:

- Increase the supply of social housing through new construction.
- Encourage the building and construction industry through the simultaneous funding of additional residences and increased spending on maintenance and repairs. Consequently this proposal will support the growth of businesses providing

materials and resources for manufacture as well as construction. Additionally, this particular initiative may also enable individuals to retain their jobs within the industry and promote further employment of staff and personnel.

The use of a case study to evaluate the effectiveness of the proposed framework allows system evolution to be more easily managed and facilitates the support of multiple stakeholders in the coordination of complex projects. Using the method described above, the initial research was able to retrieve innovative designs to improve the model whilst also validating the framework. In the initial findings, a pilot case study enabled the most important factors for success in dimensioning the model, were identified.

4.4 Materials/Instruments

The researcher investigated four case studies with the newly developed multi-perspective model based on relevant literature as mentioned previously in Chapter III. This model was verified based on a collaborative design through a pilot case study, prior to employing the multiple case study research method to further refine the model. The method of case studies based on a qualitative methodology is a widespread research practice in the area of information systems (Alavi & Carlson 1992; Orlikowski & Baroudi 1991). The case study method is an empirical form of enquiry that investigates an emerging area in which multiple sources of evidence are used (Yin 2003). The researcher validated his research model through multiple case studies involving four case studies across three different Australian government agencies within the umbrella of housing departments. The researcher was able to evaluate the resulting conceptual model as an instrument of analysis designed to capture and record evidence for further validation of the successful model.

This study employed multiple case studies derived from the research of well-established scholars in the field (Hamel, Dufour & Fortin 1993; Strauss 1987; Yin 2003). The researcher asked the participants questions about complex project coordination across the organisations. The researcher used semi-structured interviews to obtain primary data on working practices within dynamic organisations. All procedures related to the interview findings and the analyses of data were documented for the validation phases of the research project. Through pre- and post-experimental questionnaires, the researcher investigated all the interviews to collect information relevant to the case study. The researcher distributed a total of 58 questionnaires (e.g., closed- and open-ended questions) to validate research questions in measuring the success of multi-perspective modelling through participants' experience in their organisations. Responses were analysed qualitatively by identifying the common themes of problems and comparing similarities and differences. Furthermore, the researcher employed content analysis to review the literature and to critically evaluate the multi-perspective approach. The following section outlines the approach used in the research design that validates the model through multiple case studies.

4.5 To Facilitate the Research

The researcher has also engaged in collaborative work with Vienna University in Austria. This work was involved with Professor Dimitris Karagiannis and his colleague during last two years. The project involved development of a methodology for collaboration and the researcher collaborated with Vienna University (<http://www.omilab.org>) to further develop an open-source modelling tool called

MeLCA on ADOxx. This modelling tool served to support the researcher's proposed model as well as enabling participants to understand visually, the purpose and objectives of the framework. This tool displays the relationship between the boundary roles and collaborative activities. The researcher's involvement was in testing the tool through case study to determine whether it helps in managing complex processes in an organisation. Some participants agreed that the tool was useful but still needed improvement with regard to knowledge flow in multiple perspectives.

The case study shows that the use of the open-model tool allows for successful management of collaborative environments.

4.6 Case Study Design

The researcher carried out a pilot case study and four main case studies using the modelling dimensions for success, described in the section below. The initial research was able to reveal innovative designs to improve the model while concurrently validating the framework. A pilot case study enabled the researcher to derive initial findings i.e. the most important factors in determining success model dimensions: organisation, business, knowledge and social perspective variables.

The researcher employed a qualitative method to examine the organisations in order to understand the complex processes and collaboration issues encountered. The use of a case study to evaluate the effectiveness of the proposed framework allows system evolution to be more easily managed and facilitates the support of multiple stakeholders in the coordination of complex projects. Through the use of the method described above, the initial research was able to retrieve innovative designs to improve the model whilst also validating the framework. Figure 4-1 displays the case studies processes

including the phases of pilot testing, re-specification of model, interviews, validation of model and case analysis.

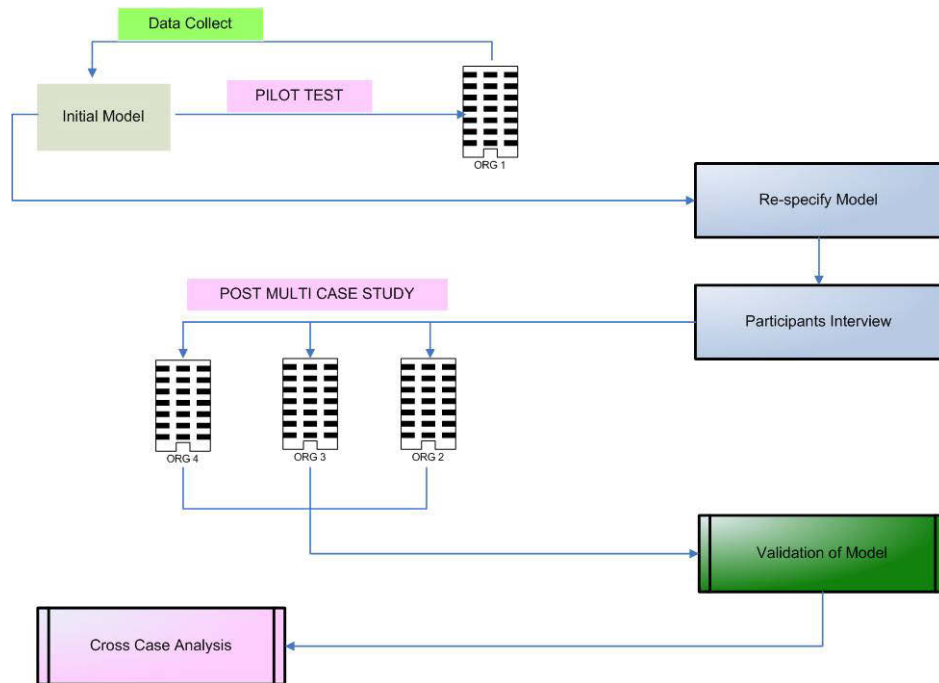


Figure 4-1. Multiple case studies.

The use of multiple sources of evidence allowed the validation of the concept to be reinforced in the pilot case study. Additional results were obtained by conducting the ensuing four case studies. The case studies involved eight months of qualitative data gathering and the researcher maintained a close relationship with the participants, including directors, project managers and professional managers involved in change management and social networking in their complex projects. This enabled the researcher to gain greater insights into the knowledge required to develop a multi-perspective framework.

In selecting the criteria, the literature review was carried out and feedback from informal practitioners' interviews enabled identification of important factors which are

relevant to measure the success of the developed model. These factors related to user satisfaction, model quality, model use and model content.

4.6.1 Deriving the Measurement Model

To devise a multi-dimensional concept of a multi-perspective success model, according to Kanellis, Lycett & Paul (1998), a complete set of measurement dimensions is important. Bandara, Gable & Rosemann (2006) describe the modelling success as complex due to the lack of IS success frameworks studies. In order to achieve modelling success the eight dimensions as identified below in Table 4-2 must be applied. These dimensions have been derived from the literature by conceptualising the model success. Furthermore, the extracted dimensions were correlated to the multiple perspective contexts.

Table 4-2. Modelling success dimensions

User Satisfaction	The extent to which the users believe multi-perspective modelling achieves the objectives in an unanticipated event
Model Quality	The extent to which the users believe multi-perspective modelling affects the responsiveness in an unanticipated event
Model Use	The extent to which the users believe multi-perspective modelling executes the ease of use in an unanticipated event
Model Content	The extent to which the users believe multi-perspective modelling achieves reliability in an unanticipated event
Policy Impact	The extent to which the users believe multi-perspective modelling directs the business rules in an unanticipated event
Process Development Impact	The extent to which the users believe multi-perspective modelling captures the correct procedures in an unanticipated event
Information Flow	The extent to which the users believe multi-perspective modelling discovers the knowledge flow in an unanticipated

	event
Collaboration Impact	The extent to which the users believe multi-perspective modelling displays the stakeholders' relationship in an unanticipated event

**Adapted from Bandara, Gable & Rosemann (2006)*

4.6.2 Pilot Case Study Design

In this study, a single pilot case study was applied to construct the final case study protocol. According to Tellis (1997), 'pilot projects are very useful in determining the final protocols that will be used' (p. 4). The pilot case study provided the re-specified success measures from an *a priori* model in Figure 4-2, whilst Table 4-2 described the modelling success dimensions. This re-specified model provided helpful guidelines to complete the multiple case studies.

A qualitative method of interviewing participants and collecting data through case study research was employed. This approach assisted the researcher to evaluate the effectiveness of the proposed framework and its capability in solving wicked problems.

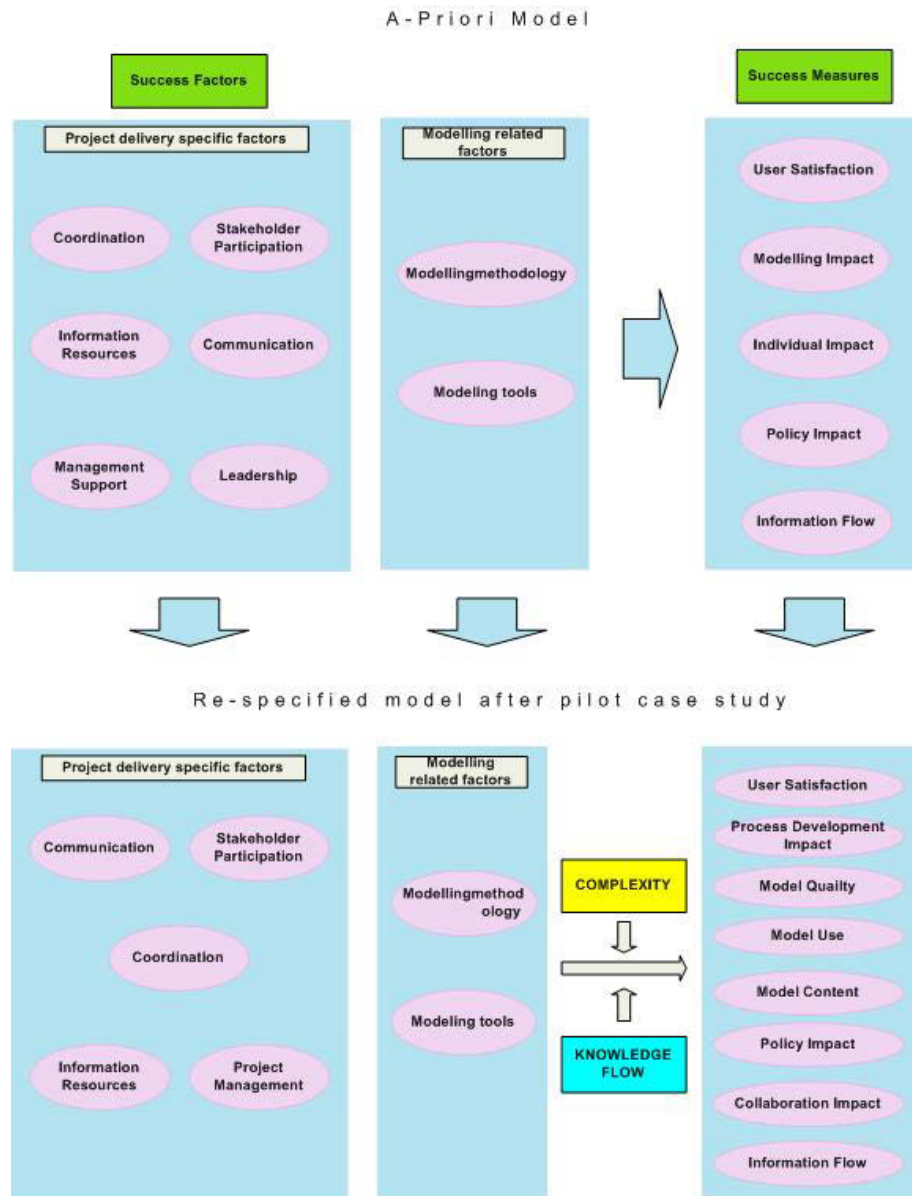
4.6.3 Pilot Case Study Findings

The initial research was able to retrieve innovative designs to add new concepts due to the method mentioned above while concurrently validating the framework. The pilot case study enabled the identification of the most important factors in success model dimensions, these being:

- Organisation perspective variable – users will respond to unforeseen circumstances and notify stakeholders. For example, methods for developing and reviewing position descriptions to address organisation's strategic goals.

- Knowledge perspective variable – users will know what to do in the unlikely event of unforeseen circumstances. For example, it illustrates a learning organisation with social communities, Community of Practice, Knowledge Hub.
- Business perspective variable – a multi-perspective model will help the user facilitate changes. For example, shows how business activities are formalised, and the methods for sharing practical business activities – the interaction with different roles in the organisations.
- Social perspective variable – users are able to identify experts and information in unforeseen circumstances. For example, illustrates the social complexity and process of change within and across other perspectives. Methods for collaborations, networks, strategic alliance and changing forms with no clear boundaries.

The pilot case study revealed that the proposed multi-perspective model satisfied the success model dimensions to measure and improve knowledge flow in unforeseen circumstances. In essence, the purpose of the pilot case study was to investigate the participants' initial thoughts and opinions regarding the need for a new model. Based on these preliminary findings, the researcher was then able to construct more concrete questionnaires for subsequent data collection. The process also recognised the additional success factors and measures as illustrated in Figure 4-2.



Adapted from Bandara et al. (2006)

Figure 4-2. Re-specified success measures.

4.7 Data Collection, Processing and Analysis

4.7.1 Data Collection Method

In order to gather the necessary important data, the researcher used the case study method of research. This method focused on the investigation of an existing situation in an organisation as the research concentrated on identification methods for complex

processes. The researcher also carried out a range of interviews as a research method for additional data gathering.

The face to face interview process consisted of two stages. During the first stage, the researcher began with general questions and then moved on to the specific questions to understand and clarify answers. The researcher made notes and observations during the interview and these, along with the individual responses, were transcribed after the completion of each interview. The researcher analysed the interview narrative to identify the participants' points of view regarding the effectiveness of current frameworks as they related to the ability to manage change in complex business processes.

Once the data was collected, the next step was to categorise the information. The researcher identified patterns that showed themes and concepts the participants had articulated. The researcher then organised the data into logical categories that summarised and brought meaning to the material gathered.

The researcher developed specific codes to categorise the responses into the above-mentioned construct in order to recognise the themes. During this data aggregation stage, subcategories were identified, which were not identified during the initial development of the research project.

Though the researcher defined pre-set categories in the initial phase of the research, setting the initial direction of the study, emergent categories were then subsequently identified. The researcher included categories adding emergent categories as they were defined. The following approach was employed to collect data as follows:

Content Analysis: The researcher critically conducted a review of literature and an evaluation of multi-perspective approaches.

Practitioners' interviews: The researcher used the findings from the literature review to formulate the research questions and to develop an understanding of issues to be validated during the interviews. The researcher also used a questionnaire consisting of closed- and open-ended questions. Participants were project managers and directors who were involved in change management and the social networks in their complex projects. Data was collected from interviews to develop a holistic model and requirements for the proposed framework.

Case Study: The case study focused on validating the multi-perspective framework; participants needed to have decision-making responsibility and a relationship in managing multiple stakeholders. The researcher used a pilot case study which involved questionnaires consisting of open- and close-ended questions to collect information pertinent to the case study.

4.7.2 Data Analysis

The purpose of analysis is to understand the structure of what already exists, and to identify the causes of any problems or restrictions. The data collected has been analysed and synthesised to address the research questions. Each case follows a standard procedure, supporting the theoretical findings gained from the literature review and comprises key words to generate common themes facilitating comparative analysis.

The researcher used NVivo[®] software to code each participant's transcribed interview (DeNardo & Levers, 2002). The researcher read the codes from each participant

interview, and distilled these themes from the coded text to reflect the themes critical to the central question. After data was collected, an analysis of the qualitative data was performed as follows:

Content Analysis: the researcher critically analysed the literature to evaluate the concepts, approaches and the processes of the characteristics of a complex organisation. The researcher used the results to formulate research aims, research questions and to develop an understanding of issues for exploration during the interviews and case study.

Interviews: Responses were analysed qualitatively whereby a search was conducted to identify the common themes of the problem as articulated and also effect comparisons of the similarities and differences. The analysis of the interview data and content analysis from the literature provided deeper insights, understanding and the knowledge required for developing multi-perspective frameworks.

Case Study: Responses from the questionnaire that the participants completed were analysed qualitatively. Multiple criteria were used to measure the efficiency of the framework, strengths, and weaknesses of the self-organisation and the effectiveness of the easier-to-manage system evolution.

4.7.3 Generating Hypotheses

Burck (2005) explains that the most significant aspects of the qualitative research process are the research questions and generation of hypotheses deriving from interview data. While hypotheses are generated from the analysis and observation of qualitative data, the qualitative researcher will be inclined to investigate numerous cases, identifying emerging hypotheses and common ideas in an attempt to maintain validity (Maxwell 1992). Thus, the generation of hypotheses, enhances reliability and validity through different dimensions.

From analysing the collected data, the researcher generated the following hypotheses.

The proposed model is intended to identify the information flow in complex systems by measuring user satisfaction, therefore:

- The multi-perspective model will help to create knowledge flow that may improve decision making. (H1)

The proposed model will enable users to understand what to do in the unlikely event of unforeseen circumstances by measuring the reliability of the model, hence:

- The model helps the organisation to learn how to create knowledge. (H2)

A multi-perspective model will support users to facilitate the changes and collaboration with regard to unforeseen circumstances by measuring the adaptability of the model, thus:

- Knowledge flow in organisations is influenced by the significance of collaborative change. (H3)

A multi-perspective model will enhance the development of better relationships among stakeholders which cannot simply involve looking at processes but must consider social and organisational structures. It also improves responsiveness to unforeseen circumstances by measuring the responsiveness of the model, therefore:

- The organisation will respond to unforeseen circumstances needed for knowledge flow to adapt quickly to change by creating new knowledge. (H4)

This work will be significant in that it validates the integrated perspectives which allow for the understanding and development of a model within an organisation.

4.8 Validity and Reliability

According to Trochim and Donnelly (2006), validity reflects the estimation of the truth of any conclusion that is described in the research. The researcher used validity to assess the quality of the research conclusions. The researcher assessed the internal and external validity of the research to ascertain the relationship between the variables.

According to Creswell (2005), validity is used to evaluate the accuracy of the study's findings. The researcher used triangulation to increase the validity of this study. Triangulation uses multiple research approaches and methods.

Johnson (1997) and Newman and Benz (1998) identified the strategies that should be considered to enhance the internal validity including sources of information from different sources and peer reviews to discuss the interpretations of the findings and conclusions drawn. Internal validity is shown in the extent to which the answers from the participants reflect the same attributes (Fink, 2008). The sources for the study were taken from organisational websites which ensured that the information used in the literature review was reliable and valid (Creswell 2005; Trochim & Donnelly 2006). The researcher validated the questions before collecting the data by collating relevant information from the pilot case study and demonstrating the multi-perspective model through the use of an open-modelling tool.

Reliability measures the quality of the data, the consistency of the data with the research background, and the suitability of the data for analysis (Saunders, Lewis & Thornhill 2009). This study concentrated on the views of a group of individuals, as Merriam (1988) suggested:

Qualitative research assumes that there are multiple realities; that the world is not an objective thing out there but a function of personal interaction and perception. (p. 17)

Figure 4-3 illustrates an approach to research that validates multiple perspective frameworks used case study research as a qualitative method.

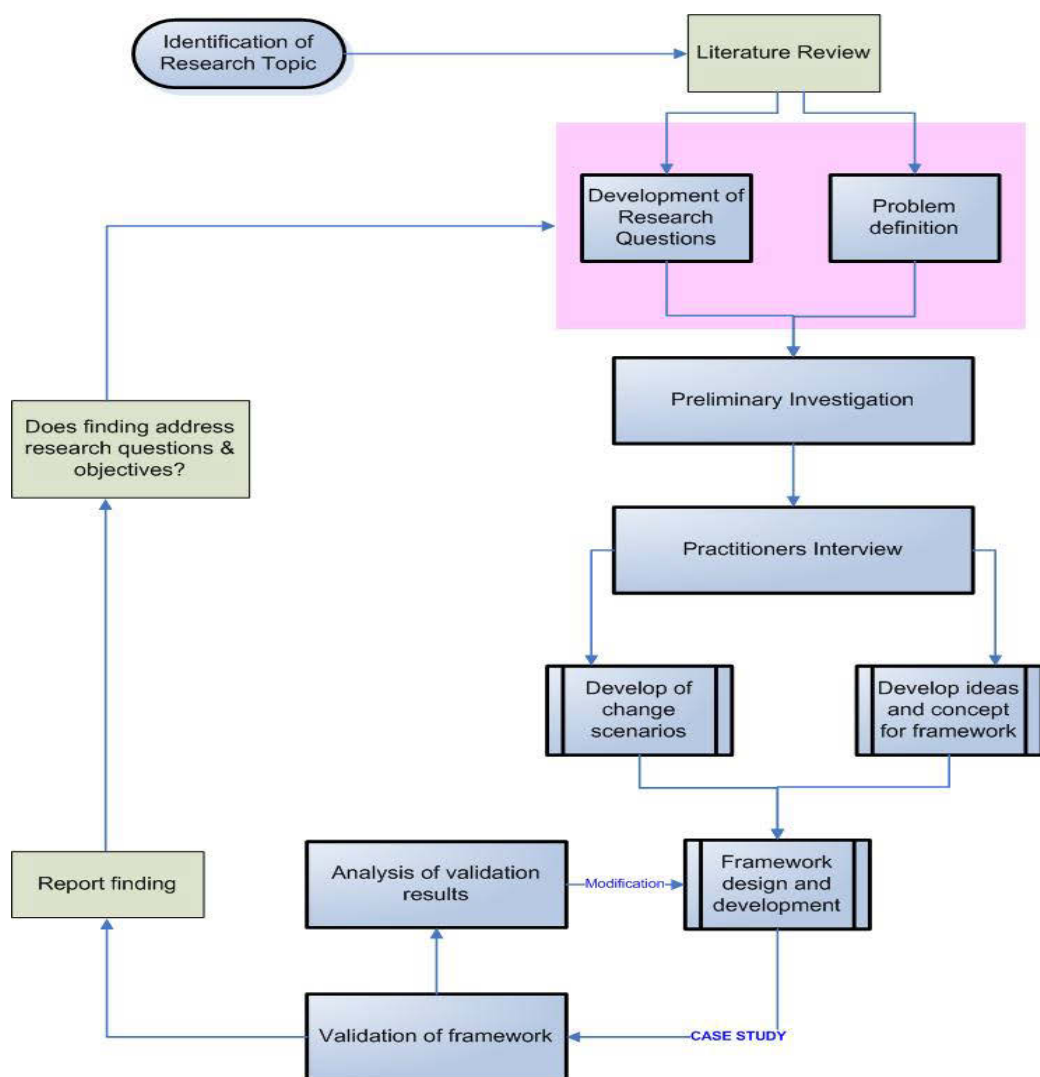


Figure 4-3. Data analysis and validation process

4.9 Summary

Chapter IV discussed the research methodology that was employed in the qualitative study and included information regarding participants and the instruments used. The process of data collection and analysis was also presented, followed by an in-depth discussion of the validity, reliability and ethical issues relevant to the research. This chapter noted that four case studies were conducted to validate the model for its effectiveness within three government organisations. There was a need to validate the framework through these chosen organisations as they were faced with emergent changes requiring collaboration amongst multiple stakeholders. Such changes could include the clustering of government organisations to handle shared projects in a more sustainable manner.

The researcher used NVivo[®] software to code each participant's transcribed semi-structured interview (DeNardo & Levers, 2002). The researcher read the codes from each participant interview, and distilled the resultant themes from the coded text to reflect the issues critical to the central research question. There were few Computer Aided Qualitative Data Analysis (CAQDAS) tools that were designed to support qualitative research. NVivo[®] was used as a systematic approach for managing the case data in the multiple case studies. NVivo[®] was found to be a useful tool for analysing qualitative data including individual transcripts and open-ended responses from interviews.

Multiple case studies illustrated both the understanding and the experiences that the participants had towards the current practices, and how these experiences affected the ability to manage change in complex business environments.

CHAPTER V

RESULTS

5.1 Introduction

This chapter presents the results of the data analysis and interpretations from the questionnaire and interviews through the case study. The researcher focused on the effectiveness of the conceptual model (multi-perspective model) as applied in government organisations. Each of the perspectives has been assessed to determine their overall reliability.

Section 5.2 describes the findings from the interviews, and presents the qualitative data analysis using NVivo and a summary of the results.

Section 5.3 provides details of the collected data from interviews as coded by the NVivo[®] for use in creating invariant constituents for analysis. Further, this section presents an interpretation of qualitative data and the categorisation of analysed data.

Section 5.4 presents a thematic analysis and organises major categories into a set of themes pertaining to specific research questions.

Section 5.5 provides participants' attribute values that are ranked in order of importance and organised by relevance to the working hypotheses.

Section 5.6 provides a summary of findings of the interpretative analysis.

This chapter outlines the key findings that have influenced the need for an integration of multiple perspectives in complex environments. This research emphasises the use of the

newly gathered data to confirm research questions about the improvement of complex business processes.

5.2 Findings from the Case Study

In the four case studies, the researcher interviewed thirty five participants during a period of eight months in 2012 using semi-structured interviews and further extensive data collected from observations, comments, and recommendations.

The interviews have been conducted in order to determine how the behavioural perspective of complex processes in social systems may extend to support elements of the organisation and aid the further adoption of system evolution. The case study revealed that the multiple perspectives framework functions as a common platform for improved decision making across collaborative organisations. It also refers to the workflow process based on seeking approval by senior management that improves the effectiveness of the decision process.

Subsequent data analysis provided the rank order of perspectives by NVivo. Each perspective was ranked in importance and organised by relevance against the hypotheses in section 5.5.

The purpose of the ranking was to establish a common foundation for collaboration to take place between multiple stakeholders. Furthermore, the researcher collected a ranked list of each perspective of the framework that participants agreed on which was most applicable to the development of the model and their complex projects.

5.2.1 Difficulty in Analysis

This chapter focuses on the findings from the interviews of directors, project managers and professionals in the case studies mentioned in section 4.3. In the case studies, the researcher collected and interpreted narratives and their transcriptions from the various project managers and professionals.

As the interviews proceeded a number of difficult challenges emerged:

- Due to the open-ended questionnaires, participants' discussions were disjointed, with many becoming side-tracked through irrelevant responses which led to the re-scheduling of interviews as well as the amendment of questionnaires.
- Initially the analysis of data proved to be difficult as there were large amounts of data to transcribe.
- The method of data analysis and coding was time consuming as the researcher was required to familiarise himself with computer-aided qualitative data analysis tools beforehand.
- Validation of the proposed model caused greater challenges where the researcher exceeded the time constraints due to the need to demonstrate the importance and relevance of each perspective.
- Further, the issues of differing perspective arose in all the interview sessions. The participants answered the questionnaires as directors, managers and professionals. The researcher acknowledged and understood such problems associated with distinguishing perspectives and how they operated across organisations for collaboration.

As addressed in the case study, project managers collaborated with numerous people working across nine different project development firms (see Appendix C). The researcher continuously analysed the results of the case study and effected an interpretation of interview data and archival materials in order to expand and test the validity and reliability of modelling dimensions.

The following sections (5.2.2 and 5.2.3) describe the use of the NVivo[®] software for handling qualitative data.

5.2.2 Nvivo for Qualitative Data Analysis

NVivo[®] was used in the coding process which was separated into three different phases as follows:

1. In the first phase the categories were established through the coding of transcribed interview data to explore the issues the researcher needed to focus on. Further, thematic categories were recorded for contribution to a set of themes.
2. The second phase involved reviewing the data coded in phase 1 in order to confirm its relevance to the categories identified.
3. Within this phase, NVivo's analysis features were used to help identify the themes for addressing the research questions.

The coding through NVivo helps to make sense of qualitative data and it enables the organisation of a large amount of text to facilitate the derivation and categorisation of meaningful information. The categorised information helps the researcher quickly classify the contents of the interview data. Rossman & Rallis (2003) explain the

differences: ‘think of a category as a word or phrase describing some segment of your data that is explicit, whereas a theme is a phrase or sentence describing more subtle and tacit processes’ (p. 282). In contrast, according to Saldaña (2008), a theme derives from coding, categorisation, and analytic reflections. Figure 5-1 shows a schematic from a coding manual for NVivo analysis that this study followed in the analysis for generating themes.

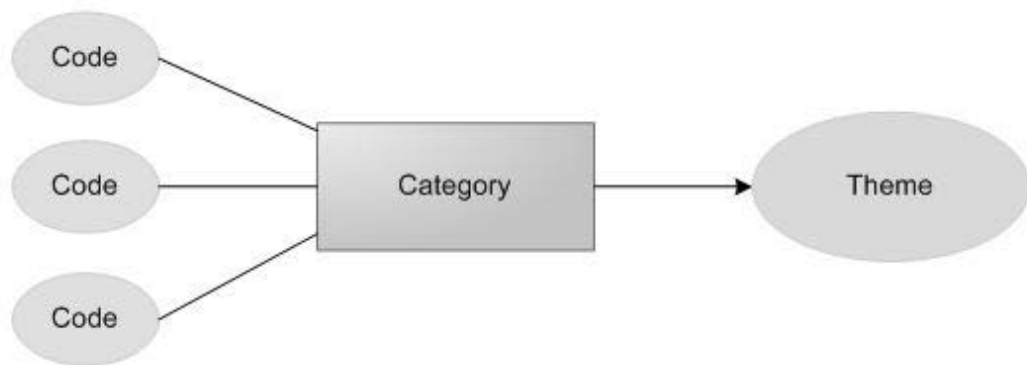


Figure 5-1. Coding for qualitative data

5.2.3 Categorising

In categorising information through NVivo, core themes were generated from clustered information from the invariant constituents and established the participants’ experience (Moustakas, 1994). Then the invariant constituents of the participants’ experience were categorised to construct thematic labels. Consequently the researcher devised seven major categories, created to ensure that coded data belonged to the following categories: (1) methods used to manage a complex problem; (2) organisational perspective; (3) knowledge perspective; (4) business perspective; (5) social perspective; (6) multiple perspectives, and (7) change adaptation practices.

The generated themes constructed by the researcher provided an awareness of the experiences of professionals in managing complex projects.

As noted, seven major categories were used to classify the complex information from the large volume of text of the transcribed interview data. Each of these categories enabled the researcher to answer the research questions as summarised in the Table below. Table 5-1 shows a summary of overall insights into effective management within a complex environment. As in Figure 3-2, the Collaborative Common Framework explained the theme. Additional descriptions of the major categories are outlined in section 5.3 and detailed explanations of the themes are presented in section 5.4.

Table 5-1. Insights from multiple case studies

Research questions	Findings	Major Categories
Does a multiple perspectives framework improve the ability to develop change strategy for complex business processes? (RQ1) and all hypotheses.	After carrying out this study, it was found that the hypotheses were supported as revealed in Section 5.5. Therefore, the multiple perspective model helps to manage change. For example, the model serves as a common framework encouraging effective collaboration amongst organisations.	Major category 6 (Multiple perspectives)
How does the organisation respond to the unanticipated event required for better knowledge flow? (RQ3) Hypothesis-generating (H1)	Organisation perspective had an impact and was crucial to enhancing the quality of decision making as highlighted in Section 5.5. For example, clear organisational objectives, improvement of resource management and strategic direction.	Major category 2 (Organisation perspective)
How can changes in event affect	Business perspective had an	Major category 3

knowledge flow in organisations? (RQ2) Hypothesis-generating (H4)	impact and was important for the model to allow for adaptation practice as indicated in Section 5.5. For example, clearer identification of all the business activities/plan and culture.	(Business perspective)
Does the model based on a multi-perspective approach help to create knowledge flow in unanticipated events? (RQ1a) Hypothesis-generating (H2)	Knowledge perspective had an impact and was very important for the model to better manage accessibility of knowledge as outlined in Section 5.5. For example, clear illustration of information flow and effectiveness of decision making process.	Major category 4 (Knowledge perspective)
Does the model help the organisation to learn how to discover knowledge? (RQ1b) Hypothesis-generating (H3)	Social perspective had an impact and was important for the model to promote collaboration and social exchange as revealed in Section 5.5. For example, the formation of strong relationship among stakeholders and the sharing of experiences.	Major category 5 (Social perspective)

In order to generate categories to classify and code complex information the researcher drew attention to interview data transcripts, observations and respective comments made. After the categories were established, the researcher determined the developing concepts contributing to the resolution of the research questions. For example, reference to *the multi-perspective model will help to create knowledge flow that may improve decision making (H1)* with the mention of codes eventually categorised as ‘organisation perspective’, a major category 2. From this analysis, a theory of the emergence of knowledge flow in organisations arose, one that hypothesised the effectiveness of the decision-making process as similar to an important factor of responsiveness and impact

on policy changes. Furthermore, the organisation perspective was ranked in importance as shown in Figure 5-2.

5.3 Major Categories

In NVivo[®], invariant constituents are defined as a word or phrase that share meaning based on the syntax or structure of the words themselves (Patton, 2002, p. 465). Hence, Table 5-2 shows a listing of words and phrases that were combined forming categories. As outlined by Shank (2006), thematic analysis is known as a process which deals with recognising consistencies and patterns across categories. The researchers' codes from NVivo[®] revealed the major categories for classifying and coding complex information. The remainder of this section is structured as follows.

Section 5.3.1: Major category 1 – Methods Used to Manage Complex Problem.

Section 5.3.2: Major category 2 – Organisation Perspective.

Section 5.3.2: Major category 3 – Business Perspective.

Section 5.3.2: Major category 4 – Knowledge Perspective.

Section 5.3.2: Major category 5 – Social Perspective.

Section 5.3.2: Major category 6 – Multiple Perspectives.

Section 5.3.2: Major category 7 – Change Adaptation Practices.

Table 5-2. Invariant constituents for categories

Seven Major Categories	
○ Methods used to manage complex problem • Responsibility for activities • Quality control • Efficiency in problem solving • Ease of use	○ Knowledge perspective • Improve knowledge flow • Decision-making process • Information relevance • Information resources

○ Organisation perspective • Strategic importance • Political impact • Effectiveness of decision • Flexibility to adapt • Satisfaction ○ Business perspective • Communication • Business activities/culture • Roles and responsibility	○ Social perspective • Stakeholder participation • Effectiveness of information sharing ○ Multiple perspective • Authorisation • Common framework • Process efficiency • Effectiveness of governance ○ Change adaptation practices • Responsiveness • Adaptability to changes
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The following subsequent sections explained significant findings that answered the research questions from case studies. In addition, the responses were collated from the interviews which involved thirty five participants (N=35).

5.3.1 Major Category 1: Methods Used to Manage Complex Problem

Does a multiple perspectives framework improve the ability to develop change strategy for complex business processes? (RQ1)

Thematic Categories: *Responsibility for activities, quality control, efficiency in problem solving and ease of use.*

The first category included data obtained from all groups and demonstrated participants' descriptions of the complex issues. The researcher developed the thematic category from invariant constituents relating to politics/government changes, access information, a cultural difference, a policy/governance initiative, a communication, legal/financial, a remote location, stakeholders' expectation, a strategic direction, a coordination, a

human interaction, an information management, key stakeholders, a process/procedure, and a resource management.

The researcher asked participants through interviews in this study to describe complex issues. About 26% of the sample mentioned politics/government changes; only 11% of the sample brought up access information; only 6% of the sample brought up a communication. Some examples follow:

Examples for Politics/Government Changes (26%)

Participant #7 described factors for affecting decision making as:

'My decision is based on political views and it is critical.'

Participant #1 described politics/government changes as:

'I have to understand new standards and government regulation for building and environmental impact for public housing. I think that political impact has critical effects on business.'

Participant #7 mentioned politics as external drivers when he stated:

'For me, political decision and difficulties are identifying and analysing key stakeholders.'

Example for Access Information (11%)

Participant #3 mentioned decision-making process when he stated:

'In most cases, time management, information exchange and priority of work are impacting on my programs and it is important for delivery of milestones.'

Example for Communication (6%)

Participant #8 stated: *'I follow up by meeting and discussion with clients to manage all projects are on track.'*

Also Table 5-3 shows key factors that influenced the methods by which to identify the complex problems faced by an organisation.

Table 5-3. Complex issues in the organisation

Invariant Constituents	# of participants to offer this experience	% of participants to offer this experience
Politics/Government changes	9	26%
Access information	4	11%
Cultural difference	3	9%
Policy/Governance	3	9%
Communication	2	6%
Legal/Financial	2	6%
Remote location	2	6%
Stakeholders' expectation	2	6%
Strategic direction	2	6%
Coordination	1	3%
Human interaction	1	3%
Information management	1	3%
Key stakeholders	1	3%
Process/Procedure	1	3%
Resource management	1	3%

5.3.2 Major Category 2: Organisation Perspective

How does the organisation respond to the unanticipated event required for better knowledge flow? (RQ3)

Thematic Categories: *Strategic importance, political impact, effectiveness of decision-making process, flexibility to adapt to change and Satisfaction.*

The second category included data obtained from all groups and demonstrated the participants' perceptions and ideas with regard to organisation. The researcher developed the thematic categories from invariant constituents related to the participants' organisational objectives, resources/improvement, performance, strategic plan, contractual agreement, economic, and politics.

The researcher asked participants in this study about the importance of the organisational perspective in controlling changes in the unlikely event of unforeseen circumstances.

Example for organisational objectives (31%)

Participant #3 stated:

'I continuously improve process that, what is work and what is not through brainstorming and place right processes to set up and get approval in most effective way. And also consider on evidence basis to analyse benefit of the changes.'

Example for resources/improvement (17%)

Participant #3 described the importance of resources when they stated:

'I travel to remote areas and experience network access problems relating to governance and processes. It is on-going issues that require up-to-date procedure to make decision on acquisition and disposal of properties.'

Example for contractual agreement (6%)

Participant #10 described the importance of contractual agreement when they stated:

'I have to constantly monitor all construction projects including upgrade and maintenance programs. I have to consult with legal team to clarify the contractual agreement all the time and also I engage the expert to revise change requirement in early stage.'

Examples for politics (6%)

Participant #1 stated:

'In most cases, policy and political decision are the influencing factors. I have to understand new standards and government regulation for building and environmental impact for public housing. It is imperative to understand government policies and procedures.'

Participant #4 stated:

'I respond immediately on decision making due to legal bounds and government legislation. Main focus is an economic stimulus plan which I have to fully understand protocols and government initiative. It is critical that I have to distinguish between policy and legislative matters.'

Table 5-4. Organisation perspective

Invariant Constituents	# of participants to offer this experience	% of participants to offer this experience
Organisational objectives	11	31%
Resources/Improvement	6	17%
Performance	5	14%
Strategic plan	4	11%
Not sure	3	9%
Contractual Agreement	2	6%
Economic	2	6%
Politics	2	6%

5.3.3 Major Category 3: Business Perspective

How can changes in event affect knowledge flow in organisations? (RQ2)

Thematic Categories: *Business activity, business culture, communication, and roles and responsibility.*

The third category included data obtained from all groups and demonstrated the participants' perceptions and ideas with regard to business. The researcher developed the thematic categories from invariant constituents relating to the participants' business activity/plan, business culture, process/governance, contractual agreement, and resources/improvement. The business perspective of cooperative activities describes the objectives in a business plan required for a group to share goals.

Examples for business activity/plan (49%)

Participants mentioned business activity/plan when they described a situation where the rules and guidelines were not clear.

Participant #1 stated:

'I come across that requirement and procedures are not clear from the government. I have to exercise my best ability to deal with all parties involved and develop procedure for guidelines.'

Participant #4 stated:

'During the delivery of NBESP projects, I come across that planning requirement and procedures are not clear from the commonwealth government. I have to exercise my best ability to clarify the issues with all stakeholders and develop procedure for implementation.'

Participant #5 stated:

'During the coordination of handover programs, I come across that legislations and process are not clear from the other agencies. I have to request for further clarification to deal with all parties involved.'

Example for business culture (31%)

Participants mentioned business culture when they described the key drivers for process integration or collaborative structure within the organisation. Participant #1 stated:

'Policy and process changes are key drivers for collaboration and I'm always adapting changes effectively in a rapidly changing environment.'

Example for resources/improvement (3%)

Participant #10 described a situation where they had a lack of resources when they stated:

‘During the delivery of construction projects, I come across that administration of builders and contractors are very difficult due to lack of resources and inadequate process. I have to exercise my best ability to deal with all situations.’

Table 5-5. Business perspective

Invariant Constituents	# of participants to offer this experience	% of participants to offer this experience
Business activity/Plan	17	49%
Business culture	11	31%
Not sure	3	9%
Process/Governance	2	6%
Contractual Agreement	1	3%
Resources/Improvement	1	3%

5.3.4 Major Category 4: Knowledge Perspective

Does the model based on a multi-perspective approach help to create knowledge flow in unanticipated events? (RQ1a)

Thematic Categories: *Improve knowledge flow, effectiveness of decision-making process, information relevance, and information resources.*

The fourth category included data obtained from all groups and demonstrated the participants' knowledge perspective. The thematic category was developed from invariant constituents relating to the participants' information flow, effectiveness of decision process, information relevance, resources/improvement, relationship/exchange experience, and approval workflow communication.

The researcher asked participants in this study about the importance of the knowledge perspective for unforeseen circumstances.

Examples for information flow (49%)

Participant #1 stated:

'I follow up feedback and professional opinions from experts, assessing potential risks and analyse possible opportunities.'

Participant #2 stated:

'I seek information from project experts and investigate fully on all aspects of programs to manage the projects within deadlines. It is critical for the business. I obtained the knowledge from everywhere. For example, I gathered information through the meeting, forums, information system, discussion, social network, workshop, seminars and training etc.'

Participant #22 described the importance of information flow such as other experts' knowledge and stated:

'I consult with client, peers, special consultant and other experts' knowledge. Especially, I have to meet the project deliverables and quality levels within the

timeframe. Time management practice is essential criteria for project management roles.

Examples for effectiveness of a decision process (20%)

Participant #4 stated:

'I have to make sure all stakeholders understand the status of all projects and place the systemic process to monitor performance, continuously checking and tracking to measure effectiveness of all projects.'

Participant #12 stated:

'I respond immediately on decision making due to legal binding and government legislation. Main focus is an economic stimulus plan which I have to fully understand protocols and government initiative.'

Example for resources/improvement (9%)

Participant #14 stated:

'I follow the process and procedures to manage the project deliverables within strict time frame.'

Example for approval workflow (3%)

Participant #10 stated:

'I have to constantly monitor all construction projects including upgrade and maintenance programs. I have to consult with legal team to clarify the contractual agreement all the time and also I engage the expert to revise change requirement in early stage.'

Table 5-6 shows important factors that influenced the knowledge flow in a collaborative environment.

Table 5-6. Knowledge perspective

Invariant Constituents	# of participants to offer this experience	% of participants to offer this experience
Information flow	17	49%
Effectiveness of decision process	7	20%
Information relevance	4	11%
Resources/Improvement	3	9%
Relationship/Exchange experience	2	6%
Approval workflow	1	3%
Communication	1	3%

5.3.5 Major Category 5: Social Perspective

Does the model help the organisation to learn how to discover knowledge? (RQ1b)

Thematic Categories: *Stakeholder participation and effectiveness of information sharing.*

The fifth category included data obtained from all groups and demonstrated the participants' social perspective. The researcher developed the thematic categories from invariant constituents relating to a relationship/exchange experience, a responsibility, roles, and resources/improvement.

Examples for relationship/exchange experience (22%)

Some participants share an idea with their co-workers or group very often.

Participant #8 stated:

'I'm collaborating with other stakeholders to share issues through meeting and training sessions.'

Some participants had difficulty while they were coordinating work with other workers, but they felt that other workers were cooperative.

Participant #2 had difficulty when he stated:

'I am faced with different challenges in particular issues individual capabilities for collaboration. I consult with senior management to get advice through meeting and report to resolve the issue.'

Some participants were faced with challenges while they were coordinating work with other units and departments, and felt that other units and departments were uncooperative.

Participant #7 was faced with challenges when he stated:

'I have noticed that there are different political views and generally speaking, others are uncooperative.'

Most participants thought that their work group was cooperative.

Participant #12 stated:

'I communicate clearly on negotiation skill, project management and financial issues (builders claim more money than contract agreement) through discussion session to help them to improve current situation.'

One participant thought that their work group was disruptive when they had to take the lead to get a task done. Participant #11 stated:

'I explain time management, possible input and coordinating outcomes through discussion session to help them to understand the situation.'

Most participants thought that someone in another department was cooperative when they received cooperation from him/her. Participant #12 stated:

'I communicate clearly on issues, express awareness of their priorities with respect, provide requested information and negotiate reasonable deliverables and timeframes for collaboration.'

Examples for responsibility (11%)

Participant #2 was responsible for explaining target, direction, and objectives when he stated:

'I explain target, direction and objectives clearly through discussion with senior management to help them to understand the situation. I also control consultants and set expectation to meet project success.'

Participant # 3 was responsible for managing to break down the work into micro-levels when he stated:

'I manage to break down the work in micro-levels that staffs clearly understand the tasks and project deliverables within a defined timeframe. I delegate the work and program according to staff skill sets and provide mentoring and motivation.'

Example for resources (6%)

Participant #11 described the importance of resources when he stated:

'I need to closely monitor quality outcomes from all parties involved and measure it against KPIs, such as management system, performance and documented requirements to record all phases of construction development activities.'

Table 5-7 shows key aspects that impacted on the interaction across different organisations.

Table 5-7. Social perspective

Invariant Constituents	# of participants to offer this experience	% of participants to offer this experience
Relationship/Exchange experience	22	63%
Not sure	6	17%
Responsibility	4	11%
Roles	2	6%
Resources/Improvement	1	3%

5.3.6 Major Category 6: Multiple Perspectives

Does a multiple perspectives framework improve the ability to develop change strategy for complex business processes? (RQ1)

Thematic Categories: *Authorisation, common framework, process efficiency and effectiveness of governance.*

The sixth category included data obtained from all groups and demonstrated the major changes occurring in the organisation. The researcher developed the thematic categories from invariant constituents relating to a common framework, an approval workflow, effectiveness of a decision process, a responsibility, information flow, a process/governance initiative, a communication, economic, organisational objectives, resources/improvement, and strategic plan.

Examples for common framework (29%)

Participant #1 stated:

'Multi-perspective framework is very important for multiple stakeholders. Organisation must create the common platform for all key stakeholders prior to complex project commences.'

Participant #6 stated:

'Multi-perspective framework is critical for all parties involved.'

Example for approval workflow (17%)

Participant #16 stated:

'Organisational perspective understands the complex issues and authorisation process for decision making.'

Example for effectiveness of decision process (17%)

Participant #20 stated:

'I strongly agree that knowledge perspectives display the information flow for effective decision making for the successful delivery of complex projects. I'm always monitoring the performance of budget against target and quick approval from client.'

Table 5-8 shows critical factors that affected the collaborative work across different organisations.

Table 5-8. Multiple perspectives

Invariant Constituents	# of participants to offer this experience	% of participants to offer this experience
Common framework	10	29%
Approval workflow	6	17%
Effectiveness of decision process	6	17%
Responsibility	3	9%
Information flow	2	6%
Process/Governance	2	6%
Communication	1	3%
Economic	1	3%
Not sure	1	3%
Organisational objectives	1	3%
Resources/Improvement	1	3%
Strategic plan	1	3%

5.3.7 Major Category 7: Change Adaptation Practices

How can changes in event affect knowledge flow in organisations? (RQ2)

Thematic Categories: *Responsiveness and adaptability to changes.*

The seventh category included data obtained from all groups and demonstrated the major changes that occurred in the organisation. The thematic categories were developed from invariant constituents relating to a process/procedure, legislation/regulation, a political impact, roles/responsibility, access information, an information system, a policy/strategy initiative, a responsiveness, a planning approval, site condition change, and time management, or were not applicable.

Examples for process/procedure (17%)

Participant #1 stated:

'I come across that requirement and procedures are not clear from the government. I have to exercise my best ability to deal with all parties involved and develop procedure for guidelines. It happens very often. In order to maintain the quality management system, I carried out internal and external audits on all procedure and processes for accreditation from international standard organisation body. I introduce the score card system to measure contractors' performance for tendering process.'

Participant #2 stated:

'During developing and delivering NBESP and community housing programs, I come across that legislations and process are not clear from the other agencies. I have to request for further clarification to deal with all parties involved.'

Participant #6 stated:

'It involves internal and external audit process to review the programs. I take the business as usual approach to react.'

Participants brought up a process/procedure when they described what they have done in order to be effective with their organisation and planning. Participant #1 stated:

'I measure the effectiveness by internal and external audits, deliver refresher courses for professional services staff, and general to adapt new processes and responsibilities.'

Example for legislation/regulation (14%)

Participants brought up legislation/regulation when they described a situation where the rules and guidelines were unclear. Participant #9 stated:

'Yes, I have. During the delivery of aboriginal housing programs, I come across that legislation and process are not clear from the state government. I have to request for further clarification to deal with all parties involved.'

Examples for political impact (14%)

Some participants mentioned a political impact when they described a situation where they had a number of alternatives to choose from. Participant #24 stated:

'Yes, I have. This situation happens all the time. It is dependent on time constraint and politics.'

One Participant mentioned political impact when they described the process they followed in solving problems. Participant #32 stated:

'I enforce the policy and governance to solve the problem.'

Examples for roles/responsibility (14%)

Some participants mentioned roles/responsibility when they described a situation where the rules and guidelines were unclear. Participant #14 stated:

‘During the delivery of fire program, I come across that scoping requirement is not clear from the state government. I have to exercise my best ability to deal with all parties involved. It happens sometime.’

Some participants brought up roles/responsibility. Participant #2 stated:

‘I need to closely monitor on performance of all parties involved and measure it against KPIs to record all phases of community housing development activities. I also use regular team meeting and feedback.’

Example for access information (11%)

Some participants mentioned access information when they described their recommendations for improving the current process. Participant #1 stated:

‘We should be focused on access of information and how to familiarise yourself to policy changes through meeting and discussion.’

Table 5-9 shows important aspects that affected change management practice in the collaborative environment.

Table 5-9. Change adaptation practices

Invariant Constituents	# of participants to offer this	% of participants to offer this

	experience	experience
Process/Procedure	6	17%
Legislation/Regulation	5	14%
Political impact	5	14%
Roles/Responsibility	5	14%
Access information	4	11%
Information system	2	6%
Policy/Strategy	2	6%
Responsiveness	2	6%
Not Applicable	1	3%
Planning approval	1	3%
Site condition change	1	3%
Time management	1	3%

5.4 Interpretation

This section presents the researchers' interpretations of the data analysis based on generated categories and themes and outlines the key factors that have influenced the need for an integration of perspectives in complex environments. The researcher has interpreted the generated themes, namely, Theme1: Organisation perspective; Theme 2: Business perspective; Theme 3: Knowledge perspective; Theme 4: Social perspective; and Theme 5: Multiple perspectives.

From the generated seven major categories, the researcher labelled each perspective that connected to the themes. The following descriptions are about how the participants perceived their knowledge and understanding of organisations. Moreover, each theme responds to the research questions.

Theme 1: Organisation Perspective

The general understanding of the causes and tackling of complex issues, an important factor of responsiveness and compliance, impact on policy changes for decision-making process. (RQ3)

The high frequency of responses within major category 2 (Organisation perspective), organisational objectives, resources/improvement, and performance, provided evidence for a general understanding of the organisation perspective in controlling changes in the unlikely event of unforeseen circumstances. In effect, these changes were controlled through advanced planning and the development of strategic methods, that is, the implementation of a multi-perspective framework. Organisational objectives were the most cited type of organisational perspective. The groups for the most part represented perceptions and ideas that showed good knowledge of organisational perspective. The most significant and relevant themes emerging from the group of the invariant constituents (Table 5-4) illustrates that within organisational objectives is the need to respond quickly to unanticipated events.

Theme 2: Business Perspective

Participants understanding of both role and culture changes in a rapidly changing environment. (RQ2)

The high frequency of responses within major category 3 (Business perspective), business activity/plan, and business culture, provided evidence for suggesting a general understanding of the business perspective as an important factor in responding to unforeseen circumstances in a rapidly changing environment. Business activities/plans were the most cited type of business perspective and were used mainly to seek out common goals. The groups for the most part represented perceptions and ideas that

demonstrated good knowledge of the business perspective. The most significant and appropriate themes emerging from the group of the invariant constituents (Table 5-5) illustrates that users facilitate the changes within business activities and plan to adapt quickly to unforeseen circumstances.

Theme 3: Knowledge Perspective

Participants' understanding of access information for better knowledge flow and learn how to discover knowledge. (RQ1a)

The high frequency of responses within major category 4 (Knowledge perspective), information flow and the effectiveness of decision processes provided evidence for suggesting a general understanding of the knowledge perspective for unforeseen circumstances. Information flow was the most cited type of business perspective. The groups for the most part represented perceptions and ideas that showed good understanding of the knowledge perspective. The most important and highly applicable themes emerging from the group of the invariant constituents (Table 5-6) illustrates that users will know what to do in the unlikely event of unforeseen circumstances in the analysis of information flow. More specifically, organisations become more aware of complex knowledge flow processes, thus are able to assess incoming and outgoing information more accurately. Therefore, the accurate interpretation of information prompts organisations to understand the key stakeholders involved in collaborative activities.

Theme 4: Social Perspective

Developing better relationships amongst stakeholders, (allows for the identification of experts and the sharing of information) able to identify experts and sharing information. (RQ1b)

The high frequency of responses within major category 5 (Social perspective), relationship and exchange, and experience provided evidence for suggesting a general understanding of the social perspective. Relationship/exchange experience was the most cited type of social perspective. The groups for the most part represented perceptions and ideas that showed good knowledge of the social perspective. The major and relevant themes emerging from the group of the invariant constituents (Table 5-4) illustrates that better relationships are formed when experiences are exchanged through social networking. As a result, this perspective prompts the visualisation of interactions and the different levels at which they take place.

Theme 5: Multiple Perspectives

The common framework platform provides effective and efficient collaboration, to successfully help manage change in a complex environment. (RQ1)

The high frequency responses within major category 6, common framework, approval workflow and the effectiveness of decision processes provided evidence for suggesting a general understanding of the multiple perspectives. Common framework was the most cited type of multiple perspectives. The groups for the most part represented perceptions and ideas that showed good knowledge of multiple perspectives. The most essential and key themes emerging from the group of the invariant constituents (Table 5-8) illustrates an increased improvement in the workflow approval process and strategic decision making. In essence, the enhanced connectivity between the different perspectives

provides organisations with a holistic approach to tackle wicked problems as they emerge from collaborative environments.

5.5 Participants' Attribute Value

For the multiple perspective variables discussed in section 4.6.3, the weighting of these ingredients might be summarised as follows. All charts are generated by NVivo[®] which is a qualitative data analysis (QDA), developed by QSR International.

The organisational perspective anticipates an environmental uncertainty which includes complexity and sustainability. The researcher asked participants in this study about the importance of the organisational perspective in controlling changes in the unlikely event of unforeseen circumstances. Fourteen of the 35 (40%) participants strongly agreed and 17 (48.57%) participants agreed that it was important for the business. A further two (5.71%) participants were not sure, whilst two participants disagreed.

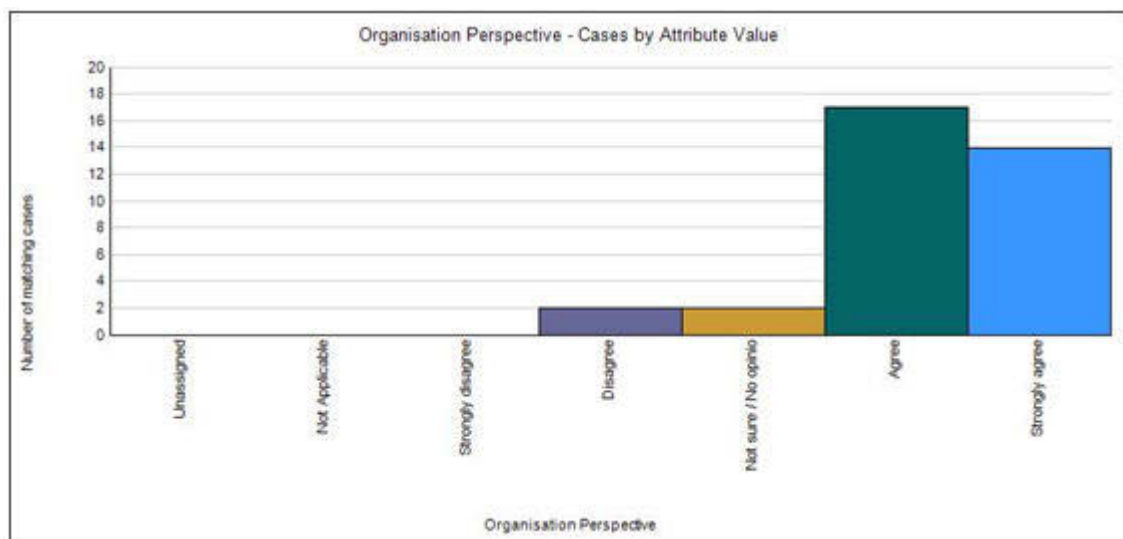


Figure 5-2. Organisation perspective value

The business perspective of cooperative activities describes the objectives in a business plan required for a group to share goals. The researcher asked participants how the

business perspective is an important factor in responding to unforeseen circumstances in a rapidly changing environment. Ten of the 35 (28.57%) participants strongly agreed and 20 (57.14%) participants agreed that it was important for the business. A total of 30 out of 35 (85.71%) participants agreed that knowledge flows in all business activities are important and agreed, with the remainder giving neutral responses.

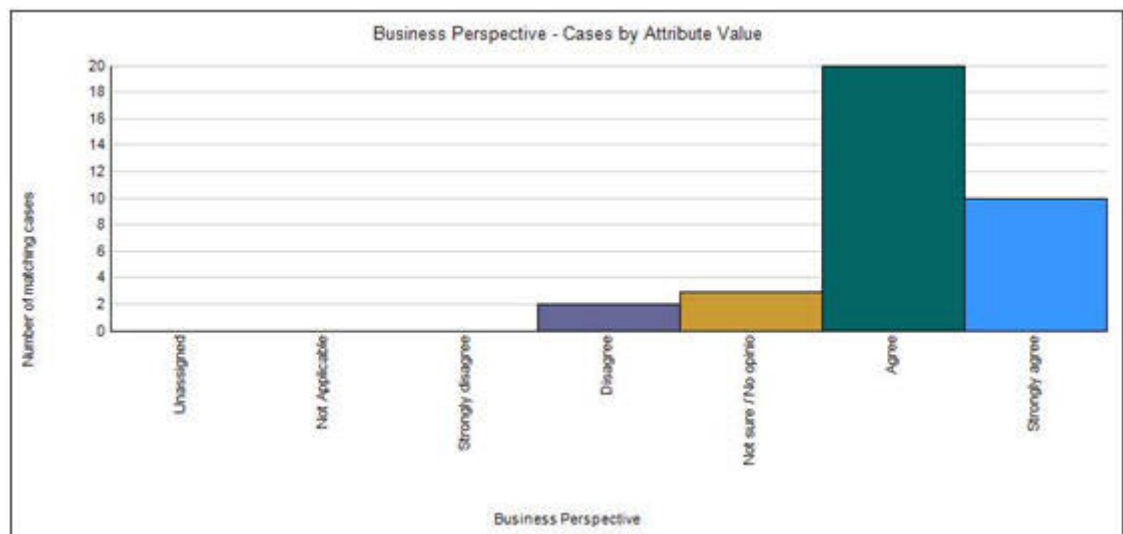


Figure 5-3. Business perspective value

The knowledge perspective controls the flow of information and access to the right information for sharing and reuse. The case study showed that fourteen of the 35 (40%) participants strongly agreed, 20 (57.14%) participants agreed and one participant had no opinion that the knowledge perspective plays an important role in delivering effective information flow for better decision making.

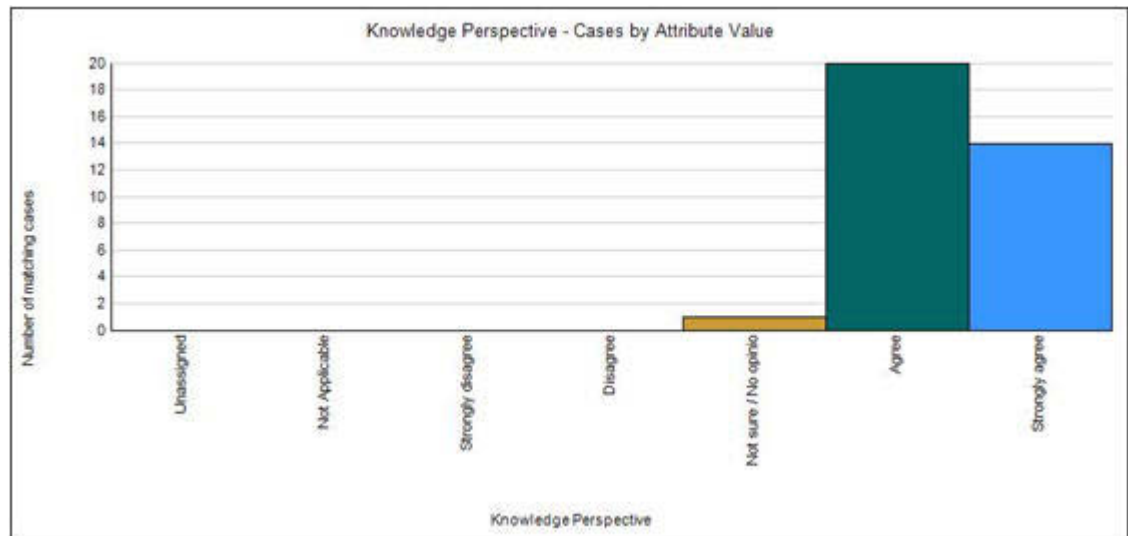


Figure 5-4. Knowledge perspective value

The social perspective focuses on the roles and responsibilities that change in the diverse culture and social interactions between business units and among all stakeholders. The results show that over two-thirds (82.86%) of responses described it as very important and agreed with the statement, whilst six (17.14%) participants responded otherwise.

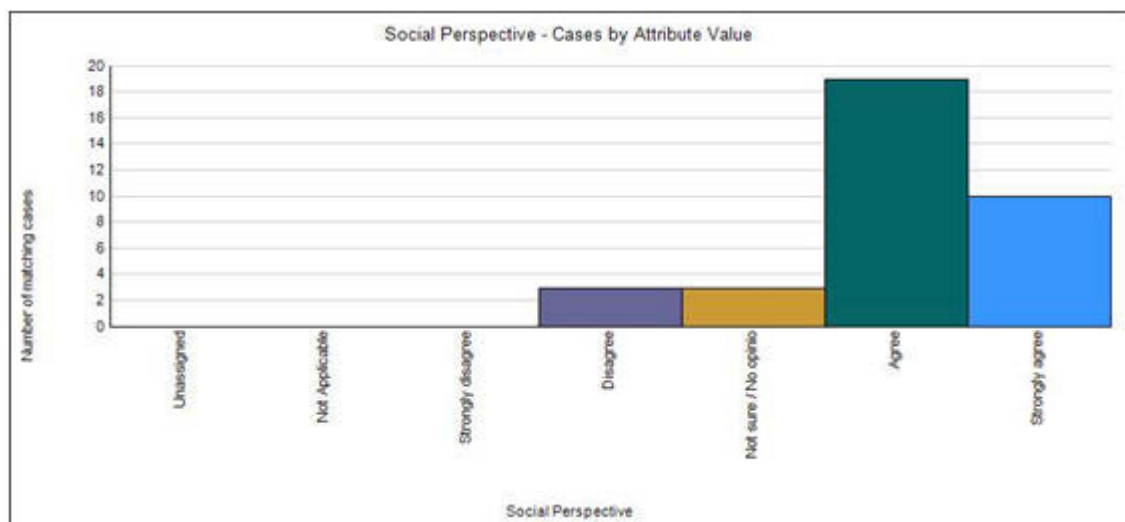
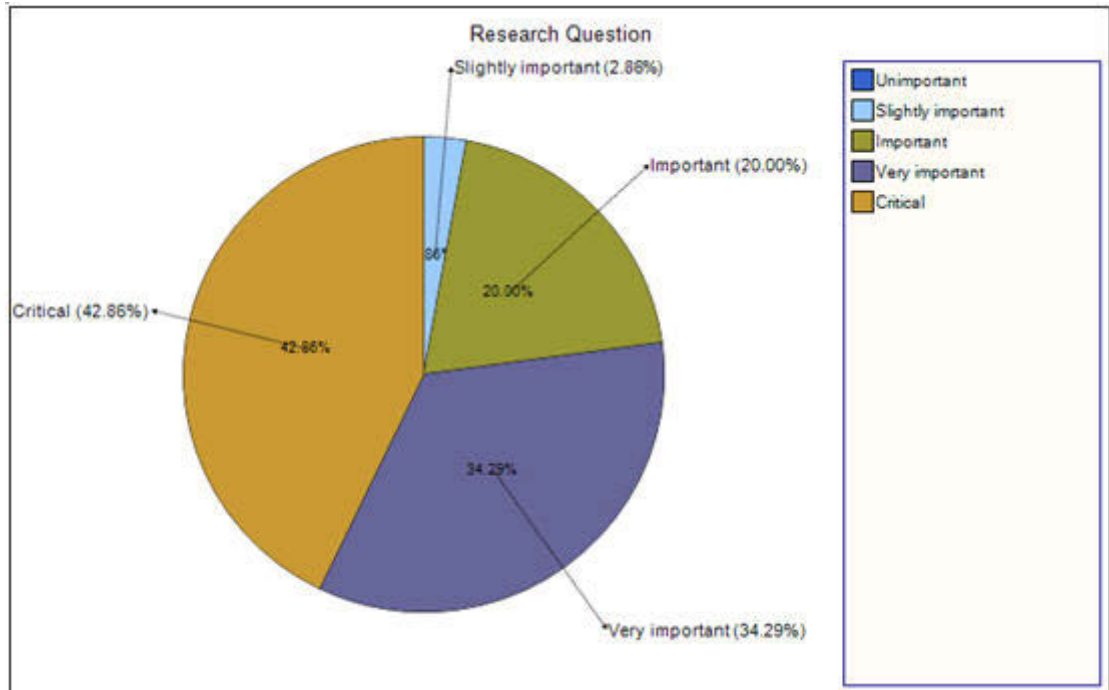


Figure 5-5. Social perspective value

The researcher designed the subsequent survey phase to discuss the interpretations of the survey findings in detail during interview for explanation and triangulation purposes. Participants in this study were asked about the importance of the multi-perspective framework to provide a common platform for multiple stakeholders' collaboration. Fifteen of the 35 (42.86%) participants responded that it was critical and 12 (34.29%) participants agreed it was very important. A further seven (20%) participants stated that it was important, whilst one (2.86%) participant replied otherwise. After carrying out this study, it was found that the hypotheses (H1 – H4) were supported therefore the multiple perspective model helps to understand complexity.



Research Question	1 - Unimportant	2 - Slightly Important	3 - Important	4 - Very Important	5 - Critical
Does a multiple perspective framework improve the ability to manage change in complex business processes?	0% (0)	2.86% (1)	20% (7)	34.29% (12)	42.86% (15)

Rating Average (RA) = Respondent Number with the Column Weight / Respondent Totals

Respondent Number with the Column Weight	$1*(0)+2*(1)+3*(7)+4*(12)+5*(15)$	146
Respondent Totals	$0+1+7+12+15$	35

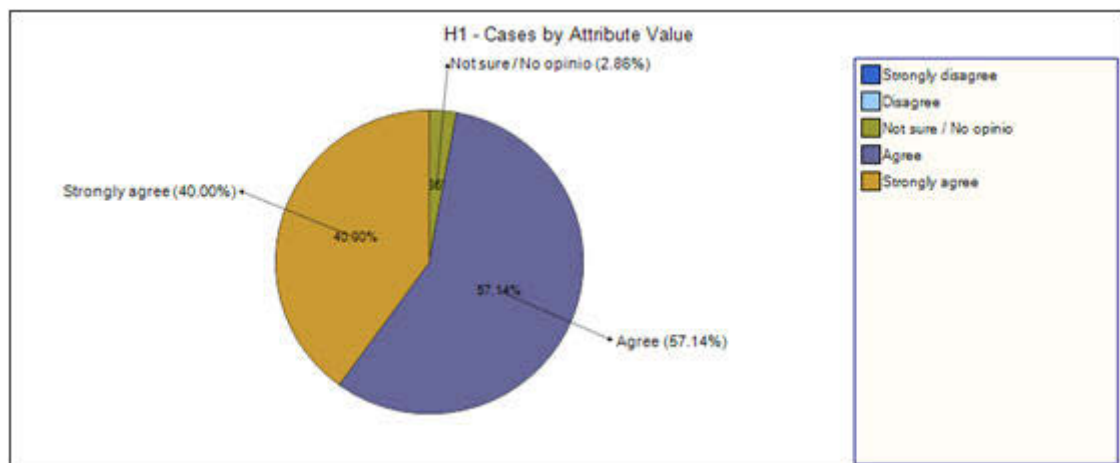
Rating Average (RA) for RQ	4.17	Very important
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Figure 5-6. Response - Main research question

The frequencies and relevant themes emerging from the data collected illustrates that user satisfaction is the success factor for measurement and reveals that the rating average for research question was considered to more reflect the very important range, as shown in Figure 5-6.

H1: The multi perspective model will help to create knowledge flow that may improve decision making. H1 relates to the (a) *Model Use* and (b) *Information Flow* that are dimensions of collaborative model success in Table 4-2. H1 is also linked to Theme1: Organisation perspective.

The proposed model will enable users to understand what to do in the unlikely event of unforeseen circumstances by measuring the reliability of the model, hence:



H1:	1 - Strongly disagree	2 - Disagree	3 - Not sure / No Opinion	4 - Agree	5 - Strongly agree
Multi perspective model will help to create knowledge flow that may improve decision making	0% (0)	0% (0)	2.86% (1)	57.14% (20)	40.00% (14)

Rating Average (RA) = Respondent Number with the Column Weight / Respondent Totals

Respondent Number with the Column Weight	$1*(0)+2*(0)+3*(1)+4*(20)+5*(14)$	153
Respondent Totals	$0+0+1+20+14$	35

Rating Average for H1	4.37	Agree to Strongly agree
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Figure 5-7. Response – Hypothesis-Generating 1 (H1)

Model use and information flow are the success factors for measurement and reveal that the rating average for H1 was considered to reflect the strongly agree range, as shown in Figure 5-7.

H2: The model helps the organisation to learn how to discover knowledge. H2 relates to the (a) *Collaboration Impact* which is the dimension of collaborative model success and is also linked to Theme 2: Business perspective.

A multi perspective model will support users to facilitate the changes and collaboration in unforeseen circumstances by measuring the adaptability of the model, thus:

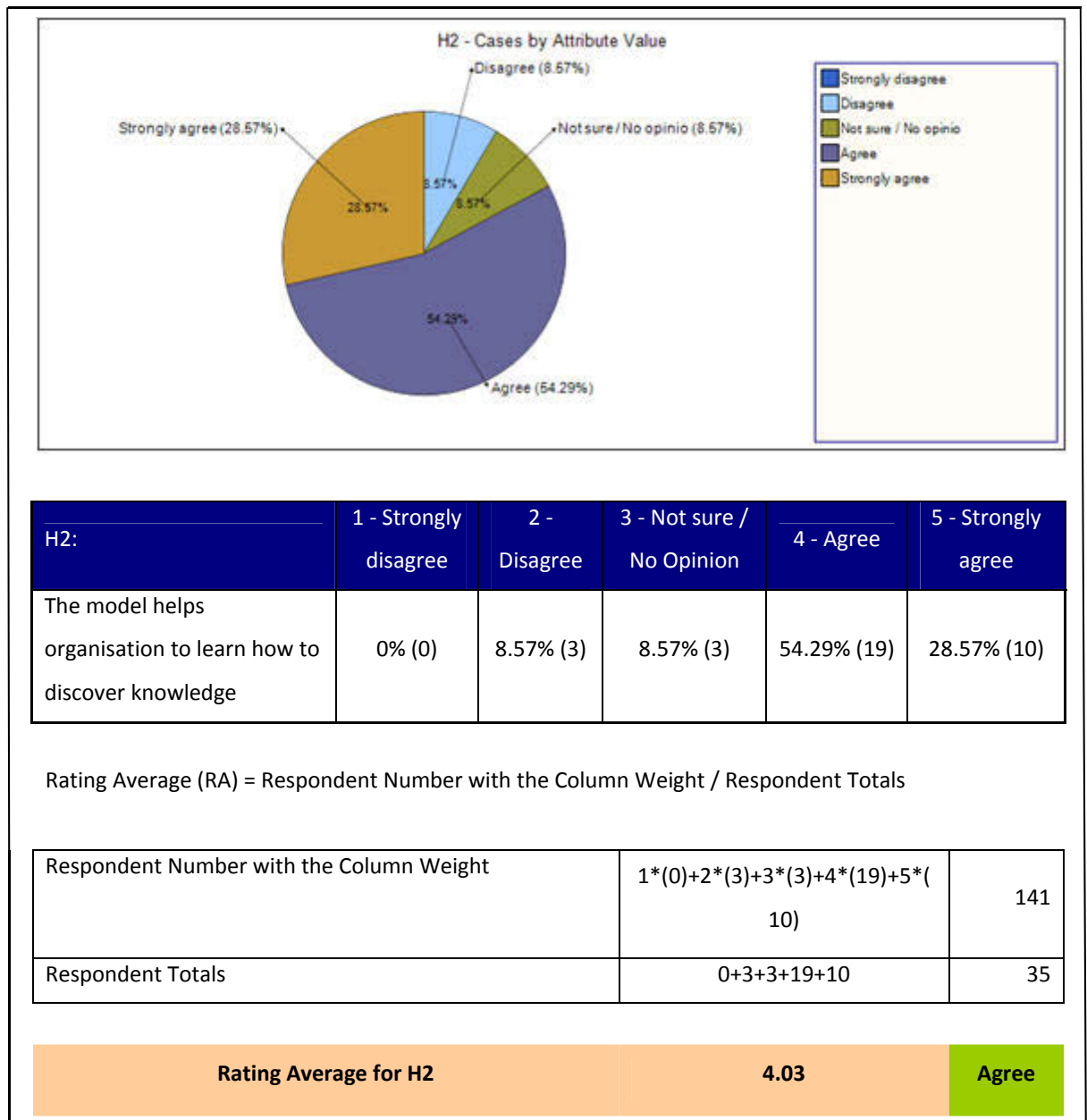


Figure 5-8. Response – Hypothesis-Generating2 (H2)

The relevant themes and frequencies indicate that collaboration impact is the success factor for measurement. Moreover, the rating average of 4.03 for H2, as shown in Figure 5-8, indicated that majority of respondents agreed that the model helped organisations to learn how to discover knowledge.

H3: Knowledge flow in organisations is influenced by the significance of collaborative change. H3 relates to the (a) *Model Content* and (b) *Process Development Impact* that are dimensions of collaborative model success. H3 is linked to Theme 3: Knowledge perspective.

A multi-perspective model will enhance the development of better relationships among stakeholders and improve responsiveness to unforeseen circumstances by measuring the responsiveness of the model, therefore:

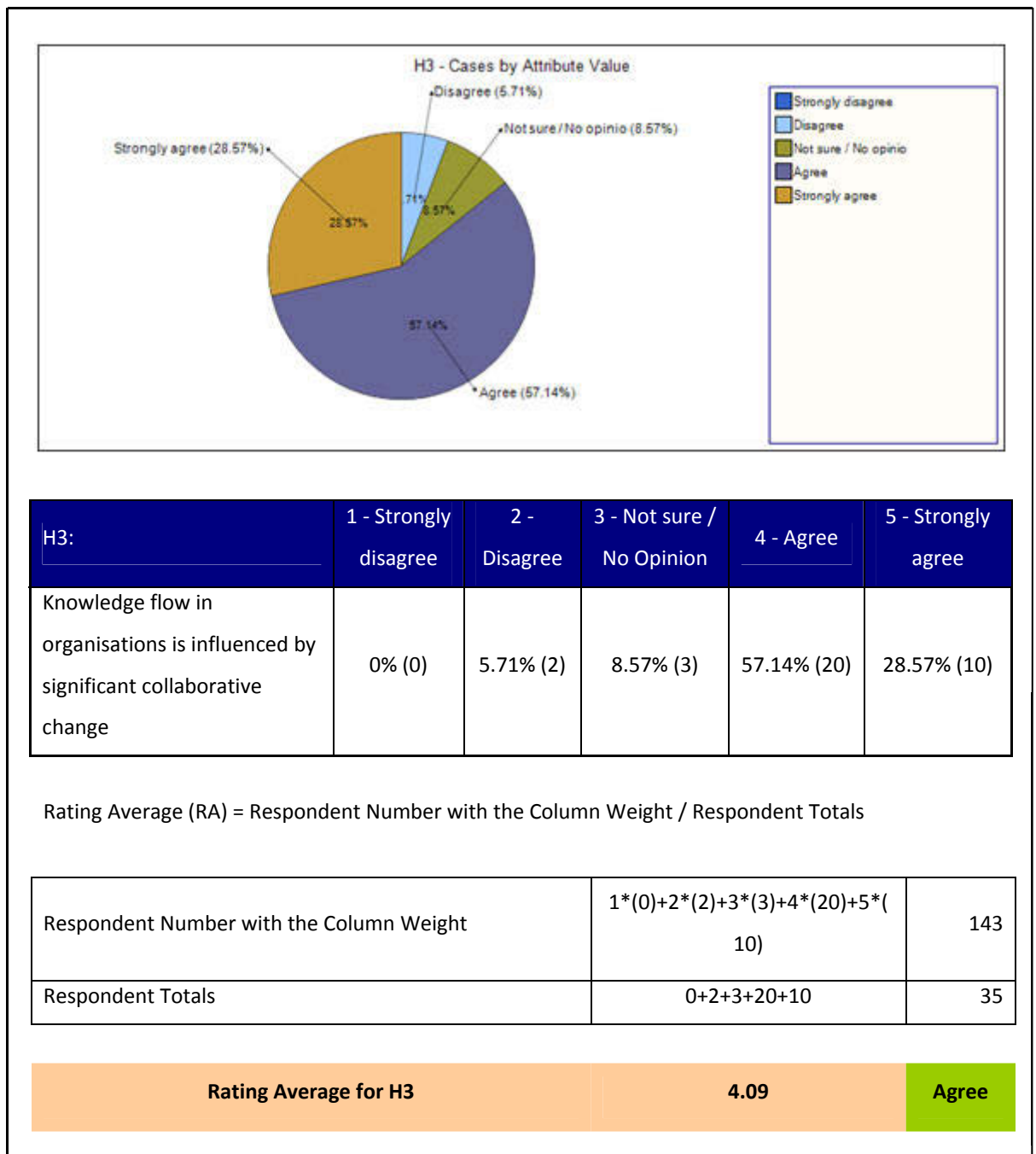


Figure 5-9. Response – Hypothesis-Generating3 (H3)

The model content and process development impact are defined as the success factors for measurement. As shown in Figure 5-9, the rating average of 4.09 for H3 suggested that most participants agreed that knowledge flow in organisations was influenced by significant collaborative change.

H4: The organisation will respond to unforeseen circumstances needed for knowledge flow to adapt quickly to change by creating new knowledge. H4 relates to the (a) *Policy Impact* (b) and *Model Quality* that are dimensions of the collaborative model success. Further, H4 is linked to Theme 4: Social perspective.

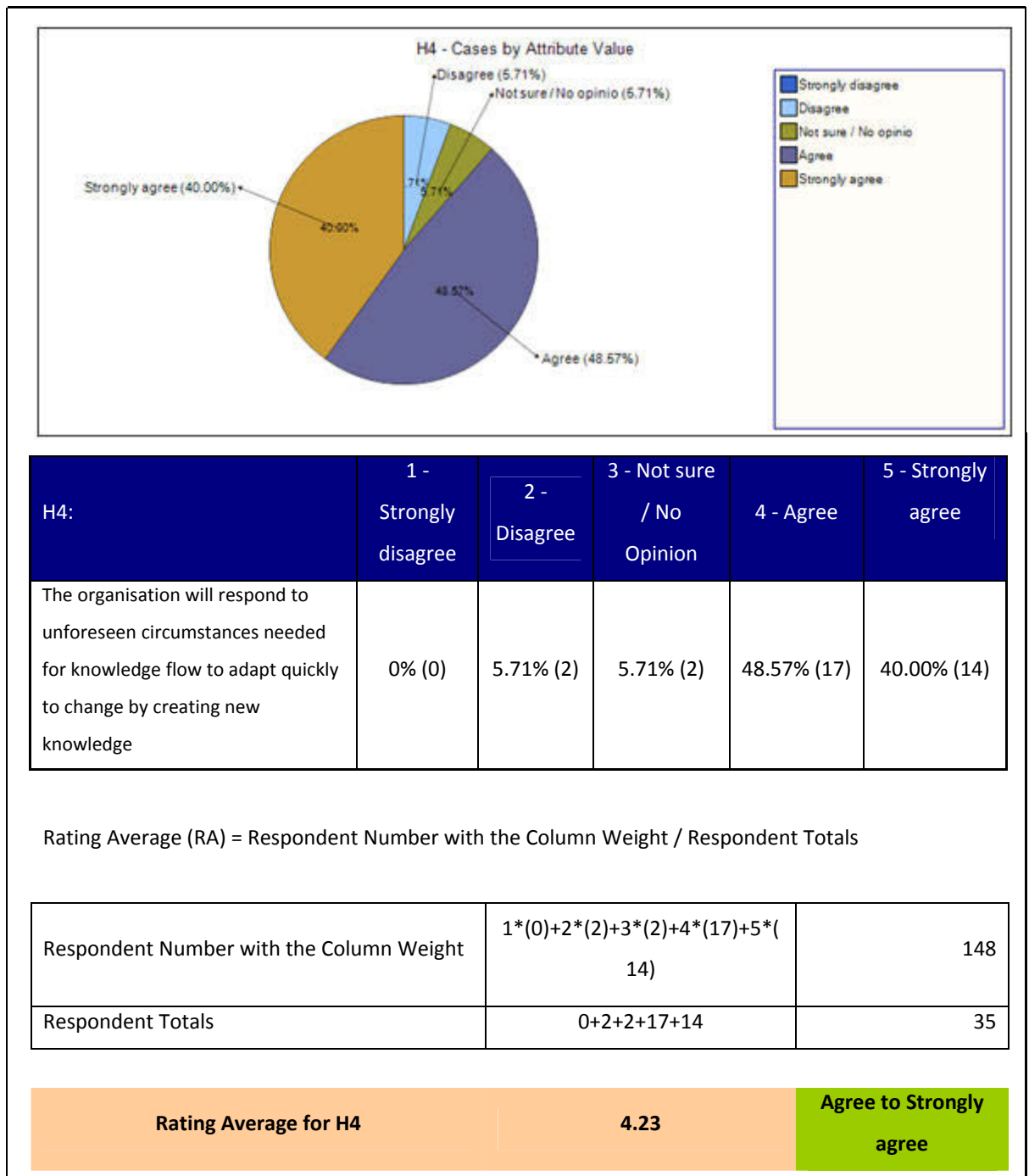


Figure 5-10. Response – Hypothesis-Generating4 (H4)

The policy impact and model quality are the success factors for measurement and reveals that the rating average for H4 was considered to reflect the ‘strongly agree’ range, as shown in Figure 5-10.

5.6 Summary

This chapter revealed the results of the qualitative data analysis for this study. The chapter began with an overview of NVivo analysis and a presentation of case study findings. Next, the chapter presented the data analysis interpretation and conclusions. The data analysis revealed invariant constituents that were grouped into seven thematic categories. The researcher reviewed each category and the significant invariant constituents of which they were comprised to respond to the research questions. Currently, the absence of appropriate methods to eliminate wicked problems has resulted in organisations responding ineffectively to emergent changes. In particular, the growing complexity within organisations has motivated the construction of a new framework. In effect, all hypotheses were linked to the four perspectives and generated themes which suggested that the demand for a new model was critical for sustainable business.

CHAPTER VI

DISCUSSION AND CONCLUSION

6.1 Introduction

In this chapter, the researcher presents the major findings of the investigation and draws conclusions regarding the effectiveness of a multiple perspectives model. This thesis began with the aim of developing a model made up of multiple perspectives to help tackle wicked problems. The rest of the chapter is structured as below;

Section 6.2: Research questions are re-visited and a brief discussion ensues as to how these were addressed.

Section 6.3: Major findings and contributions of the study are outlined.

Section 6.4: A comprehensive description of the limitations of the study is provided.

Section 6.5: In this section, future work and recommendations are explored.

6.2 Re-visitation of the Research Questions

The researcher proposed five research questions and examined the effectiveness of the multiple perspectives framework which is explained in greater detail in section 6.2.1.

The research used four case studies to understand complex issues arising within organisations and identified new characteristics for a dynamic environment. Wicked problems faced by organisations were managed effectively by conducting research and

testing the validity of the multi-perspective model. This was in close cooperation with participants in government agencies.

As argued by Skyrme (2003), all governments are reluctant to respond promptly to unforeseen circumstances and to provide higher quality services that are expected by its citizens. In contrast, knowledge management has played an important role in ensuring organisational performance improvement in the private sector. Moreover, research is also needed to investigate the behavioural perspective of social system dynamics with complex processes. These are to be extended to the support elements of the organisation and for further adoption of system evolution.

A new multi-perspective model has been constructed based on the gaps in the literature. In order to verify and solve wicked problems in collaborative organisations innovative solutions were required. Nevertheless, their effectiveness can be limited without some additional tools such as MeLCa (Figure 3-5) to improve collaboration between the different dimensions of the perspectives from the theoretical to the practical. As a consequence, the researcher understood that the result of the model verification process was changeable. A model was examined through a case study of the public sector in Australia. Future research should therefore concentrate on the investigation of dynamic complexity which can be evaluated to support higher levels of adaptability to manage system evolution for the private sector and in other countries.

Values of Multiple Perspectives Approach

The following discussion describes how each of the research questions (see Section 3.2 and Appendix D) was addressed within the thesis.

Answer to Research Questions

After the analysis of transcribed data through the use of NVivo[®], the researcher was able to determine the answers relevant to each research question. In response to the research questions, NVivo[®] filtered the data to codify key words and create categories which in turn generated specific themes as responses appropriate to the research questions.

- Does a multiple perspectives framework improve the ability to develop change strategy for complex business processes?

In accordance with RQ1 and Theme 5 (Multiple Perspectives), the common framework, approval workflow and effectiveness of decision processes are beneficial for managing organisations as this allows them to better cope with changes in complex environments.

- Does the model based on a multi perspective approach help to create knowledge flow in unanticipated events?

As outlined in Section 5.4, Theme 3 (Knowledge Perspective) is closely related to RQ1a where categorised structures of information flow, effectiveness of decision processes and information are relevant and effective in allowing organisations to understand or cope better with knowledge flow.

- Does the model help organisations to learn how to discover knowledge?

Relevant to RQ1b and Theme 4 (Social Perspective), relationship and exchange experience, as well as responsibility are effective for interactions amongst stakeholders between organisations.

- How can changes in event affect knowledge flow in organisations?

Applicable to RQ2 and Theme 2 (Business Perspective), categorising structures of business activity and plan and business cultures are affecting knowledge flow in unanticipated events.

- How does the organisation respond to the unanticipated event required for better knowledge flow?

Relevant to RQ3 and Theme 3 (Organisational Perspective), three main variables, namely organisational objectives, resources and improvement and performance are effective for achieving organisational strategic goals.

The present study aimed to address the gap in the integration of perspectives while the researcher found that a multiple perspectives framework improved the ability to manage change in a complex organisation. For example, a collaborative common framework (Figure 3-4), correlates with the findings of research studies (Alman 2003; Cuddeback & Ceprano 2002) where multiple perspectives significantly affected the ability to manage change in a complex organisation. However, several studies indicated that the multiple perspectives approach had no significant effect and did not result in optimal performance in a collaborative environment.

6.3 Research Significance and Contribution

From the results, this research confirmed that the multi-perspective model verification and efforts to improve the collaborative process required innovative solutions to complex issues. Also a significant part of this research was completed by visualising a complete diagram of a complex environment and the relationships across multiple stakeholders. Moreover, this research offered the experiences and perspectives of the users to develop a collaborative common framework. In order to acquire an understanding of the effectiveness of their complex projects, a multi-perspectives model was used to help visualise the problems into solutions. This information may enable them to simplify decision processes to coordinate their projects and better meet the needs of the partnership alliance. Collaborative knowledge flow is consequently created through a multi perspective approach. Furthermore, the case study confirmed that the integration of multiple perspectives helps to manage wicked problems by primarily understanding the interaction between the social and knowledge perspectives.

However, the effectiveness of combined multiple perspectives may be limited in the absence of some additional tools to improve collaboration between the different dimensions of perspectives, from the theoretical to the practical. The result of the model verification process is therefore changeable. Future research should therefore concentrate on the evaluation of dynamic complexity in support of the higher levels of adaptability required to manage system evolution.

The aim of this research was to determine the effect of the multi-perspective framework. Furthermore, the researcher's objective was to develop a multiple perspectives model that managed the collaborative environment and knowledge flow in complex organisations.

The proposed multiple perspectives model comprised four constructs:

- (1) organisation perspective: influencing and crucial to enhancing the quality of the decision-making process;
- (2) business perspective: important in the model to change adaptation practice;
- (3) knowledge perspective: influencing the management of knowledge flow;
- (4) social perspective: this was used for collaboration and the display of social exchange.

It was widely acknowledged that each perspective in its own right when integrated can offset each other's drawbacks. Nevertheless, managing a complex collaborative organisation's knowledge flow depends on having a common framework. A proposed multiple perspectives model can be used to encourage collaboration across the organisation as well as to deliver effective decision-making. Other findings showed that future study should focus on economic perspectives for the business side and explore more aspects of other perspectives.

Furthermore, this research outlines the collaborative work management and the analysis of knowledge flows. These may pose as a serious challenge to the public sector. The proposed framework characterised an unstructured knowledge flow for effective management of collaborative interactions between stakeholders whilst the model

successfully assisted organisations to adjust to the rapidly changing environment. In addition, it helped to manage system evolution and will have a significant impact in the public sector. These outcomes substantially contribute to a deeper insight into the research of social perspective and the modelling of multiple perspective methods. Significant findings on the effectiveness of the emergent structure for improving organisational collaboration were made. The findings in this study presented a new understanding of the model's ability to manage system evolution and provided a practical approach for integrating multi-perspective views.

The results from this research will make several contributions to the current literature.

- First, the multiple perspectives model displays the collaboration amongst multiple stakeholders and organisations. In particular, it visualises the characters and the relationship between the boundary roles. Boundary role refers to stakeholders across different organisations and this is outlined in Figure 3-5 and further illustrated in Appendix B;
- Second, providing further analysis of methods in relation to integrating multi-perspectives for organisational complexity (McElroy 2000);
- Third, addressing new characteristics of the organisation, namely self-organisation and adaptation noted by Merali (2006); and
- Last, a multiple perspective framework will improve collaborative architecture in a complex environment through the visualisation of interactions and relationships shared amongst stakeholders.

In summary, this research outlines the benefits of using a multiple perspectives framework including higher stakeholder commitment, effective decision making and problem solving in complex organisations. Furthermore, it displays the relationship across different boundaries of roles in collaborative environments.

As mentioned in Chapter II (Literature review), individual perspective modelling methods, which are understood to be theoretically and practically self-dependent, are not necessarily relevant in solving wicked problems in many cases. As a consequence, it is important to develop the multiple perspectives model in order for it to work across complex organisational boundaries.

6.3.1 Multi Perspectives and Knowledge Flow

In this research, the model based on a multi-perspective approach helped to recognise knowledge flows in an unanticipated event. For example, managers showed clear illustration of information flow and effectiveness of decision-making processes. These findings correlate with studies carried out by researchers (Cil et al. 2005; Courtney 2001; Hall & Davis 2007) that the multi-perspectives approach helps to create knowledge flow in collaborative organisation.

As outlined in Chapter III, Figure 3-2, *Integration of Different Dimensions for Collaborative Architecture*, it was demonstrated how the integral connection between the perspectives allows for collaborative decision making to approve workflow more effectively. In addition, the results collated from the multiple case studies show that this method helps to manage changes in the case of unforeseen circumstances. The researcher's study therefore confirms how collaboration between organisations is

critical as it establishes an opportunity for the creation of new knowledge.

6.3.2 Changes in Circumstances and Knowledge Flow

In the present study, changes in circumstances affected knowledge flow in organisations. Business perspective had an impact and was important in the model to change adaptation practice. For example, managers easily identify all relevant business activities, plans, and cultural aspects. However, some researchers have raised questions about the causal ordering of changes in circumstances and knowledge flow in organisations.

The case study results show that the participant organisations responded to unanticipated events needed for better knowledge flow to adapt changes rapidly in collaborative environments. Furthermore, the organisation perspective had an impact and was crucial to enhancing the quality of decision making. For example, managers mentioned that clear organisational objectives, improvement of resource management and strategic direction are needed to deliver effective decision making in unforeseen circumstances.

The findings provided some insight into how managers may begin to increase the multi-perspectives approach. Moreover, the present results suggested that managers should seek to foster the multi perspectives approach, not only in the interests of identifying knowledge flow for unforeseen circumstances, but also because the multi-perspectives approach resulted in an effective decision-making process.

This research shows that the multiple perspectives approach helps to address and improve the understanding of wicked problems in a collaborative environment. Within

any organisation many stakeholders may share common goals, however perceive them differently. A potential wicked problem can be explained through the design of residential housing. A wicked problem then arises following the designers' obligations to adhere to government policies concerning energy usage and environmental regulation constraints.

As a consequence, in order to tackle wicked problems, a new model may assist organisations to develop strategies more collaboratively which ultimately enables restructuring of unstructured data for adaptation and self-organisation. The majority of current modelling methods are suitable for structured systems. However, modelling methods need to be introduced in such a way as to consider the need to analyse the management of change and to improve adaptations to it. Therefore, a proposed multiple perspectives model facilitates the identification of changes occurring within a complex environment and offers an efficient and effective solution to the organisational problem.

6.4 Limitations of Study

A potential shortcoming of this study lies in the measurement of the success of multi-perspective modelling through participants' experience in their organisations. In the present study, the researcher used semi-structured interviews, which presented difficulties to many researchers in this field.

Three aspects of the present study limit the generalisability of the findings. First, the results of the descriptive portion of the present study indicated areas that influenced the reliability of the research portion of the present study. The vast majority of the participants were in the Australian public sector. The researcher cannot generalise the

findings to the population because it may threaten external validity (Hoyle, Harris & Judd 2002).

Second, the researcher relied on data from an interview questionnaire to assess his important theoretical variables. Nevertheless, the researcher's reliance on an open-ended questionnaire may overestimate the reliabilities that he found among the constructs.

Third, the researcher is cautious about interpreting the results since the case study was limited to the public sector.

6.5 Further Work and Recommendations

The researcher suggests that organisational leaders attempt to understand a multiple perspectives framework to better deal with the multiple perspectives of role-players. As a result, a multiple perspectives framework can assume a considerable role in resolving wicked problems and also introducing leaders as future successors to an approach that covers information systems and management studies. This would allow them to focus on the wicked problems and proficient challenges arising within a rapidly changing environment.

The researcher also provided a suggestion in the hope that it may help guide future research on a multiple perspectives framework: use more reliable standards for the significant interpretation of case study results and reliable standards for establishing the identity of the validity of measures. The researcher recommended that measures ought to demonstrate the validity of meaningful real-world outcomes such as knowledge flow (Ferguson & Rueda 2009).

The study's outcomes provided information to consider when working with individuals or more specifically, with managers. The researcher suggested that there was a potential need to monitor emergent changes in circumstances such as organisational and economic changes in collaborative environments. Yet, the study's findings also indicated that changes in unanticipated events affected knowledge flow in organisations. Additional research to further clarify the relationship between changes in organisational circumstances and knowledge flow in organisations is warranted. Furthermore, changes in complex organisation appear to be a significant factor to consider when given its relationship with knowledge flow in collaborative situations as indicated in the present study. Thus, organisation perspective had an impact and was crucial to enhancing the quality of decision making.

Further experimental work is needed to determine the extent to which the external validity of the multiple perspectives framework is beneficial to the complex organisation. The economic perspective also merits further attention.

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- Yoo, C. B., Hawryszkiewicz, I., Kang, K., (2013). "A Multi-Perspective Approach to Knowledge Management in Complex Environments: A Case Study in an Australian Government", *Pacific Asia Conference on Information Systems (PACIS)*, Jeju Island, Korea.
- Yoo, C. B., Hawryszkiewicz, I., Kang, K., (2013). "A Multi-Perspective Approach to Facilitate Collaboration: A Case Study On Australian Public Sector Organisations", *International Conference on Information Systems (ICIS)*, Milan, Italy.
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APPENDIX - A

STUDY OUTCOMES

A.1 Journal Publication

Yoo, C. B., Hawryszkiewicz, I., Kang, K., (2012). “*Multiple Perspectives Approach: Australian Government Case*”, VINE: The Journal of Information and Knowledge Management Systems. Submitted.

A.2 International Conference Papers (Refereed)

Yoo, C. B., Hawryszkiewicz, I., Kang, K., (2013). “*A Multi-Perspective Approach to Facilitate Collaboration: A Case Study On Australian Public Sector Organisations*”, International Conference on Information Systems (ICIS), Milan, Italy.

Yoo, C. B., Hawryszkiewicz, I., Kang, K., (2013). “*A Multi-Perspective Approach to Knowledge Management in Complex Environments: A Case Study in an Australian Government*”, Pacific Asia Conference on Information Systems (PACIS), Jeju Island, Korea.

Yoo, C. B., Hawryszkiewicz, I., Kang, K., (2012). “*Multiple Perspectives Framework to Model Complex Processes*”, The Australasian Conference on Information Systems (ACIS), Geelong, Australia.

Yoo, C. B., Hawryszkiewicz, I., Kang, K., (2011). “*Multi Perspective Framework to Improve the Knowledge Flow*”, European Conference on Knowledge Management (ECKM), Passau, Germany.

A.3 Doctoral Consortium (Refereed)

Yoo, C. B., (2010). “*Multiple Perspectives Framework to Model Complex Processes*”, Presented at the Doctoral Consortium of The Australasian Conference on Information Systems (ACIS), Brisbane, Australia.

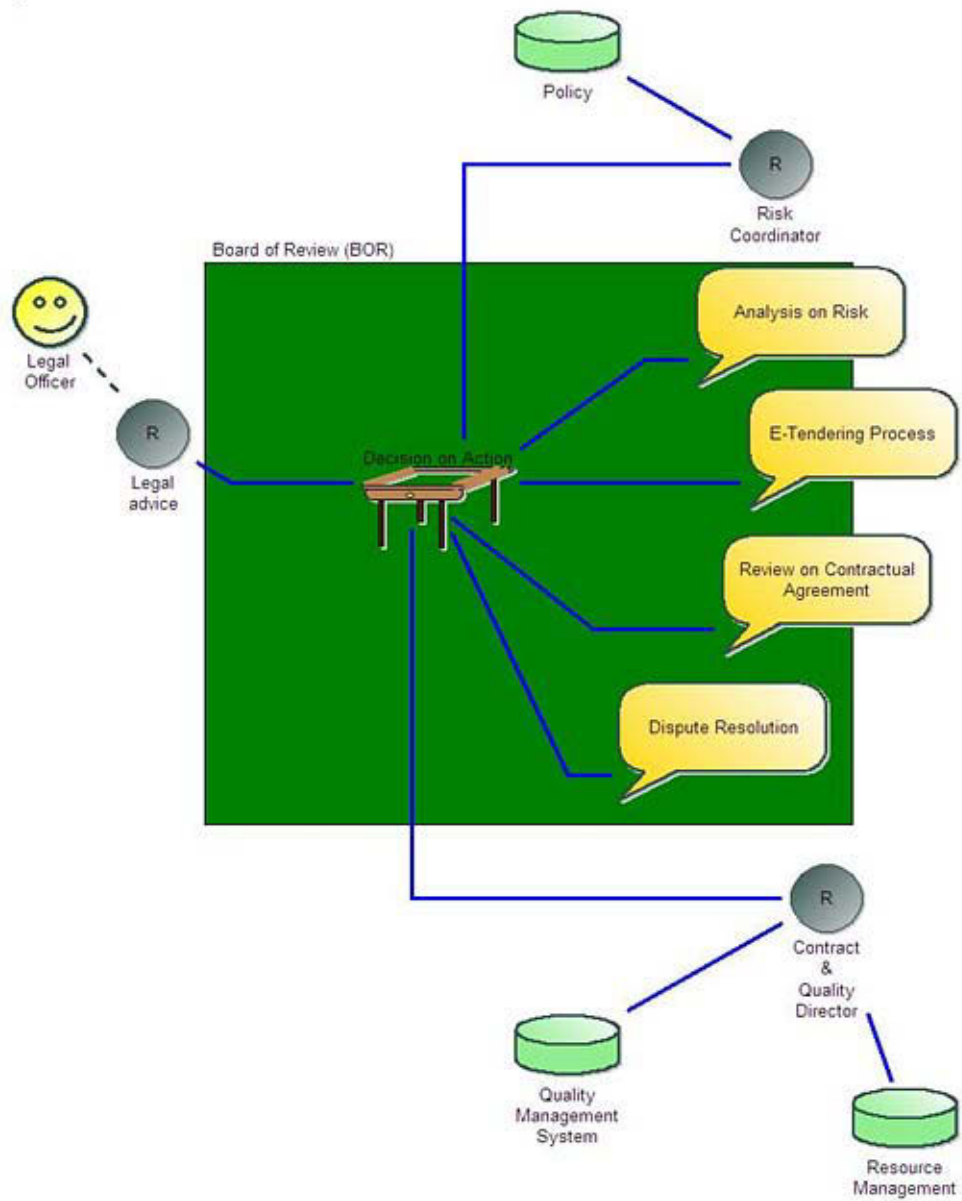
Academic Panel Members:

Professor Ron Weber, Professor Shirley Gregor, Professor Sid Huff, Professor Graeme Shanks, Professor Felix Tan, Associate Professor Deborah Bunker.

APPENDIX - B

BOUNDARY ROLES

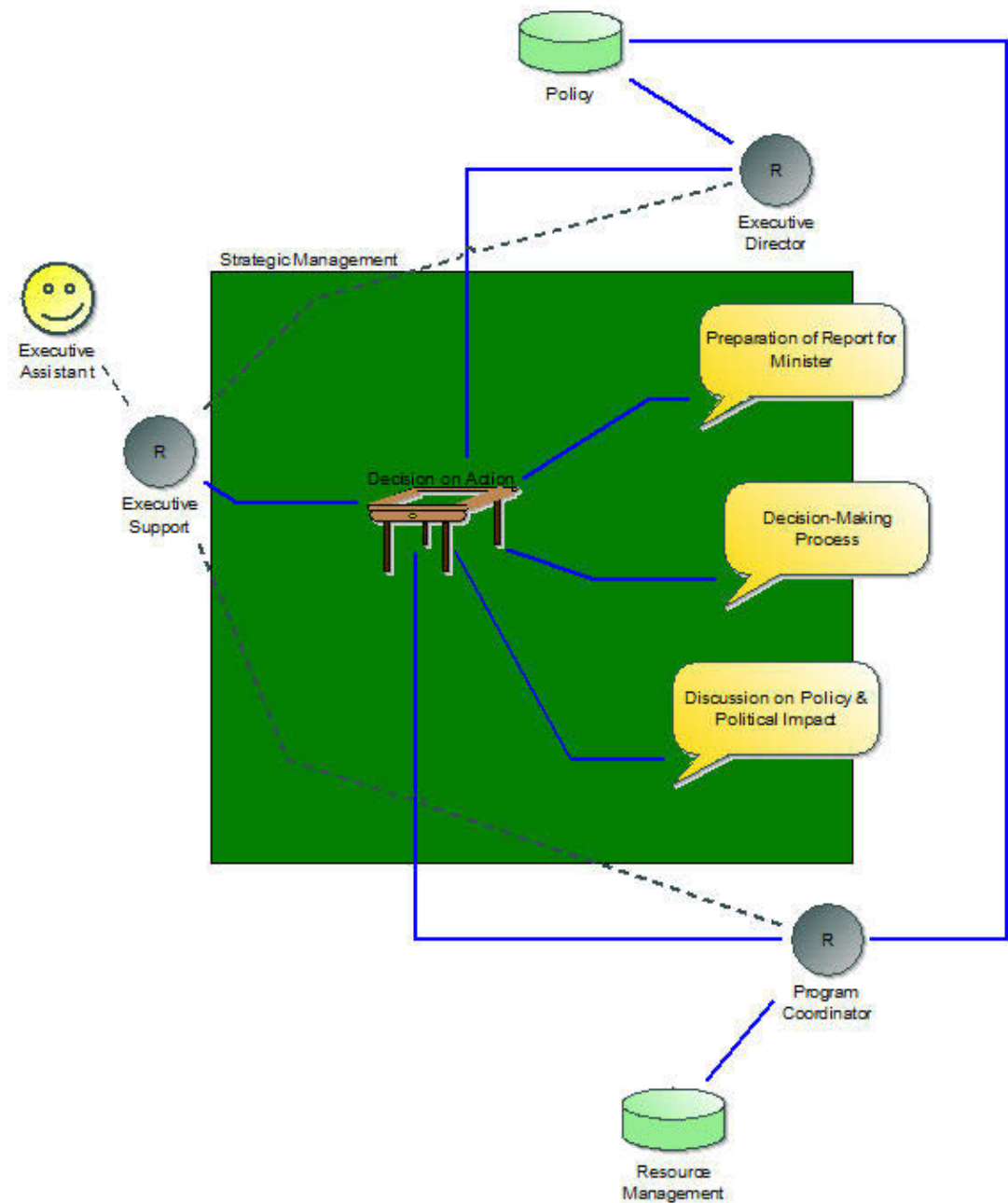
B.1 Collaboration - Board of Review (BOR)



APPENDIX - B

BOUNDARY ROLES

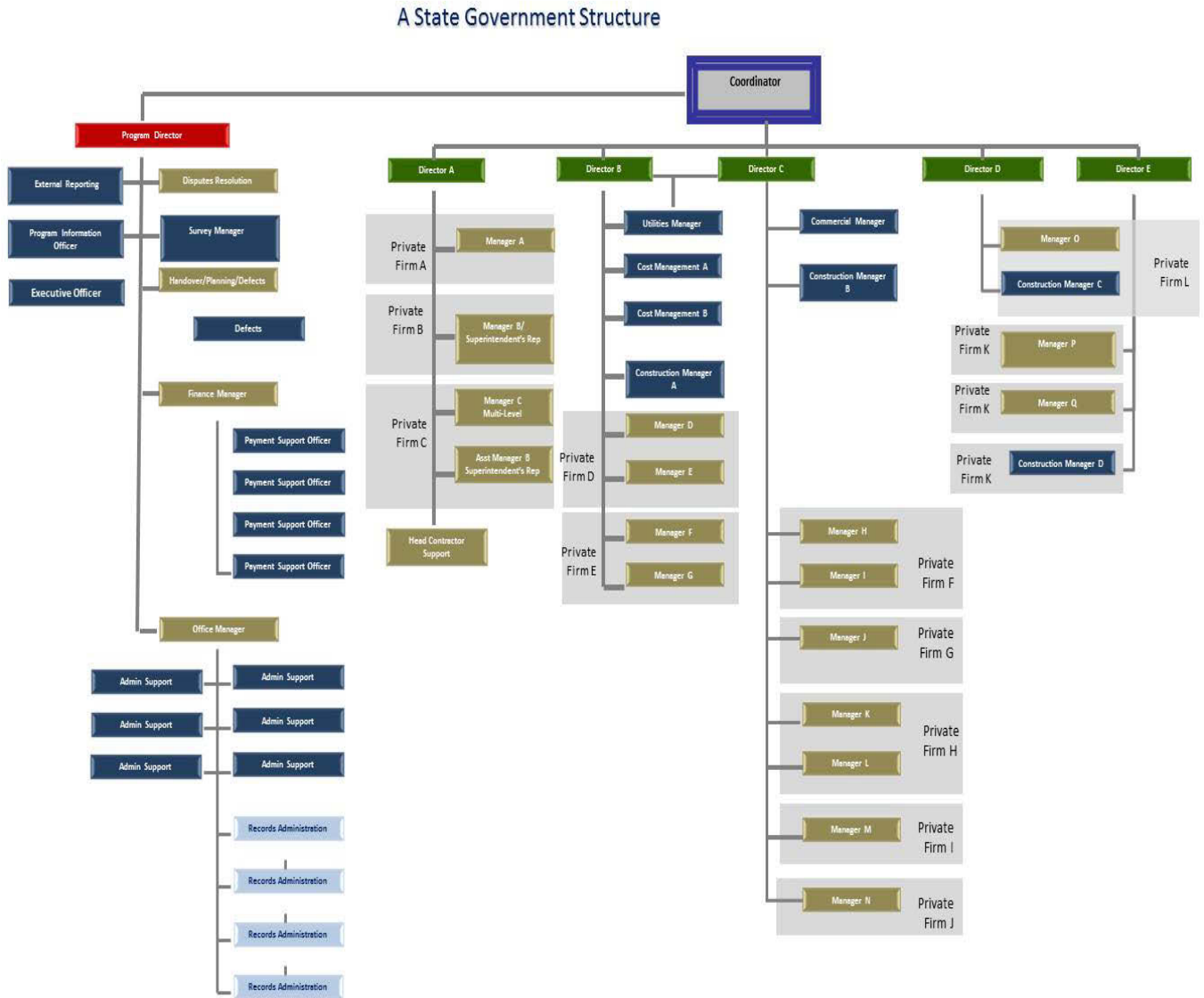
B.2 Collaboration - Executive



APPENDIX - C

COLLABORATION

C.1 Collaboration with other organisations



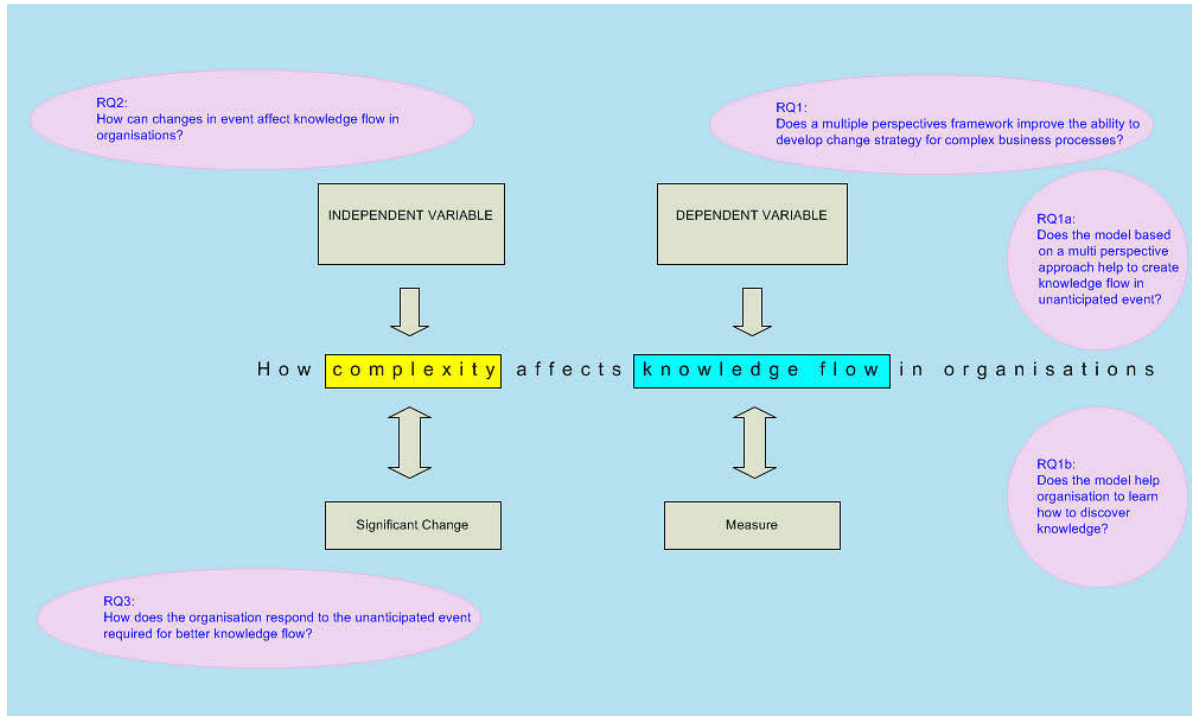
A State Government Structure:

- Collaboration with multiple stakeholders – Highlighted with Grey colour
- Dedicated Managers for each Private Firm to coordinate the projects
- Projects involved with around 300 internal & 400 external staff
- Faced with policy/governance/coordination issues
- Faced with record management issues
- Faced with information sharing and managing knowledge issues

APPENDIX -D

RESEARCH QUESTIONS

D.1 Derivation of the Research Questions



● Constructs from Literature & Case study

APPENDIX -E

QUESTIONNAIRE FOR CASE STUDY

E.1 Case Study Questionnaire

Row #	ID case study	Actual Question	Related Sub-Constructs	Research Question	Reference
Attributes of performance measure					
Satisfaction Measures					
1	SA1	Organisation perspective is an important factor to control the changes in the unlikely event of unforeseen circumstances	Strategic Importance	RQ1, RQ1a, RQ1b	Jemison, 2007
2	SA2	Business perspective is an important factor to respond to unforeseen circumstances	Strategic Importance	RQ1, RQ1a, RQ1b	
3	SA3	Knowledge perspective is an important factor to deliver effective information flow in the unlikely event of unforeseen circumstances	Strategic Importance	RQ1, RQ1a, RQ1b	
4	SA4	Social perspective is an important factor to express the unforeseen circumstances	Strategic Importance	RQ1, RQ1a, RQ1b	
5	SA5	What steps do you go through to ensure your decisions are effective	Effectiveness of decision process	RQ1, RQ1a, RQ1b	Barr & Shardab, 1997
6	SA6	Have you ever had a situation where you had a number of alternatives to choose from	Flexibility to adapt	RQ1, RQ1a, RQ1b	Wright & Snell, 1998
7	SA7	What have you done in order to be effective with your organisation and planning	Effectiveness of decision process	RQ1, RQ1a, RQ1b	
8	SA8	Is the multiple perspective model helps understanding organisational complexity	Satisfaction	RQ1, RQ1a, RQ1b	Ives, Olson & Baroudi; 1983
Change adaptation practices					
Model Quality Measures					

9	MQ1	How do you go about explaining a complex problem to your co-workers or group. What approach do you take in communicating with people.	Communication	RQ2, RQ3	Delone & McLean, 2003
10	MQ2	Describe a major change that occurred in a job that you held. How did you adapt to this change	Responsiveness of adapt	RQ2, RQ3	Bernardes & Hanna, 2009
11	MQ3	What do you do when your time schedule or project plan is upset by unforeseen circumstances	Responsiveness of adapt	RQ2, RQ3	
12	MQ4	What were the most significant events that emerged in the process	Adaptability to change	RQ2, RQ3	Jones, Jimmieson & Griffiths; 2005
Model Content Measures					
13	MC1	What knowledge do you use	Information relevance	RQ1, RQ1a, RQ1b	Streufert, 1973
14	MC2	How do you define the knowledge you need. (objective)	Information relevance	RQ1, RQ1a, RQ1b	
15	MC3	How do you access to knowledge	Information resources	RQ1, RQ1a, RQ1b	Hartley, 1982
16	MC4	Do you know what a Community of Practice is	Information resources	RQ1, RQ1a, RQ1b	
17	MC5	How often do you involved in Community of Practice	Information resources	RQ1, RQ1a, RQ1b	
18	MC6	How knowledge creates in Community of Practice	Information resources	RQ1, RQ1a, RQ1b	
19	MC7	How to capture knowledge and expertise from others	Information resources	RQ1, RQ1a, RQ1b	
20	MC8	Do you know what a Knowledge Hub is	Information resources	RQ1, RQ1a, RQ1b	
21	MC9	Where does information reside within department and how is it shared and structured	Information resources	RQ1, RQ1a, RQ1b	
Methods used to manage complex problem					
Model Use Measures					
22	MU1	What is your position/role in the organisation	Responsibility for activities	RQ2, RQ3	Zmud, 1984
23	MU2	What activity do you participate in	Responsibility for activities	RQ2, RQ3	

24	MU3	How do you monitoring the effectiveness of your activities	Quality control	RQ2, RQ3	Adam Jr., 1984
25	MU4	How do you keep track of other participant's activity	Quality control	RQ2, RQ3	
26	MU5	What activities have you engaged in to assure other stakeholders in the organisation view your work group	Responsibility for activities	RQ2, RQ3	
27	MU6	Describe a time when you believed it was necessary to modify or change your actions in order to respond to the needs of multiple stakeholders.	Efficiency in problem solving	RQ2, RQ3	Fensel & Straaatman, 1998
28	MU7	What kinds of problems have you had coordinating complex projects. How did you solve them	Efficiency in problem solving	RQ2, RQ3	
29	MU8	How would you describe the complex issue in your organisation	Efficiency in problem solving	RQ2, RQ3	
30	MU9	How have your activities and the activities of staff in your division changed as a result of the complex process	Efficiency in problem solving	RQ2, RQ3	
31	MU10	What problems occurred/arose in this process	Efficiency in problem solving	RQ2, RQ3	
32	MU11	What methods do you use to solve problems. Please give an example of your approach.	Ease of use	RQ2, RQ3	Segars & Varun, 1993
Process of decision making					
Policy Impact Measures					
33	PI1	What factors influenced your decision	Decision making responsibility	RQ2, RQ3	Courtney, 2001
34	PI2	Give an example of a time when there was a decision to be made and procedures were not in place	Decision making responsibility	RQ2, RQ3	
35	PI3	How quickly do you make decisions	Decision making responsibility	RQ2, RQ3	
36	PI4	What kinds of responsibilities (level of authority) you are handling	Decision making responsibility	RQ2, RQ3	
37	PI5	Have you ever had to introduce a policy change to your work group? How did you do it	Decision making responsibility	RQ2, RQ3	

38	PI6	What external drivers influence the collaborative structure within the organisation	Decision making responsibility	RQ2, RQ3	
39	PI7	How did you review the information. What process did you follow to reach a conclusion.	Decision making responsibility	RQ2, RQ3	
Process Development Impact Measures					
40	PD1	What are the key drivers for process integration for collaborative structure within the organisation	Process efficiency	RQ2, RQ3	Saeed, Malhotra & Grover; 2005
41	PD2	Have you ever worked in a situation where the rules and guidelines were not clear? How did you react	Process efficiency	RQ2, RQ3	
42	PD3	What performance standards do you have for your unit? How have you communicated them to your work group	Process efficiency	RQ2, RQ3	
43	PD4	What process do you follow in solving problems	Process efficiency	RQ2, RQ3	
44	PD5	Describe how you would notify the people you manage about a new procedure that you were responsible for implementing. It would mean that those people would be assuming new and more complex duties/activities.	Process efficiency	RQ2, RQ3	
45	PD6	What recommendations do you have for improving the current process	Process efficiency	RQ2, RQ3	
Accessibility of knowledge					
Information Flow Measures					
46	IF1	How do you create knowledge. (from/to whom)	Improve knowledge flow	RQ1, RQ1a, RQ1b	Alavi & Leidner, 2001
47	IF2	Where do you get the knowledge. (from whom)	Improve knowledge flow	RQ1, RQ1a, RQ1b	
48	IF3	Do you know who manages the knowledge (Input-Process-Output)	Improve knowledge flow	RQ1, RQ1a, RQ1b	
49	IF4	Do you know who maintain and integrity check on knowledge hub to provide the solution	Improve knowledge flow	RQ1, RQ1a, RQ1b	
Methods used to collaborate with stakeholders					
Collaboration Impact Measures					

50	CI1	How do you interact with multiple stakeholders	Stakeholder participation	RQ1, RQ1b, RQ2, RQ3	Brody, 2003
51	CI2	Which communication tool do you use most often	Stakeholder participation	RQ1, RQ1b, RQ2, RQ3	
52	CI3	What are the current collaboration tools in use	Effectiveness of information sharing	RQ1, RQ1b, RQ2, RQ3	Barrett & Konsynski, 1982
53	CI4	How is collaboration tools employed	Effectiveness of information sharing	RQ1, RQ1b, RQ2, RQ3	
54	CI5	Have you ever had to share an idea to your co-workers or group. How did you do it.	Effectiveness of information sharing	RQ1, RQ1b, RQ2, RQ3	
55	CI6	What challenges have occurred while you were coordinating work with other units and departments	Stakeholder participation	RQ1, RQ1b, RQ2, RQ3	
56	CI7	Give an example of a time when you had to take the lead with your work group to get a task done. How did you get cooperation.	Stakeholder participation	RQ1, RQ1b, RQ2, RQ3	
57	CI8	How do you get cooperation from other stakeholders	Stakeholder participation	RQ1, RQ1b, RQ2, RQ3	
58	CI9	How do you typically get cooperation from someone in another department	Stakeholder participation	RQ1, RQ1b, RQ2, RQ3	

APPENDIX -F

CONSENT FORM

F.1 Participant Consent Form



UNIVERSITY OF TECHNOLOGY, SYDNEY

I _____ agree to participate in the research project “Multiple Perspectives Framework to Model Complex Systems ”being conducted by Paul Yoo, Rm 10.3.420, PO Box 123 Broadway, NSW 2007, of the University of Technology, Sydney, for the purpose of his PhD degree.

I understand that the purpose of this study is to develop a multi perspective design method to model complex organization and guidelines to provide support for collaborative system design. This method provides a more systematic approach and includes social structure, business architecture, and knowledge hub to identify the communities of practice and business activity workflow.

I understand that my participation in this research will involve being interviewed about my organization’s complex project coordination practices and there are no risks to the research participants. Participation will involve completion of interview questionnaires that would take approximately 45 minutes to complete for each session. The interview process consists of two phases. During the first stage, general questionnaires are to be completed and the second phase deals with the completion of specific questionnaires with feedback from the previous session.

Furthermore, I am fully aware and prepared for the potential harm, discomfort or inconvenience may occur during participation. This project involves 2 site visits each month. This is a period of time, which can last as long as 6-8months.

I am aware that I can contact Paul Yoo or his supervisor Professor Igor Hawryszkiewicz if I have any concerns about the research. I also understand that I am free to withdraw my participation from this research project at any time I wish, without consequences, and without giving a reason.

I agree that Paul Yoo has answered all my questions fully and clearly.

I agree that the research data gathered from this project may be published in a form that does not identify me in any way.

Participant's Name

____/____/____
Date

Title

Organisation

Participant's Signature

NOTE:

This study has been approved by the University of Technology, Sydney Human Research Ethics Committee. If you have any complaints or reservations about any aspect of your participation in this research which you cannot resolve with the researcher, you may contact the Ethics Committee through the Research Ethics Officer (ph: 02 9514 9615, Research.Ethics@uts.edu.au) and quote the UTS HREC reference number. Any complaint you make will be treated in confidence and investigated fully and you will be informed of the outcome.

Professor Igor Hawryszkiewicz may be contacted on (02) 951 1809 or igorh@it.uts.edu.au

APPENDIX -G

EXAMPLE OF TRANSCRIPTS

G.1 Example of Transcripts

Participant #4:

Q 1. What is your position/role in the organization?

I am working as a program director and my main focus is to concentrate on the Nation Building Economic Stimulus Plan (NBESP) to achieve social housing initiative.

Q 2. What activity do you participate in?

I manage project delivery team and finalising all programs and projects for NBESP. I am responsible for review of all programs and provide strategic direction through regular meeting and discussion. I also participate in executive meetings.

Q 3. How do you monitor the effectiveness of your activities?

Monitor the effectiveness of all activities through meeting, feedback, reports and survey.

Q 4. How do you keep track of other participants' activity?

Keep tracking and final approval activities through regular meeting, report, survey and feedback.

Q 5. What kinds of responsibilities (level of authority) are you handling?

(Project manager approval/ Project director approval/ CEO or Executive approval)

I am handling the executives' approval authority and high level responsibilities on all projects.

Q 6. What activities have you engaged in to ensure how other stakeholders in the organization view your work group?

I am engaging in all construction projects and all activities through team meeting, discussion, workshop and joint meetings to develop collaborative procedures. It is critical for business.

Q 7. Describe a time when you believed it was necessary to modify or change your actions in order to respond to the needs of multiple stakeholders.

It happens in community housing projects, lack of understanding; requires training and education; change approach to solve issues.

Q 8. How do you create knowledge? (from /to whom)

It creates through email, activities, project, meeting and social network.

Q 9. What knowledge do you use?

I use all project/program related information to support the project delivery.

Q 10. Where do you get the knowledge from? (from whom)

I obtain the knowledge from everywhere for example, meeting, forums, information system, discussion, social network, workshop, seminars, training etc.

Q 11. How do you define the knowledge you need? (objective)

I need to define the requirement through expertise on government policies and strategic framework that specify the regulation and legislation requirement. I use all available tools to gain knowledge.

Q 12. Do you know who manages the knowledge? (Input-Process-Output)

It manages by each team members and stakeholders collectively share knowledge.

Q 13. How do you access knowledge?

I access the information through discussion, social network and ongoing learning process. I use all available resources.

Q 14. Do you know what a Community of Practice is?

Yes, extensive knowledge. For example, user group and PCG meetings.

Q 15. How often are you involved in Community of Practice?

Yes, all the time.

Q 16. How is knowledge created in Community of Practice?

It creates through all available resources.

Q 17. How do you capture knowledge and expertise from others?

It happens through all available resources.

Q 18. Do you know what a Knowledge Hub is?

Yes, but general knowledge. I believe that it connects and provide necessary information to others.

Q 19. Do you know who maintains and integrity checks the knowledge hub in order to provide the solution?

I think that in the defined unit maintains the knowledge.

Q 20. Describe a major change that occurred in a job that you held. How did you adapt to this change?

I come across major changes in planning approvals and change to timeline for requirements. I need to constantly explain and discuss the complex issues to my team for solution.

Q 21. Have you ever worked in a situation where the rules and guidelines were not clear? How did you react?

Yes, I have. During the delivery of NBESP projects, I come across that planning requirement and procedures are not clear from the commonwealth government. I have to exercise my best ability to clarify the issues with all stakeholders and develop procedure for implementation.

Q 22. Have you ever had to share an idea to your co-workers or group? How did you do it?

Yes, I have. I'm collaborating with other stakeholders to share issues through all available resources and choose whatever the effective way to share an idea. It involves with discussion, action plan, implementation of plan and feedback process.

Q 23. How do you go about explaining a complex problem to your co-workers or group? What approach do you take in communicating with people?

I talk to them directly and show basis on evidence to resolve issue. I need to acknowledge immediate solution and apply direct/indirect approach to understand the root cause of problems to solve the complex problem. It is difficult to deal with but keep up to date information to share knowledge.

Q 24. What challenges have occurred while you were coordinating work with other units and departments?

I faced with different challenges such as political impact, different perspective views and drivers but I have to understand common drivers to resolve the issue. In general, I am

practising that my best ability to delegate the work and share common goals amongst stakeholders.

Q 25. What factors influenced your decision?

In most cases, target and results (outcomes).

Q 26. Give an example of a time when there was a decision to be made and procedures were not in place?

I respond immediately on decision making due to legal bounds and government legislation. Main focus is an economic stimulus plan which I have to fully understand protocols and government initiative.

Q 27. How quickly do you make decisions? Give an example.

In most cases, it depends on criticality and time constraint. Decision-making is especially important for senior management and leadership. I normally explain my decision to those involved and affected, and then follow up for effective implementation.

Q 28. What steps do you go through to ensure your decisions are effective?

I have to make sure all stakeholders to understand status of all projects and place the systemic process to monitor performance, continuously checking and tracking to measure effectiveness of all projects. I mentioned earlier, always to follow up to proper and effective performance.

Q 29. Have you ever had a situation where you had a number of alternatives to choose from?

Yes, I have. This situation happens all the time. It is dependent on time constraint and politics. In government, political decision affecting works priorities and business cultures.

Q 30. How did you review the information? What process did you follow to reach a conclusion?

I need to evaluate basis of performance target set.

Q 31. Have you ever had to introduce a policy change to your work group? How did you do it?

Yes, all the time. I continuously improve process that what is work and what is not through brainstorming and place right processes to set up and get approval in most effective way. And also consider on evidence basis to analyse benefit of the changes.

Q 32. What performance standards do you have for your unit? How have you communicated them to your work group?

In order to maintain the performance of project, I introduce the individual workplan for performance measure to track all aspects of programs and apply BAU approach that changed to require.

Q 33. What do you do when your time schedule or project plan is upset by unforeseen circumstances? Give an example.

I respond immediately to advise all stakeholders for changes and deal with it. For example, more than 500 projects and builders do have financial difficulty or bankrupted and they have all sorts of problems that affecting delivery of projects.

Q 34. What have you done in order to be effective with your organization and planning? How is project success measured?

I make sure all stakeholders to participate and understand what they have to do. Moreover, they have to perform against KPI and continuously monitoring on their performance.

Q 35. What kinds of problems have you had coordinating complex projects? How did you solve them?

Main problems are contamination and environmental issues. I have to get experts' advice as well as second report to satisfy the conditions. It is extreme and I constantly monitor and review the processes to remove all complex issues.

Q 36. How would you describe the complex issues in your organization?

Agreed on time constraint and legal matters are complex issues. It is challenging for solutions.

Q 37. How have your activities and the activities of staff in your division changed as a result of the complex process?

It is difficult to improve when priority changes and respond properly to all situations. It is challenging work environment.

Q 38. What problems occurred/arose in this process?

It effects on time management and project management. However, it provides acceptable solution.

Q 39. What process do you follow in solving problems?

I address the need of new approach to recognise problem, identify what advice I needed, consider all options, choose best options and working with stakeholders to resolve and testing whether all projects are on track or not.

Q 40. What methods do you use to solve problems? Please give an example of your approach?

I organise discussion with key stakeholders to consider innovative method and people to implement correctly on their tasks. I'm very satisfied on this approach.

Q 41. Give an example of a time when you had to take the lead with your work group to get a task done. How did you get cooperation?

All project delivery team to accept services notices and get legal advice and prepare action plan to serve. I acknowledge skills and achievement and constant feedback to analyse the benefits.

Q 42. How do you get cooperation from other stakeholders?

I explain clear objectives, goals and best interest through the discussion to understand requirements, impact issues and contractual agreement for collaboration.

Q 43. Describe how you would notify the people you manage about a new procedure that you were responsible for implementing. It would mean that those people would be assuming new and more complex duties/activities.

In most cases, I send notification through meeting and forums to define effectiveness, benefits and professional development. I prepare written target set to discuss with all participants that they have to commit, involve, test it and implement the process.

Q 44. How do you typically get cooperation from someone in another department?

I establish better relationship with all divisions and demonstrate that all stakeholders are under contractual obligation to participate.

Q 45. What were the most significant events that emerged in the process?

Noticeably significance in legal conformation and prepare all evidence to proof that we follow the right process and documentation are correct.

Q 46. What recommendations do you have for improving the current process?

My main concern is that we should be focus on commitments of all stakeholders and keep checking actual performance against KPIs. There is need to change the current processes.

Q 47. Does the multiple perspective model helps in understanding organizational complexity? (See attached)

Multi perspective framework is critical for all parties involved. It may help to collaborate across organisational boundaries.

Q 48. How do you interact with multiple stakeholders?

I am collaborating through one to one meeting and discussion. I also follow up with other available tools to interact.

Q 49. Which communication tool do you use most often?

I use email and face-to-face meeting.

Q 50. What are the key drivers for process integration for collaborative structure within the organization?

Project deliverables are key drivers for collaboration and it requires clear understanding on business objectives.

Q 51. What external drivers influence the collaborative structure within the organization?

For me, external driver are meet commonwealth target, builders' relationship, economic growth, strength of project management in public sector and social housing providers.

Q 52. Where does information reside within department and how is it shared and structured?

I think that it resides within people and using all available tools to share information.

Q 53. What are the current collaboration tools in use?

I use Sharepoint to monitor all project and program. We need to set up the common system/platform for multiple stakeholders.

Q 54. How are collaboration tools employed?

Collaboration tools employed through corporate system, information and reports.

What is your opinion on the following statement:

Q 55. Organization perspective is an important factor to control the changes in the unlikely event of unforeseen circumstances.

I strongly agree and it critical for the business.

Q 56. Business perspective is an important factor to respond to unforeseen circumstances.

I strongly agree and it is critical for the business.

Q 57. Knowledge perspective is an important factor to deliver effective information flow in the unlikely event of unforeseen circumstances.

I strongly agree and it is critical for the business.

Q 58. Social perspective is an important factor to express the unforeseen circumstances.

I strongly agree and it is very important for the business

Participant #7:

Q 1. What is your position/role in the organization?

I am working as a project director and my role involves the strategies, core policies and practices to achieve corporate goals through coordinating resources with various government agencies and stakeholders.

Q 2. What activity do you participate in?

My primary focus is on the management of strategic direction and very much engaged in all activities.

Q 3. How do you monitor the effectiveness of your activities?

I need to monitor and manage all activities through timesheet reports, meetings and KPI reports.

Q 4. How do you keep track of other participants' activity?

I need to keep tracking the activities through the managers' exception reports.

*Q 5. What kinds of responsibilities (level of authority) are you handling?
(Project manager approval/ Project director approval/ CEO or Executive approval)*

I am handling the project directors' approval authority and high level responsibilities.

Q 6. What activities have you engaged in to ensure how other stakeholders in the organization view your work group?

I am engaging in all activities in particular, executive meeting and staff briefing. It is important to monitor the performance of my work group.

Q 7. Describe a time when you believed it was necessary to modify or change your actions in order to respond to the needs of multiple stakeholders.

It happened during program formulation process of business as usual and it is very likely to happen in collaboration of multiple stakeholders.

Q 8. How do you create knowledge? (from /to whom)

In my experience, knowledge will create through meeting, business activities and social network.

Q 9. What knowledge do you use?

Most of the time, I'm involving with project management of technical and professional services.

Q 10. Where do you get the knowledge from? (from whom)

Of course there are many different ways to obtain knowledge you required. In my case, it comes from the training and individual experience.

Q 11. How do you define the knowledge you need? (objective)

Program and project plans to manage tasks/deliverables. I also set the requirements needed basis on project and areas.

Q 12. Do you know who manages the knowledge? (Input-Process-Output)

I believe all managers in their professional areas and units. It also manages by experts in informal organisational structure.

Q 13. How do you access knowledge?

In my case, most of the time I access the information through meetings and discussion.

Q 14. Do you know what a Community of Practice is?

Yes, I know fairly well. It's like a PCG (project control group) for every project requires this community group to share and achieve common goals.

Q 15. How often are you involved in Community of Practice?

I regularly participate in PCG meetings.

Q 16. How is knowledge created in Community of Practice?

Stakeholders are using forums and discussions to create Information and knowledge.

Q 17. How do you capture knowledge and expertise from others?

It happens through professional presentation and recording the references to build a knowledge base.

Q 18. Do you know what a Knowledge Hub is?

A knowledge hub is a central point to distribute and manage the expert on project related information and processes.

Q 19. Do you know who maintains and integrity checks the knowledge hub in order to provide the solution?

Yes, I do. There is a functional unit to manage the knowledge in organisational structure.

Q 20. Describe a major change that occurred in a job that you held. How did you adapt to this change?

It happens often in competitive environment and I have to adapt quickly and revise the existing processes to sustain the changes. It is all about the time management and very important for the business success. I also look at the cultural difference to identify the issues.

Q 21. Have you ever worked in a situation where the rules and guidelines were not clear? How did you react?

Yes, I have. Order to overcome the problem I have to respond quickly on issues and business direction to stakeholders via meetings and communication tools.

Q 22. Have you ever had to share an idea to your co-workers or group? How did you do it?

I practice this all the time and managing through the executive, business meetings.

Q 23. How do you go about explaining a complex problem to your co-workers or group? What approach do you take in communicating with people?

Manage through the staff briefing and explain impact analysis on the business.

Q 24. What challenges have occurred while you were coordinating work with other units and departments?

I have noticed that there are different political views and generally speaking, others are uncooperative.

Q 25. What factors influenced your decision?

My decision is based on political views.

Q 26. Give an example of a time when there was a decision to be made and procedures were not in place?

It happens in board meeting and ministerial brief.

Q 27. How quickly do you make decisions? Give an example.

I have to respond immediately on the issues. NBESP (Nation Building Economic Stimulus Plan) is the largest social housing development plan and it is priority for the government.

Q28. What steps do you go through to ensure your decisions are effective?

I measure the effectiveness by managers' reports and KPI (key performance indicator) and it normally defines and clarifies the issues.

Q 29. Have you ever had a situation where you had a number of alternatives to choose from?

This situation happens often and I have flexibility to deal with the issues.

Q 30. How did you review the information? What process did you follow to reach a conclusion?

I review the information by the managers' reports and organised the meeting to solve the problems.

Q 31. Have you ever had to introduce a policy change to your work group? How did you do it?

I have consulted with the policy development unit to amend the work policies to deliver the NBESP projects due to time constraint and resource management.

Q 32. What performance standards do you have for your unit? How have you communicated them to your work group?

There are performance management program for each unit and most of the time staff briefing to communicate with stakeholders. In that I'm generally satisfied on staff performance.

Q 33. What do you do when your time schedule or project plan is upset by unforeseen circumstances? Give an example.

It will impact on financial and I re-schedule the time management program immediately to adjust the plan and the situation is sure to happen. In particular, there is on going challenges in resource allocation.

Q 34. What have you done in order to be effective with your organization and planning? How is project success measured?

I enforce the strategic plan to monitor effectiveness and staff briefing to communication with stakeholders. It measured by time and financial objectives.

Q 35. What kinds of problems have you had coordinating complex projects? How did you solve them?

I have faced with difficult problems specially the environmental issue. It involves various stakeholders, such as local councils, experts and other government agencies. In order to overcome the challenges, I have careful consideration on issues and re adjust the time management program to deliver all projects are on track. It is difficult to solve the problems and I always searching the alternative measure to work around.

Q 36. How would you describe the complex issues in your organization?

It is political and financial matters and also it has extreme difficulty for solutions.

Q 37. How have your activities and the activities of staff in your division changed as a result of the complex process?

It is challenging task to adapt for staff. I have to monitor constantly and closely on all activities for business success.

Q 38. What problems occurred/arose in this process?

It affected on resource management and financial delegation issues.

Q 39. What process do you follow in solving problems?

I enforce the policy and governance to solve the problem and discuss with all stakeholder to identify the issues.

Q 40. What methods do you use to solve problems? Please give an example of your approach?

Again, I use the policy and business rule to solve problem and organise the discussion session to address the issues. I'm somewhat satisfied on this approach and invite key stakeholders for open discussion.

Q 41. Give an example of a time when you had to take the lead with your work group to get a task done. How did you get cooperation?

I organise through staff briefing to explain the objectives and discuss the issues and staff is generally cooperative.

Q 42. How do you get cooperation from other stakeholders?

I provide clear direction and current situation in projects with stakeholders.

Q 43. Describe how you would notify the people you manage about a new procedure that you were responsible for implementing. It would mean that those people would be assuming new and more complex duties/activities.

Part of change management, I address the changes through staff briefing and explain the effects on process and procedures.

Q 44. How do you typically get cooperation from someone in another department?

I always maintaining the strong relationship with stakeholders and accommodate their views.

Q 45. What were the most significant events that emerged in the process?

During the NBESP project, I notice that the priorities on budgets and politics.

Q 46. What recommendations do you have for improving the current process?

Developing the new design methods to prepare and adapt changes for sustainability. I'm also focus on the strategic planning and staff training for productivity.

Q 47. Does the multiple perspective model helps in understanding organizational complexity? (See attached)

Multi perspective framework is necessity for the business and critical to provide common rules.

Q 48. How do you interact with multiple stakeholders?

Mainly through meetings and discussion.

Q 49. Which communication tool do you use most often?

I use general communication system, such as email, phone and intranet.

Q 50. What are the key drivers for process integration for collaborative structure within the organization?

I believe the strategic goals and clear understanding of organizational goals.

Q 51. What external drivers influence the collaborative structure within the organization?

For me, political decision and difficulties in identifying and analysing key stakeholder.

Q 52. Where does information reside within department and how is it shared and structured?

I think that it resides within the corporate systems.

Q 53. What are the current collaboration tools in use?

We use Sharepoint, TRIM and HOMES to share project and program related information with all stakeholders.

Q 54. How are collaboration tools employed?

Collaboration tools employed through corporate systems, such as intranet and sharepoint.

What is your opinion on the following statement:

Q 55. Organization perspective is an important factor to control the changes in the unlikely event of unforeseen circumstances.

I strongly agree and it is critical for the business, especially monitoring on costs.

Q 56. Business perspective is an important factor to respond to unforeseen circumstances.

I agree and it is very important for the business.

Q 57. Knowledge perspective is an important factor to deliver effective information flow in the unlikely event of unforeseen circumstances.

I strongly agree and it is critical for the business.

Q 58. Social perspective is an important factor to express the unforeseen circumstances.

I agree and it is very important for the business

Participant #12:

Q 1. What is your position/role in the organization?

I am working as a program director and managing all project related matters.

Q 2. What activity do you participate in?

I manage project delivery team and finalising all programs and projects for NBESP. I am responsible for review of all programs and provide strategic direction, delegate authority through regular forums and discussion. I also participate in executive meetings.

Q 3. How do you monitor the effectiveness of your activities?

I am constantly monitoring effectiveness of all activities through formal implementation planning for standard framework, weekly forum and data analysis.

Q 4. How do you keep track of other participants' activity?

I'm working closely with project manager and their teams to keep tracking and final approval activities through project plan for all participants.

*Q 5. What kinds of responsibilities (level of authority) are you handling?
(Project manager approval/ Project director approval/ CEO or Executive approval)*

I am handling the executives' approval authority and high level responsibilities on all projects.

Q 6. What activities have you engaged in to ensure how other stakeholders in the organization view your work group?

I am engaging in all program activities through lessons learnt exercise for better collaboration.

Q 7. Describe a time when you believed it was necessary to modify or change your actions in order to respond to the needs of multiple stakeholders.

It happens in financial assessment for builders to solve issues for example, criteria changes of material suppliers and manufacturers.

Q 8. How do you create knowledge? (from /to whom)

It creates through collaboration tool, bulletin, email and industry meeting.

Q 9. What knowledge do you use?

I use general management information for effective planning.

Q 10. Where do you get the knowledge from? (from whom)

I obtain the knowledge from experts and diverse resources for example, internal and external contractors, industry forums and seminars.

Q 11. How do you define the knowledge you need? (objective)

I need to define the requirement through master scheduler with dependency which will create quality outcomes. I use all available tools to gain knowledge.

Q 12. Do you know who manages the knowledge? (Input-Process-Output)

It manages by each team members and stakeholders collectively share knowledge.

Q 13. How do you access knowledge?

I access the information through information systems.

Q 14. Do you know what a Community of Practice is?

Yes, extensive knowledge. (same requirements)

Q 15. How often are you involved in Community of Practice?

Yes, all the time.

Q 16. How is knowledge created in Community of Practice?

It creates through information system and gathers knowledge from all stakeholders and meeting.

Q 17. How do you capture knowledge and expertise from others?

It happens through discussion and information system.

Q 18. Do you know what a Knowledge Hub is?

Yes, extensively. I have created a team to provide project related information to all stakeholders.

Q 19. Do you know who maintains and integrity checks the knowledge hub in order to provide the solution?

In the defined unit and each functional unit maintains the knowledge.

Q 20. Describe a major change that occurred in a job that you held. How did you adapt to this change?

I come across major changes in step out from general manager role to take NBESP director in a day. It indicates that how important this project was. I need to constantly explain and discuss the complex issues to my team for solution.

Q 21. Have you ever worked in a situation where the rules and guidelines were not clear? How did you react?

During the delivery of NBESP projects, I come across that planning requirement and procedures are not clear from the commonwealth government. I have to exercise my best ability to clarify the issues with all stakeholders and develop procedure for implementation.

Q 22. Have you ever had to share an idea to your co-workers or group? How did you do it?

Yes, I have. I'm collaborating with other stakeholders to share issues through all available resources to share ideas. It involves with evaluation of criteria for builders, implementation, reallocation and land information.

Q 23. How do you go about explaining a complex problem to your co-workers or group? What approach do you take in communicating with people?

I talk to them directly through discussion and workshop for creating ideas and contribute ideas to resolve issue. I need to acknowledge immediate solution and apply direct/indirect approach to understand the root cause of problems to solve the complex problem.

Q 24. What challenges have occurred while you were coordinating work with other units and departments?

I faced with different challenges in particular legal issues which affects on turnaround time and participation as a part of team.

Q 25. What factors influenced your decision?

In most cases, clear objectives and term of priority. Another important factor contributing to programme is government policy changes.

Q 26. Give an example of a time when there was a decision to be made and procedures were not in place?

In my case, difficult times in self-approval procedures, definition/rules for other stakeholders and environmental assessment.

I respond immediately on decision making due to legal binding and government legislation. Main focus is an economic stimulus plan which I have to fully understand protocols and government initiative.

Q 27. How quickly do you make decisions? Give an example.

It depends on criticality and time constraint. I respond in a same day. It is very important for workflow.

Q 28. What steps do you go through to ensure your decisions are effective?

I monitor effectiveness and empowerment on outcomes and how it implemented aligned with business objectives and goals.

Q 29. Have you ever had a situation where you had a number of alternatives to choose from?

Yes, I have. It is dependent on priorities and time constraints.

Q 30. How did you review the information? What process did you follow to reach a conclusion?

I use what if analysis to evaluate target set and quality outcomes.

Q 31. Have you ever had to introduce a policy change to your work group? How did you do it?

I implement the fee for services structure and commercial environment activity process through senior meeting and discussions.

Q 32. What performance standards do you have for your unit? How have you communicated them to your work group?

I need to closely monitor on project plant that provide leading indicators for extra milestone to measure it against KPIs, such as management system, performance and documented requirements to record all phases of construction development activities.

Q 33. What do you do when your time schedule or project plan is upset by unforeseen circumstances? Give an example.

I respond immediately for analysing root caused problem and readjust priorities to manage all programs are on track.

Q 34. What have you done in order to be effective with your organization and planning? How is project success measured?

I communicate that what matters most effectiveness values are on time, budget and quality to all parties involved. I make sure all stakeholders to participate and understand what they have to do to meet project success.

Q 35. What kinds of problems have you had coordinating complex projects? How did you solve them?

Main problems are different governances in nine DPM firms, milestones to balance and flexibility. I constantly communicate the importance of strategic direction and review the processes to remove all complex issues.

Q 36. How would you describe the complex issues in your organization?

I think that difference in culture and attributes among private firms are the complex issues due to market changes. It is quite challenging and I always try to find the best solution to a problem.

Q 37. How have your activities and the activities of staff in your division changed as a result of the complex process?

It is difficult to manage programs due to its volume and strategy.

Q 38. What problems occurred/ arose in this process?

It affects on project management which slipping away from master scheduler.

Q 39. What process do you follow in solving problems?

I address the need of new approach to recognise root caused problems, general methods that streamlining the processes and working with key stakeholders to resolve the issues.

Q 40. What methods do you use to solve problems? Please give an example of your approach?

I follow up with key stakeholders' feedback and continue improvement on strategic planning with executives' advice to solve problems. I use the root cause analysis method to meet requirements within agreed timeframe.

Q 41. Give an example of a time when you had to take the lead with your work group to get a task done. How did you get cooperation?

I communicate clearly on negotiation skill, project management and financial issues (builders claim more money than contract agreement) through discussion session to help them to improve current situation.

Q 42. How do you get cooperation from other stakeholders?

I explain clear objectives, goals and best interest through the discussion to understand requirements and under contractual obligation for collaboration.

Q 43. Describe how you would notify the people you manage about a new procedure that you were responsible for implementing. It would mean that those people would be assuming new and more complex duties/activities.

I send notification through forums and discussion to update current status and encourage their involvement to develop skill further.

Q 44. How do you typically get cooperation from someone in another department?

I impose their participation requirement through discussion and forums to share information and expertise.

Q 45. What were the most significant events that emerged in the process?

I challenged by politic and misunderstanding that I constantly persuade all key stakeholders through regular meeting.

Q 46. What recommendations do you have for improving the current process?

Focus should be on commitments of all stakeholders and increasing efficiency by streamlining business processes.

Q 47. Does the multiple perspective model helps in understanding organizational complexity? (See attached)

Yes, it is vital for the business. Multi perspective framework is critical for collaborative environments. Especially, for the NBESP project, it involves nine development firms with seven hundred people to develop new social housing.

Q 48. How do you interact with multiple stakeholders?

I am collaborating through discussion, reports and meeting.

Q 49. Which communication tool do you use most often?

I use general communication system such as email, discussion (creates documentation) and phone.

Q 50. What are the key drivers for process integration for collaborative structure within the organisation?

Master scheduler (all activities to be accountable) is key driver for collaboration and it indicates the all stakeholders' involvement.

Q 51. What external drivers influence the collaborative structure within the organization?

For me, external drivers are diversity and outsourcing model.

Q 52. Where does information reside within department and how is it shared and structured?

I think that it resides within people and corporate system.

Q 53. What are the current collaboration tools in use?

I use Sharepoint and risk plan to monitor all project and program.

Q 54. How are collaboration tools employed?

Collaboration tools employed through corporate system and intranet.

What is your opinion on the following statement:

Q 55. Organization perspective is an important factor to control the changes in the unlikely event of unforeseen circumstances.

I agree and it is very important for the business.

Q 56. Business perspective is an important factor to respond to unforeseen circumstances.

I strongly agree and it is critical for the business.

Q 57. Knowledge perspective is an important factor to deliver effective information flow in the unlikely event of unforeseen circumstances.

I strongly agree and it is critical for the business.

Q 58. Social perspective is an important factor to express the unforeseen circumstances.

I agree and it is very important for the business

Participant #16:

Q 1. What is your position/role in the organization?

I am working as a program manager and overseeing the tendering processes.

Q 2. What activity do you participate in?

I manage organisations tender core and requirement of external project for assessment. I participate in scoping, planning work, develop process and identify the system requirement to deliver tender documentation.

Q 3. How do you monitor the effectiveness of your activities?

I preferred face-to-face approach to monitor effectiveness of all activities through project plan and tracking meetings.

Q 4. How do you keep track of other participants' activity?

In relations to participant's activity, I'm monitoring and tracking all the activities through individual task plan and their special requirement other than core skills.

Q 5. What kinds of responsibilities (level of authority) are you handling?

(Project manager approval/ Project director approval/ CEO or Executive approval)

I am handling the project directors' approval authority and high level responsibilities.

Q 6. What activities have you engaged in to ensure how other stakeholders in the organization view your work group?

I am engaging in all activities through large group meetings to identify the issues for decision making. It is important and mainly focuses on the tender core and assessment requirement within the timeframe as well as assessment scoping for tender submission.

Q 7. Describe a time when you believed it was necessary to modify or change your actions in order to respond to the needs of multiple stakeholders.

It happens in document control with counter and its practicality, and developing the system to control.

Q 8. How do you create knowledge? (from /to whom)

It creates through meeting, projects and discussion.

Q 9. What knowledge do you use?

I use professional process outcome support approach which provides information on administration, projects, process, IT, and financial knowledge.

Q 10. Where do you get the knowledge from? (from whom)

I obtain the knowledge from the senior staff, documentation, wide stakeholders and hard copies.

Q 11. How do you define the knowledge you need? (objective)

I need to define the analysis of requirement through similar project, experience and lessons learnt.

Q 12. Do you know who manages the knowledge? (Input-Process-Output)

I believe that it manages by each team collectively to share knowledge.

Q 13. How do you access knowledge?

Most of the time, I access the information through meetings, forums, media and discussion.

Q 14. Do you know what a Community of Practice is?

Yes, but general knowledge.

Q 15. How often are you involved in Community of Practice?

It is limited to project team due to government control. (NBESP)

Q 16. How is knowledge created in Community of Practice?

It creates through discussion, forums and premiers office.

Q 17. How do you capture knowledge and expertise from others?

It happens through discussion and forums to documents the outcomes.

Q 18. Do you know what a Knowledge Hub is?

I have a little knowledge.

Q 19. Do you know who maintains and integrity checks the knowledge hub in order to provide the solution?

Each unit maintains their own knowledge to share.

Q 20. Describe a major change that occurred in a job that you held. How did you adapt to this change?

I noticed that the changes in access information and I need to constantly review the success and failure projects and maintain the information through central location.

*Q 21. Have you ever worked in a situation where the rules and guidelines were not clear?
How did you react?*

Yes, I have. Since the stimulus program is new area I have to use ideal approach to deliver the programs that involve comparison on the similar projects and other stakeholders' experience.

Q 22. Have you ever had to share an idea to your co-workers or group? How did you do it?

Yes, I have. I'm collaborating with nine major private project development firms all the time and managing through discussion and meetings. It happens often.

*Q 23. How do you go about explaining a complex problem to your co-workers or group?
What approach do you take in communicating with people?*

I manage through brainstorming with different approach and reports to solve the complex problem in tender document and protocol.

*Q 24. What challenges have occurred while you were coordinating work with other units
and departments?*

I faced with different challenges, such as high risk and pressure. In general, they are cooperative most of the time.

Q 25. What factors influenced your decision?

In my case, political decision is impacting on my projects and programmes.

*Q 26. Give an example of a time when there was a decision to be made and procedures
were not in place?*

Since NBESP project is new area, I have to constantly review the task and individual skill level to identify the gaps and requirement to deliver the programs.

Q 27. How quickly do you make decisions? Give an example.

I have to respond immediately on the issues and political dependant.

Q 28. What steps do you go through to ensure your decisions are effective?

Make sure deliver the projects within the schedule, project deliverables and political success. And then I follow up for its performance.

Q 29. Have you ever had a situation where you had a number of alternatives to choose from?

This situation arises often. It is highly dependent on political influence. When it happens, I immediately analyse the situation and discuss with key stakeholders.

Q 30. How did you review the information? What process did you follow to reach a conclusion?

I consult with IT team to develop the IT solution to control documentation and assessment.

Q 31. Have you ever had to introduce a policy change to your work group? How did you do it?

I am constantly working with the policy development team by meeting and discussion on changes.

Q 32. What performance standards do you have for your unit? How have you communicated them to your work group?

In order to maintain the performance level, I have to identify the key objectives and deliverables, and plan out sub components of projects, and assign the work break down structure to staff. My approach is face to face meeting to discuss the performance of the individual. I applied this method to measure the performance.

Q 33. What do you do when your time schedule or project plan is upset by unforeseen circumstances? Give an example.

I reschedule the timelines to revise the project plan immediately.

Q 34. What have you done in order to be effective with your organization and planning? How is project success measured?

I measure the effectiveness by political success. It is depend on schedule and deliverables within project plan.

Q 35. What kinds of problems have you had coordinating complex projects? How did you solve them?

Main problem is that how to approve assessment process quickly in a professional manner and it is challenging. I organise with IT team to develop the approval system to remove all complex problem.

Q 36. How would you describe the complex issues in your organization?

Multiple facet and coordination are complex issues. I continuously search for the best solution to a problem.

Q 37. How have your activities and the activities of staff in your division changed as a result of the complex process?

It begins to disorient and equipment are not supporting well to deliver programs. I organise the formal discussion for solutions.

Q 38. What problems occurred/arose in this process?

It affects on slower performance and people problem.

Q 39. What process do you follow in solving problems?

I address the understanding of root cause issue through meeting and discussion to solve problem. There is no perfect solution and I try to organise collaborative discussion to a complex issue.

Q 40. What methods do you use to solve problems? Please give an example of your approach?

I define the problem and use root cause analysis to solve problems.

Q 41. Give an example of a time when you had to take the lead with your work group to get a task done. How did you get cooperation?

I manage to work breakdown structure to micro level and specify role to each staff. I also review the task and face to face discussion to address the issues.

Q 42. How do you get cooperation from other stakeholders?

I provide clear understanding on current situation in projects with stakeholders and demonstrate the outcomes, and focus on building the confidence level up for staff.

Q 43. Describe how you would notify the people you manage about a new procedure that you were responsible for implementing. It would mean that those people would be assuming new and more complex duties/activities.

In most cases, I send notification and define role with their association through induction process.

Q 44. How do you typically get cooperation from someone in another department?

I organise meeting to address priority of work and clear understanding of objectives and I encourage them to support the processes and procedures.

Q 45. What were the most significant events that emerged in the process?

I think that achievement of large outcomes which system drives significant results.

Q 46. What recommendations do you have for improving the current process?

I must say that we should focus on the review of best fit normal business, BAU (business as usual).

Q 47. Does the multiple perspective model helps in understanding organizational complexity? (See attached)

I imagine that a multi perspective framework use as a collaboration tool for effective decision-making process.

Q 48. How do you interact with multiple stakeholders?

I am collaborating through face-to-face meetings, reports and Sharepoint.

Q 49. Which communication tool do you use most often?

I use general communication system, such as email, phone and Sharepoint.

Q 50. What are the key drivers for process integration for collaborative structure within the organisation?

Central point of assess information and process are key driver for collaboration.

Q 51. What external drivers influence the collaborative structure within the organization?

It depends on the external stakeholders' systems and its connectivity and compatibility for sharing information.

Q 52. Where does information reside within department and how is it shared and structured?

I think that it resides within the Sharepoint.

Q 53. What are the current collaboration tools in use?

I use Sharepoint to share project and program related information with all stakeholders.

Q 54. How are collaboration tools employed?

Collaboration tools employed through customized system that rollout to user group.

What is your opinion on the following statement:

Q 55. Organization perspective is an important factor to control the changes in the unlikely event of unforeseen circumstances.

I agree and it is very important for the business. It understands the complex issues and authorisation process for decision making

Q 56. Business perspective is an important factor to respond to unforeseen circumstances.

I agree and it is very important for the business.

Q 57. Knowledge perspective is an important factor to deliver effective information flow in the unlikely event of unforeseen circumstances.

I strongly agree and it is critical for the business.

Q 58. Social perspective is an important factor to express the unforeseen circumstances.

I agree and it is important for the business

Participant #23:

Q 1. What is your position/role in the organization?

I am working as a project manager and my role involves interacting with people from another department including Ageing, Disability and Home Care and community services.

Q 2. What activity do you participate in?

I manage the capital work project. I am responsible for housing, community housing and ageing, disability and home care to manage the major projects.

Q 3. How do you monitor the effectiveness of your activities?

As a project manager, I'm using project plan and discussion through follow-up on all my activities and tasks.

Q 4. How do you keep track of other participants' activity?

I'm having periodic meeting with all stakeholders to keep tracking the contract administration activities and also communicating regularly through phone and reports.

Q 5. What kinds of responsibilities (level of authority) are you handling?

(Project manager approval/ Project director approval/ CEO or Executive approval)

I am handling the project managers' approval authority and high level responsibilities on major projects.

Q 6. What activities have you engaged in to ensure how other stakeholders in the organization view your work group?

I am engaging in all major project activities through team meeting and discussion forums.

Q 7. Describe a time when you believed it was necessary to modify or change your actions in order to respond to the needs of multiple stakeholders.

It happens in heritage project and I have to change strategy plan to involve the department of health and other parties for solving problems.

Q 8. How do you create knowledge? (from /to whom)

It creates through meeting, email and social network.

Q 9. What knowledge do you use?

I use the information on management to support the project delivery.

Q 10. Where do you get the knowledge from? (from whom)

I obtain the knowledge from discussion and meeting.

Q 11. How do you define the knowledge you need? (objective)

I need to define the requirement through project objectives and goals that specify the deliverables and requirement.

Q 12. Do you know who manages the knowledge? (Input-Process-Output)

I'm guessing that it manages by each team members and stakeholders collectively share knowledge.

Q 13. How do you access knowledge?

I access the information through corporate systems, meeting and discussion.

Q 14. Do you know what a Community of Practice is?

I'm engaging in user group meetings and general discussion forums.

Q 15. How often are you involved in Community of Practice?

I'm involved in community of practice once a week to manage my projects.

Q 16. How is knowledge created in Community of Practice?

It creates through forums, discussion and social network.

Q 17. How do you capture knowledge and expertise from others?

It happens through discussion, lessons learnt and my mentor.

Q 18. Do you know what a Knowledge Hub is?

I think it is a central place where providing the relevant information to different functional groups.

Q 19. Do you know who maintains and integrity checks the knowledge hub in order to provide the solution?

I'm not sure but it may maintain the knowledge by special functional unit.

Q 20. Describe a major change that occurred in a job that you held. How did you adapt to this change?

I come across major changes in major projects are lodgement of DA and legislation process for example, danger species tree removal requires additional reports to justify the development. I need to constantly identify the complex issues in major projects for delivery management.

Q 21. Have you ever worked in a situation where the rules and guidelines were not clear? How did you react?

During the delivery of major projects, I come across that planning requirement is not clear from the land authority. I have to exercise my best ability to deal with all parties involved.

Q 22. Have you ever had to share an idea to your co-workers or group? How did you do it?

Yes, I have. I'm collaborating with other stakeholders to share issues through discussion.

Q 23. How do you go about explaining a complex problem to your co-workers or group? What approach do you take in communicating with people?

I need to understand the root cause of problems and outcomes to solve the complex problem.

Q 24. What challenges have occurred while you were coordinating work with other units and departments?

I faced with different challenges such as different expectation on client's interpretation and persuade them to resolve the issue. I tried to explain the work clearly and asking for their support.

Q 25. What factors influenced your decision?

My decisions are influenced by time constraints and project deliverables.

Q 26. Give an example of a time when there was a decision to be made and procedures were not in place?

I have to constantly monitor projects in particular, I have to engage department of environment to manage in danger species issues and also I engage the expert to revise change requirement in early stage.

Q 27. How quickly do you make decisions? Give an example.

I have to allow timeframe within the project to understand the problems. It is affecting on budget and time constraints. I raise the issues to senior management straight away for advice.

Q 28. What steps do you go through to ensure your decisions are effective?

I consult with client, peers, special consultant and other experts' knowledge. It normally coming out from the periodic meeting that how it performs.

Q 29. Have you ever had a situation where you had a number of alternatives to choose from?

Yes, I have. This situation happens all the time. It is dependent on priority per case by case. I normally consulted with my director and peers.

Q 30. How did you review the information? What process did you follow to reach a conclusion?

I need to cross check with project requirement, read reports, emails, documentation and brief notes to make sure all projects are on track.

Q 31. Have you ever had to introduce a policy change to your work group? How did you do it?

Yes, most of the time. There is no mechanism or system to adapt changes quickly to carry out my projects development. I manage to get an approval by end of each project. I also organise meeting and discussion to share the information.

Q 32. What performance standards do you have for your unit? How have you communicated them to your work group?

In order to maintain the performance of programs, I need to closely monitor project timelines and organise regular meeting to follow-up and use project management system to record all phases of construction activities.

Q 33. What do you do when your time schedule or project plan is upset by unforeseen circumstances? Give an example.

I respond immediately to advise client and adjust the program to gain lost time by tighten the other activities.

Q 34. What have you done in order to be effective with your organization and planning? How is project success measured?

I measure the effectiveness by gap analysis on quality management system, group discussion and recommendation for improvement for best work practice.

Q 35. What kinds of problems have you had coordinating complex projects? How did you solve them?

Main problems are requirement conflict and engagement of experts for special knowledge to manage major project activities and it is challenging. I attend the team meeting to remove all complex issues.

Q 36. How would you describe the complex issues in your organization?

Agreed on remote location, unforeseen events, time, cost, quality and skilled resources are complex issues. I recommend that we should have to look at economic perspective for all activities before project initiation phase.

Q 37. How have your activities and the activities of staff in your division changed as a result of the complex process?

It is difficult when priority changes.

Q 38. What problems occurred/rose in this process?

It affects on time management and priorities.

Q 39. What process do you follow in solving problems?

I address the need of new approach to prioritise using metric to sort all activities by importance and urgent issues to solve problems. I also escalate the issues to the management for risk analysis.

Q 40. What methods do you use to solve problems? Please give an example of your approach?

I use priority metrics to measure and evaluate the all projects.

Q 41. Give an example of a time when you had to take the lead with your work group to get a task done. How did you get cooperation?

I motivate the group by explain objectives clearly and tighten the timeframe with micro level tasks delegation to staff.

Q 42. How do you get cooperation from other stakeholders?

I demonstrate the best interest, leadership, participation with respect and clear communication for collaboration.

Q 43. Describe how you would notify the people you manage about a new procedure that you were responsible for implementing. It would mean that those people would be assuming new and more complex duties/activities.

In most cases, I send notification through meeting and forums to explain importance, evaluation of procedures, learning and gateway process.

Q 44. How do you typically get cooperation from someone in another department?

I communicate to motivate participants with respect and explain the importance of projects and recognition of their work.

Q 45. What were the most significant events that emerged in the process?

I challenged by heritage issues and expertise advice and it should be recognise early stage of the project.

Q 46. What recommendations do you have for improving the current process?

I would recommend pay particular attention for understanding different authority and risk mitigation process for all stakeholders.

Q 47. Does the multiple perspective model helps in understanding organizational complexity? (See attached)

Multi perspective framework is definitely required and it is critical for all parties involved. Focus should be on economical (financial) perspective.

Q 48. How do you interact with multiple stakeholders?

I am collaborating through regular meeting, phone and discussion.

Q 49. Which communication tool do you use most often?

I use general communication system such as email and phone.

Q 50. What are the key drivers for process integration for collaborative structure within the organization?

Strong relationship is key driver for collaboration and it works for me in collaborative environments.

Q 51. What external drivers influence the collaborative structure within the organization?

For me, external driver is project deliverables. It is all about the project management practice.

Q 52. Where does information reside within department and how is it shared and structured?

I think that it resides within the information system, such as HOMES, OneSystem, QMS and TRIM.

Q 53. What are the current collaboration tools in use?

I use OneSystem to monitor all project and program.

Q 54. How are collaboration tools employed?

Collaboration tools employed through information and reports.

What is your opinion on the following statement:

Q 55. Organization perspective is an important factor to control the changes in the unlikely event of unforeseen circumstances.

I strongly agree and it is very important for the business. Eg. Political, Fund

Q 56. Business perspective is an important factor to respond to unforeseen circumstances.

I agree and it is important for the business.

Q 57. Knowledge perspective is an important factor to deliver effective information flow in the unlikely event of unforeseen circumstances.

I agree and it is important for the business.

Q 58. Social perspective is an important factor to express the unforeseen circumstances.

I agree and it is important for the business