School of Information Systems

Unravelling Methodologies: A theory building approach

Salam Abdallah

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DECLARATION

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made.

Signature:

Date: 11/5/2005

ABSTRACT

Problem solving methodologies in IS are numerous, varied in objectives and scope, and commonly suffer consequences of deviation and rejection. This research investigates the essence of methodologies in order to understand and to address these consequences. In this thesis, methodologies are treated in a broad sense in order to arrive at a generalisable solution. An integrated research framework was constructed to pursue the solution. The framework is based on my adopted ontological, epistemological and methodological assumptions. The research is considered as an interpretivist single case study using qualitative research methods. A holistic Information Security Methodology was selected for in-depth study. Data were collected from various sources, but primarily from focus groups using 18 participants representing 11 organisations. Data were also collected from the developer of the methodology and two other organisations who were implementing it. Data analysis was based on a grounded approach to arrive at a substantive theory representing a conception of an ideal methodology as perceived by these practitioners. The use of the Hermeneutic circle and the purposely constructed Interrogative Framework were the essential tools for analysis. This conception is believed to hold some of the key factors for reducing the common problems of deviation and rejection of methodologies. The proposed theory is the main contribution of this research, which can be used as a foundation theory to construct and evaluate methodologies. The theory also has been used to propose extensions to existing theories. The core theory consists of basic elements and attributes. Other constructs were also developed to be used as contexts to the theory. In totality these findings provide a rich sphere to examine and understand methodologies.

Keywords: *Methodologies, Adoption, Construction, Evaluation, Theory, Theorising, Theory Building.*

THIS STUDY IS DEDICATED TO

MY MOTHER AND FATHER

TO WHOM WE GIVE SO VERY LITTLE.

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INTRODUCTION

Information systems (IS) as a discipline is multifaceted, dealing with problems related to technical, organizational, social and political issues. These problems are often solved using different types of methodologies by managers, planners and decision makers. In the IS discipline there are a very large number of methodologies for different purposes and scopes, which are intended to aid practitioners during planning, designing and implementing the planned solution. Methodologies play an important role in conceptualising a problem and resolving it. They contain a set of practices to suit special circumstances and usually follow a life cycle aiming at an effective solution process and ensuring quality outcomes.

Practitioners and academics have been motivated to develop methodologies to ensure the next project is more successful than the last. Knowledge gained from previous practices is embedded into these methodologies to ensure project success. Therefore, methodologies are necessary, for without a strong methodology, the quality of a project is threatened. The need for rigorous and formalised problems solving methodologies is stressed in the IS literature. Although there are many different types, all have frequently shared the similar fate of deviation and rejection by users.

The purpose of this thesis is, therefore, to investigate problems that are believed to affect the fate of these methodologies. These problems may have emanated from the lack of a

theoretical foundation, which could have been used to construct more usable methodologies. This research was motivated by the lack of such a foundation theory needed to resolve some or all of these inherent problems.

This study aims to bring some of these inherent problems found in methodologies forward and to build an empirically grounded substantive theory representing one perspective of what may constitute an 'ideal methodology' as a solution. The value of this thesis is its contribution towards the construction, evaluation and efficacious adoption of problem solving methodologies. It may be seen as progressing towards unravelling and theorising IS methodologies. The propositions made in the research are seen as being relevant to developers of methodologies, users of methodologies and researchers.

This chapter provides a brief introduction to problem solving methodologies in order to set the theme of the research, followed by an outline of the chapters of the dissertation. These chapters describe the details of the proposed theory, the way it was developed, and its value.

1.1 Problem solving Methodologies

There are number of different views of what methodologies are. Methodologies in general are viewed as problem-solving processes (Jayaratna, 1994). Enid Mumford (1998) states that problems can be solved in many different ways. That is why in the last two decades, we have witnessed a numerous number of problem solving methodologies. Methodologies are viewed as preset guides to assist practitioners to solve certain types of problems (Jayaratna, 1994) and they are considered as important means of reflecting on reality, determining problems and solving them. They also aim at transforming a situation of uncertainty to a state of certainty, reducing complexities, providing means of collecting user requirements, allowing for control, and standardising

practices to reduce risk of project failure. Methodologies are considered useful, influence practice, are taught at universities and are being continually developed by different areas in the IS discipline.

Ackoff (1981, p.354) argues that "to solve a problem is to select a *course of action* that is believed to yield the best possible outcome". In the IS discipline, these courses of actions have been formalised into methodologies that are based on different paradigms and philosophies for solving different problems using different types of methodologies. Some of the common types of methodology used in the IS discipline are:

- System Development Methodologies (SDMs): Used in designing different types of information systems such as Transaction Processing Systems, Management Information Systems, Point of Sale Systems, Decision Support Systems, Expert Systems, Enterprise Information Systems…etc.

- Strategic Information Systems Planning (SISP): This type of methodology seeks to integrate and to align an organisation's strategic objectives with its existing information systems plan or business needs (Ang et al., 1995; Lederer and Sethi, 1996; Earl, 1993). SISP methodologies aim at assisting organisations in identifying opportunities by capitalising on technologies for competitive advantage.

- Business Process Re-engineering (BPR): Used to maximise corporate profitability by redesigning and transforming the organisation's business processes (Kettinger et al., 1997).

- Information Security Methodologies (ISM): Assist organisations to establish a security plan for effective asset protection (de Koning, 1995; Badenhorst and Eloff, 1990). We are currently seeing the emergence of more holistic information security methodologies. They include project management issues,

education and training and support to ingrain security into the culture of the organisation.

Methodologies have been taking different roles in the life of the IS project. They have been used as a full-blown methodology and they have been reduced to a method or a technique. This thesis distinguishes between the terms 'methodology' and 'method', although they have been used interchangeably in the IS field (Jayaratna, 1994). In the context of this thesis, the term 'methodology' means a holistic approach to the problem solving process and the word 'method' is a subset of a methodology (Hirschheim and Klein, 1992).

Methodology in this research also refers to a "well-tried method, often developed by experts and publicised through training courses and books" (Mumford, 1998, p.452). This study looks at methodologies in a broad sense and seeks to generalise between the different types based on the assumption that methodologies share a common foundation. They have similarities in that they have phases such as planning, building and managing, but they differ in their details. Methodologies are phenomenological, having a common core with a finite objective of solving problems. For example, Baskerville (1993) and Dhillon and Backhouse (2001) have all argued that information security methodologies are similar to SDMs since they consist of phases and procedural steps.

The development of systems, plans or solutions, regardless of their nature, is a complex process involving people interacting with internal and external factors. In spite of their inherent weaknesses, the literature has expressed the need for formal development rather than ad-hoc development (Avison and Fitzgerald, 2003; Dhillon and Backhouse, 2001; Roberts et al., 1999; Kettinger et al., 1997;Lederer and Sethi, 1988).

Methodologies are adopted based on the assumption that they add value to the quality of processes and product (Russo and Stolterman, 2000). The use of methodologies does not always contribute towards successful project completion and this has created an

imbalanced feeling towards methodologies, creating an impasse as to whether to use or not to use a methodology.

Peoples' reactions towards the use of methodologies in IS have been consistent throughout their short history. Methodologies have been adopted in some cases, but also, deviated from and largely rejected. The reasons for deviation and rejection are not always clear in the literature. They may be attributed to psychological or technical reasons or both. This study examines methodologies as a phenomenon and people's behaviour towards them.

IS projects of different natures have been failing extensively. These failures may be partially attributed to inadequate methodologies or misuse of methodologies. For example, information systems projects have failed at an alarming rate, reaching up to 70% (Whittaker, 1999; Saarinen, 1990; Lyytinen, 1987a). One of the most frequently cited causes of project failure is lack of planning (Whittaker, 1999). Methodologies certainly play a major role in the planning process; therefore, effective methodologies can impact the success rates of projects.

Failures have also been cited because of the lack of effective security plans in organisations. Companies are still vulnerable to cyber crimes (CSI, 2004; AusCERT, 2004) causing havoc to computer systems, which can have serious implications on organisational revenue and customer trust. These failures may be also attributed to inadequate ISM or ineffective implementation processes resulting in poor adoption. James (1996, p.10) argues that traditional information security approaches are inadequate due to "inflexible or rigid structure, lack of user involvement, lack of management participation and support, academic and theoretical, difficult to apply in practice, or based upon scientific methods that are not appropriate to human related systems environments."

Similarly, Strategic Information Systems Planning methodologies (SISP) have their own problems. The results from a survey found only 53% of IS planners are satisfied with

their methodologies (Lederer and Sethi, 1988). Also, projects in Business Process Re-engineering (BPR) have been failing at the rate of 70% (Grant, 2002).

Although projects continued to fail, this did not stop developers, users, and researchers from developing, using, and trying to understand methodologies. Jayaratna (1994) estimated that there are more than a thousand methodologies in the IS field. Development processes are also viewed as technical processes with social consequences (Klein and Hirschheim, 1987). Consequently methodologies have been going through a phase of transformation - moving from a mechanistic to socio-cultural paradigms or from the hard to the soft approach, all in the hope of guidance leading to successful projects.

To sum up, methodologies are being adopted in the IS discipline and are considered as a valuable means of solving different types of problems. However, the practices of methodologies are still considered to be problematic leading to their rejection. This research has assumed that there is a common foundation for methodologies, which is in need of discovery to address the causes of rejection and in order to enhance their adoption.

1.2 Research Theme

Methodologies could be viewed as a mystery, which needs certain clues to probe further investigation. It is time to establish a stronger foundation of the concept of methodologies in an attempt to understand and improve their content and operation with the objective of constructing successful methodologies that will contribute towards improved project success rates. After all, methodologies are supposed to guide users on 'what to do' and to inform them of 'what is to come'. We expect methodology developers to learn from the lessons of the past and to pass that distilled knowledge to users by providing better constructed methodologies.

The failures of projects are multidimensional because they can emanate from multiple sources (Lyytinen, 1987a). Methodology developers and users are keys in reducing the failure rate. This thesis is motivated by the need to understand and to re-construct methodologies aiming for a foundation of an ideal methodology. I believe an ideal methodology should be attentive to the humanistic nature of its users and cope well with the harshness and the dynamics of the problem solving environment. We need to understand the basic elements of methodologies to establish a more solid foundation for constructing them, before we can move on to resolve other details and their functions.

SDMs are extensively covered in the literature, but very few studies have been made on the other types of methodologies. Most literature in BPR or information security relies on the established knowledge gained from the information systems development environment. BPR literature acknowledges that their concepts have been borrowed and synthesized from the IS field such as soft systems (Johnson and Stergiou, 1997; Earl, 1994; Wastell et al., 1994). There are many BPR methodologies; almost all of them follow the same steps (Husein et al, 1999).

As previously mentioned, this study has a generic view towards methodologies. Therefore any appropriate methodology that is holistic may be used as a rich source to provide the means for understanding. This thesis uses the SDM rich literature to formulate research questions and to discuss the findings of this research. An information security methodology (ISM) was used as a case study for understanding one type of methodology and to answer the research questions.

A typical ISM would include a combination of technologies, policies, procedures, techniques, tools and material resources. ISMs have emerged in recent years to address vulnerability associated with unauthorized misuse of information (CSI, 2004; Baskerville, 1993). An ISM can be also considered as a problem-solving methodology since it covers the complete security management lifecycle, which is comprised of stages such as assessment, design, and implementation, including management and education.

The outcome of the research is seen as a port of departure to derive other theories and as a platform on which to attach useful principles. The abstraction of the theory in this thesis is done at a high level to avoid referencing the specifics of any certain type of methodology and to facilitate generalisation to other types of methodologies.

1.3 Dissertation Layout

The thesis contains six chapters as depicted in Figure 1.1. Chapter 2 examines the literature to determine the characteristics and the problems inherent in methodologies and to establish an argument for the need for a foundational theory on methodologies. The arguments were formulated based on a number of significant questions raised by many scholars. Significance, objectives and the research questions are also stated in the second chapter. Chapter 3 discusses the research framework that was adopted as the means for arriving at the stated objectives and answering the research questions. Chapter 4 is the main body of work behind the development of the substantive theory; it covers data collection, data analysis and the chain of evidence on how the theory was developed. Chapter 5 is a discussion of the implications illuminated by the derived theory. Finally in Chapter 6, the conclusions highlighting the contribution of this research, its limitations, and raises future research questions.

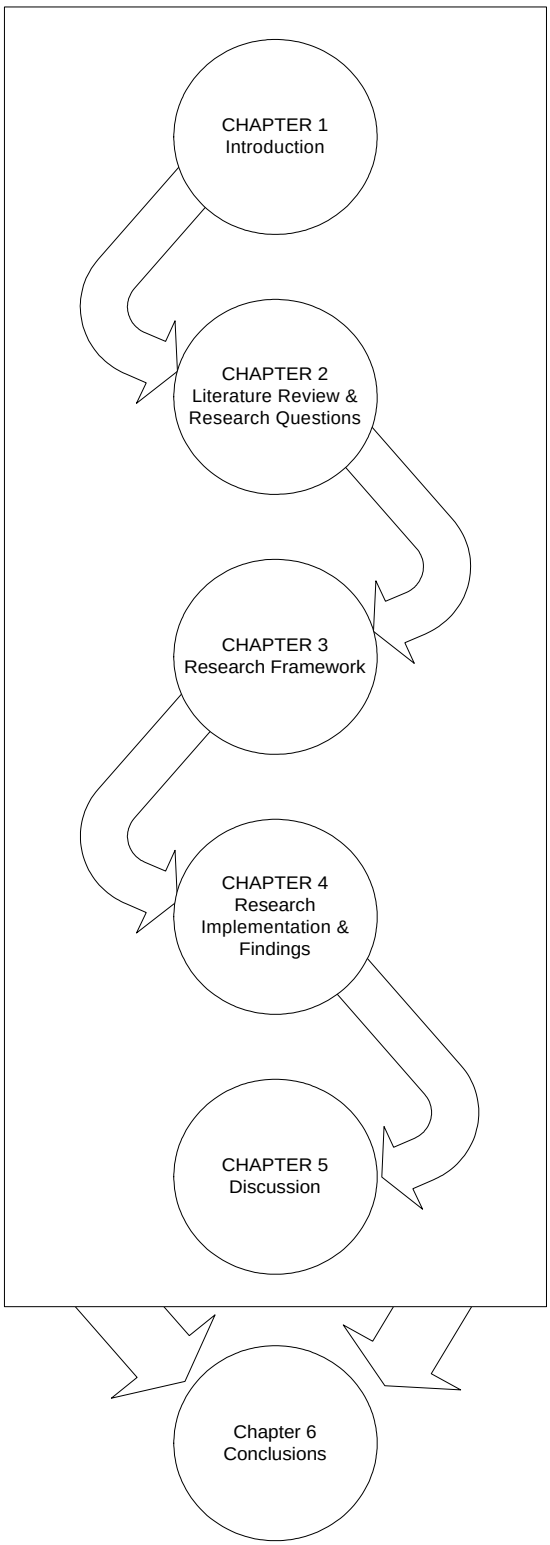

Figure 1.1: Chapter Layout

2

LITERATURE REVIEW & RESEARCH QUESTIONS

This chapter examines problem solving methodologies used in the information system discipline. The literature is examined to highlight the nature of 'methodologies', their adoption, and some of their common inherent problems. The aim of this thesis is to reduce these inherent problems. The following sections review the literature to focus on problems related to IS methodologies as a way to support and build the argument that theorising the concept of a methodology has practical and theoretical relevance. The literature from SDM will be mostly used, since it is rich and expansive. Research questions are raised throughout this chapter based on discussions of different issues pertaining to methodologies.

This chapter is divided into four main sections. The first section (2.1) states the motives of this research. The second section (2.2) looks at various definitions of methodologies, their adoption and characteristics. This section also attempts to characterise methodology users metaphorically to provide a better perspective on their nature. The third section (2.3) examines the ongoing debate of the 'IS crisis' and the quest for the 'IS Core'. It also summarises the significance of this research, objectives and lists the research questions that are raised throughout this chapter. The last section is a summary and concludes the chapter.

2.1 Research Motives

Weber (2003, p.iii) argues that IS research is characterised by the activities of researchers by either: describing a phenomenon, theorising the phenomena or testing the phenomena. Weber highlights several important issues concerning the choice of the problem and its solution - These need to be considered carefully by the researcher (p.iv):

1) To seek answers for problems that have longevity;
2) To address relevant deep substantive, generic, prototypical problems.
3) To attempt to uncover new theories and move away from using existing theory.

These above three points were considered important in setting the aim of this thesis. This research is an examination of the concept 'methodology', which has a long history and will continue to play a major role in solving problems in the various practices in the IS field.

This study is motivated by the fact the methodologies are an important and decisive factor for the success or failure of projects. Introna and Whitley (1997, p.41) argue "that methodology still plays an important role in the substance of development, but certain adjustments to its use are necessary". Methodologies are inescapable when solving problems. Even if people decide not to use a formalised methodology, they will consciously or subconsciously construct their own methodology based on their knowledge, desires, and the available resources before solving the problem. Methodologies are phenomenological, worthy of in-depth understanding.

Three perspectives have been considered by this study to understand the concept of a 'methodology' as used in the IS field: 1) from the perspective of the methodology developers, who have an interest in having the methodology adopted by the larger community; 2) from the practitioners' perspective, who want to understand their role in solving the problem – people who understand their own personal and organisational needs and 3) from the academics' perspective who are interested in defining a set of core properties and theories to contribute to the understanding of the IS discipline, since

some scholars see systems development as a central activity of IS. It is envisaged that a theory that is capable of conceptualising an ideal methodology in terms of its basic elements and characteristics would serve the needs of methodology developers (to construct and improve), methodology users (to use and evaluate), and methodology researchers (to understand and theorise).

Therefore, I am making the assumption that methodologies, regardless of their purpose, all share some common fears or consequences, which are rejection, deviation and eventual abandonment. The ideal situation seen by all stakeholders would be to have methodologies get adopted and infused in the working activities of practitioners as a way of achieving successful projects.

2.2 Problem Solving Methodologies

The following sections will first examine various definitions of methodologies. Some consideration will also be given to what methodologies are, their characteristics, their adoption, and users' reactions toward them. The primary objective of this section is to bring to readers' attention research issues that need to be resolved.

2.2.1 Definitions

There are hundreds of methodologies in use by the IS community (Jayaratna, 1994). These are often based on different philosophies (Avison and Fitzgerald, 2003b). Hirschheim and Klein (1989) argue that common methodologies are based on certain paradigms or assumptions that are implicitly or explicitly expressed such as Functionalism (objective, order), Social Relativism (subjective, order), Radical Structuralism (Objective, conflict), and Neohumanism (Subjective, conflict) (derived from Burrell and Morgan, 1979).

The term ‘methodology’ has been open to many interpretations by academics and to date there are no universally agreed definitions of what a methodology is (Iivari and Maansaari, 1998). Iivari et al. (1999) argue that the ‘core idea’ of a methodology is clear, but to date we have not seen major theories of methodologies emerging. Iiavari and Maansaari (1998) argue that the concept of systems development (methodology) is often vaguely defined and it is not always clear if it covers hardware, software and information systems.

However, an examination of some of the academic definitions and descriptions, of ‘what is methodology?’ will provide an insight into the understanding of the term:

> Jones (1990): *A body of knowledge and techniques...they furnish rules for achieving their desired result.*
>
> DeMarco and Lister (1987): *A proven method for undertaking a repeated task.*
>
> Roberst, Gibson, and Fields Rainer (1998) quoting Bachman (1992): *A way to skin a cat.*
>
> Checkland (1981): *A methodology will lack the precision of a technique but will be a firmer guide to action than a philosophy. Where a technique tells you “how” and a philosophy tells you “what”, a methodology will contain elements of both “what” and “how”.*
>
> Welke (1983): *A comprehensive procedural framework directed at accomplishing a particular change in the object systems.*
>
> Olle et al. (1991): *A methodical approach to information systems planning, analysis, design, construction and evolution.*
>
> Lyytinen (1987b): *A systems development method is an organized collection of concepts, beliefs, values, and normative principles supported by material resources.*
>
> Avison and Fitzgerald (2003b): *A collection of procedures, techniques, tools and documentation aids which will help the systems developers in their efforts to implement a new information system. A methodology will consist of phases, themselves consisting of sub-phases, which will guide the systems developers in their choice of techniques that might be appropriate at each stage of the project and also help them plan, manage, control and evaluate information systems projects.*

Jayaratna (1994): *An explicit way of structuring one's thinking and actions. Methodologies contain model(s) and reflect particular perspectives of 'reality' based on a set of philosophical paradigms. A methodology should tell you 'what' steps to take and 'how' to perform those steps but most importantly the reasons 'why' those steps should be taken, in that particular order.*

Wynekoop and Russo (1997): *A methodology is a systematic approach to conducting at least one complete phase (e.g. requirement analysis, design) of system development, consisting of a set of guidelines, activities, techniques and tools, based on a particular philosophy of system development and the target system.*

Russo and Solterman (2000) extended the earlier definition to include :
.. a means of improving the management and control of the systems design and development process by specifying and standardizing the activities to be performed and the documentation to be produced.

Mingers and Brocklesby (1997): *Methodology is a structured set of guidelines or activities to assist people in undertaking research or intervention. Generally, a methodology will develop, either implicitly or explicitly, within a particular paradigm and will embody the philosophical assumptions and principles of the paradigm.*

Cockburn (2003): *Any conventions and policies the team relies on to successfully deliver systems.*

Regarding definitions from the other fields, such as Business Process Re-engineering field, no distinctive differences from the previous definitions were noted:

Preece and Peppard (1996*) theory put into practice aiming at dealing with real world situations*

Daven and Short (1990, p.11): *Analysis and design of work flows and processes within and between organisations.*

Valiris and Glykas (1999): *A consistent set of techniques and guidelines which will enable the business process redesigner to reorganize business activities and processes in an organisation.*

The definitions of methodologies touch many issues and vary in abstraction. The definitions highlighted issues such as body of knowledge, collection of principles, methodical, change process, management and control, problem solving, theory put in

practice, repeated task, explicit way, any conventions and polices and so on. In the light of this, the following question may be raised:

Issue# 1

Why do we have so many definitions? Is the IS field still lacking the understanding of the essence of a methodology? How can researchers and practitioners construct theoretical based definitions to provide better meaning?

2.2.2 Why Methodologies?

Examining the reasons practitioners use methodologies provides a rationale for understanding them as methodologies aim at reducing a project into smaller stages to allow better control. They are seen as a way of acquiring knowledge and preserving it in a set format to guide organisations on their next project. Methodologies provide an appreciation of standards and they enforce a more disciplined and consistent approach to systems development in organisations (Fitzgerald, 1998). Their deliverables may be checked for quality and they are considered as teachable (Roberts, Michael, Gibson, Kent, and Kelly, 1998). A study has shown that the use of a structured software and maintenance methodology can contribute to the quality and business value (Nelson and Ghods, 2002).

2.2.3 Methodology Adoption

Research that is aimed at increasing the adoption of methodologies is seen as valuable (Sauer and Lau, 1997). Methodology adoption research is complex and has been viewed from different angles to promote their utilisation and infusion. Numerous studies have attempted to understand methodology adoption in order to overcome inherent problems. Researchers have used numerous theoretical assumptions in order to understand

methodology adoption, such as diffusion of innovations theory, stakeholder attitudes and preference, resistance theory, labour process theory, and task fit models (Sauer and Lau, 1997). Researchers have also used other miscellaneous factors to study methodologies, including, developers' attitudes and preferences, centralisation and formalisation of the IS function, lack of management support and commitment, ill-defined roles, conservative culture, lack of fit with systems development practice, lack of commitment from users, insufficient training, and inadequate feedback during adoption (Sauer and Lau, 1997).

The above extensive research, which is based on different theoretical perspectives, provides evidence of the value of understanding methodology adoption. The findings from these studies are relevant, but, somehow the focus has not been on the features of the methodologies, but rather on studying the environment of methodologies in order to determine their survivability. Little interest has been shown in studying a methodology as a phenomenological object and in determining its essential elements and characteristics. We need to consider methodologies and their context jointly in an effort to unravel their phenomenological behavior in order to improve their adoption rate. We need to determine the basic elements of methodologies so that they can be used as building blocks on which to construct more coherent and adoptable methodologies.

2.2.4 Methodology Characteristics

Lee and Truex (2000) argue that formal methods may be inadequate because they are built on a defective philosophy originating from deterministic instrumental rationality. This inflexibility assumes that the development process is a laboratory experiment, i.e. freezing the dynamic variables that occur within the organisation resulting in an inappropriate system for the organisation, and may also "suppress organisations' emergent behaviour" (Lee and Truex, 2000, p.349).

Baskerville et al. (1992) argue that the current methodologies should be replaced with paradigms that support rapid and ad hoc construction since organisations have taken an

emergent form. We have already seen a historical paradigm shift of methodologies (mechanistic to socio-technical) but this did not stop projects from failing and methodologies continued to be adapted, abandoned and rejected. It seems that methodologies do change in their appearance, content and philosophies, but they maintain their inherent problems.

Lyytinen and Robey (1999b) have downplayed the blame of project failures on methodologies. Instead, they argue that project failure is due to the failing of organisations to learn from previous development projects. Another question may be raised here:

Issue# 2

How can methodologies contribute towards the dynamic learning of organisations?

From a different viewpoint, Wastell and Newman (1993) argue that information systems development has an emotional effect on stakeholders because it creates an atmosphere of change. System development is complex involving technical and social issues. A multi-perspective is needed in order to understand the complex phenomenon of system development (Wastell and Newman, 1993). These authors view IS development as a process of social interaction, which entails change, conflict and uncertainty and it is believed that these processes impact the success or failure of projects. When stress and anxiety cloud the situation, decision making, planning, and group dynamics will be affected leading to conflicts. Stress arising from such conditions has been attributed to role conflict, role ambiguity, and role overload (quantitative and qualitative) (Wastell and Newman, 1993).

Wastell and Newman (1993, p.122) raise interesting questions in their paper: Why should it be so difficult to bring IS projects to a successful conclusion? Why are new systems so often met by resistance and rejection? Another question may be posed here:

Issue# 3

What is the root cause of rejection? And how can methodologies enhance adoption?

Wynekoop and Russo (1997, p.48) raised an important question "what do practitioners need in current and future SDMs?" A similar question but with a different perspective is raised:

Issue# 4

What do practitioners think about what constitutes an ideal methodology?

It seems we are neglecting the concerns of the methodology user as a key player in the change management process of the organisation. The methodology users know their own abilities and their own organisation well. It makes sense to ask a group of practitioners how they conceive an ideal methodology.

Wynekoop and Russo (1997, p.56) argue that the literature has not answered questions such as: When is an SDM considered 'effective'? How is success measured? (Is it user satisfaction with the resulting product?, Developer satisfaction with the development process?, Design complexity or system maintainability?, Improved system quality or developer productivity? All of these or something else?)". A further question can be raised:

Issue# 5

Would a theory conceptualizing an ideal methodology be useful to guide researchers and practitioners in understanding and predicting the use and effectiveness of methodologies?

The theory may be used as an analogical tool to see how close a methodology in use is to the ideal. The theory might also be used to guide methodology development and predict its future use.

Russo and Stolterman (2000) argue that there is a misfit between the choice of methodology and project type which is affecting the failure rate. Their response to the misfit is redesign or design of new methodologies. Another question may be raised here:

Issue# 6

Is there a generalisable basic structure of these new methodologies?

Perhaps the basic foundations of the current methodologies are somewhat frail. I believe it is time to step back and determine a new descriptive foundation that can be used to construct various methodologies regardless of their philosophical assumptions.

To sum up, methodologies are being characterised as being inflexible, rendering them unsuitable for emergent organisations. They do not contribute to the learning organisation, they can be stressful and they are continually being rejected. However, methodologies are constantly being developed but carry inherent problems.

2.2.5 The Realities of Methodologies

The use of methodologies was questioned in the 1990's by practitioners and academics. Avison and Fitzgerald (2003a) have noted that organisations are leaving traditional methodologies and moving to new approaches. Others have lost faith in the usefulness of a methodology and are consequently abandoning methodologies and attacking the step-by- step concepts and dislike the large volumes of documentation that accompanies them. Other organisations have altogether rejected the idea of using methodologies. Some are moving to less bureaucratic forms and adopting light methodologies (Avison and Fitzgerald, 2003a; Cockburn, 2003). This shift in philosophy is probably because people opt to natural ways of working and it is difficult to change working practices (Cockburn, 2003; Mathiassen, 1998).

Wynekoop and Russo (1997) examined the existing research on system development methodologies from 123 research papers. The following findings are of interest:

- SDMs are usually adapted in an ad hoc manner.
- There are not enough studies to show the actual use of methodologies.
- There is not enough evidence that methodologies are useful.
- Most organizations use SDMs that are developed in-house.
- Almost half of all projects do not use an SDM, although most studies indicate that respondents believe SDM use is valuable at times and a hindrance at others.

A study by Kautz and Pries-Heje (1999) using ETHICS (Mumford and Weir, 1979) as a case study found different types of problems with methodologies:

- Too theoretical (idealistic) and the description of the methodology is too abstract.
- Time and resource consuming.
- The examples in the book do not reflect real-life problem situations and are hard to use as guidelines. The textbook explaining the methodology is too confusing.
- Requires the use of original text but other books will also be helpful.

- The methodology is not oriented towards project management.

Other constructive comments from scholars are evident in the literature. For example, organisations are adopting methodologies (Fitzgerald, 1997b), but were criticised for not having empirical or theoretical underpinning and they were highly prescriptive (Middleton, 1999). Lee and Truex (2000) found that there is a relationship between training and the cognitive structure of a systems developer. Cognitive structure relates to the way "developer's cognitive structure governs how the developer is using methods and tools in terms of the level of use and the degree of deviation from suggested guidelines" (Lee and Truex, 2000, p.360).

Nandhakumar and Avison (1999) in their study determined that methodologies in their current mechanistic form are reducing the productivity of the methodology user. Hughes and Wood-Harper (1999) found that practitioners with little experience tend to adhere to methodology to learn and to be guided because of their limited tacit knowledge.

Avison and Fitzgerald (2003a) argue that the idea of using methodologies is appealing to organisations, but they are questing for better ones. Verner et al. (1999) surveyed twenty experienced software project managements, who agreed that the right choice of the methodology has an affect on the success of the project.

Lee and Truex (2000, p.348) state that "this inability of formal methods to provide clear, consistent, universal and practical prescriptions for building successful information system may be one reason why the field still suffers from the 'software crisis (Veldwijik et al., 1994) and make it difficult to enforce the use of formal development methods within the developer community".

These are some of the common realities that continually appear in the literature on the use of methodologies.

2.2.6 Metaphors of Political Practitioners

Practitioners' reactions to methodologies are central for our understanding of methodologies; after all we develop methodologies for practitioners use. We need to determine our real recipient, in order to direct our efforts. In my view, it is a myth to think that methodologies will be followed by everyone; I believe only a minority of sincere practitioners are willing to adopt methodologies in their natural form - people who are willing to put their self-interest on the side. However, this does not stop people from seeking and devising the ultimate methodology for different reasons. The literature has been categorised according to practitioner's reactions using metaphors to help audiences understand and examine some of the problems to be faced when we are developing and adopting methodologies.

Metaphors are powerful in creating new meanings; they make the unfamiliar familiar. Kendall and Kendall (1993) have used metaphors to represent system development methodologies such game, machine, journey, family, zoo, jungle, society, war and organism.

One would think that practitioner's reactions may be divided into two categories – adopters and non-adopters. However, upon examination of the literature, it seems there are several consistent types of reaction. The naming of categories used below may be are somewhat harsh, but the names do reflect a certain reality of the politics or the interplay between users and methodologies (see Table 2.1 for a summary). Seeing things in their natural perspective can open new ways of thinking and understanding.

2.2.6.1 The Hypocrites

The hypocrites are the ones who claim that they believe in the methodology and they appear to be using a formal methodology, but in fact their intentions are dubious and are not reaping the benefits of methodologies. Veryard (1987) described this category of practitioners as people who "pay lip services to the methodology, but turn out not to be

adhering to its principles and guidelines". Introna and Whitley (1997) argue that methodologies have been used as a cover-up to impress clients and win contracts. Middleton's (1999) study reveals a similar attitude with government organisations; they are adopting methodologies (e.g. SSADM) as a political protection for civil servants should projects go wrong. Also, Nandhakumar and Avison (1999) argue that methodologies are being adopted for image building to demonstrate that things are under control. Hughes and Wood-Harper (1999), also found that experienced practitioners are cynical about standards and quality, but they follow the methodology to please their managers.

I contend that the Technology Acceptance Model (TAM) which is based on the variable 'intension to use' in determining system usage, is probably inefficient in filtering out this category of people, since users may not declare their real intentions. Therefore a false or inaccurate impression of 'the use and usefulness' of the system may be concluded.

2.2.6.2 The Imitators

This type of practitioner follows existing methodologies blindly without questioning the merits and tends to resist changes. Imitators or traditionalists tend to follow what they have learned previously e.g. from their managers. Wastell (1996) argues that methodologies are used by some practitioners in order to feel secure that they are doing that right thing, which is seen as 'social defense'. Wastell claims that people follow methodologies in a blind and mechanistic way and lose sight of the real cause, which is completing the project.

2.2.6.3 The Innovators

This type of practitioner is also seen to adopt a formal methodology. However, they differ from both the previous two types. They adapt (modify) and introduce their 'own' (mis) interpretation of the methodology to suit their personal needs and desires, causing deviation from the prescribed principles of the methodology, which may eventually lead

to abandonment. The embedded practices in the methodology needs to be followed as prescribed to ensure a better likelihood of successful outcome.

Fitzgerald (1998) quotes results from other studies that 80%-90% of methodologies are being modified. A study by Wynekoop and Russo (1997) found that SDMs are usually adapted (modified).

Lee and Truex (2000, p.348) were more precise in determining the problem with this type of practitioners' reaction: "there is evidence that, in practice, system development projects are being approached from phenomenological pragmatism, deviating from theoretically proposed teleological prescriptions (Introna, 1996; Fitzgerald, 1997a)". A question may be raised here:

Issue# 7

What is the root cause of deviation? How can methodologies minimise the deviation and assure that practices are in accordance with methodological principle?

This category of people may also go to extremes and overemphasise the methodology by adding unnecessary bits and pieces with the view to improve it. Whereas in fact additions may lead to cumbersome activities causing further deviations.

2.2.6.4 The Poly-Methodist

This category of practitioners does not believe in one single methodology, they believe in multi-methodologies and they call themselves method engineers. Method engineering emerged because people are devising, using and adapting methodologies. The concept behind method engineering is to integrate various methods, tools and techniques contingent on the problem situation (Kumar and Welke 1992; Brinkkemper, 1996, Slooten and Schoonhoven, 1996; Arthur et al., 1997).

Mingers and Brocklesby (1997) say that multimethdologies (e.g. multiview) are becoming increasingly popular – is popularity a sign of success? I have not come across any literature to hail their success or any literature that discusses the implication of the mixing between the different paradigms of methods. Introna and Whitely (1997, p.31) question current practices of method engineering: "is there any point of developing complete methodologies, if people tend to pick and choose parts of methodologies and discard others?"

2.2.6.5 The Arrogant

This category of practitioners (approx 60% (Fitzgerald, 1997a)) has not considered adopting a formal methodology, but may use certain techniques. It seems that practitioners will not adopt formalised methodologies (Fitzgerald, 1997b). Fitzgerald (2000) argues that certain practitioners do not understand the underpinning of the methodology's philosophy but they adopt some of the prescribed techniques. Mathiassen (1998, p.15) found that methodologies "were seldom, or only partially, followed by experienced practitioners". Therefore, even if methodologies are based on "best practice", this will not guarantee a successful outcome (Bennetts et al., 2000).

One might think that methodologies are not being adopted because they are not being mandated by top management (Hardgrave et al., 2003), but history tells us that we only accept things that our minds conceive as being of value and we revolt against things that affect our minds and life. If that is the case, then there have to be certain characteristics to be desired in a methodology. This raises the question:

Issue# 8

What are the desired quality characteristics of a methodology that we can agree on, so that we can convince other practitioners of the value of a methodology*?*

2.2.6.6 The Sincere

This category of practitioners contains the real adopters who believe in the use of a methodology and adhere to its principles without introduction or omission of other principles. Few studies are available to demonstrate how closely practitioners are adhering to the principles of an adopted methodology (Wynekoop and Russo, 1995), therefore it is difficult at this stage to assess this category of people.

Category of Practitioners	Reactions
The Hypocrites	Provide lip service to formalised methodologies for personal interest
The Imitators	Follow any methodology blindly and resist change
The Innovators	Adopt formalised methodologies but they keep adding to it and revising the methodology thus violating its principles
The Poly-Methodist	Believe in multi-methodologies thus creating a new deformed philosophy
The Arrogant	Do not believe in methodologies but may use techniques
The Sincere	Adopt formalised methodology and adhere to its principles

Table 2.1: Metaphors of Political Practitioners

2.3 Relevance and Significance

The relevance of this research is driven from two main areas. The first area, already covered in the previous sections, is related to the importance and the value of methodology use within the practising community. The second area is related to the

current state of the IS discipline. The aim of this section is to highlight the significance of this research on the ongoing debate of the 'IS crisis' and the quest for the so called 'IS Core'. The reason for including this part is based on the belief that this research process and outcome touches certain debated issues, which were recently brought to the attention of the IS community e.g. (Benbasat and Zmud, 2003 and Alter, 2003a).

This section will summarise the research significance, objectives and restate the pressing issues that were raised in previous sections.

2.3.1 Research Relevance and the IS Discipline

The current state of the IS field is conceived by some scholars as going through a crisis of identity. This has called for an effort to concentrate on determining who are our customers and what is the core mission of IS (Markus, 1999).

A different call made by Orlikowski and Iacono (2001, p.121) is the need for 'theorising the IT artifact'. This is defined as "those bundles of material and cultural properties packaged in some socially recognizable form such as hardware and or software" (p.121). Orlikowski and Iacono argue that the IS community is not addressing core issues and claim there have been few studies emphasising the specific characteristic of a technology. Instead, researchers have been concentrating on the social aspect of the IT artifact (e.g. role of stakeholders, arising conflicts, power moves, and symbolic acts) and neglecting the technical aspects. The authors continue to argue that more attention towards theorising about the meaning, capabilities and uses of IT artifacts are needed and are considered by the authors as "unresolved issues" for the IS field.

Similarly, a recent article by Benbasat and Zmud (2003) called for action from a similar perspective. They argue that researchers should concentrate more on issues related to the design of the IT artifact in order to make a more valuable contribution to practitioners and academics. The article called for the quest for the 'IS core' which caused a fruitful

stir in the community by generating multiple ideas, models and avenues, which are all relevant for providing a meaningful sense of direction to this research. Benbasat and Zmud (2003, p.185) argue that:

> *Topical diversity can, and has become problematic in the absence of a set of core properties, or central character, that connotes, in a distinctive manner, the essence of the IS discipline.*

Benbasat and Zmud have also argued that the absence of a core is allowing the IS field to accept non-relevant research and excluding relevant research topics, expressed by them as inclusion and exclusion errors. They have also contended that (pp.191-192):

> *A large number of papers have been preoccupied with minor improvements to the Theory of Reasoned Action and other technology adoption models. Instead, our focus should be on how to best design IT artifacts and IS systems to increase their compatibility, usefulness, and ease of use or on how to best manage and support IT or IT-enabled business initiatives.*

Benbasat and Zmud (2003) also proposed a model that depicts the core of the IS discipline to serve as a map to be adopted by the IS community. The model consists of the 'IT artifact' and its immediate 'nomological net' (see Figure 2.1). The 'nomological net' contains information technology, task, task structure and task context including: 1) how IT artifacts are conceived, constructed and implemented, 2) how IT artifacts are used, supported and evolved, and 3) how IT artifacts impact (and are impacted) the contexts into which they embed" (p.186).

The model was initially contested by Alter (2003a) by proposing "systems in organizations" to replace 'the IT artifact' as the core subject to give the field a broader context rather than the constricted IT-artifact.

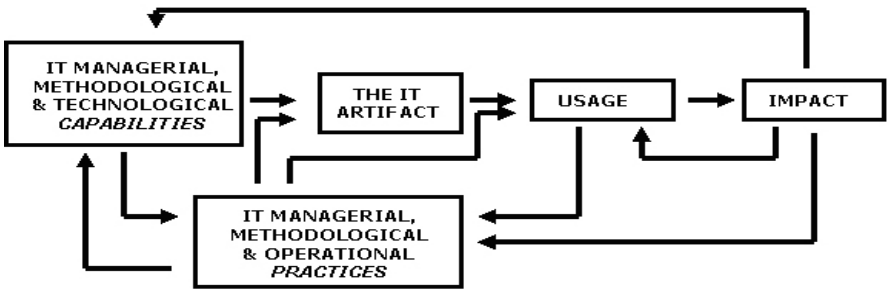

Figure 2.1: The IT Artifact and its Immediate Nomological Net (Benbasat and Zmud, 2003)

The papers by Benbasat and Zmud (2003) and Alter (2003a) caused scholars to respond by either supporting or disapproving the concept of the 'core of IS' and recommending directions to overcome the so called the 'IS crisis' (Hirschhiem and Klein, 2003; Iivari, 2003; El Sawy, 2003; Westland; 2003; Alter, 2003b; Holland, 2003, Myers, 2003; Guthrie, 2003; McCubbrey; 2003; Deans, 2003; Dufner, 2003; Power, 2003; Robey, 2003; Galliers, 2003). Several points have been abstracted that are relevant to this research.

- The concept of the core was appealing to some scholars but must portray diversity.
- There is a need for theoretical models to inform further research and development.
- A statement by Iivari (2003) in proposing the core should be IS development.

Although, this research is not about IS development per se, it focuses on a holistic methodology that is used to build an information security management system, which has close resemblance to IS development. The development of a security plan is an iterative process, which affects the hardware and the software of the organisation and it is a collective effort involving the whole organisation. In this thesis, the methodology is the IT-artifact which is being theorised from the perspective of practitioners. The proposed theory arising from this study is a perspective of an 'ideal methodology' which may be used as a foundation to construct and understand methodologies. Since IS

development was suggested as the core, the outcome of this research may illuminate the core of the IS discipline or may be considered as a contribution towards the core (if it exists).

2.3.2 Research Significance

The choice of topic is crucial in making our endeavors meaningful for ourselves and practitioners (Weber, 2003). The study of methodologies has been around for a long time and it will continue to play an important role in our working habits. Numerous studies on have covered the various facets of methodologies from their construction, adoption and their evaluation. The significance of this research stems from the following facts:

- There are over a thousand methodologies and we can not agree on a common definition.
- Projects continue to fail at a high rate.
- Methodologies are valuable in providing quality process to deliver quality products.
- Methodologies have low adoption rates.
- There is a lack of a theoretical model representing an ideal methodology to describe the essential characteristics.

The above points indicate: 1) the importance of the subject on theory and practice 2) the various definitions may indicate that methodologies have a chameleon nature making it difficult for us to capture their essence. 3) or it may mean that methodologies are multi-form with multiple-perspectives and it is difficult to reduce them to a few definitions or fundamental theories.

2.3.3 Research Objectives and Questions

The lack of theories hinders the development and understanding of the concept of methodologies. It is my belief that certain issues pertaining to methodologies my be resolved if we gain a better understanding of their essence. Most literature addresses the details of methodologies and their implications, but there is no literature concerning essence. Once the essence of methodology can be determined other technical details can be addressed more appropriately. We can not treat an illness unless we know the cause of the pain. For example, if a person has a headache, it does not necessarily mean the pain is caused from the head, it may be emanating from a stomach problem and the headache is only side effect. It seems we have been involving ourselves in the routine maintenance of methodologies, patching as we go. It is time to take a preventative approach to methodologies and find the root of potential problems and to redesign our understanding of methodologies.

The research objectives and the research issues or questions have been stated in the previous sections and are summarised below:

Research objectives:

1- To provide a rich description on the ways in which people experience a methodology.
2- To empirically develop and propose a substantive theory that can be generalised to understand and predict methodologies' behavior.

Research questions revisited:

1. *Why do we have so many definitions? Is the IS field still lacking the understanding of the essence of a methodology? How can researchers and practitioners construct theoretical based definitions to provide better meaning?*

2. *How can methodologies contribute towards the dynamic learning of organisations?*

3. *What is the root cause of rejection? And how can methodologies enhance adoption?*

4. *What do practitioners think about what constitutes an ideal methodology?*

5. *Would a theory conceptualizing an ideal methodology be useful to guide researchers and practitioners in understanding and predicting the use and effectiveness of methodologies?*

6. *Is there a generalisable basic structure of these new methodologies?*

7. *What is the root cause of deviation? How can methodologies minimise the deviation and to assure practices are in accordance with methodological principle?*

8. *What are the desired quality characteristics of a methodology that we can agree on, so that we can convince other practitioners of the value of a methodology?*

An attempt will be made to answer the above questions in this thesis by invoking the primary question, which was the motive behind this research:

> ***What do practitioners think about why some methodologies are better than others?***

The above question assumes that when practitioners are comparing methodologies, they will subconsciously construct their own ideal methodology in their minds. In-addition, when practitioners are thinking about their ideal methodology, they are also reflecting on the quality of the desired final outcome in order to construct their ideal methodology to help them attain the imagined final product. This thesis is about capturing the practitioner's image of the ideal methodology. It is assumed that this is a naturalistic human behavior that will lead to a naturalistic theory. At this stage the assumptions and the derived substantive theory are offered as a proposition and are worthy of further testing.

2.4 Chapter Summary

This research is not about the specifics of a particular methodology. The thesis aims at tracing the cause of inherent problems back to the essence, which may illuminate methodologies in a different light; it is a case of practice informing theory and back to practice.

Seeking research 'relevance' is a highly stressed issue in the IS field (Benbasat and Zmud, 1999). Researching and unraveling methodologies is a relevant topic, making this endeavor worthwhile pursing. Lee (1999) argues that researchers should be the "conscience for our practitioner colleagues and, indeed, for society in general". The research outcome was the result of being attentive to practitioners' needs balanced against the rigour of the research process as recommended by Lyytinen (1999a).

The value of methodologies can not be denied, but we need to acknowledge that a universally applicable development methodology is not possible with our current understanding (Cockburn, 2003; Fitzgerald, 1997b). It is my belief this will never be achieved, simply because we are imperfect and will continue to produce imperfect artifacts. Nonetheless, perfection is something we will and should continue to strive for, provided we have correct theories in place, which we can incrementally improve to make our progress meaningful. We also need to acknowledge that the development of hundreds of methodologies is *not* the solution. Fitzgerald (2000) envisages that new methodologies will require a new set of foundational concepts to meet Wastell's (1996, p.30) challenging question: "Where is the evidence that methodologies are indeed efficacious?"

The illustrated metaphors of practitioners' reactions (e.g., The Arrogant, The Imitator ... etc.) are a reflection of the realities faced by methodologies. In my view, these categories will always be present. However, people's reactions will change and move from one category to another. Studying '**The Sincere'** category will reflect a true understanding of successes and failures more accurately and hence will enable

practitioners and researchers to produce better methodologies for completing projects successfully. Methodologies need to have certain attributes to make them useful and adoptable in order to increase the number of people in the sincere category.

Methodologies are seen as an elusive phenomenon that has generated great interest in academic and practitioner's communities. They are being developed at a high rate, while the adoption rate is still considered low. It is questionable whether the adoption rate will ever increase drastically. It is human nature to adopt, deviate or reject prescribed ways of doing things. Nevertheless, our effort in improving methodologies should be directed towards people who are sincerely willing to adopt methodologies. Only when successful results are visible, will we be able to convince others to follow.

Finally this chapter ends with the questions raised by Russo and Stolterman, 2000, p.325):

> *Understanding why we are doing ISM (SDM) research can better guide us in determining how to do it. Currently there is no discussion on the issue of research purpose. We believe that there is a whole field of underlying assumptions around ISM (*SDM*) research purpose that also has to be revealed and analyzed.*

The words 'whole field' in the above statement by Russo and Stolterman have been taken to mean that there is a foundation or structure that needs to be unraveled, on which we can reflect to further our understanding of the basic characteristics of an ideal methodology. The search for the 'ideal' is the ultimate aim of this research. It may sound like an ambitious effort, but the derived answer might be a simple and practical one, an answer that will help us to understand current research and to guide future research.

As has been mentioned earlier, this thesis treats methodologies from a generic viewpoint and takes an information security methodology as the focus of the study to provide the means for understanding. The end product of this research is a proposed theory that conceptualises methodologies in an attempt to resolve some basic issues discussed in

this chapter. The outcome should be of a value to IS methodology developers, who need quality criteria to construct an adoptable methodology, IS developers who need to evaluate and select methodologies and academics, who have invested interest in the ongoing research on methodologies and for those who are calling for theorising the IT-Artifact, and who are seeking a core or theories for the IS discipline. The proposed theory is not meant to be the ultimate perspective on methodologies. Methodologies are complex phenomena, which may need more than one theory or perspective to enable us to understand them. The theory proposed in this thesis may be one of them.

Finally, to characterise how something is perceived or thought about by practitioners, is by nature a qualitative question, which requires a qualitative research method. The next chapter will discuss the research paradigm and assumptions that were adopted to seek answers to the research questions raised in this chapter.

3

RESEARCH FRAMEWORK

Researchers need to spell out their research paradigms and assumptions for readers to understand the world view adopted on the subject being studied and to assess the quality of the evidence for conclusions. This chapter discusses the nature of knowledge and its construction as represented in this thesis by the research framework. The framework is inspired by various theoretical assumptions and research approaches making up the researcher's world view. The research 'world view' determines the source of data collection, methods of collection, analysis and presentation. In other words, it is my way of observing, reading, understanding, comprehending the phenomena and conveying the findings verbally and graphically.

This chapter begins with section 3.1 discussing various issues concerning theories since developing a theory is the primary objective of this study. This chapter provides a detailed discussion on the research framework and the various stages that were adopted to attain the research objectives. The research framework is covered in sections 3.2 to 3.7 and the chapter concludes with a summary in section 3.8.

3.1 Theories

The rationale of this thesis is driven by the development of a foundation theory to assist in understanding and explaining the concept and the essence of methodologies. Therefore, it is useful to discuss: what are theories? Why we need theories? What types of theory are there and what is the process of theory building? These issues are discussed in section 3.1.1 to 3.1.4. The purpose of such discussion is to provide a context for the research outcome in order to appreciate what is being accomplished, how it was accomplished and to enable other researchers to refute, extend or refine the accomplishment. The discussion here also helps in establishing the terminology used in the theory building processes of this study. I have placed the discussion of 'what is a good theory' under the 'Quality of Research' in section 3.5.

3.1.1 What are theories?

There is a continuous call for good theories in the IS field. The proclaimed statement by Kurt Lewin "There is nothing so practical as good theory" still holds strongly, especially in the IS discipline – a discipline that still suffers from clarification of what a theory is (Gregor, 2002). There are many perceptions of what constitutes a theory. Researchers are being criticised for using the word theory and failing to define what the term means in the context of their research (Gregor, 2002).

Theories serve to differentiate science from common sense (Reynolds, 1971). Handfield et al. (1998) sees research efforts as being directed towards knowledge development by creating, extending or discarding theories.

In some of the scientific literature there is still a lack of consensus on what constitutes a theory. Reynolds (1971, p.11) argues that the word 'theory' is being misused to refer to other formulations, "usually abstract, including (1) vague conceptualizations or descriptions of events or things (2) prescriptions about what are desirable social behaviors or arrangements, or (3) any untested hypothesis or idea". Reynolds referred to

the above formulations as being typology and they do not fulfill the 'goal of scientific knowledge.' On the other hand, Doty and Glick (1994) contest and argue that typologies are a form of complex theories, but are parsimonious in nature with the capability of describing and predicting complex organisations. They are considered complex because they provide multiple levels of theory. Typologies are often confused with classification and taxonomies. Mckinney (1970) argues that typologies operate as theory since they have structure with functional consequences. Typologies represent an ideal type in an abstract form, i.e. having fundamental elements (empirically derived) with relationships between them. They serve as a conceptual tool to measure the extent of deviation of a phenomenon from the ideal (McKinney, 1970). They are also used to develop hypotheses or propositions (Doty and Glick, 1994).

Strauss and Corbin (1998, pp.15 & 22) define theory in the context of the 'Grounded Theory' method as:

> *a set of well-developed concepts related through statements of relationship, which together constitute an integrated framework that can be used to explain or predict phenomena …The statements of relationship explain who, what, when , where, why , how and with what consequences an event occurs.*

Similarly, Wacker (1998) argues that a theory constitutes a set of defined variables, constructs, concepts (who & what), the domain or the condition of operation, and stated relationships between the variables (why & how) that lead to a set of predictions. The purpose of the 'what' and 'how' is to provide a framework to describe the phenomena while the 'why' is used to explain the interaction between the variables (Whetten, 1989). The 'when' and 'where' should also be identified specifically when the theory is substantive as opposed to being general theory.

Theories may be presented graphically or textually to represent an abstract of the real world in the form of models, concepts, frameworks...etc. Theories are derived from the experiences of people and analysed using reasoning. Kaplan (1964, pp.296 & 268) looked at theories as being "a symbolic construction" that "guide the collection of data

and their subsequent analysis, by showing us beforehand where the data are to be fitted, and what we are to make of them when we get them".

Popper (1980, p.59) had a similar perspective on what theories are: "Scientific theories are universal statements (i.e. not pertaining to instances). Like all linguistic representations they are systems of signs or symbols …Theories are nets cast to catch what we call 'the world'; to rationalize, to explain and to master it". Reynolds (1971) classified statements in two groups; one affirms the existence of the concept while the other describes the logical relationship between the concepts.

Bacharach (1989, pp.496 & 498) provides a simplified and encompassing definition of theory:

> *A theory is a statement of relations among concepts within a set of boundary assumptions and constraints. It is no more than a linguistic device used to organize a complex empirical world… The primary goal of a theory is to answer the questions of how, when and why, unlike the goal of description, which is to answer the question of what.*

Standalone units are not seen as theory by Dubin (1978), unless they are joined together by a model to represent the theory under construction. Dubin (1978, p.216) defines theory as:

> *A model of some segment of the observable world. Such a model describes the face appearance of the phenomenon in such terms as structures, textures, forms and operations. In order that such a model be considered dynamic, it also describes how the phenomenon works, how it functions…It is clear, then, that scientific models are holistic in that they put together both structure and function into closed systems whose characteristics are the consequence of the elements composing the system and the laws by which the elements interact among themselves.*

Similarly Gregor (2002, p.4) views theory as:

> *Abstraction and generalisation about phenomena, interactions and causation are thought to be at the core of a theory. We do not regard a collection of facts or knowledge of an individual fact or event, as theory.*

Kaplan (1964, p.301) identifies theory as having levels of abstractness – the high level being the micro theories while the low level refer to macro theories. There is a common understanding that theories based on subjective interpretation are susceptible to revision as new knowledge becomes relevant (Strauss and Corbin, 1994).

To sum up, there are many perceptions of what theories are. Theories are a level of abstraction representing some aspect of a phenomenon using a form of linguistic device such as text and diagrams and are derived by scientific approaches. The term theory in this thesis refers to a construction of causal related variables and propositions used to describe, predict, explain, understand and control a phenomena in the empirical world. Ideally, a theory is general, i.e. abstracted at a high level to provide a more universal explanatory scheme for a broad range of phenomena. Theories are useful in providing a perspective to answer questions that are related to the what, how and the why question of the phenomena.

Topologies, classifications and taxonomies are not the objectives of this thesis. What is being developed is a theory with well-defined variables that may represent one perspective on the characteristics of an ideal problem solving methodology to assist practitioners and researchers to understand methodologies better and to generate conjectures and hypotheses. The next two sections elaborate on the value of theories and their different types.

3.1.2 Why Theories?

Theory and theory-building are essential for the advancement of knowledge in the IS discipline. Theories – "serve to satisfy a very human 'need' to order the experienced worlds" (Dubin, 1978, p.7). Without theories data collected would be regarded as "miscellany of observations" (Kaplan, 1964, p.268). Knowledge or science is the product of theory creation. Kaplan (1964, p.280) put forth reasons for science: "Science

always simplifies; its aims is not to reproduce the reality in all its complexity, but only to formulate what is essential for understanding, prediction, or control".

Reynolds (1971, p.4) stated five reasons why people wanted scientific knowledge to provide:

1. a method of organizing and categorizing 'things', a typology
2. predictions of future events
3. explanations of past events
4. a sense of understanding about what causes events and
5. the potential for control of events

Wacker (1998) argues that theories can be used as frameworks for analysis, as a means to further the field of research and provide an explanation for the "pragmatic world". Glaser and Strauss (1967, p.3) include another important aim of theory and that is to provide 'a style for research' for a specific area of study.

Dubin (1983, p.26) looked at theory as being "the attempt of man to model some aspect of the empirical world". Dubin highlights two reasons behind the development of theories:

> *1) that real world is so complex it needs to be conceptually simplified in order to understand it, or 2) that observation by itself does not reveal ordered relationships among empirically detected entities. A theory tries to make sense out of the observable world by ordering the relationships among elements that constitute the theorist's focus of attention in the real world.*

Theories in IS research are used during the full cycle of research from initiating the study to the production of the final outcome. Walsham (1995a, p.76) has identified three important areas where theories have been used in the research process such as:

1- as an initial guide to design and data collection
2- as part of an iterative process of data collection and analysis
3- as a final product of the research

A major contribution of a theory is its ability to provide reliable and accurate prediction and to provide a different way of understanding the phenomenon being observed (Dubin, 1978). Practitioners seem to value the characteristics of prediction more than understanding. Prediction means, if a change occurs in the value of an element, we can then expect a certain change in a certain behavior. Dubin (1978) differentiates between prediction and understanding in terms of knowledge of outcome and knowledge of process.

The value of theories in this thesis is seen as way of simplifying and conceptualising problem solving methodologies to provide understanding of their nature and to facilitate further research.

3.1.3 Types of Theories

There are various types of theories and it would be useful to know the type this thesis is offering in order to understand the nature of the contribution being made to our body of knowledge.

Theories are either ‘substantive’ or ‘formal’. Substantive means that the theory is valid for the context where the data was collected or other contexts where there is resemblance in the environment. Formal theories are grand theories that are applicable to wider applications (Glaser and Strauss, 1967). The goal of this research is to develop a substantive theory that should be subjected to further testing to check its eligibility for a formal theory.

Gregor (2002, pp.6-13) highlights five different types of theory that are relevant to the IS field. These categories are interrelated and are not meant to be exclusive, as follows:

1- **Theory for analysing and describing**: This refers to the theory that provides description ("what is") such as the theory developed by Kwon and Zmud (1987) related to the factors of information systems implementation.

2- **Theory of Understanding:** This type of theory is developed to provide answers to "how" a phenomena occurred and "why" it occurred. An example of such theory is the 'Structuration theory' developed by Giddens (1984).

3- **Theory for Predicting**: This type of theory is statistical in nature. Its primary use is to predict and provide answers in the form of "what will be". Examples of theory of this type in IS are not evident.

4- **Theory of Explaining and Predicting**: This theory is a combination of the above theories of "what is", "how", "why" and "what will be". This type is useful for theory building or theory testing. Little development of this type occurs in the IS field. Gregor (2002) highlighted that all research methods may be used to develop theories of such natures.

5- **Theory for Design and Action**: This type of theory relates to "how to do" something. It is more of a constructivist outcome. This type of theory may be based on all the above, an example of which is SSM by Checkland (1981).

The theory being developed in this research aims at a 'theory of explaining and predicting' and also for constructing more theoretically sound methodologies. As I have mentioned earlier, no definite claims of generalisability are being made in this thesis. At the conclusion of this research, the theory stands as being locally valid i.e. substantive, but needs further testing to enable generalisation for different types of methodology.

3.1.4 Theorising

Theorising is the act of building or extending theories by integrating and generating concepts and statements of relationships (Strauss and Corbin, 1998). This section explicates the process of theory building to give the reader an appreciation of the craft.

The academic literature offers many different approaches to theory building (e.g. see Glaser and Strauss, 1967; Strauss and Corbin, 1998; Schatzman, 1991; Yin, 1984; Eisenhardt, 1989; Galliers, 1992; Pare, 2004).

Dubin's (1978, p.p.8-9) model of theory building is one of the most cited works. It requires the researcher to go through a systematic approach by identifying five requirements for the development of a theoretical model, as follows:

1- Identify and define the elements that closely resemble the phenomena under study.
2- Establish a relationship between two or more elements. These relationships are expressed in 'lawful' statements.
3- Determine the boundary or context where the theory must operate to be considered as valid. For example the theory is valid for a specific type of an organisation.
4- Determine the system state i.e. specifying conditions under which the elements of theory are operative over a period of time.
5- Development of logical propositions deduced from the theory.

Dubin's model of theory building has three additional phases to guide the researcher in the process of empirical validation namely:

6- Determining empirical indicators.
7- Development of hypotheses.
8- Testing the predicted values and relationships.

A theorist can develop theories using either a qualitative or quantitative approach, but the common practice is to go usually through the theory building process (1-5) requiring qualitative research approaches to develop the theory and the empirical process (6-8) to develop an effective and valid theory requiring positivist research approaches (Goulding, 2002). These two processes are usually treated as two separate efforts by researchers. Qualitative research is seen to have an important role in the discovery, development and also testing of theories.

Strauss and Corbin (1998, p.22) explain the core act of theorising as:

> *At the heart of theorizing lies the interplay of making inductions (deriving concepts, their properties, and dimensions from data) and deductions (hypothesizing about the relationship between concepts, the relationship also are derived from data, but data that have been abstracted by the analyst from the raw data)*

Morse (1994, pp.32-33) provides a more descriptive and colorful account on theorising:

> *Theorizing is the constant development and manipulation of malleable theoretical schemes until the "best" theoretical scheme is developed. It is a process of speculation and conjecture, of falsification and verification, of selecting, revising and discarding. If one ever finishes, the final 'solution' is the theory that provides the best comprehensive, coherent and simplest model for linking diverse and unrelated facts in a useful, pragmatic way. It is a way of revealing the obvious, the implicit, the unrecognized, and the unknown. It is a way of discovering the insignificance of the significant and the significance of the insignificant …Theorizing is the process of constructing alternative explanations and of holding these against the data until a best fit that explains the data most simply is obtained.*

The theorising process is sometimes considered as a creative act that follows a systematic approach to ensure a rigorous outcome (Strauss and Corbin, 1998). It involves extensive analysis in deriving elements, attributes and relations; it is seen as an "interplay between researchers and data" (Strauss and Corbin, 1998). This interplay or data analysis is succinctly explained by Morse (1994, p.25):

> *Data analysis requires astute questioning, relentless search for answers, and accurate recall. It is a process of piecing together data, of making the invisible obvious, of recognizing the significant from the insignificant, of linking seemingly unrelated facts logically, of fitting categories one with another, and of attributing consequences to antecedents. It is a process of conjecture and verification, of correction and modification, of suggestion and defense. It is a creative process of organizing data so the analytic scheme will appear obvious.*

The purpose of theorising and data analysis is simply a way of finding the whole by finding the main parts and their interrelations (Tesch, 1995).

Following from Dubin's (1978) model of theory, this thesis only covers the first five steps i.e. identify the elements, their relationships, context for the theory, state of elements and formulating propositions. Testing of the outcome is left for further research. As Dawis (1984, p.468) says: "theory is the end product of scientific activity, but an end product that is never final because it is subject to revision and eventual rejection if a better theory is found".

So far I have given an overview of what theories are, their importance and what is involved in their building process. I have also argued my stance on what a theory is and what is being attempted in this study. The following section discusses the framework that was constructed to answer the research questions.

3.2 The Research Frameworks

This section discusses the need for an appropriate research framework to facilitate the coherence of the research process and authenticity of outcome (section 3.2.1). It also outlines the main stages of the constructed research framework (section 3.2.2) and paves the way for detailed discussion of the various stages.

3.2.1 The Need for a Research Framework

One needs to make a match between the research purpose and the research approach (Benbasat, 1984). The aim of this dissertation as discussed in the previous chapter is to unravel methodologies leading towards a substantive theory. The unravelling process is a compilation of research strategies to ensure rigorous and relevant outcomes or propositions. Franz and Robey, 1987, p.206) argue that findings are a function of the research approach:

> *We suspect that mixed or weak findings typically found in IS studies are caused by a failure to use appropriate methodologies for developing and testing ideas about processes.*

Research methods are not prescriptive nor bureaucratic procedures (Garcia and Quek, 1997) and they do not have to be followed exactly. They are essentially other people's experience and strategies on how they have arrived at their conclusions.

Baskerville and Wood-Harper (1996, p.236) argue that IS researchers may conduct research and contribute to the body of knowledge without 'grappling with the philosophical literature' of research. The literature concerning the topic of 'knowledge' is somewhat extensive, confusing and contradictory. Knowledge building without an appropriate theoretical grounding on certain reality may lead to useful findings, however, ambiguity on its appropriate use and value might be threatened. Hirschheim and Klein (1992) stress the importance of theoretical underpinning of the research to allow us to understand 'what constitutes valid research'. Similarly, Burrell and Morgan (1979, p.397) highlight the importance of establishing a sound research framework:

> *Theorists who wish to develop ideas in these areas cannot afford to take a short cut. There is a real need for them to ground their perspective in the philosophical traditions from which it derives; to start from first principles; to have the philosophical and sociological concerns by which the paradigm is defined at the forefront of their analysis; to develop a systematic and coherent perspective within the guidelines which each paradigm offers, rather than taking the tenets of a competing paradigm as critical points of reference. Each paradigm needs to be developed in its own terms.*

Franz and Robey (1987) argue that the IS discipline does not have its own distinctive research methods; therefore IS research methods depend on an amalgamation of methods from different disciplines. Cayave (1996, p.239) argues that research in the IS field may take a pluralistic approach to study a phenomenon "which implies that the use of different approaches and methods is appropriate and valid. Pluralism argues that it is the combined knowledge gained from using a variety of research strategies that enables a truly full and rich body of knowledge on phenomena to emerge".

Therefore, researchers are required to formulate their own assumptions and create their own approaches or follow the footsteps of others. Researchers are encouraged to find new ways of answering their research questions as a way for advancement of the area of research methods. Walsham (1995a) warns following research theories strictly may hinder the researcher in exploring new areas - flexibility to modify the theory in use is appropriate. However, quality of process and outcome are expected.

The quality of the research process and its outcome is governed by the explication of 'how and what has happened' implicitly or explicitly to demonstrate that rigor is interwoven in the course of the research and to provide details of assumptions or presuppositions used. Therefore, research that is not clear of its philosophical underpinning will leave traces of ambiguity on the research's intentions, actions and outcomes.

A research framework is usually composed of a research paradigm, methods and assumptions pertaining to the source, acquisition and comprehension of knowledge. A framework may also be viewed as a series of strategies that are used to go beyond the description of the phenomenon. This is seen as a challenge by Mckinneny (1970, p.255):

> *The challenge is not merely to describe social phenomena or events from an observer's perspective, but to get inside the event to see what kind of conceptual equipment or theories they are themselves utilizing as they organize the phenomena in their daily lives.*

Having argued the importance of underpinning the research inquiry, the following research framework was designed and underpinned on a specific understanding of beliefs and assumptions. It is viewed as a web of instruments for theory building. The following six sections will discuss the framework that was adopted as the means of attaining the thesis objectives.

3.2.2 The Adopted Research Framework

The adopted research framework for this study is my perspective in viewing and pursing the research problem (Orlikowski and Baroudi, 1991). It is a perspective formulated based on existing knowledge, my beliefs, and previous experience (Carroll and Swatman, 2000). The framework depicted in Figure 3.1 is composed of a series of circles that represents the stages of the theory building process that was used for this thesis. The core of the framework is the aim of the research which is building a substantive theory and propositions (G) developed to address the research problems raised in Chapter 2 (A). The theory was derived using the interpretivist approach based on my adopted ontological and epistemological assumptions (B) using a single qualitative case study (C) and qualitative approaches for data collection on the basis of observable reality using practitioners. Focus groups, observations and interviews were used for data collection (D). Qualitative approaches such as the Hermeneutic circle (E) were used in theorising the theory. A set of quality research criteria was employed (F) to ensure rigour was being applied to the data collection and analysis processes. The findings (G) were later discussed and compared with the existing literature to determine the level of plausibility, potential utility of the proposed theory and to extend existing theories (H). The last stage of the framework is the conclusion (I) used to summarise my contribution to the body of knowledge and to bring the research to an end.

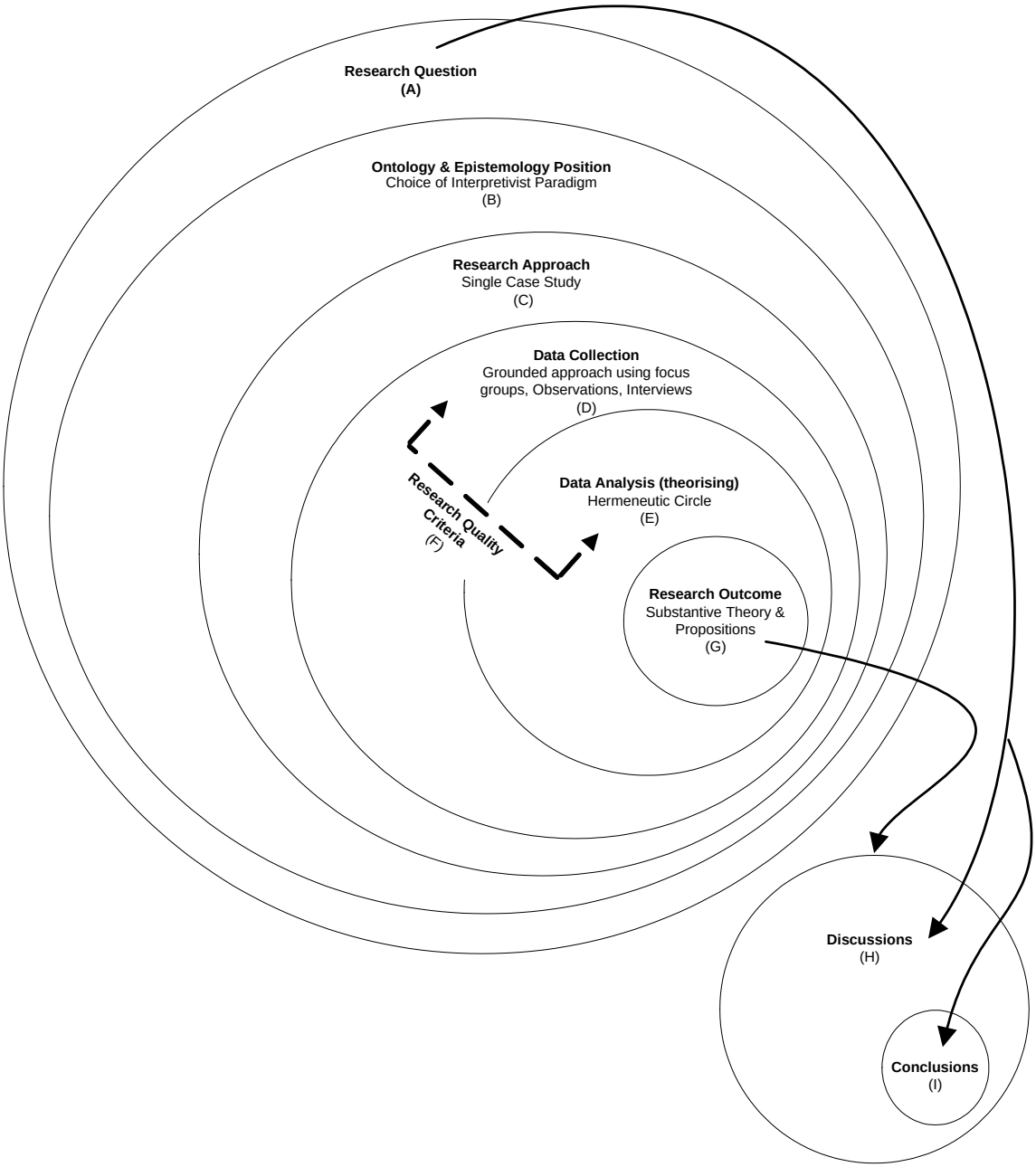

Figure 3.1: The Adopted Research Framework

The framework is however, complex and requires further elaboration. The following sections will explain the details of each stage of the framework. Chapter 4 is an application of the framework and will also provide more explanations using empirical data.

This chapter will proceed with section 3.3 to discuss the beliefs, assumptions and choice of paradigm that were adopted for the research process (Stage-B). Based on the chosen epistemology, a qualitative case research was selected as an umbrella for data collection and analysis, which is discussed in section 3.4. (Stages C, D and E). No research is complete without adhering to certain quality criteria to ensure rigor. A list of quality criteria and principles (Stage-F) is developed, discussed and outlined in section 3.5. A discussion of the literature review stage (Stage-H) is covered in section 3.6 and finally the conclusion as the last stage of the framework is discussed in section 3.7 (Stage-I).

3.3 Beliefs and Assumptions (Stage-B)

This section discusses my stance on ontological and epistemological issues, how knowledge is acquired. This section also covers a discussion on the interpretivist paradigm as the chosen approach for pursing this research.

Assumptions and beliefs are research building blocks and are expressed in what is commonly known in scientific inquiry as ontology, epistemology, and methodology (Guba, 1990, Creswell, 1998, Orlikowski and Baroudi, 1991). Table 3.1 defines ontology, epistemology and methodology. Such blocks guide researchers in planning, understanding, and comprehending things and events and to permit validation and justification of research outcomes.

Assumption	Definition
Ontology	What is the form and nature of reality?
Epistemology	How may reality be known?
Methodology	What steps that must be followed to acquire knowledge?

Table 3.1: Knowledge development building blocks

Grounding the research based on ontological and epistemological beliefs can only provide a stronger foundation for contribution towards tradition of knowledge accumulation in the IS discipline.

There have been and will always continue to be conflicting opinions on what constitutes a truthful set of assumptions or beliefs among philosophers, scientists, historians and theologians. This conflict stems from the theory behind ontology or what characterises the nature of reality. However, researchers need to adopt certain theoretical or assumed positions to underpin their research. Mckinneny (1970, p.254) asserts that:

> *A scientist, however, has to assume that there is a certain order in the social world because the logical prerequisite of any induction or empirical generalization he makes is the recognition of the validity of the principle of uniformity, which holds that there have been and will be regularities or uniformities in phenomena because of a lasting order of things in the universe.*

In order to achieve the objective of research in a scientific manner, one needs to establish a sound research framework based on ontological, epistemological and methodological grounds. The next section is a discussion of my stance concerning these issues.

3.3.1 Acquiring Knowledge

This section discusses the fact that subjective and objective perspectives are both ontologically valid which also means that the subjective world of people is also

epistemologically legitimate. This section also discusses my adopted perspective on how knowledge is perceived and constructed.

I have adopted an Islamic conception of the source of knowledge. The source of knowledge in Islam is believed to be from existence and revelation, i.e. the creation of God and revelation of God (Idris, 1987). According to this epistemological position, all knowledge originally emanates from God and He has taught the first man, 'Adam' with the names of everything (Qur'an 2:31). The word 'names' means the essence and knowledge of all things in creation. However, every human being is born ignorant, and God provided him/her with hearing, vision and intellect as expressed in the phrase from the Qur'an (Qur'an, 33:78).

> *Allah (God) brings you forth from the wombs of your mothers knowing nothing, and gives you hearing and sight and hearts (minds).*

Knowledge is then acquired after birth through senses and intellect. But this does not mean that the mind is a blank slate at birth. A person is born with innate natural propensities that may be overridden by external factors. The other source of knowledge is received through revelation but it is also acquired through the senses and minds (Idris, 1987). The view of reality in Islam is that it must be sensed, but this does not mean that everyone should sense it at the same time. Islam does not accept dichotomy or dualism of reality but acknowledges convergence and a unity in diversity (Dhaouadi, 1993). Therefore, the two extremes of perspectives on reality – nominalism and realism (Burrell and Morgan, 1979) do coexist together under Islamic understanding. This thinking is in line with a fundamental Islamic principle of 'oneness', which states that "the world and the universe are the creation of the One Creator, which means that everything in them must ultimately reflect the unity" (Dhaouadi, 1993, p.155). Finally, knowledge from the Islamic perspective will always remain limited and relative regardless of how novel and rigorous the scientific method used; this understandings comes from the verse "And you were given but little knowledge" (Qur'an, 17:85).

I have argued on my conception of the nature of knowledge used in this research. The following is an explanation of how knowledge is acquired, based on the understandings provided by Ibn Khaldun (1332-1406) in his book "The Muqaddimah" or "An Introduction to History" translated by Rosenthal (1967).

Information is acquired through perceptions derived through our senses and through one's reasoning and judgment, which leads to acquisition of newer knowledge. Perception (imagery) is awareness of knowledge, which is not accompanied by the exercise of judgment. When knowledge is accompanied with perception, it becomes apperception. Through apperception we gain new knowledge of realities constructed from past experience. The apperception then reverts to perception and the cycle continues between perception and apperception. This is how knowledge and consciousness is transformed and enriched. Therefore knowledge is either a perception of the essence of things or apperception based on past experiences and making judgments.

Ibn Khaldun argues that man also perceives things through his ability to think. Ibn Khaldun (p.334) distinguishes between three types of thinking or intellect, namely, discerning intellect, experimental intellect and speculative intellect: The discerning intellect is "man's intellectual understanding of the things that exist in the outside world in a natural or arbitrary order, so that he may try to arrange them with the help of his own power. This kind of thinking mostly consists of perceptions. It is the discerning intellect, with the help of which man obtains the things that are useful for him and his livelihood, and repels the things that are harmful to him". Experimental intellect "provides man with the ideas and the behaviour needed in dealing with his fellow men and in leading them. It mostly conveys apperceptions, which are obtained one by one through experience, until they have become really useful". Speculative intellect "provides the knowledge, or hypothetical knowledge, of an object beyond sense perception without any practical activity (going with it)…it consists of both perception and apperception. They are arranged according to a special order, following special conditions, and thus provide some other knowledge of the same kind, that is, either

perceptive or apperceptive. Then, they are again combined with something else, and again provide some other knowledge. The end of the process is to be provided with the perception of existence as it is, with its various genera, differences, reasons, and causes. By thinking about these, man achieves perfection in his reality and becomes pure intellect and a perceptive soul". We can conclude that Man's ability to think involves various modes of thinking that may lead him to success - imagination, analysis and synthesis, however, if the initial perception is flawed, all the subsequent thinking is also flawed.

3.3.2 The Adopted Ontological and Epistemological Position

This thesis is driven by the supposition that methodologies have basic structures or an essence with certain basic attributes. A realist view may be adopted to abstract the structure by examining several methodologies to determine their essence. This was not really sufficient, because I wanted to conceptualise the essence of an '*ideal methodology*' as perceived or apperceived by practitioners (nominalism view). The assumption is that the ideal methodology is a mental construction resulting from acquiring knowledge and accumulation of experience gained while solving practical problems. Probably, the first methodology was developed from a perception that may have been learned from observing nature (realist view). This is seemed to be in line with the constructivist view "Knowledge and truth are created, not discovered by mind" (Schwandt, 1994, p.125). Also, Goodman (1978, p.6) made a similar remark: "world making as we know it always starts from worlds already on hand; the making is a remaking" (citied in Schwandt, 1994).

Therefore a dichotomy between relativist and realist views is not a possibility; both paradigms converge to give one unified reality. Convergence provides evidence of accuracy and objectivity. A phenomenon can not be schizophrenic; it can have only one reality with different perspectives. Structuration theorists combine both subjectivist and objectivist perspectives. Gioia and Pitre (1990, p.592) argue that Structuration theorists

study simultaneously the interaction between "human actions and the established organizational structures … they consider social construction processes together with the objective characteristics of the social world".

Methodologies are socially constructed by developers through acquiring knowledge and building experience relying on the three mentioned levels of thinking (Ibn Khaldun, 1967). Therefore, the initial source of the data to be collected will be from a shared or similar mental image (perception and apperceptions) of what might be the essence of an ideal methodology captured from a group of practitioners who have acquired knowledge in problem solving practices. Thus the source of acquiring knowledge for this thesis is through the lived experience of people. Experience as viewed by Morse and Richards (2002, p.44) is "an individual's perceptions of his or her presence in the world at the moment when things, truths, or values are constituted". However, to understand practitioners' perceptions and to comprehend the phenomenon, one needs to also physically understand the artifact.

The epistemological position of this thesis is borrowed from a number of methods. The basis of this research is similar to the ontological and epistemological assumptions of the phenomenology research approach. Phenomenology is useful for describing the essence or the appearance of a phenomenon. Its main assumption is that the perception of practitioners represents the real world (e.g. of methodologies and their use) and it is not of just an imaginary thought. The second assumption is that people are understood in their own context (Morse and Richards, 2002). Phenomenology is an approach that depends on capturing the experience of individuals about a concept or a phenomenon (Creswell, 1998). These approaches have been used to gain in-depth insights into human nature.

Phenomenology emphasises the intentionality of consciousness i.e. the "direction of consciousness towards understanding the world" (Sadala and Adorno, 2001, p.283), which means that the various actions of people, whether explicit or implicit, have meanings when directed towards an object or event. Therefore, the researcher attempts

to read the intentionality of consciousness (lived experiences) of practitioners towards the phenomenon in order to understand its essence. It is also believed that a phenomenon can not be captured in its totality but a structure of the phenomenon may emerge after the convergence of several perspectives from different people (Sadala and Adorno, 2001). Husserl (1859-1938) views reality as being the "meaning of an object that appears in consciousness" (Creswell, 1998, p.53).

Hermeneutic (interpretive) Phenomenology or existential phenomenology developed by Heidegger (1978) and Merleau-Ponty (1962) is explained by Goulding (1999, p.864) as the endeavor to discover the nature of "being" and "this is to be found in consciousness and the type of existence that humans have. This existence is in turn dictated by the various ways in which the world is structured". This indicates that research participants should be selected based on the experience they have, i.e. the sampling should be purposive and planned. Therefore participants should be selected only if they have lived the experience of the phenomenon being studied (Manen, 1990). The outcome of a phenomenological study is usually a descriptive account to gain better understanding of the essence of the experience, i.e. resulting in a single unifying meaningful experience (Carpenter, 1999; Creswell, 1998).

The Phenomenological approach was not considered a possibility for this thesis since the objective of this research was to arrive at more than a description of the phenomenon. Its assumptions are only adopted to inform data collection.

This thesis has accounted for the lived experience of practitioners as the primary source of data to understand the essence of methodologies. This required an appropriate choice of paradigm to ground this research.

3.3.3 Interpretivism as the Chosen Paradigm

After having established the nature and the source of knowledge for the thesis, the next step was the adoption of the interpretive paradigm for the development of the desired theory. Research methods based on interpretive paradigms are appropriate for capturing and understanding the rich experience of practitioners. The focus of this research, as mentioned earlier, is to conceptualise the reality of methodologies through an explorative investigation of the interaction between a group of practitioners and a methodology, as an attempt to uncover the essence of an ideal methodology.

Galliers's (1992) research approaches taxonomy is a useful guide that researchers can use to validate their choice of an approach(es). The taxonomy is recognition that there is no one universally applicable research approach. Galliers's taxonomy classifies approaches into the scientific (positivist) and interpretivist approaches being cross referenced by the objective of the research, e.g. to study a technology or to build and test theories. Upon examination of the taxonomy, it can be seen that the interpretivist approaches are a viable means for building theories. The type of research that this thesis has adopted would fall under the descriptive/interpretive research which belongs to the phenomenological and hermeneutics school of thought (Boland, 1985).

The term 'paradigm' was brought into focus by Thomas Kuhn (1970) in order to describe research practices. The two distinctive paradigms in IS research are based on either positivist or interpretivist assumptions. Positivists assume that the social world is objective, rather than subjective or socially constructed i.e. the interpretivist view (Hirschheim and Klein, 1992; Gillham, 2000; Galal, 2001). Guba (1990, pp.20 & 23) distinguishes between positivist and postpositivist (interpretivist) perspectives on ontology: the positivist believes that there is a "reality exists 'out there' and is driven by immutable natural laws and mechanisms", whereas the postpositivist argues that "reality exists, but can never be fully apprehended. It is driven by natural laws that can be only incompletely understood".

Researchers using the positivist assumptions use quantitative and experimental methods to test theories and to arrive at causal explanations and fundamental laws. Interpretivist research uses qualitative and naturalistic approaches to inductively understand people's experiences in their natural settings and to derive theories and propositions that may be tested later using a positivist approach. Both paradigms have also been accepted by the research community as being capable of developing and testing theories (Yin, 1984). Most studies in the IS community are based on the positivist assumptions, however, the interpretivist paradigm is gaining more support as an alternative to the positivist approach. Interpretivist research is preferred when the research aims at capturing the stakeholders' conceptions, experiences and understandings (Hirschheim and Klein, 2003). Some scholars recommend the integration of both methods since each approach has its own perspective, appropriateness and merits (Lee, 1991; Kaplan and Duchon, 1988; Gable, 1994). The combined approaches result in a better approximation of the truth.

Franz and Robey (1987) argue that data collected using an interpretivist approach provides opportunities to uncover more meaningful understanding than using a method that uses a questionnaire to collect data that is limited in scope and stripped of its context. Fine and Elsback (2000) describe data collected using methods based on interpretivist assumptions as being "rich" and are more appropriate to produce theories that describe real-world issues more realistically.

Interpretivist research is becoming a standard approach to understanding practitioners' behaviours and their ways of thinking towards use and development of information systems (Klein and Myers, 1999; Walsham, 1995b). Interpretivist approaches give researchers the opportunity to immerse themselves in the data and to understand by inferring from the meanings that people have assigned to the data, while positivist approaches are not useful for developing rich meanings.

Vickers (1999, p.255) argues that interpretivist research should be employed "to assist in creating a new IT development epistemology to spare us from further IT implementation

disasters". Vickers has examined IT development methodologies over the past 30 years, highlighting the problems that have been created due to lack of attention to humanistic aspects, such as capabilities and limitations that are considered as keys to success. Vickers strongly contended that uncovering how people think and experience a phenomenon must be done through an interpretivist approach. Positivist approaches have failed to give deep insights and rich data on the specifics of methodologies.

The interpretivist ontology assumes that the reality of the object is inseparable from the subject or the observer (Weber, 2004). The epistemology of the interpretivist is said to be socially constructed from the composite of the culture, experience, history, beliefs and theoretical knowledge and so on. We usually associate the word 'quantitative' for approaches that are based on the positivist's epistemology, i.e. using an instrument to collect data. The word qualitative relates to approaches that are interpretivist, i.e. collecting and interpreting information from interviews and other texts. Methods of data collection based on the interpretivist epistemology collect rich data that require qualitative and/or quantitative data analysis methods.

To sum up, in-depth understanding of a phenomenon is best achieved through interpretive research (Orlikowski and Baroudi, 1991; Walsham, 1995a). In this thesis, an interpretivist approach was chosen because it is an appropriate and effective choice for capturing the ways practitioners think about methodologies and gaining in-depth understanding of the basic elements of a methodology. The choice for an interpretivist and not a positivist epistemology was driven by the research questions and my perspective on the phenomenon. The next section discusses in more detail qualitative approaches as the basis for the methods used in this research to generate and analyse qualitative data.

3.4 Research Approach (Stage C)

The research approach that was adopted for the research is based on qualitative research methods. A qualitative research method refers to the strategy for data collection and analysis based on the adopted epistemology. Creswell (1998, p.15) defines qualitative research as:

> *Qualitative research is an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem. The researcher builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting.*

Theories developed using qualitative approaches are more representative of the real-world. Qualitative methods based on the interpretivist's epistemology involve entering the field or the natural setting of the phenomenon under examination and thus generating 'rich' data for interpretation by the researcher. Rich or qualitative data are the results of meaning allocated by people to events and objects (Manen, 1990).

There are many qualitative approaches in use by the inquiring disciplines. The qualitative approach that I have adopted in this research may be classified as an approach for the 'discovery of regularities' (Tesch, 1995). These approaches are characterised as a process of uncovering 'properties', concepts, and variables, with the possibility of establishing relationships among them (Tesch, 1995).

In these approaches, researchers are interested in determining regularities and variations in data patterns, which are seen as useful in enabling reflections and understandings. Qualitative research infers knowledge by studying the behaviour of people or objects in their natural or simulated settings while they are interacting with their contexts, boundaries and time. Researchers using qualitative approaches collect data from the words, actions, and symbols (explicit and tacit knowledge) of people. Qualitative approaches such as ethnography, grounded theory, phenomenology and symbolic interactionism or any derivations of them may be used to unravel people's perception of

an IT phenomenon (Vickers, 1999). Fine and Elsback (2000, p.55) outline the role of participants in research:

> *Qualitative research is based on the assumption that informants are excellent judges of which issues are worth examining. By permitting one's informants to set the agenda, underlining their perspectives, we generate theory based upon data that are linked to the immediate experiences of participants rather than to the removed experience of researchers, who are constrained by their methodological choices…(researchers) who use(s) qualitative data in their theory building can explain naturalistic behavior.*

The direction of this study as I have previously mentioned, was motivated by the fact that theory is absent in the area that is being studied, therefore a decision to follow a process of theory development by empirical means using qualitative method based on an interpretivist epistemology was appropriate.

3.4.1 Case Research as the Chosen Approach

Case research was chosen as the qualitative approach to study the phenomena and as an umbrella to encompass other methods. This section highlights the appropriateness of case research as a strategy for gaining in-depth understanding of one type of problem solving methodology being applied in a specific type of environment. My argument for this choice of approach is communicated to the reader through highlighting their merits, not through comparison with other approaches. I do not claim either that the adopted approaches are the only means for achieving the research objectives. This section also discusses the related methods and approaches used in the data collection (section 3.4.2) and data analysis (section 3.4.3) that were encapsulated in a case research.

This thesis does not view case research as an approach but rather as a way of choosing and describing an object to be studied under a given paradigm (Stake, 1994; Galliers, 1992). Remenyi et al. (2002, pp.15 & 16) argue that "a case study is really nothing more than an umbrella term, which may be used to focus the fact that a collection of different research tactics are being applied to one situation or one organisation. The actual nature

of the research is determined by the individual research tactics used within the case study". Therefore, case research is viewed as an informative strategy.

Case studies as a research strategy are widely used in the IS community since they offer insights that are only possible with this approach and specifically when the phenomenon is complex (Pare, 2004; Walsham, 1995a; Hamilton and Ives, 1992; Lee, 1989). Cavaye (1996, p.229) defines case research as a "research approach that uses the case method". The case method:

- does not explicitly control or manipulate variables
- studies a phenomenon in its natural context
- studies the phenomenon at one or a few sites
- makes use of qualitative tools and techniques for data collection and analysis

Case studies have been used to describe, build and test theories of substantive nature (Darke et al., 1998; Galliers, 1992; Eisenhardt, 1989). Pare (2004) also suggests that this type of research is the 'best' approach to study system design and implementation. Case research is particularly useful when the answers to how and why questions are being sought (Yin, 1984). Eisenhardt (1989, pp.548-549) states that case studies are:

> (case studies are) *particularly well suited to new research areas or research areas for which existing theory seems inadequate. This type of work is highly complementary to incremental theory building from normal science research. The former is useful in early stages of research on a topic or when a fresh perspective is needed, while the latter is useful in later stages of knowledge.*

One of the strengths of case research is that it allows the capturing of a real snapshot of the phenomenon (Yin, 1984). Case studies can take the form of being descriptive, explorative or explanative (Pare, 2004). Pare (2004) argues that research may be initiated with or without prior theory or a research framework (Cavaye, 1996).

This thesis used case research of an explorative nature to build theory without adopting any specific a priori theory, which is seen by scholars as an approach appropriate for

theory development or formulating propositions (Pare, 2004; Orlikowski and Baroudi, 1991).

Case studies may be single or multiple. Dyer and Wilkins (1991, p.614) recommend the use of single cases and argue that "the more contexts a researcher investigates, the less contextual insight he or she can communicate". The authors have also mentioned numerous studies that resulted in advancing knowledge using single case studies.

This research is considered as a single case, although data collection was from different sources and organisations, since I have studied a specific methodology called ISMS (Information Security Management System) as used within a single homogenous group (government institutions). Using a single case gave me in-depth understanding of the methodology in terms of its development and use. Dyer and Wilkins (1991) quote Van Maane (1979, p.615) to demonstrate the merits of the single case study: "theory that is born of such deep insights will be both more accurate and more appropriately tentative because the researcher must take into account the intricacies and qualifications of a particular context".

Case research may take a positivist or an interpretivist position (Shanks, 2002). Research is considered as positivist if it deals with quantifiable measures of variables or hypotheses that are being tested (Klein and Myers, 1999). Interpretivist case research relies on the social constructions that people create. The role of the researcher is then to interpret these social constructions to reach an understanding in order to describe, explain or develop theory on a certain phenomenon. Social constructions are embedded in the language, consciousness, shared meaning, documents, tools, and other artifacts (Klein and Myer, 1999). I have already argued for an interpretivist approach as the means of uncovering how people think and experience a methodology. All methods used in this research are of qualitative nature which includes a grounded approach for the development of theory.

3.4.2 Data Collection (Stage-D)

This section discusses several issues related to the data collection stage. Section 3.4.2.1 will start with by clarifying from this thesis perspective on what is meant by 'theorising using grounded approach'. Several sampling strategies were used and they are discussed in section 3.4.2.2. The use of focus groups was a prime strategy for data collection and it is given a special attention and discussed in section 3.4.2.3.

3.4.2.1 Theorising Using Grounded Approaches

Grounded or inductive approaches are usually used to generate new theories rather than to test a theory. A grounded theory approach means that the essence of the theory is derived from data without having any preconceived framework in mind (Dey, 1999). In other words, theory is grounded in reality as informed by the data (Galal, 2001). Theorising is considered as a creative process (Glaser and Strauss, 1967) and "consists of disciplined imagination that unfolds in a manner analogous to artificial selection" (Weick, 1989, p.516).

The outcome of a grounded theory is usually more than a description of an essence; it is usually an abstract model of the phenomenon. A grounded approach collects subjective qualitative data based on the understanding of participants (Strauss and Corbin, 1998). It involves subjective sampling and analysis techniques (Flick, 2002). Theory building tends to be inductive in nature therefore overindulgence in interpretation can be a concern (Glaser and Strauss, 1967; Strauss and Corbin, 1998). During interpretation, researchers add their own insights into why those experiences exist. The background of the researcher may also bring creative and important insights during the interaction with the data (Strauss and Corbin, 1998). In a grounded approach, researchers are discouraged to enter the field "with a set of pre-established concepts or with a well-structured design. Rather, the design, like the concepts, must be allowed to emerge during the research process. As concepts and relationship emerge from data through qualitative analysis, the researcher can use that information to decide where and how to

go about gathering additional data that will further evolution of the theory" (Strauss and Corbin, 1998, p.33).

Theories developed using a grounded approach assist researchers in describing the phenomena and to establish theoretical conjectures to explain the behavior between the variables of the phenomena (Remenyi and William, 1995). Theoretical conjectures are considered to be useful contributions to a field (Remenyi and Willimas, 1995). The outcome of this research is a proposed theory with certain conjectures. Further testing will be required using a larger sample to claim the theory is empirically generalisable (Remenyi and Willimas, 1995). The grounded approach process is no different from other qualitative research approaches. They all follow a process of data collection, analysis and interpretation or theory building. However, theory building requires several repetitive cycles of data collection to allow for an emerging theory to be developed and to ensure internal validity (Eisenhardt, 1989).

3.4.2.2 Sampling and Data Collection

Burrell and Morgan (1979, p.253) argue that all interpretive paradigms aim for understanding the 'subjective experience of individuals'. These understandings are usually formulated into categories emerging from data. Data for this thesis have been sampled from various sources using different methods.

Pare (2004, p.246) suggests that there are different strategies for selecting participants (adapted from Patton, 2002). This study has used a purposeful sample and also used three other strategies in my selected case (organisation). 'Opportunistic or Emergent' sampling was used. The 'Opportunistic' strategy guided me to use another sampling strategy, which is 'Homogeneous'. The third strategy was the Snowball or Chain. An elaboration of the action taken under each sampling strategy is shown in Table 3.2. The adapted table shows that I have capitalised on different strategies to capture the richness of the methodology environment.

Information Sampling Strategy	Meaning	Action taken
Purposeful	Select information-rich cases strategically and purposefully; selected type and number of cases selected depends on study purpose and resource.	Have identified a government organisation that has developed an information security methodology with the intention of propagating it into other government organisations.
Opportunistic or Emergent	Following new leads during fieldwork; taking advantage of the unexpected; flexibility.	My engagement with the organisation has led me to determine an opportunity to attend a training session on the methodology and a training session using the risk management tool which is part of the methodology.
Homogeneous	Focuses, reduces, simplifies; facilitates group interviewing.	I have used part of the training session to carry out four focus groups.
Snowball or Chain	Identifies cases of interest from people who know people who know what cases are information-rich.	My engagement with the organisation led to the introduction to other organisations who were using ISMS methodology.

Table 3.2: Strategies for selecting participants for data collection

(Adapted from Patton, 2002)

I have conducted interviews, observations, and focus group interviews including the collection of secondary data. The data collected using these strategies have either directly contributed to the development of the theory or have contributed to my understanding to facilitate interpretation. I entered the field with very little theoretical knowledge of information security, which meant that in-depth understanding of the total security environment was required.

3.4.2.3 Focus Groups

In this thesis, data generated from focus groups were essential and considered as a primary source for the development of the proposed theory. This section justifies the use of focus groups as a viable means of collecting data.

Focus groups are an alternative means of gathering qualitative data for a group of people is able to reflect on certain questions asked by a moderator. They are particularly appropriate when the research aims at explaining people's perceptions of an experience, product, or event and also for generating new ideas and concepts about a certain phenomenon (Krueger, 1994; Williamson, 2002). Focus groups are considered a qualitative research method and are widely used in applied research for program evaluation, market research, concept development and product design and usability (Hague et al., 2004) and recently in many areas of health and social science (Kitzinger and Barbour, 1999). They are used for exploratory, pre-testing, triangulation, and phenomenological purposes (Fry and Fontana, 1991).

Krueger (1994, p.10) argues that focus group is useful because "it taps into human tendencies. Attitudes and perceptions relating to concepts, products, services, or programs are developed in part by interaction with other people". They have the ability to elicit information that is difficult to produce from individual interviews. They provide rich answers to complex phenomena (O'Donnell, 1988). Kitzinger (1995, p.300) argues that "group processes can help people to explore and clarify their views in ways that would be less accessible in a one-to-one interview … When group dynamics work well the participants work alongside the researcher, taking the research in new and often unexpected directions".

Focus groups capitalise on group interaction and dynamics, thus creating a high level of face validity (Krueger, 1994). They differ from one-to-one interviews in the sense that participants are encouraged to "talk to one another: asking questions, exchanging anecdotes and commenting on each other's experiences and points of view" (Kitzinger,

1995, p.299). The data from focus groups is a refined consensus of the matter being studied. Focus groups are considered a standalone method for data collection and they are also regarded as a 'self contained technique' (Williamson, 2002).

In this thesis, the proposed theory representing the essence of the ideal methodology was developed on the premise that an ideal methodology should be defined from customer perspectives. Focus groups are useful in examining what and how people think and why they think that way (Kitzinger, 1995). The use of focus groups as a data collection method for this research was seen as justifiable given that its objective was to seek in-depth understanding of what may constitute an ideal methodology by capturing the perceptions and the experiences of practitioners.

The data from the focus groups were analysed using a grounded approach as explained in the following section.

3.4.3 Data Analysis (Stage-E)

This section discusses the details of the concepts used for the data analysis. Section 3.4.3.1 provides a brief background on the nature of qualitative data analysis followed by a discussion of the approach of abstraction by categorisation as a way to develop the theory covered in section 3.4.3.2. The abstractions are implemented using the concept of the Hermeneutic Circle and an 'Interrogative Framework' specifically constructed to assist in data analysis 3.4.3.3 to 3.4.3.4. Section 3.4.3.5 presents my preconception of an ideal methodology as a way of declaring my biases.

3.4.3.1 Qualitative Data Analysis

There is a continuous effort by scholars to develop systematic approaches to the analysis of qualitative data to ensure reliable findings and to achieve a degree of confidence about claims being made. After the data collection phase, a researcher's main concern is

reaching an accurate understanding by either explanation or interpretation of the data collected.

The difference between reporting on qualitative and quantitative data analysis is that qualitative research needs to spell out the analysis process to give a reader a sense of a rigorous outcome, whereas in quantitative research, it is usually sufficient to mention the type of statistical testing carried out.

The data are basically made up of text and meaning and the endeavour becomes to capture the right meaning of the text. This endeavour or text analysis must be regulated by certain criteria to ensure a high degree of validity of findings. Lacity and Janson (1994) in her 'Text Analysis Framework' argues that the method of analysis should consider the research method, the nature of the text and the role of the researcher.

Under the interpretivist paradigm, understanding has to come from open dialogue, which can be either between two people or between a reader and the text. In both cases the language is the medium for understanding (Gadamer, 1979). Schatzman (1991) argues dialogues associate with themselves things like perspective, context, element, conditions, action, consequences, and attributes. Schatzman later suggests that the process of discovering is governed by reflection on one's interaction with the data. The objective of the analysis is then to discover the meanings of those interactions in reconstructing the observed situation, in order to bring more complete or different understandings.

There are numerous methods for qualitative data analysis that researchers can utilise or adapt to suit their needs. Taylor and Bogdan (1998, p.118) encourage researchers to be creative and innovative in their research design by quoting the words of Wright Mills (1959, p.224):

> *Be a good craftsman: Avoid a rigid set of procedures. Above all seek to develop and to use the sociological imagination. Avoid fetishism of method and technique. Urge the rehabilitation of the unpretentious intellectual craftsman, and try to become a craftsman yourself. Let every man be his own methodologist.*

Therefore researchers tend to adapt methods according to their situation; there are no standardised processes (Patton, 1980).

Glasser and Strauss (1967) stressed that creativity plays a role in experimenting and modeling the data collected. Hirsch (1967, p.206) argues that "conflicting interpretations can be subject to scrutiny in the light of the relevant evidence, and objective conclusions can be reached. Of course, imagination is required – a divinatory talent like that needs to make interpretive guesses – simply to discover highly relevant evidence".

The interpretation of text requires a certain level of inference. The aim of this process is to reveal pre-existing phenomena and the relationships between their parts. The richness of qualitative data allows certain dynamics to be continually projected based on the perspective held by the researcher; therefore it is possible to use the same data to infer different types of related knowledge by invoking different questions on the data. Data are transformed into meanings in the form of categories or patterns that inductively emerge from data. Another approach towards understanding the data is the use of the Hermeneutic circle to understand the whole by understanding its main parts. This quest for understanding and interpretation are the primary concerns of Hermeneutics. Hermeneutics is the underpinning philosophy that informed the data analysis approach used in this thesis. Hermeneutics may be considered as an epistemology for treating the understandings and interpretations of text (Boland and Wesley, 1989; Lacity and Janson, 1994). Hermeneutics has a long history of development and different interpretation by various philosophers, but the philosophy of Heidegger and Gadamer are commonly used to interpret IS qualitative research approaches (Klein and Myers, 1999).

Researchers' presuppositions or pre-understandings are valuable in making comprehensible interpretations; therefore it is practical for researchers to construct their own framework for analysis (Lopez and Willis, 2004). The findings of the research will therefore be a blend of the practitioners' experiences and the researcher's background that he/she bring with them to collect and interpret the data; this is termed by Gadamer as "fusion of Horizon". Therefore, the findings are the researcher's perspective to the

interpretation of practitioners' experiences (Lopez and Willis, 2004). However, it is essential that the findings be subjected to further verification to determine their plausibility and generalisability by the IS community. The researcher should declare issues that may have shaped the data - issues such as prior assumptions, biases, and experiences which can influence the analysis (Klein and Myers, 1999).

This research followed a generic qualitative analysis consisting of data description, reduction, display and conclusion drawing (Miles and Huberman, 1984, Wolcott, 1994).) Data reduction may be achieved by forming categories using inductive means and analogical thinking requiring a certain amount of creativity (Miles and Huberman, 1984). The findings are enhanced by displaying the finding in matrixes or diagrammatically. Finally, conclusions are drawn to verify findings and reach a coherent interpretation and understanding of the phenomena being studied.

Wolcott (1994, p.12) views analysis as "transforming data", having three related phases: description, analysis and interpretation. He considers these phases as "the primary ingredients of qualitative research" (p.49). Description is referred to as the creation of a story from the data to inform the reader "what is going on here?" Writing a story encourages reflection. Wolcott differentiates between analysis and interpretation and argues that in the analysis stage, researchers extend data beyond the description phase by illustrating patterns and themes in the data. In the third stage, researchers give their own interpretations of what is going on. The discussion of the data analysis stage of this thesis (Chapter 4) is laid out using Wolcott's three phases of 'data transformation' (description, analysis and interpretation) to facilitate the reader's understanding.

Coffey and Atkinson (1996, p.10) summarise the process of analysis as being not "only adhering to any one correct approach or set of right techniques; it is imaginative, artful, flexible, and reflexive. It should also be methodical, scholarly, and intellectually rigorous".

Lee (1989) argues analysis of qualitative data can be a problem since there are no defined rules that one can follow to make controlled deduction as opposed to mathematical propositions found in the positivist studies. Lee later clarifies that qualitative analysis "only deprives itself of the convenience of the rules of algebra; it does not deprive itself of the rules of formal logic" (1989, p.40). Therefore the plausibility of the finding also relies on the logical analysis and the construction process used for the final findings.

As I have mentioned, analysis methods do not offer strict rules for researchers to follow, but there is commonality between most qualitative analysis methods, as summarised by Tesch (1995, pp.95-97), namely:

1. Analysis is not the last phase in the research process; it is concurrent with data collection or cyclic.
2. The analysis process is systematic and comprehensive, but not rigid.
3. Attending to data includes a reflective activity that results in a set of analytical notes that guide the process.
4. Data are 'segmented', i.e. divided into relevant and meaningful 'units', yet the connection to the whole is maintained.
5. The data segments are categorised according to an organising system that is predominantly derived from the data themselves.
6. The main intellectual tool is comparison.
7. Categories for sorting segments are tentative and preliminary in the beginning; they remain flexible.
8. Manipulating qualitative data during analysis is an eclectic activity; there is no one 'right' way.
9. The procedures are neither 'scientific' nor 'mechanistic'.
10. The result of the analysis is some type of higher-level synthesis.

The method adapted for this thesis was inspired by reading on the existing qualitative data analysis approaches such as phenomenology, phenomenography (Marton,1981), the hermeneutics circle (Gadamer, 1979), the two approaches of grounded theory (Glaser and Strauss, 1967; Strauss and Corbin, 1998), Dimensional Analysis (Schatzman, 1991), and the works of Miles and Huberman (1984) on qualitative data analysis.

The devised method used for analysis helped me to go beyond the surface meaning of the statements by exhaustive inquiry, and simultaneously comparing, sorting of statements and refining of categories. The main purpose of these methods is to reach a certain level of abstraction and to conclude with a set of coherent categories representing the proposed theory.

3.4.3.2 Abstraction by Categorisations

Categorisation was a major analysis process used in this study. This section will explain what is meant by categorisation in the context of this thesis.

Data do not know what to say to the researcher. Data analysis relies on asking effective questions or interrogations leading to meaningful answers, which may raise more questions (Schatzman and Strauss, 1973). This sequence of questioning leads the researcher in developing theoretical formulations and discovering the deeper meaning of a statement (Goulding, 2002). Analysis becomes more demanding when the statements have implicit meaning. Schatzman and Strauss (1973) recommend making ‘substantive and ‘logical‘questioning. Substantive questions are related to one’s field of expertise while logical questions are based on analogical thinking (Dey, 1999).

Miles and Huberman (1984) view categories as abbreviations or symbols representing part or the whole of the text. Coding or categorisation of the answers to the questions raised by the researcher is the common method of reaching abstraction of the data. These categories may be derived from either the literature, the researcher’s background or from the text itself. These categories may be predefined and get refined during the

analysis as new categories emerge. The end result of this analysis is a set of categories that should be related to each other in a coherent way and should be a close representation of the data. The desired state is to abstract these categories into an emergent theme or fewer constructs (Miles and Huberman, 1984). Higher abstraction results in higher degrees of alienation from the data.

As mentioned earlier, the outcome of this thesis is basically a set of categories, which when joined together, compose the proposed theory.

3.4.3.3 The Hermeneutic Circle

The concept of the Hermeneutic circle was adopted in order to interpret the data obtained from the focus groups, and a brief account of it is given in this section.

The Hermeneutic circle is not a method that one can readily use; it is a philosophy grounded on the understanding of text from the part to the whole, and the pre-understanding introduced by the interpreter. Text is seen by Boland (1985) as "a carrier of an important meaning that has yet to be clarified" and Hermeneutics provides us with some conditions to understand the given text.

Heidegger (1978, pp.191-192) said "whenever something is interpreted as something, the interpretation will be founded essentially upon fore-having, fore-sight and fore-conception. An interpretation is never a presuppositionless apprehending of something presented to us". Heidegger termed these concerns as fore-structures (pre-understanding); it is the background practices that accompany the researcher during the interpretation of the data. These background practices have to be declared and accounted for in research to allow the reader to decide the effect of the researcher on the final analysis. In effect, pre-understanding creates different interpretation by different researchers due to the prejudices they bring with them. Prejudices may lead to errors of understanding, due to a lack of knowledge or wrongly conceived ideas. Therefore Hermeneutic interpretations are never absolute and are evolving. Depending on the

background of the researcher, different interpretations are possible, therefore researchers do not need to check their interpretations with other researchers (Gadamer, 1979). Gadamer (1979) views interpretation as being open and ongoing permitting no final conclusion; it is an approximation to reality.

According to Gadamer (1979, p.267) "a person who is trying to understand a text is always projecting. He projects a meaning for the text as a whole as soon as some initial meaning emerges in the text. Again, the initial meaning emerges only because he is reading the text with particular expectation in regard to a certain meaning. Working out this fore-projection, which is constantly revised in terms of what emerges as he penetrated into meaning, is understanding what is there". This cyclic revision of fore-projection ceases when we are satisfied with the meaning.

To put it differently, the Hermeneutic circle is an analysis process that places the text in a context in terms of place and time of its collection and its relation to the surrounding text. It is basically an engagement of text reflecting upon the pre-understanding of the researcher by establishing a circular relation between a part and the whole. A single word (part) belongs to the context of a statement (whole). Then the statement becomes the part and in the context of the rest of text. The final interpretation will eventually become a part of the related literature and thus reducing prejudice. To understand the part will always require a sensible comprehension of the whole. Simply, to understand the meaning of text, there is circular movement or interplay between the whole to the part and back to the whole. To understand the whole, the researcher is required to continually collect data in its various forms until absurdities, contradictions, and oppositions are released from the data (Myers, 1994). If the part is not seen as part of the whole, this may lead to a misunderstanding of the part and eventually losing the meaning of the whole. It is based on a presupposition that "in order to understand the part (the specific sentence, utterance, or act), the enquirer must grasp the whole (the complex of intentions, beliefs, and desires or the text, institutional context, practice, form of life, language game, and so on), and vice versa" (Schwandt, 2000, p.193). This

circular movement is like a generator fuelled by our fore-conceptions that produces understandings.

Subjecting the data to questioning and gaining answers is the dialectic structure of Hermeneutics, i.e. the key to understanding what lies behind the text. The following are a few assertions made by Gadamer (1979) in highlighting the logic of questioning and gaining answers:

- "The close relation between questioning and understanding is what gives the hermeneutic experience its true dimension" (p.374).

- "To understand a question means to ask it. To understand meaning is to understand it as the answer to a question" (p.375).

- "To ask a question means to bring into the open" (p.363).

- "We have to discover the question which it answers, if we are to understand it as an answer … (it is called the) axiom of all hermeneutics" (p.370).

- "Questioning always bring out the undetermined possibility" (p.375).

- "Understanding is always more than merely re-creating someone else's meaning. Questioning opens up possibilities of meaning, and thus what is meaningful passes into one's own thinking on the subject" (p.375).

The above statements emphasise that, as questioning is a key technique for interpreting, the types of questions need to be considered carefully, since a question may be asked rightly or wrongly (Gadamer, 1979, p.364). E.g., a right question provides a sense or a meaningful direction to the knowledge to be revealed and reaching a productive conclusion (Strauss and Corbin, 1998).

The Hermeneutic circle in this thesis was useful as a concept for interpreting data in order to understand the essence of the methodology (whole) derived from single statements (parts) collected from the field. The interpretation was achieved by employing a set of well crafted questions in order to reveal the meaning carried by the text. The interpretation is subjective and based on my pre-understanding. For this research, I have constructed an 'Interrogative Framework', which consists of nine questions used to interrogate the data. The concept of the 'Interrogative Framework' is largely motivated by the Dimensional Analysis framework (Schatzman, 1991) and from own experience.

The concept of Dimensional Analysis is explained in the next section to provide an understanding of the devised framework used for interrogating the data obtained from the focus groups.

3.4.3.4 The Dimensional Analysis Framework

It should be the intention of the researchers during the analysis phases to reach a higher level of abstraction leading to an eventual theory. As previously mentioned, abstraction is achieved by asking theoretical questions (Glaser, 1978; Gadamer, 1979). The core concept of questioning in this study is adapted from 'Dimensional Analysis' (Schatzman, 1991). Dimensional Analysis provides a structure and a way to explain the statements that were collected in the field. It was proposed in the late 1970s by Schatzman as an alternative approach to the 'Grounded Theory' method (Glaser and Strauss, 1967). Dimensional analysis is a structured way of categorising data used by researchers to analyse qualitative data.

Schatzman was a colleague of Glaser and Strauss who witnessed the development of the Grounded Theory method (Kools et al., 1996). Dimensional analysis provides a more visible and parsimonious way of grounding a theory in data. It is rooted back to the philosophy of interactionist epistemology and the theory of "natural analysis" (Kools et

al. 1996; Robrecht, 1995) as a systematic way of understanding a phenomenon. The underpinning of the approach has been highlighted by Robrecht (1995) by quoting Blumer (1969, p.2).

> *Human beings act toward things based on the meaning that the things have for them; the meaning of such things is derived from the social interaction that the individual has with his fellows; and meanings are handled in, and modified through an interpretive process and by the person dealing with things they encounter.*

The aim of Dimensional Analysis is: "to discover the meanings of interactions observed in situations" (Kools et al., 1996, p.316) and was developed because it was felt that the grounded theory method lacks a structural foundation that would facilitate itself as a methodical analytical process.

The method relies on providing serial explanation of what is going on. To clarify further, quoting from Schatzman (1991, p.308):

> *An explanation, after all, tells a story about the relations among things or people and events. To tell a complex story, one must designate objects and events, state or imply some of their dimensions and properties – that is, their attributes – provide some context for these, indicate a condition or two for whatever action or interaction is selected to the be central to the story, and point to, or imply, one or more consequences. To do all this, one needs at least one perspective to select items for the story, create their relative salience, and sequence them.*

Kools et al. (1996, p.319) explicate that the approach "stimulates integration and conceptual development within the developing theory by directing subsequent inquiry and logic". The repeated patterns of categories stipulate "theoretical saturation", meaning further data will not be required. The final outcome is substantive theory grounded in data – "substantive in the explanatory story they tell" (Schatzman, 1991, p.313).

The main principle of Dimensional Analysis is the deconstruction of data encompassing the phenomenon being studied into dimensions and then reconstruction of the

dimensions to derive an emergent substantive theory, i.e., from the part back to the whole.

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Schatzman (1991, p.309) elaborates on the underpinning of the approach by stating:

> *Any phenomenon is more complex than any single name or meaning for it. Dimensionality thus calls for an inquiry into its parts, attributes, interconnections, context, processes and implications.*

The analysis is derived by inductive and deductive reasoning in an Hermeneutic circle (Robrecht, 1995) to determine and describe perspectives, contexts, conditions, actions, consequences and attributes, taking into account a single statement at a time. This coding family is arranged in an explanatory logic conceptualised in an explanatory matrix. The purpose of the matrix is to provide the researcher with a means to explain and tell a story about the phenomenon in terms of the relationship between actions and consequences under selected conditions in a specific context for a given perspective, in other words, to facilitate coding (Kools et al., 1996).

The outcome of the analysis is to portray to the reader a sense of authenticity and conviction for the overall theory in terms of its main constructs and properties. Extracts from the data collected from practitioners will be displayed to support claims.

With this approach, the researcher can easily detect the ‘plausibility’ and ‘consistency’ of the theory being developed by going through the sequence of narration. This structure of analysis is a useful way of animating the text into live explanatory scenarios which infer in-depth understanding of the meaning of statements, as we shall see in the next chapter.

I developed and used what I have called an 'Interrogative Framework', which is based on dimensions that have some resemblance to the coding family employed by Dimensional Analysis. The Interrogative Framework is based on nine dimensions (coding family), namely: **Intention, Mission, Element, Methodology Context, Project Phase Context, Methodology Consequence, User Consequence, Adoption Consequence and Remedial Attribute**. These dimensions provided me with a way to interpret and explain the data and to finally construct the theory by categorisations using this scheme.

The interrogative framework was designed specifically for this research to allow for the construction of a rich picture of the content of the data collected. The framework was developed through trial and error before reaching a somewhat coherent framework. It was inspired from a combination of concepts and ideas i.e. the dimensional analysis framework, the evaluative nature of the exercise, literature on the construction and adoption of methodologies, my preconception of the ideal methodology, experience on using methodologies and some creative thinking. The Interrogative Framework and how I used it are explained in the next chapter.

3.4.3.5 The Preconception of an Ideal Methodology

This section serves as a statement of my biases. Committing all biases and conceptions in written form is not realistic. This section lists several items on how I conceived an ideal methodology. Other pre-understandings and assumption were already laid out in Chapter 2 and more will be declared in Chapter 4.

The primary sources for interpreting qualitative data include the experience of the researcher and the analytic thinking process. Although I had no definite conception of the ideal methodology, I did formulate certain qualities that may be desired to be in a methodology and that may have affected the interpretation of the data, for example:

A methodology is seen as a philosophy, which has it own beliefs and assumptions and way of doing things. It is constructed to illuminate users and provide useful guidance with no ambiguity. It is comprehensive and encompassing all details, which makes it useful for different contingencies and in resolving conflicts. It aims at influencing without being influenced. The ideal methodology is comprehensive to the extent of being self-contained, i.e. does not rely on external sources. It lasts for a long time and it is not easily neglected and forgotten by the public domain because it is clear and non-contradicting. In simple terms the ideal methodology is:

- A philosophy.
- Illuminating to provide useful guidance with no ambiguity.
- Comprehensive and encompassing, meets needs and contingent.
- Useful for resolving conflicts.
- Self contained does not rely on external sources.
- In the public domain.
- Stands the test of time.

The ideal methodology is seen from a high level of abstraction. These were my thoughts and they are not meant to serve as categories for analysis.

3.5 Quality of Research (Stage-F)

This section lists the principles and the criteria that were adopted in this thesis as the basis for ensuring rigour and relevance of the research processes and outcome, namely:

1) Principles for conducting and evaluating interpretive field studies Klein and Myers (1999): These principles were applied to ensure the quality of the whole research process

2) Good theory criteria: are certain factors that were considered in informing this research on what constitutes a good theory.

The complexity of the qualitative research tends to produce rich data that makes their analysis open to many interpretations and their validation may be argued for or against. Quality of research is maintained by procedures and criteria, which researchers adopt to validate research. Validity is the evidence provided by the researcher to support the findings (Lacity and Janson, 1994). To validate research that seeks to understand qualitative knowledge is not subject it to the "rigors of a hypothesis test" but rather "rests on the strength of the analytical arguments used to defend the interpretation" (Lacity and Janson, 1994, p.146). Furthermore, Lacity and Janson highlight that the validity of findings rests largely on their adoption by the scientific community. Guba and Lincoln (1989) view validity of qualitative research in terms of "authenticity". Authenticity in this study means that the research includes rigour and relevancy. In other words, the data collected is trustworthy and the outcome of the interpretation has certain relevancy to human needs.

Research is driven by ethics and methods. Every piece of research carries with it implicitly or explicitly a level of authenticity ranging from being a trustworthy source of knowledge to being a fabricated source of knowledge that can not be trusted. Most research would fall between these two extremities. It is up to the researchers to demonstrate their 'ethical' position, which is believed to empower the other research quality criteria. During the course of the research, I was faced with decisions that would impact the validity of the research. It is these decisions that need to be declared to the reader if ethics are considered important. These decisions are sometimes made unconsciously and therefore to express them explicitly is not an easy task. The best way to deal with this matter is to firstly, satisfy oneself that the research is being conducted scientifically and ethically and secondly to 'tell things the way they happened' so that the reader can pick out the contradictions (if any). However, researchers are also required to provide the criteria adopted to convey authenticity on the research process. Each stage of the research process uses different means to demonstrate the level of authenticity.

Each research outcome must be subjected to critique and evaluation in order to qualify as useful knowledge by examining its assumptions, methods and findings. The literature has a plethora of proposed sets of research evaluation criteria. Researchers need to compile their own evaluation criteria to demonstrate that quality is being pursued. The basis for authenticating my research has relied on two sets of criteria that are interrelated. These criteria are explicitly and implicitly referenced throughout the thesis. The first set includes Klein and Myers's (1999) seven principles for evaluating interpretive case research. The other set is a list of criteria to measure what makes a 'good theory'. These principles and criteria are explained in the next two sections.

3.5.1 Principles for Conducting and Evaluating Research

Seven principles or guidelines were proposed by Klein and Myers (1999, p.72) to evaluate interpretive research based on the concept of hermeneutics philosophy. These principles serve as guide to researchers to reflect on their research activities including data collection, analysis and generalisations. Below is list of the seven principles that were applied in this research as way of inducing rigour into the process and the findings. Chapter 4 discusses the research implications using these principles.

1- The Fundamental Principle of the Hermeneutic Circle: *This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form. This principle of human understanding is fundamental to all other principles.*

2- The Principle of Contextualization: *Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged.*

3- The Principle of Interaction Between the Researchers and the Subjects: *Requires critical reflection on how the research materials (or "data") were socially constructed through the interaction between the researcher and the participants.*

4- The Principle of Abstraction and Generalization: *Requires relating the idiographic details revealed by the data interpretation through the application of principles one and*

two to theoretical, general concepts that describe the nature of human understanding and social action.

5- The Principle of Diaglogical Reasoning: *Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings ("the story which the data tell") with subsequent cycles of revision.*

6- The Principle of Multiple Interpretations: *Requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to multiple witness accounts even if all tell it as they saw it.*

7- The Principle of Suspicion – *Requires sensitivity to possible "biases" and systematic "distortions" in the narratives collected from the participants.*

3.5.2 Good Theory Criteria

The literature discusses a wide range of criteria that may be used to evaluate theories. This thesis has relied on three norms to guide and judge the quality of the proposed theory as suggested by Kaplan (1964), namely: norms of correspondence, norms of coherence and pragmatic norms and have also included falsifiability as another essential criteria:

Norms of correspondence relate to the fitness between the theory and the corresponding reality which is being explained, i.e., how the theory "fits the facts" (Kaplan, 1964, p.313). To facilitate correspondence, Wacker (1998) argues that the variables of the theory must all be clearly defined and their relation to other variables to be clearly stated using how and why statements, otherwise the theory can not be considered as internally consistent.

Norms of Coherence refers to the simplicity of the description of the theory and to what is being described. Reynold (1971) referred to this conception as parsimony. The issue here is simplicity of the theory's statements (free of redundancy), which explain the role of the variables and their relationship with each other. As Popper (1980, p.142) noted, "simple statements, if our knowledge is our object, are to be prized more highly than less

simple ones because they tell us more; because their empirical content is greater, because they are better testable". Poole and Van De Ven (1989, p.562), put more clarification to the term parsimony; "A good theory is, by definition, a limited and fairly precise picture. It does not attempt to cover everything and would fail to meet the parsimony criterion if it did".

Another aspect of norms of coherence is 'aesthetic' (Kaplan, 1964); theory should resemble works of art in terms of its beauty. Other scholars looked at good theories being interesting. Theories need to have theoretical and practical contribution. Theories lacking such contributions are of the category of 'who cares?' (Whetten, 1989). Theories are more practical when they are viewed as interesting rather than obvious. Although theories can be obvious, they should have a creative dimension and be aesthetically presented (Weick, 1989).

Pragmatic Norms or utility norms refer to the working and the effectiveness of the functioning of the theory. In addition, pragmatic norms relate to what contribution a theory can make to science and to the quest of inquiry; "the value of theory lies not only in the answers it gives but also in the new questions it raises. One might almost say that science is as much a search for questions as for answers" (Kaplan, 1964, p.320). The theory is regarded as useful if it can explain and predict (Bacharach, 1989) and the real test of utility of the theory is its adoption by the scientific community (Reynolds 1971, Whetten,1989) and "how it relates to the other scientific propositions ... how it guides and stimulates the ongoing process of scientific inquiry" (Kaplan,1964, p.320).

Utility refers to the accuracy of the prediction of the theory of the real world, i.e, the practical outcome of the theory (Dubin, 1983) or the usefulness of a theoretical system. The utility of the theory is what makes it relevant for practitioners since it informs them of the possible outcomes given certain conditions. Dubin (1983, p.39) highlights the importance of the utility virtue; "the utility of the theory must ultimately meet the test of application by the practitioner. When it does, we have the fruitful interplay between practitioner and theorist".

The utility of the theory relies on the level of the abstraction of the theory. Wacker (1998) classified the abstraction into three levels: high, middle and low. The low level has the least scope and usually a limited set of relationships. However, low level abstraction theories are the building blocks for grand theories at a higher level of abstraction. A high level abstraction theory has wider application because of its generalisability and wider domains. Wacker considers that the advance of a theory from the low level to the higher level of abstraction is an important goal of theory building.

Falsifiability is another criterion that is being stressed in theory building literature. In principle the theory must present itself in a way to be refuted, that is, it must be possible to collect data in order to test the theory. A theory that can not be falsified is not considered a theory (Popper, 1980; Reynolds, 1971; Bacharach, 1989).

The above set of criteria and principles were applied and are discussed in Chapter 4.

3.6 Discussion (Stage-H)

This stage of the framework is where the research implications and synthesis of findings are discussed. It also serves as a second part to the literature review since it is recommended when developing a theory to postpone that literature review until after the development of theory. The less the researchers have preconceived ideas on the subject being studied, the less likely they will be influenced by their biases. Glaser and Strauss (1967, p.253) argue that detailed coverage of the literature before initiating the research "increases the probability of brutally destroying one's potentialities as a theorist". Eisenhardt (1989) emphasises the use of literature towards the end of the research project, in order for the inductively derived theory can be compared to the existing literature (Miles and Huberman, 1984).

This stage of the research framework is used to compare the emergent theory with literature in terms of similarities and differences (Eishenhardt, 1989; Franz and Robey,

1987). The comparison is discussed in Chapter 5. Comparison with similar frameworks or concepts improves the external validity and enables analogical generalisation. Therefore, the purpose of this stage is then to place the proposed theory within existing knowledge in order to reveal the logic of its internal structure and to possibly extend existing theories. The conformance with literature is also a way of reducing the prejudice that may have been introduced by me during the analysis.

One of the primary purposes of research is to enable generalisation of the findings to a wider perspective. Generalisability in interpretive research is more difficult as it may usually include only one or several case studies, or the findings may be confined to a certain setting. Yin (1984) stated that case studies are generalisable to theoretical propositions. Walsham (1995a, p.79) discusses generalisation of findings from interpretive case studies may fall into four categories; "the development of concepts, the generation of theory, the drawing of specific implications, and the contribution of rich insight". The generalisation that I am trying to make in this research is of a theory development and its application. The intention of theory developed is to be applicable to any methodology that presents itself as a detailed guide for practitioners in solving a particular problem. The discussion stage is covered in Chapter 5.

3.7 Conclusions (Stage-I)

This stage of the research framework is used to bring the research findings into focus and to reflect on their usefulness in meeting the research objectives and in answering the research questions stated in Chapter 2. This part of the framework is also used to bring to light the limitations of the research and to suggest future research. The conclusions are covered in Chapter 6.

3.8 Chapter Summary

This chapter had emphasised that theory building is the ultimate aim of this research and testing of the proposed theory is regarded as a separate research topic. A research

framework was developed and justified to meet this endeavor. The framework is based on my adopted ontological, epistemological and methodological assumptions and two sets of principles and criteria to ensure rigour and relevance. The framework was used to inform data collection, analysis and to ensure the quality of research. The whole of the research process and activities are encapsulated in a single, interpretivist case study. The source of data was obtained from a single, homogeneous group of people primarily using focus groups.

I have emphasised the usefulness of grounded approaches especially when theories and knowledge about the phenomenon are lacking. I have also stressed the Hermeneutic circle and Dimensional Analysis as central concepts for the development of the 'Interrogative Framework' for deriving the substantive theory. This chapter has also presented my preconception of an ideal methodology.

The next chapter is an explicit implementation of the research framework formulated in this chapter.

4

RESEARCH IMPLEMENTATION & FINDINGS

This chapter discusses the proposed theory and its uncovering process based on the research framework constructed in the previous chapter. As mentioned previously, this thesis has taken a single case to study an information security methodology as the point of interest. This chapter explains of how the proposed theory was developed and the story is told in detail in the following sections;

- How I entered the field and engaged myself with ISMS is covered in section 4.1 and 4.2.

- Understanding of ISMS as a phenomenon was the result of multiple sources of data collection, discussed in section 4.3. This section describes the details of these sources, the type of data generated, and their implications on the research. The section includes a time schedule, details of settings and type and role of participants.

- Data transformation (data analysis) the next stage after the data collection, is covered in section 4.4. Data transformation includes several intermediate analysis stages for transforming the collected empirical data to a set of coherent

categories. This transformation is covered in sections 4.4.1 to 4.4.2. The resulting categories are then used to construct the proposed theory, as discussed in section 4.4.3.

- How the research process was scrutinized for rigour or authenticity is covered in section 4.5.

- The chapter concludes with a summary highlighting the main issues discussed.

This chapter is considered as a way of meeting "The Principle of Contextualization", which requires the researcher to provide "historical background of the research setting so that the intended audience can see how the current situation under investigation emerged" Klein and Myers (1999, p.72).

4.1 Selection of Case and Field Entry

One way to arrive at a conception of an ideal methodology is to enter a practitioner's environment, which would allow me to obtain in depth understanding of a methodology and its use. The case involved a government organisation in Western Australia (WA), which had actually developed an information security methodology (ISM) called Information Security Management System (ISMS), and was in the process of its implementation in other government agencies. This gave me access to the methodology and to tap into the knowledge of the ISMS developer and its users. I spent about two years intermittently in the field, which allowed me to observe the experience of others and to collect the necessary data to answer the research questions. My entry to the field was at the completion stages of the ISMS development and at the beginning of rolling out ISMS in other government agencies.

This research was seen as an opportunity to study a new unexplored phenomenon (ISM). This study aims at investigating ISMS in the context of government agencies as the

place of its ‘natural setting’. A brief background on ISMS follows to set the context of the research.

4.2 ISMS background

ISMS was developed by a department in the Western Australian state government called The Office of E-Government (TEOG), as an initiative to protect the government’s sensitive data and eServices against unauthorized threats. The Premier of WA has endorsed the ISMS methodology or an ‘equivalent’ to be adopted by all government agencies to protect their information assets. The term ‘equivalent’ refers to any methodology that is in compliance with security standards of Australia and New Zealand codes of practice for information security management (Standards, 2001). The objective of ISMS is to guide the organisation to assess risks of its business processes and to mitigate those risks to an acceptable level. ISMS provides a structured way of identifying and analysing the organisation's risks in its daily operations. The methodology is based on the three pillars of information security: the preservation of confidentiality, integrity and availability (as in Standards, 2001).

The development of ISMS was carried out in cooperation with Computer Associates (WA). The methodology is based on best practices and packaged with a database support tool and a set of comprehensive training manuals. The support tool was developed to help agencies identify and record their information assets, conduct risk analysis and establish appropriate risk management strategies and treatments. ISMS can be accessed by the Western Australian public sector through the ‘GovSecure’ website using the internet.

It is claimed by TEOG that organisations who implement ISMS, will gain the following benefits:

- preventing an information security incident from occurring;
- reducing the likelihood of a security incident occurring;
- reducing the consequences or impact of a security incident;
- detecting an incident occurring, or its effects;
- protecting the information from the effects of an incident;
- responding to an incident to minimise business damage or recovering quickly should an incident occur.

The methodology may be described as having detailed instructions consisting of stages, steps and tasks to be used by any organisation for the establishment of an information security management system. ISMS also assists organisations to comply with the Standards (AS/NZS ISO/IEC 17799:2001) of information security, which may lead to accreditation if desired.

The methodology goes through an iterative cycle of planning and design phases similar to the processes of systems development methodologies (SDM).

4.3 Gaining Understanding

This section describes my engagement with ISMS and the methods used for data collection to gain understanding. Section 4.3.1 describes my involvement with ISMS developers and to understand how ISMS was developed. Section 4.3.2 and Section 4.3.3 describes my work with two organisations who were implementing ISMS. Data collection from training sessions is discussed in section 4.3.4. Focus groups as the primary data collection method are discussed in section 4.3.5 along with their methodological implications.

Theory development requires a systematic approach to guide the researcher in understanding the phenomena in order to provide an explanation that is reliable and valid. An acceptable means of gaining understanding is through data collection from

different sources and formats (Eishenhardt, 1989; Yin, 1984). There are four common types of data collection approaches in interpretivist research, namely, observations, interviews, documents and audio visual materials (Creswell, 1998). These means are all suitable for grounding theories (Eisenhardt, 1989; Glaser and Strauss, 1967).

To capture a conception of an ideal methodology requires in-depth understanding of ISMS methodology, which needs to draw the required knowledge from its natural environment. The data for the theory needs to be captured from the experiences and the concerns of practitioners who are involved in the information security environment. The research design was motivated by the premise that by gaining understanding of the 'concerns' and 'issues' raised by practitioners during an implementation of ISMS would assist in determining the basic elements of the emergent theory. As mentioned in the previous chapter, the understandings for this thesis were obtained from different sources using different sampling strategies, i.e., 'Purposeful', 'Opportunistic', 'Homogeneous' and 'Snowball'.

Other sources of data collection were also used such as reflection on the literature using primarily academic publications on information systems, information system development methodologies, information security, organisational behaviour, cognitive psychology and education psychology. Data collection was influenced by self-reflection in terms of my experience as an IS practitioner, and my beliefs and values. Such reflection has an impact on the research process and interpretation of data (Gadamer, 1979).

All the sources of information contributed variably in providing the necessary perspective to this thesis. I want to reiterate that the data that I was interested in collecting were mainly basic *concerns* and *problems* faced by practitioners that need to be addressed by ISMS or similar methodologies. There now follows a discussion of the data collection process to show the reader how the findings emerged, and thus fulfilling "The Principle of Interaction between the Researchers and the Subjects" (Klein and Myers, 1999, p.72) which states that researchers need to show "how the research

materials (or “data”) were socially constructed through the interaction between the researchers and participants”.

4.3.1 ISMS

This section discusses how I became involved with ISMS and includes a brief historical account of the development of ISMS.

4.3.1.1 ISMS Developers

I developed a liaison relationship with the Manager, Information Security Assurance (MISA) at The Office of E-Government, who was also the project manager for the ISMS development. He also had the responsibility of disseminating the methodology to other state government agencies. I met MISA on a weekly basis over a period of about two years, which was sufficient time to allow me to obtain a good appreciation of the information security working environment about which I had very little previous knowledge. Interpretation of the data would have been difficult without this accumulation of knowledge concerning the information security environment. The knowledge build up process was a bit slow due to the low priority given to information security in government organisations, which can be attributed to the lack of awareness and limited resources.

My relationship with MISA was useful for a number of reasons: a) becoming an insider rather than an outsider, which had the good affect of building trust - I was given full access to the methodology and the project files, b) facilitating entry and introduction to other government organisations, and c) monitoring events to determine opportunities for data collection.

In addition to the weekly meeting with MISA, I have also carried out two recorded unstructured interviews with MISA, one at the initiation stage of the research and one before exiting the field. I also carried out one unstructured interview during the early

stages of my involvement with the consultant from CA who was also responsible for the development of ISMS.

4.3.1.2 ISMS Development

The ISMS was motivated and developed as the result of an audit and some penetration testing in the various government agencies by the 'Auditor General'. Weaknesses in the security environment were the conclusions of the audit report.

MISA also mentioned that global factors were a contributing factor - "the threats are increasing, the number of incidents are increasing and some of the impact to business and to government have been quite substantial...we needed to increase our efforts". A framework developed as a first step was later seen by MISA as an insufficient means to guide managers to establish a security environment:

> *I realised that we need to be more practical and develop tools that we can give to the people for security and we were also looking at a consistent approach to security all across government.*

MISA examined what other States were using - "we found everybody had their own way of doing it", and realised that whatever methodology they use, it must be based on some recognised standards such as AS/NZS ISO/IEC 17799:2001. According to MISA, "the standards represent a body of knowledge whereas we felt we needed a practical implementation tool". The Agency contracted a consultancy firm (CA) to develop ISMS based on the standards.

The development of ISMS made use of SDM methodologies as explained by MISA:

> *CA had number of their own methodologies, they have, like for system development for project management, so we looked at them as models.*

After the completion of the methodology, MISA had the role of propagating it to other organisations and that was when his fears started. He was asked what fears he had concerning the future of ISMS and replied:

> *the fear is that people will not use it (haha- nervously)…my main fear is people won't use it and won't fully support it and it won't be pushed by this Department as something that people have to use (it).*

The above statement implies the problem lies on the adoption of the methodology. However, later in the conversation MISA recognised that the weakness may also result from the methodology itself:

> *The methodology itself may not be perfect but it can be improved. It is only by people using it and getting feedback that says what you need to improve …the more people that use it, the more useful feedback that you get and you can build that into future versions of the thing.*

MISA raised another fear during the conversation:

> *There is always that danger, I suppose, that people might not use it properly, or misinterpret, hopefully their internal audit would spot that.*

There seems to be a misconception or a paradox about how developers view their methodologies; they tend to think that ambiguity of the methodology is not an issue and the lack of use or misinterpretation is the fault of the user. The data collected from the point of view of users in this thesis indicates otherwise. Attention to reduce ambiguity needs to be a prime concern for methodology developers.

4.3.2 ISMS Implementation at Alpha

Alpha, a large government agency, had as its objective the development of a security plan using ISMS. I became involved with Alpha for about a year from the outset of the project. The project was initiated with the evaluation of a number of information security methodologies. ISMS was selected and used as Alpha's guide for the

implementation. I exited the agency when they had completed their security plan. My contact with the organisation was through the Risk Manager. Data collected was mainly through passive observation during meetings of the project steering committee, which was attended by eight individuals composed of the technical committee and executive managers. The meetings were all chaired by the Risk Manager who presented the achievements and problems encountered during the implementation to the rest of the committee. I took notes whenever the topic was related to the ISMS methodology (see Appendix 5 for a typical project steering committee meeting agenda). The data collected was used for triangulation purposes and to provide an in-depth understanding of the phenomenon.

4.3.3 ISMS Implementation at Beta

Beta is a government agency considered to be of medium size. They had hired a Risk Management consultant with the objective of developing an effective and efficient information security plan using ISMS. This organisation provided me with secondary documentation and occasionally I had short informal conversations with the consultant. The engagement with Beta lasted only a few months. Nevertheless, it was useful in providing certain triangulation data and gave me a better understanding of the security environment, which was useful during the data analysis phase.

4.3.4 Training Sessions

Two 2-day training sessions on the ISMS were organised by TOEG for groups of practitioners. The aim of the training was to give participants a basic introduction to the ISMS methodology (see Appendix 1 for training schedule). The same course was conducted for two different sets of participants with 8 participants attending the first session and 10 participants attending the second.

The training session created a unique environment for multiple data collection methods. I was a passive observer taking a back seat. During the training, a simulated information

security environment was created by the nature of the training activities, which allowed comments and debate to surface freely with no intervention on my part. In some instances, there was conflict between participants while carrying out an activity; each had his/her own opinion on how to approach the problem.

Attending the training sessions provided me with insights into the methodology, its environment, problems, concerns and opportunities from the view of practitioners. After four days of attendance (observing and taking notes) I became engrossed by the simulated security environment, which provided me later with a better sense of the data collected, its value and the characteristics of the participants who were responsible for generating the data. Comments were digitally recorded and notes were taken. I have also documented the observations that were made and digitally stored all recordings.

Having spent two days with each group of participants, the tension (if any) caused by my presence had been eased. It was important for me that the participants felt comfortable to allow data to be collected naturally.

4.3.5 Focus Groups

The primary data sources for building the theory were the result of using 'Opportunistic', 'Homogeneous' strategies for data collection. The training sessions presented an opportunity to collect data using a homogenous strategy such as a focus group.

These focus groups were not conducted by having participants respond to the probing questions raised by the moderator. Instead, I introduced an activity at the end of the second day of both training sessions in the form of an exercise. It was conducted in a focus group format and moderated by the trainer while I observed the activity. The objective of the exercises was to elicit the participants' views and experiences in their own choice of words and terms. I conducted two focus groups during each training session i.e. a total of four focus groups shown in Figure 4.1.

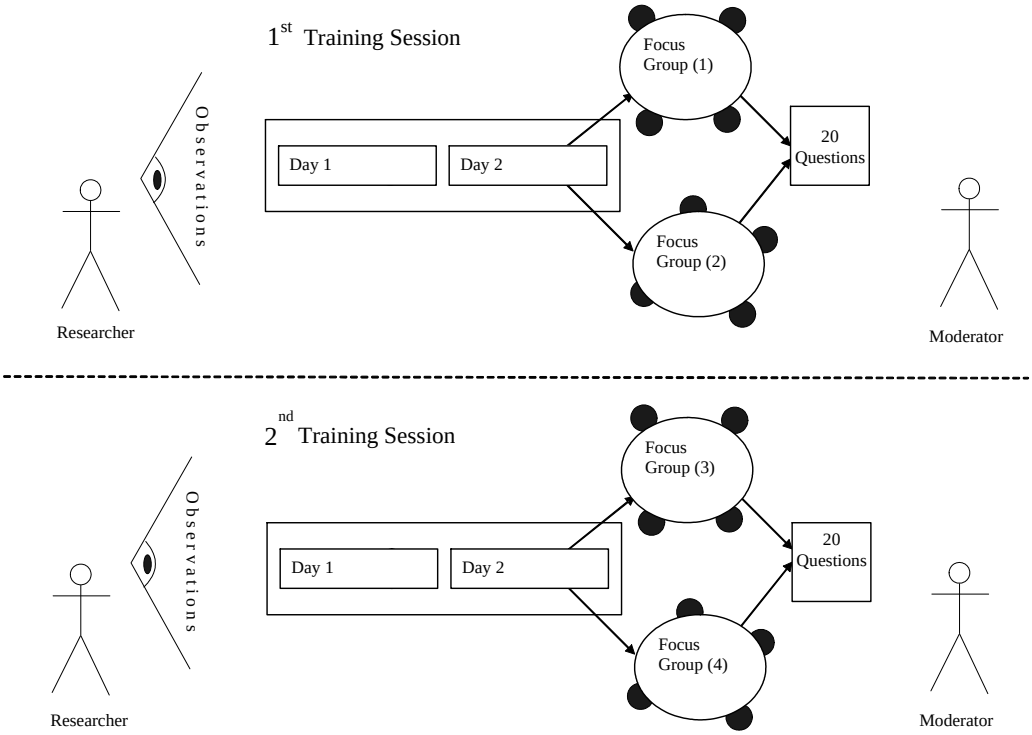

Figure 4.1: Two 2-day training sessions and 4 focus groups

4.3.5.1 The evaluation exercise

The objective of the exercise was to 'capture the reality' of practitioners' perceptions of what may constitute an ideal methodology by generating evaluation questions. The exercise was simply asking each group to generate evaluation questions that they would use to evaluate an ISM methodology or similar (see Appendix 3). I had a very strong notion that there would be a hidden fundamental pattern that would underlie the evaluation questions. By understanding these patterns, a better understanding of ISM methodologies may be achieved. Thus, the intention of the exercise was to find an explanation and understanding of the basic fundamentals of a methodology. The exercise was a good way to capture participants' perceptions of ISMS and to put forward their opinions and perceptions of it and any other previous experience they had had with

other methodologies. These perceptions, opinions and experiences were interwoven into the evaluation questions.

One might ask, why I asked for 'questions' to be generated instead of plain statements. I did this for three reasons: 1) I wanted to place participants into an evaluator mind set. 2) Asking questions usually generates a higher order of thinking and therefore better quality content. 3) It will not limit the dimensions of their responses.

I wanted to use the exercise as a placid means of initiating a provocation on the participants' ways of thinking and for them to reflect on their experiences with methodologies. The exercise was a way of capturing the mental image in the minds of the participants on a conception of an ideal methodology. The exercise resulted in a rich source of data.

It is assumed that when the participants generated these questions, they were reflecting on the interplay of their organisation's needs and desired outcomes. We would expect their thinking to start with the desired outcome and work backwards reaching a level of what is needed in a methodology to assist them to attain their objectives and resolve difficulties that they may have. This concept is line with a quote from Ibn Khaldun (1967, p.335), which states that "the beginning of action is the end of thinking, and the beginning of thinking is the end of action". Ibn Khaldun illustrates this concept by giving an example of a person building a shelter: "if a man thinks of bringing into existence a roof to shelter him, he will progress in his mind (from the roof) to the wall supporting the roof, and then to the foundation upon which the wall stands. Here, his thinking will end, and he will then start to work on the foundation, then (go on to) the wall, and then to the roof, with which his action will end". In the case of this exercise, the participants thought of their desired outcome and an ideal process to achieve it. This was evident in the nature of the data collected as will be seen later in this chapter.

The questions generated were general in nature and not all were directed towards ISMS. This is an indication that the participants had wider perspectives that went beyond ISMS.

Each participant was asked on the first day of training to think of 10 evaluation questions to be used for the exercise on the 2nd day of the training sessions. A total of four groups were formed with two focus groups running in parallel during each training session. The groups were asked to discuss these questions and to select and write down the 10 most important questions. The questions were later exchanged between the two groups. The groups were then asked again to discuss their answers and present them in front of the other group using the ISMS as an example. The exchange of questions assisted in removing any ambiguous statements; clarifications were provided immediately from the group who had formulated the questions. Recording the answers also assisted me later in having a better understanding of the meaning of the questions and hence deriving a more coherent interpretation.

4.3.5.2 Methodological Implications

As the analysis will show in the later sections, focus groups proved to be an effective and efficient way of capturing the views of practitioners. This section will discuss the methodological implications of focus groups in the light of the evaluation exercise. These focus groups are discussed based on the six characteristics found in focus groups as identified by Krueger (1994, p.16): 1) people 2) assembled in a series of groups 3) possess certain characteristic 4) provide data 5) of a qualitative nature 6) in a focused discussion.

1) People : The participants who attended the focus group represented 11 different governmental organizations, with varying job titles such as Risk Manager, Security Administrator, Auditor, and various others IT related job titles. There are no empirical studies found in the IT literature that there is any difference of perception between female and male practitioners. Nevertheless there were 5 females attending the focus groups. All participants had an IT background with considerable understanding of information security.

Four or five members were assigned to each focus group. Krueger (1994) recommends, keeping the number of participants in a focus group small but large enough to generate different perspectives. A large number of participants, i.e., more than 12 members may lead to fragmentation within the group. A small group of 3-6 has been recommended to allow everyone to express and share his/her ideas (Kitzinger and Barbour, 1999). From my observation of the groups, everyone was contributing and opinions were not being imposed.

The trainer who took the role of the moderator during the focus groups had more than 14 years experience in education and training. She was expressive and motivated in maintaining the discussion's flow and encouraged the participants to come up with good evaluation questions.

2) Series of focus groups: A focus group needs to be repeated at least three times to allow for repeatability (Krueger, 1994). As already mentioned, four focus groups were carried out, enough to allow for a repeating pattern as the analysis shows later. The focus groups were conducted two at a time in the same session (see Figure 4.1); this may have contributed to raising good evaluation questions due to the competing environment and since each group had to answer the other group's questions. The atmosphere for the focus groups must be relaxed to allow data to be generated naturally (Frey and Fontana, 1991). I have no apparent reason to think the participants in the four groups were uncomfortable. On the contrary, the event was enjoyable while participants carried out the details of the exercise in a non-threatening setting (Morgan and Krueger, 1993). The groups sat in a circle (see Appendix 2). Group members influenced and encouraged each other, forcing everyone to participate and keep things moving as recommended by Fry & Fontana (1991). Carrying out four focus groups provided the research with multiple sources of data collection, which allowed the findings to converge (Benbasat et al., 1987).

3) Possess certain characteristic: Goldman (1962) argues that group homogeneity or cohesiveness is critical to the success of the focus group; they must share a common

interest. The participants of these four focus groups shared an invested interest in using the methodology in their respective organisations; otherwise they would not have attended the training session. Another further factor of homogeneity states that the participants must come from similar professional experience (Sim, 1998). Although the participants had various job titles, they all had a security focus as part of their jobs. In practice the person who is responsible for the implementation of information security management methodology such as ISMS may be either an IT or a risk management person.

4) Provide data: The focus group brought together participants with different skills and different roles allowing for a wider perspective of information to be surfaced which simulated a real world setting. Such a set-up revealed new and useful information produced from the open interaction and the stimulating environment. New information was drawn from the participants' attitudes, feelings, beliefs and experiences.

Focus groups are known to generate a large amount of qualitative data and their management becomes cumbersome (Massey and Wallace, 1991). It is better to ask fewer questions and get an intensive response. In the case of this research, the focus groups were given one question to answer, yielding 40 evaluation questions. The questions were hand-written by the participants and were collected at the end of each session (see Appendix 4 for the full list of evaluation questions). This made the collection and the analysis easier - direct and not cluttered. The volume of the data is compressed since each statement supposedly had the agreement of four participants. The research concentrated on a single focused issue, which allowed a more in-depth understanding and exploration of the phenomena.

Each focus group took over an hour to complete, but the participants had two days to contemplate and to come up with their own evaluation questions. There are no empirical studies on the optimal length of focus groups. However, one hour was sufficient to collect the necessary data. The 40 questions generated were the result of each group's

interaction, reduction and selection from up to 180 questions. Each question submitted hypothetically had a shared meaning before consensus was reached by the group.

These 40 questions were formulated by technically knowledgeable and skilled participants from various professions, representing various types and sizes of organisations and who may have different security needs. Some of the participants had previously experienced ISMS, while others had knowledge of information security at various levels. Some of the IT participants had some experience with systems development methodologies (SDM).

5) Data of a qualitative nature: The participants were conditioned over the two days before conducting the focus group. Over the two days of training, an information security environment was simulated by watching videos, doing case studies, and holding group discussions and debates between participants; this allowed the participants to enact their job roles in a simulated security environment. Such a setup created an opportunity to collect rich data.

The questions that were collected covered a variety of topics presumably representing a set of desired features of methodologies as perceived by the participating practitioners. Below is a typical question to illustrate the format and style of questioning:

> *Does the methodology give clear and easy to understand steps that could be taken by a person with limited security or risk management understanding?*

Carey (1994) recommends that a detailed comparison across the focus groups may not be useful, because of the different compositions of groups. The evaluation questions generated by each group are completely different. At a glance, one can almost say that there is no overlapping of questions; each question stands out on its own. However, qualitative analysis aims at revealing hidden patterns. In this study, a pattern was confirmed by using qualitative data analysis as this chapter shows.

Carey (1994) argues that psychological factors such as personal needs and group chemistry will have an impact on the nature of the data being collected. However, these "factors cannot be teased out of the data; rather, they are part of the contextual fabric that provides rich details, as well as presents challenges in analyses" (p.235). Therefore, I have considered the data in its totality, i.e. as one set of data, with each question contributing towards the conception of an ideal methodology.

6) Focused discussion: Morgan and Krueger (1993) note that focus groups have the potential to provide concentrated discussions on a topic of interest central for the researcher and the participants. Information security was the central theme of the training session before initiating the focus groups. The central topic of discussion of the focus groups was on the evaluation of information security methodologies, which resulted in an engagement of a shared experience.

Each focus group went through the same training session followed by the evaluation exercises and the moderator going through the same motions, as if all the groups were attending the same session.

Worth making a note of here is that the purpose of the exercise was not solely to evaluate the ISMS methodology, but to come up with a set of questions to which any information security methodology can be subjected.

To sum up, focus groups are not the ultimate method for all research problems, but they do provide us with unique insights generated in a group context. The following section will discuss how the data from the focus groups were analysed, which led to the development of a substantive theory based on the participants' perceptions.

4.4 Data Transformation

Eisenhardt (1989) criticises research reports that neglect reporting the details of their theory formulation process. Researchers should present the formulation process clearly and logically. This formulation process is termed data transformation. This section explains the data transformation process, which includes different stages of analysing the data obtained from the focus groups leading to the stage of constructing the emergent theory. As mentioned in the previous chapter, the data analysis conducted in this research will follow Wolcott's (1994) view of data transformation as having three distinct stages: description, analysis and interpretation. This section therefore, is subdivided into three main sub-sections, namely; data description covered in section 4.4.1, analysis discussed in section 4.4.2 and finally interpretation or making sense of the analysis covered in section 4.4.3.

Before starting the discussion on the data transformation, I need to highlight that data collected from the focus groups are subject to many possible interpretations from which "none are finite". However, there may be better interpretations that are closer to being "true" (Gadamer, 1979). It is left to the reader to decide on the legitimacy of the interpretation being presented in this section. Therefore, one should keep in mind that "every interpretation attempts to attain clarity and certainty, but no matter how clear an interpretation as such appears to be from the point of view of meaning, it cannot on this account alone claim to be the causally valid interpretation" (Weber. 1947, p.96).

To avoid confusion, the participant's evaluation questions, which were collected from the four focus groups, will be referred to, from this point and onwards, as the "statements" or "participants' statements".

4.4.1 Data Description

The participants' statements from the focus groups were seen as a complex set of texts, since I had no preconceived theory to test or to guide the analysis. Each statement seemed independent of the other. This section describes the steps that were taken to manage the data and to get myself acquainted with the participants' statements. Section 4.4.1.1 explains how the data was stored and managed. The statements were later examined to determine the nature and characteristics of questions, explained in section 4.4.1.2. A story was later composed out of the statements as another strategy to familiarise myself with the data and to view the statements as a whole, illustrated in section 4.4.1.3. Section 4.4.1.4 discusses the quality of the participants' statements to warrant further analysis.

4.4.1.1 Data Management

A Microsoft Access database was created using a single table to enter the data to facilitate the daunting task of visualizing the data from different perspectives by instantly sorting by columns. The statements were entered giving each record a unique code related to the focus group. Additional fields were created to store the anticipated categories (see Figure 4.2).

Question #	Statements	Category 1	Category 2	.	.	.	Category n
101							
.							
.							
n							

Figure 4.2: Single table for storing statements and anticipated categories

Microsoft Access was preferred over specialized qualitative analysis software, for several reasons: 1) The two dimensional snapshot of the table gave me constant vision of the data, which helped me to immerse myself to reveal hidden patterns and to find relevant relationships. 2) I had more control in manipulating the data i.e. constant comparing and sorting. 3) The ease of creating and deleting new fields in the database allowed easier experimentation and modeling of data using different categories. 4) Glaser and Strauss (1967) did not encourage the use of computerised analysis software since it tends to distance the researcher from the data.

4.4.1.2 Data Classifications

One of the first tenets of transforming qualitative data is getting to know the evidence well by reading and re-reading the statements collected (Taylor and Bogdan, 1998; Marton, 1981; Glaser and Strauss, 1967; Strauss and Corbin, 1998). The data description process was initiated by spending a few days reading and comprehending the statements and grasping their nature and characteristics. They were classified under different headings. The purpose of data classification is merely to give me a sense of the different types of statements and to become familiarise with participants' statements. Below is the description of the different types of statements illustrated with examples from the participants' statements.

a) Scope: The statements covered a typical cycle of an information security project. The questions covered issues related to the initiation of a project, for example:

> *What skills are needed for a successful implementation team?*

And, there were questions related to completion of the project such as:

> *What measurements should be captured to assess the ongoing effectiveness of the ISMS?*

b) The General and the Specific: Some statements were related to a specific element of the methodology, such as:

Does the ISMS provide meaningful examples?

And, there were the general statements related to the overall methodology, such as:

Will ISMS be supported in the future?

c) The explicit and implicit: The statements were sometimes easy to interpret from their explicit wording producing perceptible meaning, such as:

Does the ISMS provide tools to facilitate and disseminate communication?

Sometimes statements were implicit, which required more analogical deduction to understand the implied meaning, such as:

If there is one person managing and performing the ISMS, what is the risk in it being biased toward their knowledge base? i.e. does the ISMS mitigate the risk of the instant (untrained) security expert and risk expert?

d) The recurrent: There were statements that were slightly different from each other but their meanings were very similar such as:

Does the methodology give clear and easy to understand steps that could be taken by a person with limited security or risk management understanding?

Similar to:

Are all the steps well defined so that a person with little training can proceed thru the entire methodology or is a training course necessary?

e) The Compounded: There were some statements referring to more than one subject that needed separation, such as:

> *Does the ISMS provide **tools** and **examples** to facilitate and disseminate communication?*

The varying nature of the participants' statements gave me some confidence in the quality of the data collected, i.e. the statements were not addressing a single issue. The next section discusses a story that was composed from participants' statements as a different way of reaching further understanding of the nature of data.

4.4.1.3 Story Telling - What is going on here?

The data collected were standalone statements and were not the result of a question and an answer, which usually results from a face-to-face interview. A good way to make sense out of the participants' statement is to construct a "Day-in-the-life" story (Wolcott, 1994). Building a story from the participants' statements using their own words in telling the story provides a sense and coherence of the forty statements. Writing this story was useful in grasping the context of the whole before I could start doing any detailed analysis on the parts. The story below also reveals to the reader my own prejudices since they involve certain projections and interpretation. The story assumes that these questions were generated by one practitioner, as follows:

The story:

This is the story of a typical risk manager practitioner who is currently evaluating a methodology (ISMS) with a myriad of features while at the same time trying to assess the security goals of his organisation:

Practitioner evaluating the methodology (Own interpretation)	**Practitioner asking question** (Participants' Statements from focus groups)
The Risk manager is experienced enough to know that Security planning is complex and encompasses a wide spectrum of issues. The practitioner is determined to select an ideal methodology that would most likely meet the requirements of his demanding organisation – Compliance with the standards has become an important issue.	Q. Does the understanding and the full implications of prevention procedures response and recovery result from the ISMS process? Q. Is full understanding of each business service risk management process achieved in ISMS? Q. The AS/NZS standard requires the development of a statement of applicability – where does this step fit within the ISMS methodology?
The evaluation questions were the practitioner's effort to make a best-fit decision. Obviously, he was going through different scenarios in his mind to resolve dilemmas by considering the value of the methodology while assessing the existing organisational environment and culture.	Q. How compulsory will the methodology be & how much will it need to be followed exactly? Q. How flexible is the ISMS? Q. Can the methodology be stream lined without losing integrity?
The practical practitioner has done some	Q. How are existing standards and

work already such as a security policy; he wants to know how he can integrate the methodology with what already exist in the organisation.	procedures incorporated into ISMS? Q. Some of the information required for ISMS will exist in the agency. Can you work that out from the flow or examples?
He was consistently reflecting on the problems that he would face while initiating and implementing the security project. He is aware of executive management behaviours toward security - what commitment and actions are needed and who is going to be involved in the implementation. He wanted to be equipped and educated with tactics, strategies and success factors that would ensure a successful implementation.	Q. How do we explain ISMS to executives? Q. Is the methodology practical or will it cause angst in trying to implement the system thru the general user community? Q. What level of executive commitment & support is required prior to implementation of the methodology? Q. What skills are needed for a successful implementation team?
The practitioner is realistic and he is aware of the potential conflicts and disagreements that will arise during interactions -- how will they be resolved by the methodology?	Q. Does the methodology supply ways of implementing cultural change? Q. What steps can be taken if the ISMS is opposed at a management level as they feel security reduces operability?

He also made an account of his own values, interest, experience, skills and beliefs. He also had his own fears whether he can articulate the goals of the methodology – He was concerned about understanding and being correctly guided – will he and his team members get consistent results? Where can he go for help and support when faced with uncertainty?	Q. Is there a defined manner for capturing the required data i.e. if two people use it their results would look similar e.g. can templates be developed? Q. Does the ISMS provide meaningful examples? Q. Does the methodology give clear and easy-to-understand steps that could be taken by a person with limited security or risk management understanding?
He was conscious of his productivity- he wanted to know what tools and features are available and how does the methodology contribute to his learning and to the organisational at large.	Q. Does the ISMS provide tools to facilitate and disseminate communication? Q. Does the methodology work in a cyclical fashion so that once it has been set up it moves back into a review mode
The practitioner was also concerned about the evaluation process; he wanted to ensure that he is using a reliable methodology.	Q. How can the benefit or ROI from implementation of an ISMS be measured? Q. What measurements should be captured to assess the ongoing effectiveness of the ISMS?
Is this the successful methodology that he is looking for? Will it be infused successfully in his organization and will	Q. Will the methodology still be applicable in a) 5 years time ? b) 10

it become a standard way of doing things?	years time? Q. Will the cost of the ISMS be relative to the outcomes (Benefits etc)
How will I know if it is my ideal methodology?	<purpose of this research>

The purpose of the above story was to simplify and to provide a hypothetical background to participants' statements. The story provided me with a feel for the variation and depth of questions that were raised during the focus groups. In the above story not all issues or themes were covered, see Figure 4.7 for a full list of themes that were raised by the participants' statements.

4.4.1.4 Quality of the participants statements

Although, the participants' statements were raised in a limited number of hours, I believe that they are unbiased and sufficient from which to draw rich conclusion, for the following reasons:

1) Statements were obtained from four focus groups representing 11 organisations with eighteen professionals attending. The data was large and sufficient for repeating patterns to emerge.

2) These statements were compounded from two different classes of professions: IT and Risk Management professions. So, one would expect that the questions would cater for the needs of both professions (if there is a difference of needs).

3) Figure 4.7 illustrates the comprehensiveness of topics that were raised during the focus groups. The participants made every effort to put forward their

experiences, opinions, and their perceptions of an ‘ideal methodology’ and to embed ((un)consciously) them in these statements.

4) The analysis was rich and provided a rich theory, as shown later in this chapter.

5) The statements were the result of group discussions; the moderator had no role and control of the group discussions, in other words, she was in fact a facilitator who had little influence on the types of statements generated and therefore biases were controlled.

As the result of the processes of data classification and story formulation, I have gained a better understanding of the data. When I had gained confidence in the data collected, then I was ready to initiate the analysis phase. The next section discusses the analysis process using the concept of Hermeneutics circles implicitly in the foreground as the epistemology and using the adopted Interrogative Framework to guide the analysis.

4.4.2 Analysis

This section is the second stage of the data transformation process and it is the most detailed section. First the process of analysis is explained in section 4.4.2.1 followed by further explanation of the category ‘context’ and its value to analysis is covered in section 4.4.2.2. Section 4.4.2.3 lists and explains nine questions that were used to interrogate the data from the focus groups using one of the statements as an example. A complete list of the derived categories is presented in section 4.4.2.4. Further discussion on the core categories is covered in section 4.4.2.5, which also provides more sample data given with their corresponding categories. Finally section 4.4.2.6 is a discussion to bring the process of analysis and the data collection to a close.

4.4.2.1 The Process of Analysis

Understanding resulted from interpreting each statement, taking a single word and relating it to the rest of the words in the statement. Then the whole statement becomes part of all the statements and back in a Hermeneutic circle until meaning is satisfied. Boland (1985, p.195) views the analysis process as an "interpersonal dialogue" by "asking: what question does this text answer? But each text has concrete, continuing historical existence, in which meanings are actively being constructed and new questions are being answered". The Hermeneutic circle used in this research is depicted in Figure 4.3 as shown below:

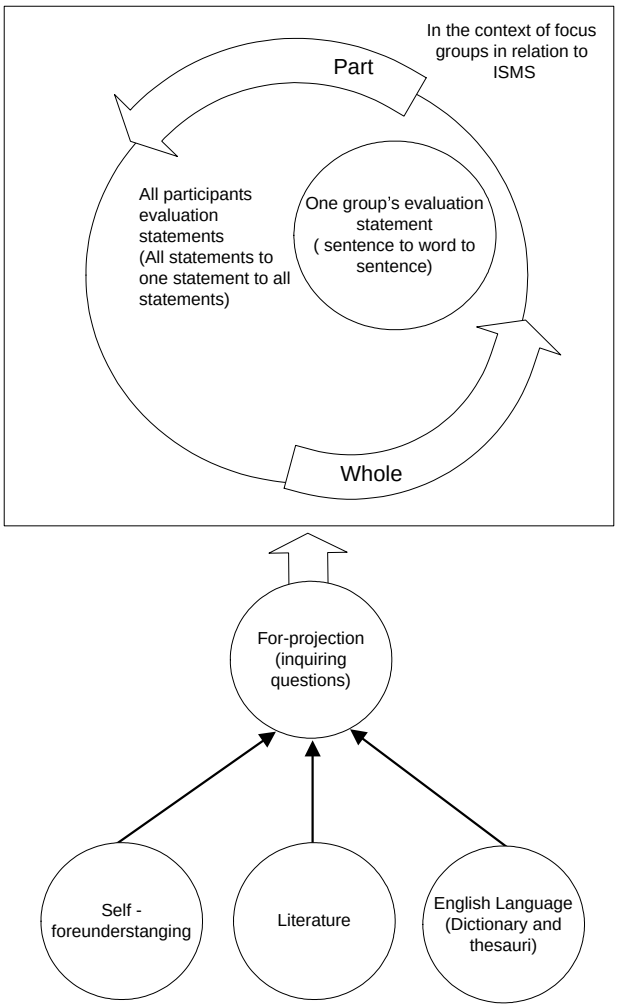

Figure 4.3: The Hermeneutic circle used in the research

This circular movement is used to fulfill "The Fundamental Principle of the Hermeneutic Circle" (Klein and Myers, 1999, p.72) which states that "understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form".

As mentioned in Chapter 3 (section 3.4.3.4), the structure of analysis for this thesis has relied on the developed 'Interrogative Framework' as shown in Table 4.1. The objective of the framework is to understand the parts in order to understand the whole by categorising the data. Categories are labels that are given to certain statements that carry the same or similar meanings. The framework consists of nine interrelated questions to assist in categorising the data according to the dimension being projected by each question. As mentioned in Chapter 3, these dimensions are coded as: Intention, Mission, Elements, Methodology Context, Project Context, Element Consequences, User Consequences, Adoption Consequences, and Remedial Attribute. This list of the coding family provides the events and actions necessary for comprehending 'what all is involved here?' (Schatzman, 1991). The rationale for these questions stemmed from the initial purpose of the exercise used during the focus groups, which was to evaluate methodologies in order to come up with a perspective on an ideal methodology. Therefore, the objective of the framework was an attempt to capture fundamental elements of an ideal methodology and to also determine potential problems that need to be remedied by quality attributes. These fundamental elements are captured by the quality attributes in the framework**.**

This process of events and actions is described below based on the nine interrogative questions and the intended projected dimensions as shown in Table 4.1. Figure 4.4 also depicts diagrammatically the analysis process and its possible outcomes. This sequence of analysis is further clarified with an example later in this chapter (section 4.4.2.3) to demonstrate the scenario building of the analysis and to show the relationship between these events and actions.

No.	**Interrogating Questions** Understanding the part based on Gadamer's concept	**Dimensions Projected** (coding family)
IQ-1	What is the intention of the statement?	**Intention**
IQ-2	What are the different ways of experiencing the methodology?	**Mission**
IQ-3	What basic element of the methodology is the question referring to?	**Element**
IQ-4	What part of the methodology is the question referring to?	**Methodology context**
IQ-5	What part of the project phase is the question relating to?	**Project Phase Context**
IQ-6	What is the likely impact on the element if the request made by the statement was not satisfied?	**Element Consequence**
IQ-7	What is the likely impact on the user based on the outcome from IQ-6?	**User Consequence**
IQ-8	What is the likely impact on the adoption of the methodology based on the outcome from IQ-6 and IQ-7	**Adoption Consequence**
IQ-9	What is the most likely desired attribute to overcome the consequences from IQ-6, IQ-7 and IQ-8?	**Remedial Attribute**

Table 4.1: Interrogative Framework

The analysis process was initiated by determining a short meaning or the **intention** of one single statement. **Mission** was then determined or 'the way practitioners think about the methodology'. The dimension 'Mission' is an expression of the practitioners' needs in terms of assistance or guidance in solving the problem. This was followed by extracting the element that is needed to represent the theoretical explanation of the statement. The 'ideal' methodology is portrayed through the basic **element** of a methodology within the **context** of a **methodology** and a generic **project** phase. The element is then characterised by having basic quality attributes. These attributes are determined as remedial to overcome three possible interrelated consequences. These consequences are created by determining what may happen if the request made by the participants' statements weren't satisfied. The three consequences impact the **element**, the **user** and its **adoption** and the **remedial attribute** is a suggested attribute to reduce these impacts.

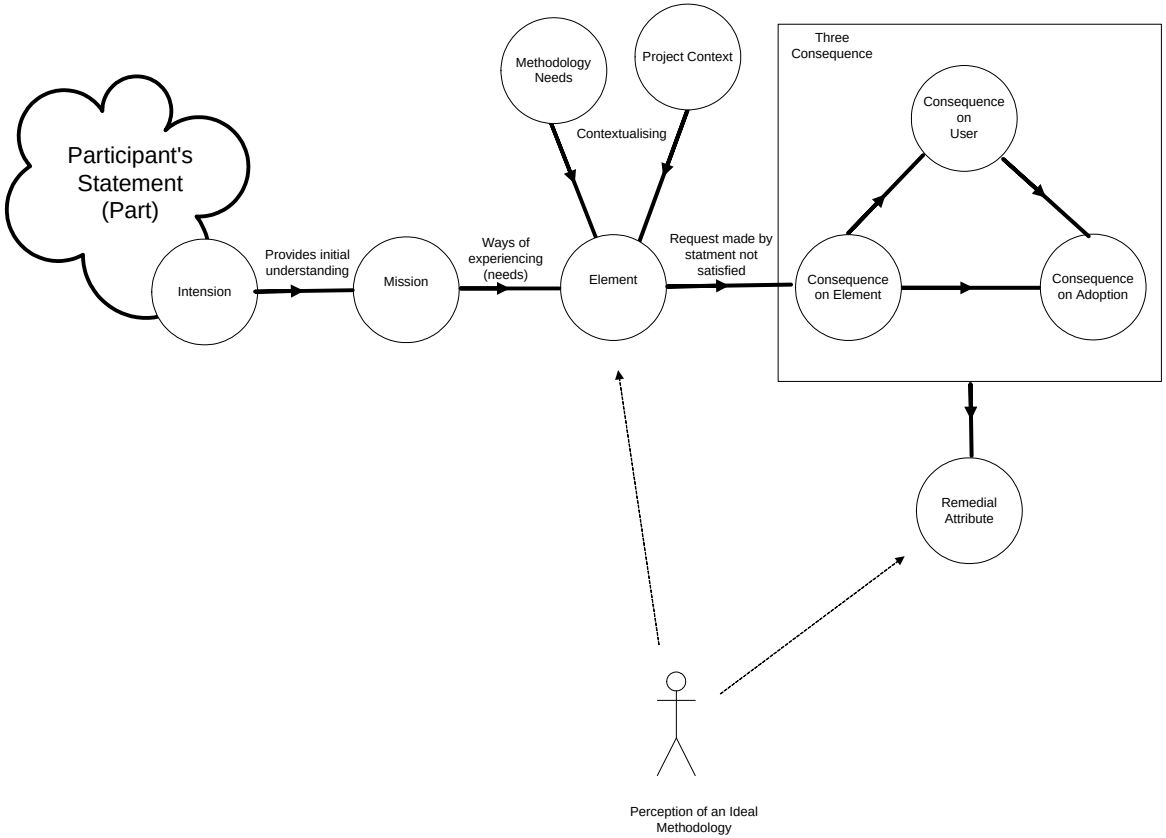

Figure 4.4: Analysis process for a single statement

The above process is repeated for all the participants' statements using the Interrogative Framework. Through a cycle of inductive and deductive reasoning, the most salient categories were derived using this sequence of coding to arrive at a structure for explanation and to construct a substantive theory i.e. relevant in the context of data collected. The names for the categories were either derived from the participants' statements, observation during the training session, contact with organisations, IS literature or my experience as a practitioner.

The above coding family provides the necessary means for conceptualising methodologies as they were perceived by the participants and for providing new meanings in order to characterise methodologies in terms of what could (or should) be done in order to reduce the deviation or prevent rejection of the methodology.

4.4.2.2 Contextualising

The participants' statements had a context or surrounding background as the analysis or the interrogations of data will show later in this chapter. This section is an elaboration on the value of having a 'context' as a dimension and it is emphasised because of its value in capturing depth and breadth in the meaning of the statements as opposed to abstract interpretations.

A context may have been created while participants reflected on their daily activities while formulating the statements. Two different contexts were derived form the analysis, one was related to the methodology and the other related to a specific phase of a project. The purpose of the 'context' dimension is to provide contextualising to the meaning of the statement. Van Oers (1998) defines the idea of contextualising as a "quintessential condition for the construction of meaning (implying both particularisation and coherence)" (p.483). Particularisation of meaning relates to "constraining the cognitive process of meaning construction, and by eliminating ambiguities or concurrent meanings that do not seem to be adequate at a given moment" (p.475).

The participants' statements are either perceptions or apperceptions of their experience. Marton and Booth (1997, p.180) argue that these perceptions have structure "that indicates what is aimed at, what it demands and where it will lead". Van Oers (1998, p.481) adds that in order to arrive at a coherent meaning "essentially depends on some sort of surroundings". Hirsch (1967, p.47) acknowledges that understanding the context "narrows the meaning probabilities for the particular word sequence; otherwise, interpretation would be hopeless" but it is not seen as to guarantee accurate interpretation - "at best a context determines the guess of an interpreter (though his construction of the context may be wrong, and this guess correspondingly so)" (Hirsch, 1967, p.47).

The issue of context or surrounding background has been also borrowed from the Phenomenography approach (Marton, 1981). Phenomenography is an empirical research approach that emerged from Sweden in the 70s. It is structured to capture variations of people's perceptions of a reality or ways of experiencing a particularly phenomenon (Marton and Booth, 1997). It has been used in a number of areas in the IT field (Bruce, 2002) to study issues such as conception of learning and conception in specific disciplines of study. For example Cope (2000) studied how information systems are conceived by academics, students and practitioners, while Klaus and Gable (2000) studied senior managers investigating their understanding of knowledge management in the context of ERP. During analysis, researchers rely on the use of a "structure of awareness" framework (Marton and Booth, 1997; Cope, 2000) to distinguish between the levels of understandings. The framework is based on the field of consciousness proposed by Gurwisch (1964). The data is interpreted in terms of theme, thematic field, and margin. Theme is the "focus of his attention" exhibited in the excerpts while thematic field is the surrounding background and the margins are considered as noise that has no relevance on the data. The 'methodology context' and 'project phase context' in this study captures the thematic field and the other dimensions assist in capturing the theme of the participants' statements.

4.4.2.3 Data Interrogation

I have already mentioned that data do not speak for themselves; they have to be questioned or interrogated to obtain answers. This section lists nine questions that were used to interrogate the forty statements in order to determine the categories that will be used as the main parts of the theory conceptualising a methodology. An example is provided later on the application of these questions to demonstrate how the categories or outcomes of this thesis were derived.

The previous chapter highlighted the importance of questioning the data. To emphasise this issue further, Gadamer (1979, p.370) argues that to understand text, a person:

> *must question what lies behind what is said. He must understand it as an answer to a question. If we go back behind what is said, then we inevitably ask a question beyond what is said. We understand the sense of the text only by acquiring the horizon of the question ...Thus the meaning of a sentence is relative to the question to which it is a reply, but that implies that its meaning necessarily exceeds what is said in it.*

Based on the above proposition, I have formulated my own interrogating questions based on the coding family to understand the collected data and to allow me to move from a description stage to one of abstraction (Strauss and Corbin, 1998).

These interrogating questions resulted from examination of the literature covered in Chapter 2 and my own preconception of the ideal methodology given in Chapter 3. The questions are used to understand the whole by understanding the parts as suggested by Gadamer (1979). This set of questions and corresponding subjective answers constitutes my prejudice or preconceptions. Declaring my preconceptions is in line with the requirements of the "Principle of Dialogical Reasoning" (Klein and Myers, 1999, p.76) which requires the researcher "to confront his or her preconceptions (prejudices)". The questions were shown in Table 4.1 along with their projected dimensions. Figure 4.5 is also an illustration of this interrogating process.

The analysis is basically a phenomenological reduction based on my background and experience, and my understanding of ISMS and of the participants' characteristics and background, which were formed over the four days of training. Revisiting the existing literature continuously during the analysis was seen as crucial to ensure that the analysis is in line with natural and common sense issues. The analysis is my understanding of the practitioners' statements, which are in fact my explanations of the data collected. I also found the use of online dictionaries and thesauri useful tools to arrive at a consistent meaning of words. In addition, I had the participants' answers to the raised statements which helped me to understand better the meaning of these statements.

All statements were subjected to these nine interrogating questions. The outcome from this stage was the emergence of a collection of categories. The categories were derived using inductive analysis and analogical reasoning. These questions were somewhat exhaustive, meaning that I have tried to induce as many nuances and contingencies as I possibly can from the data (Goulding, 2002).

The method of analysis is based on reflecting on the semantic content of the participants' statements and involved many tasks that were carried out either sequentially or simultaneously, including reading (many times), constant comparison, sorting, negating, grouping and ungrouping, reflecting on existing literature, backtracking, subjective and objective interpretation and summarising by categorisation in order to determine the essence of the phenomenon. The analysis process also involved comparing the emergent categories with existing literature from cross disciplines e.g. to check for coherence and consistency. Data analysis involved experimentation with different categories, which was essential before reaching the final set of categories. The analysis took several weeks, which also involved continuous discussions with my supervisor, wife and colleagues. The analysis was an iterative process until all questions were resolved into categories. Saturation was reached and a feeling that a consistent plausible pattern was emerging. What is being applied constantly in the analysis is the circle of Hermeneutics – a movement from a word to sentence, back and forth to reach an understanding.

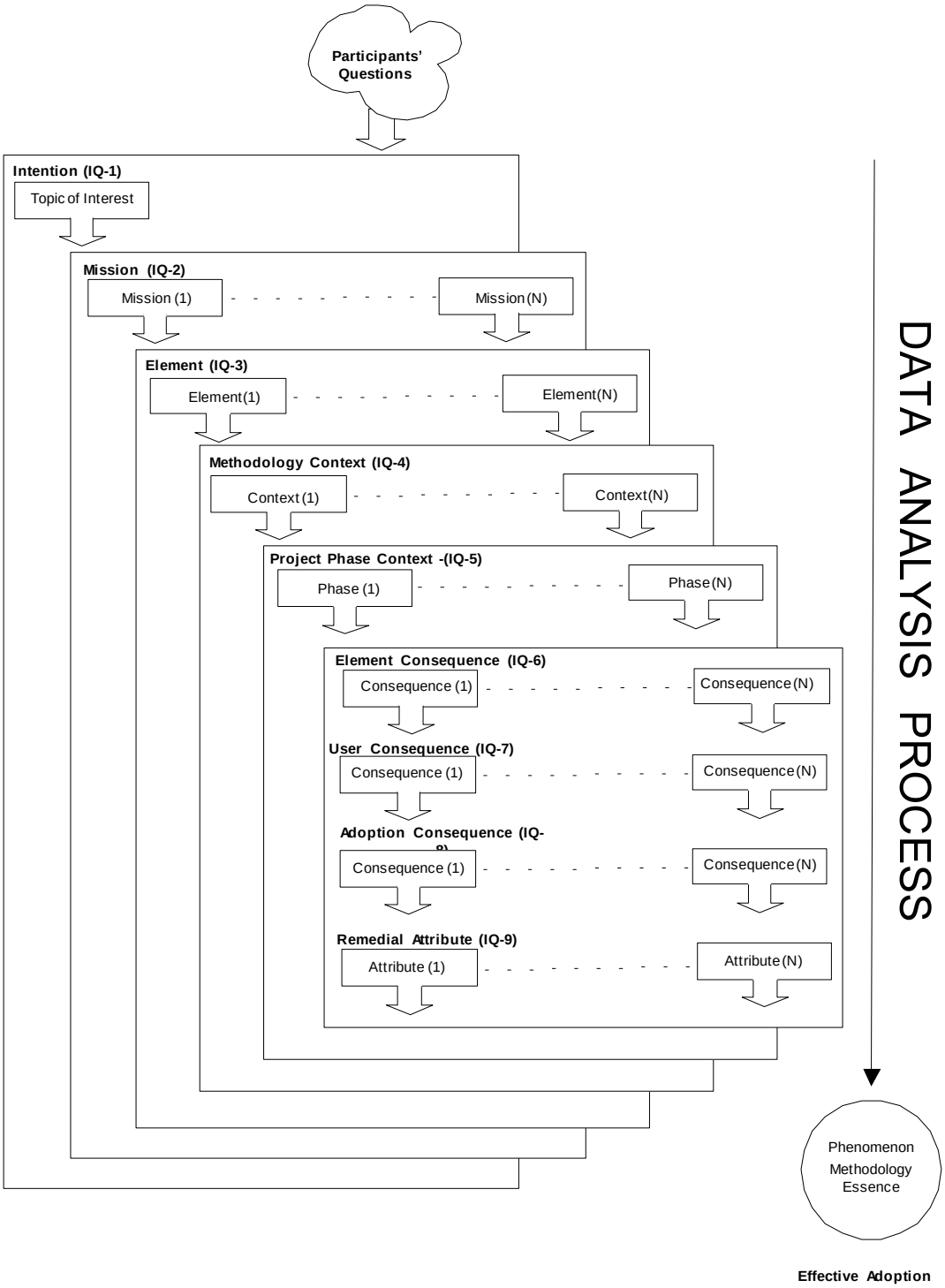

Figure 4.5: Illustrating the data analysis process

The involvement of my wife (a qualified counsellor) throughout the data analysis was important to keep a check on myself and to perform cross-examination to ensure consistent categorisations were being made. My wife played the role of the "devil's advocate". Occasionally, I became too immersed in the data. Although desired, it created an atmosphere of constant fear that I would lose track and might be overcome by my own biases and start forcing data. It was important to periodically step back and look at the data (Strauss and Corbin, 1998). I revisited the data several months later, to see if the meaning of the participants' statements remained stable in terms of their categorisation. When revisited, two statements were altered without affecting the overall structure since I was looking for the key elements.

An example would seem appropriate at this stage to explain the process of data analysis using the interrogating questions to illustrate how the constructs of the theory emerged.

Here is one analysed statement from one of the focus groups to demonstrate the analysis process. Section (4.4.2.4) will discuses in more detail the resultant categories and how they were allocated.

> ***Does the methodology give clear and easy to understand steps that could be taken by a person with limited security or risk management understanding?***

Subjecting the participant's statements to the above nine interrogative questions generated the following categories. As I have mentioned, the labels of these categories were either derived from the participants' statements or from the literature, determined by my own judgment.

> **IQ-1: What is the intention of the statement?**

Intention

The first question is used to determine the intention or the topical area of the statement. A wide range of topics was derived from these statements (see Figure

4.7). This question served to construct an overall picture of all the statements. In the given example, this statement is referring to 'clear and easy steps' and this was understood to refer to an aspect that relates to the '***Usability***' of the methodology.

IQ-2: What are the different ways of experiencing the methodology?

Mission

This question was used to reflect on the conception of the methodology as perceived by practitioners. I wanted to determine how practitioners view methodologies in terms of assisting them in their daily activities. The different conceptions will constitute the various missions of methodologies.

In the given example, the statement is referring to 'clear and easy steps' and this was interpreted to represent the methodology fulfilling a '***Requirement*'**. Therefore, we can say one of the missions of the methodology is then to meet the 'requirements' of practitioners' needs.

IQ-3: What basic element of the methodology is the question referring to?

Element

Question three was applied to determine what element the statement is referencing. The determined element sets the perspective for the subsequent interrogating questions (IQ-4 to Q-9).

In the given example, on close examination of part of the statement, it can be seen that the 'steps' of the methodology are the subject or the theme of the statement, and consequently assigned the label '***Process*'** being representative of the word 'steps'.

IQ-4: What part of the methodology is the question referring to?

Methodology Context

This question was used to contextualise the participant's statements in a frame relevant to the methodology taking the element 'Process' as the perspective to answer the question.

In the given example, the word 'steps' or 'process' is the subject of enquiry. The statement is referring to the content of the process and thus the label '***Content***' was allocated.

IQ-5: What part of the project phase is the question relating to?

Project Phase Context

This question was used also to contextualise the statements in order to put them in a frame within a generic project phase, again, taking the element 'Process' as the perspective to answer the question.

In the given example, the statement contains 'give clear and easy to understand steps' and this was understood that the statement refers to carrying out the details of a task. The majority of the 'steps' or 'processes' in the methodology are mostly related to the development or building of the solution. Therefore the context here is labeled as '***Building'***.

IQ-6: What is the likely impact on the element if the request made by the statement was not satisfied?

Element Consequence

This is a 'what if' scenario type of question. The purpose of this interrogative question is to determine the impact likely to occur on the element if the request made by the participants' question is not satisfactory or nullified by the

determined basic element. In other words, an absence of one of the characteristics of the element is being assumed.

In the given example, if the request made by the participant's question can not be satisfied or nullified would cause the element 'Process' to be "not clear and not easy". In this case the consequence on the element (process) is labeled as '***Unclear***'.

IQ-7: What is the likely impact on the user based on the outcome from IQ-6?

User Consequence

This question determines the likely side effects on the user resulting from the previous question (IQ-6).

In the given example, when the element or the 'process' is 'unclear', the user will be placed in a dilemma on how to carry out the prescribed process. The label '***Equivocality***' is assigned to the 'User Consequence' to describe the state being faced by the user. Such a state may lead to undesired consequences.

IQ-8: **What is the likely impact on the adoption of the methodology based on the outcome from IQ-6 and IQ-7?**

Adoption Consequence

This question determines the most likely outcome resulting from IQ-6 and IQ-7 i.e., from the state of the user caused by the deficient element.

In the given example, as a consequence of 'equivocality' arising from IQ-6 and IQ-7; the methodology user may start making a wrong interpretation of the process and start applying the methodology according to his/her limited understanding, which might eventually lead to deviation from the intended

purpose of the methodology. The category ***'Deviation'*** was chosen to represent this dimension of 'Adoption Consequence'.

IQ-9: What is the most likely desired attribute to overcome the consequences from IQ-6, IQ-7 and IQ-8?

Remedial Attribute

What is being sought after in this question is a remedial quality factor of the element to reduce the consequence from IQ-8 resulting IQ-7 and IQ-6.

In the given example, this statement was interpreted as follows: in order to ease the state 'equivocality' of the user and to make the process clearer and reduce the likely 'deviation' of the user from the intended objective of the process, the remedial attribute '***Practical***' was denoted as a representative choice, i.e., the processes of the methodology need to be practical to provide the user proper comprehension.

Figure 4.6 illustrates the above theorising process and its outcome using the given example. In simple terms, the general theme of this example is related to a **usability** issue which is interpreted as a **requirement** needs. The **process** (A) is the element in focus. The participant's statement is an inquiry on the **content** of the methodology (y-axis) that may be useful in the **building** phase (x-axis). The element is now placed in two different contexts (x and y axis). If the process is assumed to be **unclear** (B), it may put users in a state of **equivocality** (C), which may cause them to misinterpret the process, leading to **deviation** (D) from the intended purpose of the **process** (A). In order to make the element clearer and to reduce the possibility of deviation, the element needs to be **practical** (E) and thus make the element more effective.

This sequence of the Hermeneutic circle and reasoning was applied to all the participants' questions producing a small set of categories that are interrelated. This

chapter and Chapter 5 elaborate on these categories and their viability. The following section lists all the derived categories resulting from the interrogation process.

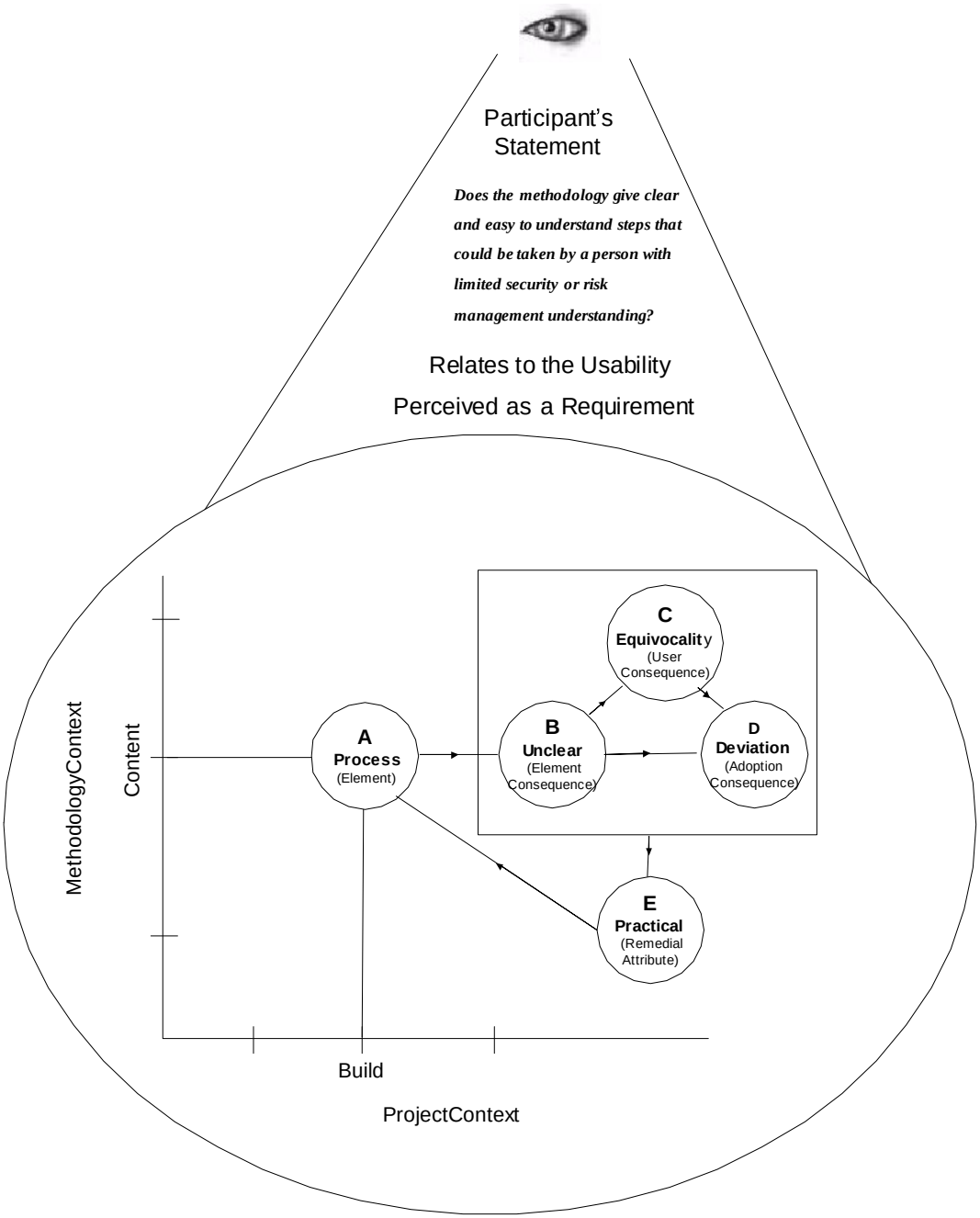

Figure 4.6: The Theorising process for the given example

4.4.2.4 Complete List of Categories

The final analysis resulted in 24 main categories, consisting of three perceptions on mission, two different sets of contexts having three categories each, three 'elements', three 'methodology consequences', three 'user consequences', two 'adoption consequences' and three remedial 'attributes'. These final categories emerged as the result of several processes of generating alternative explanations and interpretations, which were guided by the nine interrogation questions. These processes involved trial and error which included mental workouts, written notes and discussions with colleagues. Various labels for these categories were also used before final settlement reached. Labels that are more salient and most encompassing were chosen. As I have mentioned earlier, the answers to the evaluation questions provided by the participants and the discussions over the four days assisted me in reaching accurate interpretation of the data including my visits to organisations (TOEG, Alpha and Beta). The list of the final categories and reasons for their selections, are as follows:

IQ-1 What is the intention of the statement?

Intention

The participants' statements have generated a range of topics, as shown in Figure 4.7. These topics were determined based on the main themes of the statements.

IQ-2 What are the different ways of experiencing the methodology?

Mission

Three categories were generated, namely: '**Vital needs'**, '**Requirements**', and '**Improvements**'. 'Vital needs' was allocated when the statement related to the basic and essential needs that are required to carry out an information security project such as being compliant to the security standards such as AS/NZS ISO/IEC 17799:2001 or based on the understandings of risk management. The 'Requirement' category was allocated when the statement related to the usage and the steps of the methodology while

the ‘Improvement’ category relates to enhancement provided by the methodology such as tools and automation.

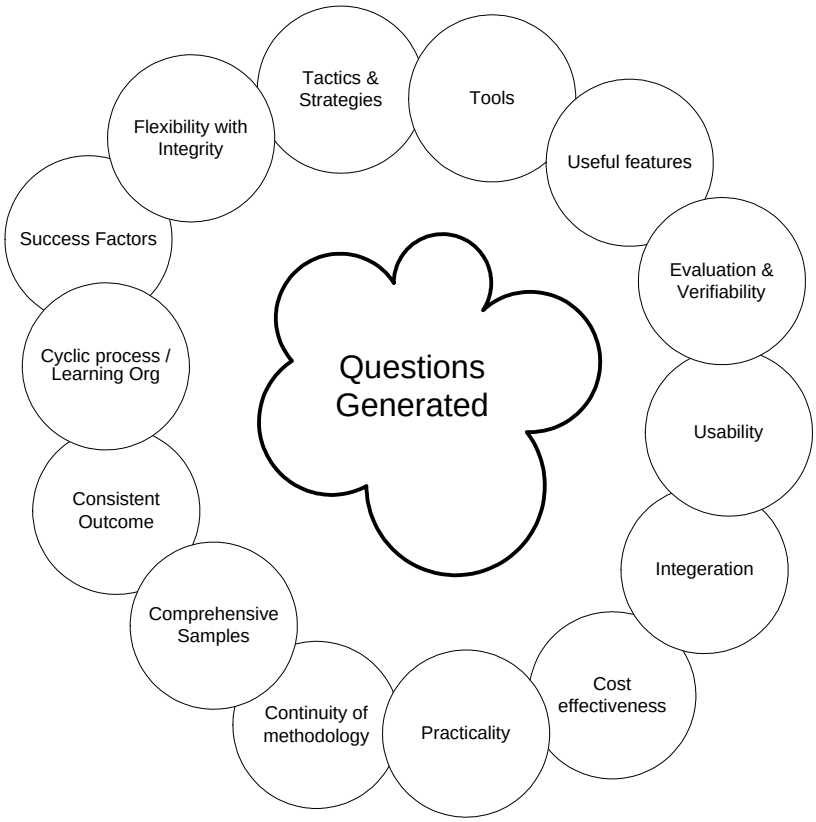

Figure 4.7: Topics of interest

IQ-3 What basic element of the methodology is the question referring to?

Element

This question generated categories to represent three elements and they include, ‘**Principle**’, ‘**Process**’, ‘**Example**’ and ‘**Whole**’. The ‘Principle’ category was assigned if the statement was referring to the structure or the philosophy of the methodology, while the ‘Process’ category is assigned when the statement is referring to an operation or instructions. The ‘Example’ category was allocated when the statements required

different aspects of clarity. If the statement was not referring to any specific element or any part of the methodology the category 'Whole' was given.

IQ-4 What part of the methodology is the question referring to?

Methodology Context

This question derived three categories. If the statement relates to the structure or operation of the methodology, '**Operation'** was assigned. If the statement refers to the content of the methodology then '**Content'** category was assigned. If the statement relates to organisational and implementation issues, the '**Environment'** category was allocated.

IQ-5 What part of the project phase is the question relating to?

Project Phase Context

This question produced three categories: '**Planning'**, '**Building'** and '**Managing'**. These categories were determined based on the content of the statement in relation to the project phases. Usually the statements gave clear indication of their applicability within a project phase i.e. in the beginning, middle or end of the project. Occasionally, I would ask myself; under what section in the methodology would I find the answer to a participant's statement. I have chosen the labels planning, building and managing to be representative and most generic. However, if the statement did not indicate one of these three categories, '**All Phases'** was allocated.

IQ-6 What is the likely impact on the element if the request made by the statement was not satisfied?

Methodology Consequence

This question created three categories, namely: '**Rigid'**, '**Uninformative'**, and '**Unclear'**. 'Rigid' was allocated if the element principle or the structure of the methodology were assumed inflexible while 'Uninformative' was allocated if the

elements do not provide the necessary information. The category 'Unclear' is given when the elements lacked practical information.

IQ-7 What is the likely impact on the user based on the outcome from IQ-6?

User Consequence

This question created three categories: '**Anxiety'**, '**Uncertainty'** and '**Equivocality'**. 'Anxiety' was allocated when the element is inflexible. 'Uncertainty' was specified when the element lacks the necessary information and 'Equivocality' allocated when the user is not clear on how to take them.

IQ-8 What is the likely impact on the adoption of the methodology based on the outcome from IQ-6 and IQ-7?

Adoption Consequence

This question generated two categories based on IQ-6 and IQ-7. These two categories are either '**Deviation'** or '**Rejection'** of the methodology.

IQ-9 What is the most likely desired attribute to overcome the consequences from IQ-6, IQ-7 and IQ-8?

Remedial Attribute

This question derived three quality attributes to overcome the three likely consequences, '**Flexible'**, '**Comprehensive'** and '**Practical'**. These attributes were also selected because they were frequently mentioned during the training session and the focus groups.

Table 4.2 shows the interrogative questions, the dimensions being sought and the resultant categories. Figure 4.8 summarises the data analysis process diagrammatically with the derived categories.

No.	**Interrogating Questions** Understanding the part Based on Gadamer's concept	**Dimensions Projected** (Coding family)	**Categories** (Resulting from analysis)
IQ-1	What is the intention of the statement?	**Intention**	See Figure 4.7
IQ-2	What are the different ways of experiencing the methodology?	**Mission**	Vital needs Requirements Improvements
IQ-3	What basic element of the methodology is the question referring to?	**Element**	Principle Process Example Whole
IQ-4	What part of the methodology is the question referring to?	**Methodology context**	Content Operation Environment
IQ-5	What part of the project phase is the question relating to?	**Project Phase Context**	Planning Building Managing All Phases
IQ-6	What is the likely impact on the element if the request made by the statement was not satisfied?	**Element Consequence**	Rigid Uninformative Unclear
IQ-7	What is the likely impact on the user based on the outcome from IQ-6?	**User Consequence**	Anxiety Uncertainty Equivocality
IQ-8	What is the likely impact on the adoption of the methodology based on the outcome from IQ-6 and IQ-7	**Adoption Consequence**	Deviation Rejection
IQ-9	What is the most likely desired attribute to overcome the consequences from IQ-6, IQ-7 and IQ-8?	**Remedial Attribute**	Flexible Comprehensive Practical

Table 4.2: Questions, dimensions and categories

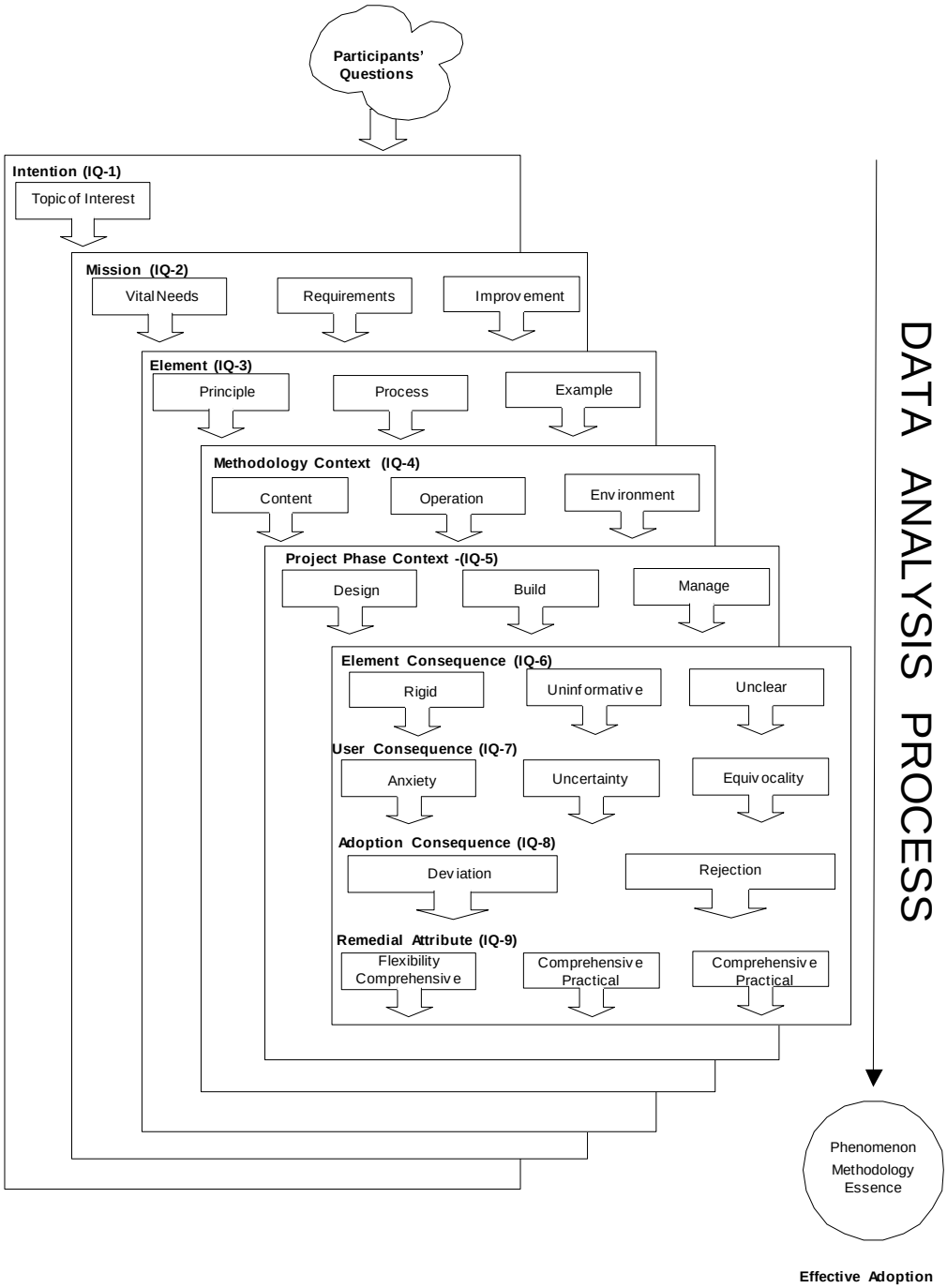

Figure 4.8: Data analysis process with derived categories

As mentioned earlier, Microsoft Access was used to store the statements and their corresponding categories. The records format is shown in Table 4.3. The table shows an example statement (301) and its resultant categories.

Question #	Statements	Intention	Mission	Element	Methodology Context	Project Context	Methodology Consequence	User Consequence	Adoption Consequence	Remedial Attribute
301	***Can the methodology be streamlined without losing integrity?***	Flexibility with integrity	Vital Needs	Principle	Operation	Planning	Rigid	Anxiety	Deviation	Flexible
302										
303										
.										
.										
n										

Table 4.3: Records Format

The data analysis process shown in Figure 4.8 allowed me to learn and understand the participants' statements by contextualising and using different modes of thinking as suggested by the coding family. It can be seen that these nine interrogative questions have been useful in providing a theory building process and in demonstrating how the categories emerged and developed from the data. Looking at Table 4.3 (record 301) it can also be seen that one can easily build a scenario of events and actions by taking the element as perspective.

4.4.2.5 Fundamental Elements and Their Attributes

The focus of the analysis is based on the 'element' and the remedial or quality 'attribute' categories, which resulted in three fundamental elements and three fundamental quality attributes. The other categories were used to assist in comprehension and to facilitate analysis. The final analysis revealed that each element was allocated only two of the three derived attributes. These attributes were determined based on the three expected consequences on the statement being analysed. Table 4.4 shows the elements and the reasons for allocating the attributes which are to reduce the effect of the three consequences. The content of the table is discussed below followed by two examples to clarify the reading of the table.

Table 4.4 was constructed from Table 4.3, by taking each element in each record along with its corresponding attribute and consequences. The table shows that each element 'needs to' have a quality attribute in order to 'to reduce the effect of the three consequences'. The whole (combined elements) and their attributes 'promote' the methodology to an effective state.

To further clarify the table, two illustrations are given below using two statements from the conducted focus groups.

Example 1: ***Can the methodology be streamlined without losing integrity?***

The statement refers to a 'Principle' of the methodology. The principles need to be 'Flexible'. Flexible principles reduce 'Rigidity', which may in return reduce the 'anxiety' of users, and thus reducing 'deviation' from the objective of the principles.

Example 2: ***Does the ISMS provide meaningful examples?***

This statement refers to the 'example' element. This element needs to be 'practical' to reduce 'equivocality' of users, thus reducing 'deviation' from the objectives of what is being communicated to the users.

Element	Attribute	To Reduce Consequences
Principle	Flexible	*Rigid*
		Anxiety
		Deviation/ Rejection
	Comprehensive	*Uninformative*
		Uncertainty
		Deviation/ Rejection
Process	Comprehensive	*Uninformative*
		Uncertainty
		Deviation/ Rejection
	Practical	*Unclear*
		Equivocality
		Deviation/ Rejection
Example	Practical	*Unclear*
		Equivocality
		Deviation/ Rejection
	Comprehensive	*Uninformative*
		Uncertainty
		Deviation/ Rejection
The sum of the elements (whole) promote *effective adoption leading to infusion*		

Table 4.4: Basic elements and their basic attributes

Table 4.5 shows more examples of participants' statements with their corresponding categories obtained after using the interrogation scheme. Appendix 6 provides a complete list of the participants' questions with their corresponding derived categories.

Statements/ Questions	Categories
Dimension – Mission	
Is full understanding of each business service risk management process achieved in ISMS?	Vital needs
Are all the steps well defined so that a person with little training can processed thru the entire methodology or is a training course necessary?	Requirements
Does the ISMS provide tools to facilitate and disseminate communication?	Improvements
Dimension - Methodology Context	
How are existing standards and procedures incorporated into ISMS?	Operation
Does the methodology supply ways of implementing cultural change?	Content
What skills are needed for a successful implementation team?	Environment
Dimension - Project Context	
What is the interoperability of the methodology between the states / territories of Australia	Planning
How flexible is the ISMS?	Building
How can the benefit or ROI from implementation of an ISMS be measured?	Managing
Dimension - Element	
How compulsory will the methodology be & how much will it need to be followed exactly?	Principle
Are all the steps well defined so that a person with little training can proceed thru the entire methodology or is a training course necessary?	Process
How comprehensives are the outputs and sample documents?	Example
Will ISMS be supported in the future?	Whole

Table 4.5: Sample of participants statements with their categories

4.4.2.6 Reaching Saturation

The aim of the analysis was not to capture any particular group understanding of the methodology, but to capture the range of understanding within the four groups. My aim was to examine participants' statements as one whole group, since the eighteen

participants who attended the focus groups came from one type of population (government). Therefore, I have relied on these eighteen participants to provide me with their understanding of the variations of requirements of what may constitute an ideal methodology.

However, the analysis of statements from the different focus groups did not produce the same type and number of categories. To pinpoint the exact reason for the difference is not an easy task and it might even be futile, since we are dealing with group dynamics. Table 4.6 shows the total appearance of elements and their attributes. It also shows that the analysis did not reveal a fourth element nor a fourth attribute. This does not mean that if another researcher used the same set of data, they would not be able to determine a fourth or even more elements or attributes. This is a reasonable assumption to make since any analysis relies on the researcher's perspective and fore-understanding when analysing the data and on the context where the data was collected.

Attribute **Element**	**Flexible**	**Comprehensive**	**Practical**	**4th attribute**	**Total Count**
Principles	6	5	__	__	11
Process	__	12	3	__	15
Examples	__	7	5	__	12
4th element	__	__	__	__	-
Sub-total	6	24	8	0	38
Whole	4	The sum of the parts provides completeness			4
Total					42

Table 4.6: Number of statements containing the elements and their attributes

Note that table shows a total of 42 statements instead of forty, because two of the statements were of the 'compounded' type and were each split into two statements.

Even if there is a variation in group outcomes, I can confidently make a conjecture here that there is no fourth basic element, i.e. if I conduct the exercise using another focus group, their statements could be categorised as being one of the three elements. To put it differently, if these 18 participants were offered a methodology that has these three basic elements and is described as being flexible, comprehensive and practical, they would consider the methodology as having a high value – at least for now.

Since no new categories emerged, the analysis at this stage is considered saturated, i.e. overlap of patterns (Eisenhardt, 1989; Krueger, 1994, Strauss and Corbin (1998). Similarly, Schatzman and Strauss (1973, p.111) argue that analysis continues "until a guiding metaphor … general scheme ... model, overriding pattern, or story line" emerge that can link the generated categories. Only then can one reach a closure to the analysis. Upon close examination of the categories, an overriding pattern became evident. This pattern represents the emergent theory. The following section is an interpretation of how the derived categories led to the emergent theory.

4.4.3 Data Interpretation

So far I have covered the first two stages of the data transformation: the description and the analysis stages. This section covers the last stage of the data transformation endeavor. The construction of an emergent theory from the three elements and their respective attributes is covered in section 4.4.3.1. A revised conception of an ideal methodology illuminated by the emergent theory is presented in section 4.4.3.2. The last section defines the terminology of the theory constructs covered in section 4.4.3.3.

4.4.3.1 Theory Construction

Before the theory was constructed, another question was asked to determine a central theme or a conclusion of the sum of the derived categories.

What is the outcome when combining the derived elements and their attributes?

The three elements, principles, process, and examples were the result of analysis derived from the interplay between the parts to the whole and back. Inductive reasoning may also suggest that these three elements constitute the whole of the methodology, which means the three elements must have a relation to each other and their compounded quality attributes, should form a quality characteristic that can be ascribed to the whole. Completeness as a quality criteria seemed to give the best fit to meet the criteria of the conceived ideal methodology.

Theories being developed are usually represented in diagrams to provide a visual means for clarification (Miles and Huberman, 1984; Strauss and Corbin, 1996). Dey (1993) made this point very clearly when he stated, "diagrammatic displays are not just a way of decorating our conclusions, and they also provide a way of reaching them" (p.192). Dey argues that diagrams need to be simple, clear, relevant and appropriate. Diagrams are considered as "powerful tools for condensing data and comparing categories" (p.193).

Methodologies may be viewed also as a type of system. The most commonly used definition of system is defined by Von Bertalanffy (1969/1998, p.55 & p.66) as a "set of elements standing in interrelationship...if we are speaking of 'systems', we mean 'wholes'"(citied in Dubrovsky, 2004, p.113). Another definition given by de Condillac (1749/1938, p.3) stating "every system is nothing else but an arrangement of different parts of some art or science in a certain order in which the mutually support each other and in which preceding part explain the following ones" (citied in Dubrovsky, 2004, p.117).

In light of the above, the theory (whole/system) was constructed from the three elements. Diagramming was used in making the proposed theory more communicative. After experimentation with different structures, a triangle was a palpable choice and it seemed to be the best fit to explain and conceptualise the principle, process and example elements along with their attributes and their relationships as shown in Figure 4.9. This diagram is explained in the next section.

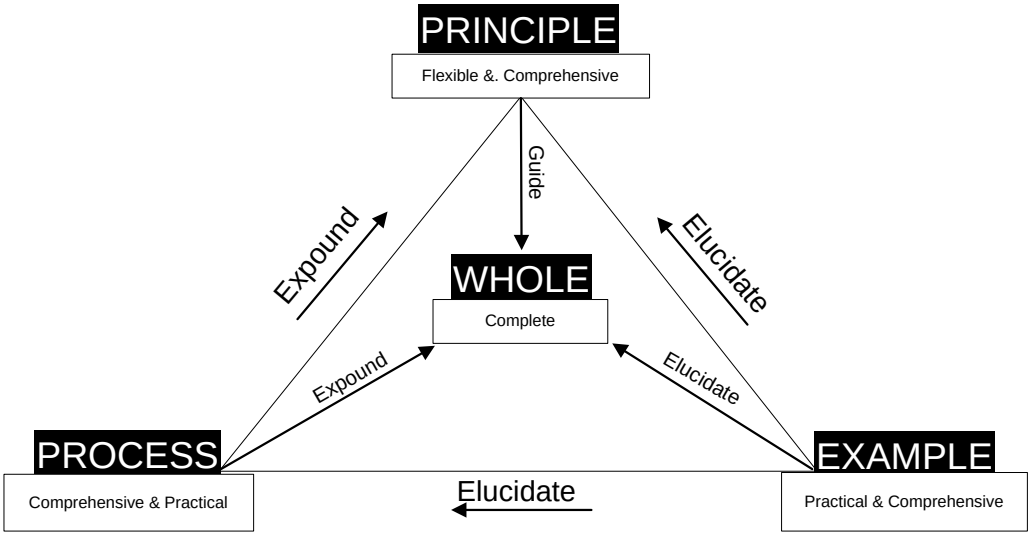

Figure 4.9: Conceptualisation of an Ideal Methodology

4.4.3.2 A Revised Conception of an Ideal Methodology

This section discusses the way I have developed my conception of an ideal methodology in the light of the three derived elements, their attributes and their relationships.

After having constructed the substantive theory diagrammatically, a final question was asked in order to determine the relationships between the elements:

What are the relationships between the derived elements and their attributes?

Gadamer (1976, p.117) suggested that "The harmony of all the details with the whole is the criterion of the correct understanding. The failure to achieve this harmony means that understanding has failed". Theoretical statements connecting the elements are also required to make the theory useful for explanation and prediction (Strauss and Corbin, 1998). To follow is a set of conjectures, statements and a story that explains the relationships in order to provide the basis for the theory definition and understanding.

These statements are formulated based on commonsense and the use of the parsimony of the triangle to explain the logic of the elements and their relationship.

The **principle** is the driving force of the methodology and it is a permanent foundation that enlightens its core philosophy. The user reaches a predetermined destination step-by-step by being informed by set of principles on what to do and why. The user is advised throughout the project journey on making intellectual decisions to override seen and expected hurdles with confidence; he/she is guided rather than being burdened. The user accepts and adopts these principles as long as he/she has the freedom to be creative (flexible) and is continually being informed (comprehensive) and guarded against pitfalls. Principles can in fact misguide the user if they do not cover every corner and every side-line of the development process. The principles acknowledge the practitioners' strengths and overcome their weaknesses.

These principles are meaningless unless they are completely understood by the user. The interpretations of these principles are expounded by **processes** expressed in stages, steps, and tasks or in any way that is cognitively acceptable to the user. The aim of processes is to provide the theoretical and practical knowledge containing a detailed discourse of utterances and actions (who, how and when). Processes are comprehensive, providing breadth, depth and accuracy in a cohesive manner.

The role of the **example** is to provide the practical knowledge and to elucidate the processes and principles. Both the process and the example deal with realistic issues with real existence and not with idealistic concepts that are distant from mental conceptions. But, at the same they are realistic and idealistic because the methodology aims at raising the standard of the practitioner to a higher level of professionalism. No matter how well the processes are expressed, a degree of ambiguity and abstractness will always exist, leaving the practitioner unclear on the application of a given stage, unless accompanied by appropriate type of examples.

The examples can be viewed as the living application of the principles and processes, providing enough knowledge on their operation to reduce the ambiguity of interpretation between a principle and a process. They are presented in multiple formats to allow each practitioner to infer the meaning of processes or principles relevant to their situation. The richness of the examples provides the practitioner with the opportunity to think, reflect, and adapt. The examples suggest or inform the user on how to integrate the process into his/her existing working scheme. They can be effective at resolving conflicts between two different opinions in order to take informed decisions.

The existence of the example as a basic element signifies that, if the methodology does not have a set of useful examples, it may be considered as unintelligible. This can be equally said about the processes and the principles if they are incomplete and uninformative. Practical examples in the form of stories (case studies), highlighting the context, events, reasons, actions, and lessons learned, lead to higher likelihood of adopting the methodology.

The combination of these three elements caters for both technical and social aspects. The technical aspects are being met by the principles and the processes and the social aspect being met by the examples. The determinants of a successful and complete methodology may depend on the synchronisation of its elements and their attributes. Probably the ultimate test of the success of a methodology is when these three elements contribute most to the understanding of the methodology users in terms of their roles within the problem solving process. Successful methodologies may be viewed as a comprehensive curriculum for educating, directing and meeting the various needs of practitioners.

It should be noted, that the relationship between the elements is not necessarily a one-to-one relation. One principle may be demonstrated by a range of processes and many examples. An example may also elucidate many principles and processes and many examples may be used to clarify one principle or one process.

The triangle may be used to predict the behaviour of a given methodology. For example, if the methodology does not provide flexible principles, comprehensive processes and practical examples, we can confidently predict that the user will deviate or reject the methodology. It will be perceived as being rigid, uninformative or unclear, which may lead to anxiety, uncertainty and equivocality. The relationships between the elements and their attributes should provide a useful tool for developers of methodologies and for evaluators to compare, select or improve methodologies. Chapter 5 provides more elaboration on the theory constructs.

I can safely conclude that participants were attempting to understand (evaluate) the methodology by discerning its main fundamental parts from their apperception. This understanding came initially from a collection of unorganised data. The phenomenon that this research was attempting to understand was: '*What do practitioners think about why some methodologies are better than the others?'* in other words '*what is the ideal methodology?*' and this was only possible when we understood the whole and its parts. Once a phenomenon is understood coherently, we know all there is to know (Galliers, 1992).

4.4.3.3 Theory Concisely Defined

This section concisely defines the emergent theory terminologies. Each element of the methodology can be defined as follows:

- **Principles** are the guiding rules, standards and beliefs of the methodology. The collection of these principles makes up the philosophy and the aims of the methodology. The principles should ideally be **flexible** and **comprehensive.**
- **Processes** express the 'principle' in the form of stages, steps, and tasks. The processes should ideally be **comprehensive** and **practical** to expound the principles.
- **Examples** clarify the 'process' and 'principle' expressed by examples, cases studies, illustration, guiding templates ...etc. They contribute to the

understanding and learning of the user. Examples are ideally described as being **comprehensive** and **practical** to elucidate the other two elements.

- The methodology (the **whole**) is composed of three essential elements (Principles, Processes, and Examples). In other words, the methodology is guided by principles expounded by processes and elucidated by examples. The combined characteristics of these three elements are a close indicator of the completeness of the methodology.

The perceived ideal methodology is then constructed from a collection of the elements in this triangle. The characteristics of the elements can be described as follows:

Flexible – (Can I change it?) Free movement within a boundary around the axes of the principle. i.e. is the principle sufficient for adaptation for different contexts, but without deviating from the permanent nature of the principle?

Comprehensive (Does it have everything that I need?) Covering all the necessary knowledge in terms of breadth, depth, and accuracy.

Practical (It is useful?) Capable of being used or put into effect. Dealing with realistic facts and relating to real existence.

4.5 Quality of Research

Dey (1999, p.70) argues that theories generated using grounded theory are interpretations made from given perspectives and therefore they are fallible. This section discusses the approaches that were considered throughout this research to minimise the fallibility of the research process and the outcome. The discussion is illuminated by the 'Principles for conducting and evaluating interpretive field studies' (Klein and Myer, 1999) and 'Good Theory" criteria explained as part of the research framework in Chapter 3.

4.5.1 Research Evaluation Using the Seven Principles

The use of Klein and Myer's (1999) principles allowed me to critically reflect upon my actions and interpretation and how the theory was constructed. To follow are the implications of conducting research in accordance to these principles.

1- The Fundamental Principle of the Hermeneutic Circle

The Hermeneutics circle was a key concept in the interpretation of the data collected from the focus groups. The adopted Interrogative Framework was used to assist in reaching interpretation of parts to the whole by formulating the nine interrogative questions. The final outcome of this research was successful in deriving a coherent set of parts or categories that may constitute the essence or fundamental elements of a methodology.

The findings of this research may also be viewed as contributing to the understanding of the existing body of knowledge. This contribution is discussed in chapter 5.

2- The Principle of Contextualization

The environment for this research was explicitly explained to give the reader a historical account of how the findings of this research emerged. I have given a detailed account of my engagement with ISMS and its developers, which eventually led me to observe groups of practitioners during the training sessions and consequently carry out focus groups interviews that became the primary source of data for the outcome of this research. The focus groups were clearly explained, giving details of the setup environment and descriptions of the participants and the types of data that were generated.

3- The Principle of Interaction between the Researchers and the Subjects:

My role in this research has been mainly as a passive observer. I have relied on practitioners to provide me with their perceptions, opinions and experiences that were given in the form of evaluation questions obtained from the focus groups.

Kruger (1994) argues that the validity of focus groups is derived from the purpose and the nature of the problem that the researcher is seeking to understand. In other words, did the focus groups provide valid data? The focus groups proved to be useful in producing rich and meaningful data that were generated in a stress-free environment.

Focus groups are not suitable for the discussion of sensitive issues, which may inhibit open discussions (Williamson, 2002). On the one hand, focus groups are easy to set up, cost effective and generate useful data in appropriate situations. On the other hand they have certain disadvantages such as possible group member domination and generalisation is limited to the context. Extra attention is required so as not to exert pressure on the group in order to reduce biases (Williamson, 2002). Asking each participant to think about evaluation questions over the two days had the advantage of encouraging the less confident members to take a more active role (Albrecht, 1993). I did not feel that there was any intimidation by anyone; the subject being discussed was not considered sensitive and the fact that there was conflict of opinions was a demonstration of openness and free discussion.

The advantage of eliciting evaluation question from the focus group was that it allowed an open discussion among the participants before reaching a consensus between themselves. Fry and Fontana (1991) argue that reaching a consensus between participants allows the data collected to be instantly triangulated.

Krueger (1994) argues that reliability in focus groups is enhanced by the repetition of the focus group, which will allow patterns to emerge. Morgan also mentions that the presence of the researcher during the sessions aids the researcher in understanding the characteristics of the participants, which will contribute to a more reliable interpretation of the data. Carrying out four focus groups and observing them has increased the reliability of the data collected. A pattern did emerge, suggesting reliability of the data collection method.

The findings of this research were also supported by other data collection methods, such as observations made during the training session and conducting unstructured interviews with developers and two other organisations. Excerpts from the words of participants were inserted in this dissertation as evidence demonstrating how categories were grounded in the data.

4- The Principle of Abstraction and Generalization:

Generalisation of findings from focus groups is viewed differently than quantitative methods due to the nature of how the sample is selected. Focus group participants were selected on the basis of purposive sampling rather than from a random sample, which can be problematic for inferring empirical generalisations, due to the small sample size. However, one can still make theoretical generalisations to other similar contexts (Sim, 1998) based on the characteristics of the phenomena and the research findings. I have attempted to abstract the data at a higher level using a collection of categories. The analysis avoided making a specific reference to the ISMS methodology to allow for possible generalisation.

Chapter 5 compares the proposed theory with several other theories to better understand the research findings and to suggest extension to existing theories. This comparison is also a way of generalising the findings.

5. The Principle of Dialogical Reasoning

The analysis was initiated with a vague preconception of an ideal methodology, which was stated in Chapter 3 (3.4.3.5). The initial preconception was later revised in the light of the derived set of categories (see section 4.4.3.2).

The set of interrogating questions used and their corresponding subjective answers is also my prejudice or preconceptions. The questions were shown in Table 4.2 along with their projected dimensions and their corresponding categories.

The involvement of a colleague during interpretation was necessary to minimise biases and as a self check to avoid being too subjective.

6. The Principle of Multiple Interpretations

The sources of data in this research relied on data using different sources, mainly from the repeated four focus groups attended by 18 participants. Other sources were also used for triangulation or to assist me in the interpretation of the collected data from the focus groups. The other sources mainly included:

- Weekly meetings with MISA including two interviews.
- An interview with one of the external consultant team member who was responsible for the development of ISMS.
- Meetings with members from two organisations that were implementing ISMS
- Observations made during the training session.

This variety of data collection methods and sources provides support in reaching a more coherent interpretation of data and allowed me reach an in-depth understanding of the phenomenon. Figure 4.10 illustrates the various sources of data collection. I have listened to all the tape recordings from these sources to extract relevant statements using the triangle as my framework to either support the meaning of these three elements and their attributes, or to determine issues that may discredit the findings.

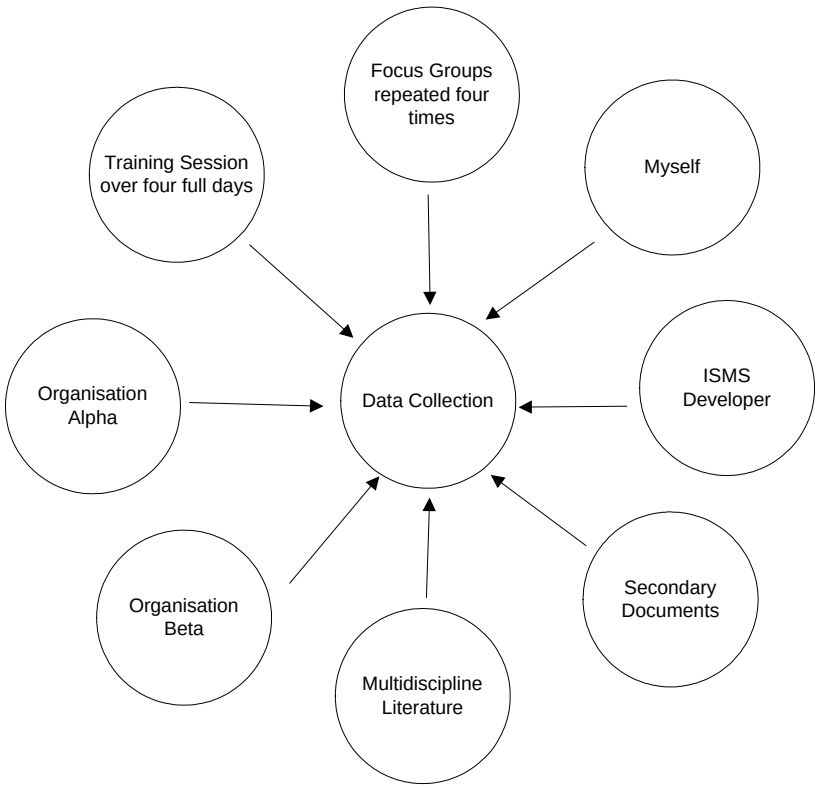

Figure 4.10: Different sources of data collection

Excerpts from the participants' words are inserted in Chapter 5 to give the findings a clearer context and better meaning.

7- The Principle of Suspicion

Klein and Myer (1999) have left this principle as an option for its being difficult to apply. This principle is related to the discovery of "false preconceptions". I did not see the applicability of this principle to this research mainly because I had no reason to believe that the participants had any motives to provide false statements.

4.5.2 Is it a "good theory"?

This section reflects on the "good theory criteria" discussed in the last chapter for judging the quality of the proposed theory. The criteria are based on the three norms

(Kaplan,1964), namely: norms of correspondence, norms of coherence pragmatic norms and the falsifiability criteria (see section 3.5.2 for their description):

It can be seen that the substantive theory does meet the criteria of **Norms of Correspondence** by providing enough evidence to demonstrate how the theory fits the data. The derived theory provides a precise and parsimonious picture portraying a perspective on the fundamental elements of a methodology and its various contexts.

Norms of Coherence: The derived theory is interesting and somewhat unique. The example element was revealed as one of the basic elements of an ideal methodology. One tends to think that examples should be part of training documentation which is usually an afterthought. The example fits within the aesthetics of a triangle which gives the proposed theory its coherence and parsimony.

The theory is simple, coherent and can be explained and therefore it can be tested for refutation (**falsifiability**) and therefore one can speculate about its **Pragmatic Norms**. Chapter 5, discuses the potential utility of the emergent theory for enhancing adoption, constructing and evaluation of methodologies by reflecting on the existing literature and comparing it with existing models. The theory is presented at a high level of abstraction which should give it a wider applicability. The Pragmatic Norms have not been met in this thesis in full, since, it is recognised that the ultimate test of the theory is its utility and its acceptance by the community. Rigorous testing the pragmatic norms of the theory was treated as a separate endeavor for future research.

4.6 Chapter Summary

The substantive theory was developed based on the collection of statements from practitioners, which indicates that methodologies can be seen, experienced and understood. The focus groups were a useful technique for bringing about a deeper

understanding of practitioners' ways of experiencing a methodology. This experience can be better expressed as the intentionality of their consciousness, which means that the human consciousness is always directed towards something other than itself. For this study, the sum of their intentionality (abstracted statements) represents the phenomenon of the ISMS methodology within the context in which the data was collected.

I started the analysis with certain pre-conceived ideas, being the natural approach to any research. Entering the field with no preconceived ideas is close to impossible but one has to be open-minded to allow for new findings to emerge. Hence, a revised conception of an ideal methodology was derived represented by the triangle. One must keep in mind that qualitative data analysis assists researchers in reaching a conclusion, but it is not a final one because analysis is "an ongoing process" (Taylor and Bogdan, 1998, p.141).

The proposed theory is an interesting and simple way of viewing methodologies and it has also the potential of being useful. It is interesting because it caters for both technical and social aspects presented in a simple format.

A review of the literature will be discussed in the next chapter to position the proposed theory within the context of what is already known and to suggest ways of using the theory. The theory is useful because it is viewed as a foundational theory to construct, evaluate or improve adoption of methodologies since it has the capability of providing understanding and predicting power as Chapter 5 will demonstrate.

5

DISCUSSION

This chapter is the fruition of this research; it contains various discussions and brings the contributions of this research into focus. In theory building research, detailed examination of the extant literature is usually postponed until after the development of theory, so that researchers have limited preconceived ideas before field entry to limit the level of biases (Glaser and Strauss, 1967). In this dissertation, the discussions of the extant literature are covered in two different chapters. In Chapter 2 I have covered some of the literature in order to identify research issues and set the direction of the research. In this chapter, I re-visit the literature to highlight consistencies and conflicts in the light of the emergent theory and existing, competing theories and frameworks. Eisenhardt (1989, p.544) states that "an essential feature of theory building is comparison of the emergent concept, theory, or hypotheses with the extant literature. This involves asking what is this similar to, what does it contradict, and why. A key to this process is to consider a broad range of literature". The aim of this comparison is also to extend upon existing theories that were identified in the literature as potentially having some bearing on the proposed theory.

This chapter also serves to contextualise the emergent theory within the existing literature in order to suggest to readers a context in which to use the findings and to

assert the credibility of this research. Glaser (1978, p.134) argues that "The credibility of the theory should be won by its integration, relevance, and workability, not by illustration used as if it were proof". Therefore this chapter aims at contextualising, extending theories and substantiating the credibility of the theory. The discussions in this chapter also provide the grounds for enforcing the logic behind the proposed theory from different perspectives and by interweaving it with extant literature.

This chapter achieves the above objectives by discussing the implications of the theory on the research questions raised in Chapter 2. Starting with the primary question and proceeding to the other eight questions, these are covered in sections 5.1 to 5.7. Under each issue, different aspects of the literature will be addressed thus illuminating the reader on what the proposed theory is all about in terms of its implications and contributions. The chapter concludes with a summary in section 5.8

5.1 Primary Research Question

What do practitioners think about why some methodologies are better than others?

The IS literature is in agreement that there is no one single methodology that can solve all types of problems. However, there must be some methodologies that are better than others and they must have distinguishing characteristics. The stated primary research question was formulated to search for these distinguishing characteristics.

The emergent theory from this study provides one answer to the primary research question. This answer was derived from the experience of a group of practitioners. The theory was, in fact, an abstraction of their requirements conveyed by the forty statements. Although methodologies can be different in their modes of operation and content, I believe there should be a common theoretical foundation used in their construction, similar to the one being proposed by this theory. The abstraction of the emergent theory

in this study was purposefully made at a higher level to achieve generalisation to other types of methodologies and to allow for wider applications. The structure of this theory does not suggest any assumptions or specific paradigms.

A review of the theory and its different components in this chapter is appropriate. The emergent theory may be viewed as having five layers, see Figure-5.1. From the middle out, the first layer is the triangle showing an integration of the basic elements indicating that there are relationships between the three elements i.e. principle, process and example. The second layer contains the attributes or the basic quality characteristics of these elements. A total of three attributes were derived i.e. flexible, comprehensive and practical, but with only two attributes being suggested for each element. The third layer is the mission of the methodology, which is related to the three levels of needs i.e. vital needs, requirements, and improvements. The mission layer is considered as the first context of the triangle. The fourth layer is the methodology context, identified as having three parts– content, operation and environment and the fifth is also a context consisting of the three generic project phases i.e. planning, building and managing.

The richness of these layers provides us with multidimensional perspectives to understand methodologies. Layer one and two constitute the core of the theory and layer three, four and five are contexts that may have precedence over each other, depending on the use of theory. The core theory is better understood when it is examined through layer three to five.

I can conclude that, in the perception of the focus group participants, methodologies that have basic elements and attributes similar to the proposed core theory are better than those that lack such structure and characteristics.

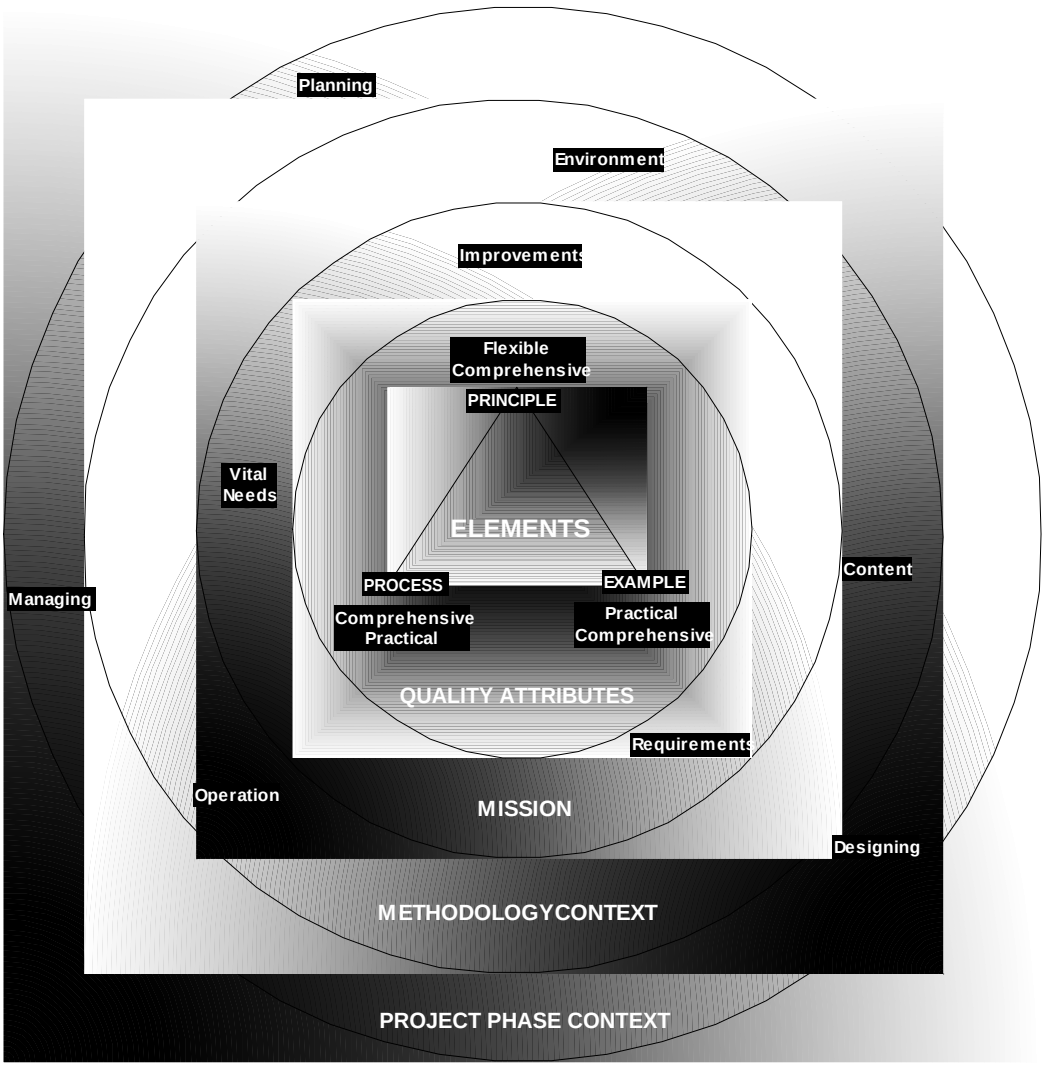

Figure 5.1: Theory Layers

The primary research question was formulated to answer the other eight questions. Hence, the derived answer for the primary question will be used to guide me to answer the other eight questions while reflecting on the emergent theory.

The proposed theory will also be also referenced from this point and onwards as a MTT acronym for 'Methodology Tripod Theory'. The methodology can be thought of as sitting on a tripod. Figures 5.2 Illustrates the three legs of the tripod, the principle, process and example. If any of the three legs are removed or shorter (weaker) than the others, the methodology would topple or collapse.

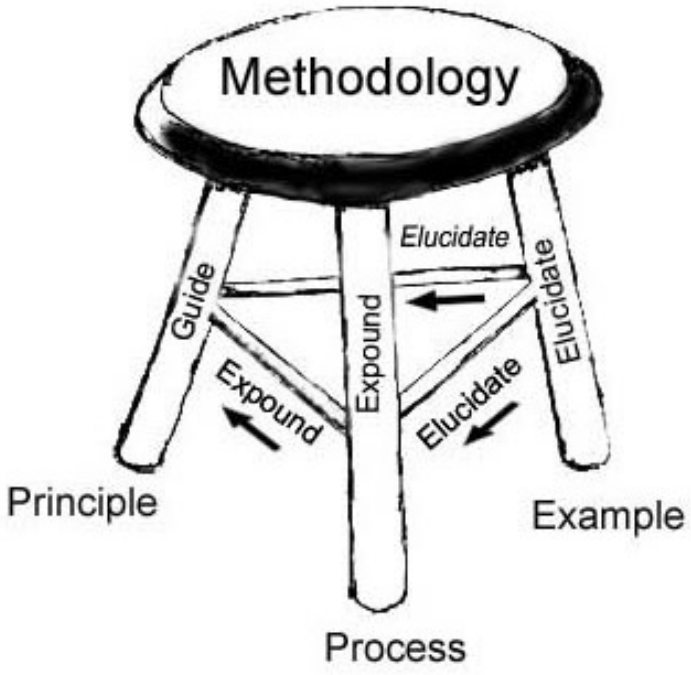

Figure 5.2: Methodology Tripod Theory (MTT)

5.2 Issue #1: Methodologies Definitions

Why do we have so many definitions? Is the IS field still lacking the understanding of the essence of a methodology? How can researchers and practitioners construct theoretical based definitions to provide better meaning?

As mentioned in Chapter 2, there is no agreement on a common definition of 'what a methodology is'. This may be attributed to the lack of theories that can inform us on the essence of methodologies, which we can also use to derive standardised definitions.

The approach used in this research, to reconstruct a more meaningful definition of methodologies - was first to understand the essence of an 'ideal' methodology taken, from the experience and the opinion of a practicing community.

The next section will discuss the essence of methodologies from the perspective of this thesis, which has assisted me in understanding methodologies and formulating my own definition.

5.2.1 The essence of Methodologies

As discussed earlier, the core of the emergent theory is composed of the elements and their quality attributes, with each element serving an interrelated purpose as depicted in Figure 4.9 in Chapter 4. A principle dictates an understanding or a process to be taken, which is expounded by a process and further elucidated by examples. Each element is augmented by two quality attributes. Using the elements, their attributes and their relationships, we can see that the main essence of the derived theory is to provide guidance without ambiguity. The analysis has shown that this structure may reduce uncertainty, anxiety and equivocality. Users placed in such undesired states may take an

easy option, invent their own ways, deviate from the original intention of the methodology or totally reject the methodology.

Ambiguity in methodologies not only causes conflict within oneself, but can also lead to serious conflicts between team members on the exact interpretation of the principles or processes. Conflicts can have negative impacts on project outcome and need to be prevented (Barki and Hartwick, 2001; Robey et al., 1989).

The issue of conflict was also evident during my field observation of practitioners while attending the training session. A conflict erupted between participants while they were carrying out an activity involving a certain stage of ISMS. It was due to the interpretation of the methodology and on deciding on the course of action to take. It was resolved by examining the example given at the back of the activity sheet.

Such a combination of elements and their quality characteristics as presented by the structure of the theory, reduces misinterpretation that may lead to biases, conflict, deviation, and abandonment. Ambiguity is a concern that needs to be addressed and reduced when constructing methodologies. Karam and Casselman (1993, p.44) state that methodology authors are not "explicit about how their methods work … (Guidelines are) treated in an especially vague and hard to-discern manner".

Probably the best definition of what methodologies are is when the definition relates to the functions of its basic elements. To follow is a definition of what a methodology is, formulated through the experience gained from this research and supported by the emergent theory:

> *A methodology is a structure of interrelated elements (principles, processes, and examples) to provide guidance for solving problems.*

Guidance is the key word in the definition, it is through the structure and the quality of guidance that we may adopt, deviate or reject methodologies. The importance of the

concept of guidance is illustrated from a statement collected from the field. The statement was made by one of the participants while carrying out an activity using ISMS.

*It was good to have guidance **all the time** otherwise we would have gone astray.*

It seems that we will continue to formulate definitions of what methodologies are, due to a lack of theoretical understanding of their essence. Such theories could illuminate our understandings of what methodologies are and hence derive more meaningful definitions. I am arguing that whatever definition we put forward, it must be substantiated by a theoretical perspective.

5.3 Issue #2: Learning of Organisations

How can methodologies contribute towards the dynamic learning of organisations?

Using methodologies can contribute to the learning of organisations in the realm of building systems or other solutions. The implication of the proposed theory on learning is provided largely through the example element. From the experience gained from this research, I have come to realise that the example element can serve three purposes related to learning: 1) guiding the user on the proper use of the methodology 2) guiding the contingent use of the methodology for a best fit solution 3) constructing a knowledge base populated from previous projects.

The uniqueness of the emergent theory is brought about from the inclusion of the example as a fundamental element. The fact that the example is an essential element has made me to consider this element as the 'missing link' in the current construction of methodologies. The example element is the most neglected part in the structure of methodologies. It needs to be exposed and placed in the foreground. This section is an elaboration on how the example element may be developed and used more effectively in

the education of organisations and specifically the methodology user. The purpose of this section is not to give a full coverage of the literature on learning theory, but to emphasis the role of examples in storing and imparting knowledge. Various issues will be covered such as learning theories, the benefit of learning by examples, the implication for the cognitive load on the user, the different ways of presenting knowledge, the type of content, and finally, a note on the use of the example element for building champions. Firstly, I will discuss the need for such an element as a learning platform as supported from my field notes collected during the training session on the ISMS methodology.

5.3.1 The example element as a teaching platform

Methodology developers need to expand their attention beyond functionality requirements and to include the cognitive needs of the methodology users. The efficient use of the methodology is tied directly to its functionality, ease of learning and ease of use. Only when methodologies fit the needs of users and are easy to learn and use will the methodology be adopted and propagated.

Examples are different forms for disseminating knowledge for different purposes. Therefore, in the context of this thesis, any representation that contributes to the knowledge and the wisdom of the user is related to the example element. One can learn from an exemplar, case, illustration, filled templates, sample output, model, metaphor, and analogy.

The purpose of a methodology is not to flex its technical ability only; conveying these technical strengths to the methodology user is seen to be equally important. Examples can also stand as evidence that the methodology is practical and useful. Methodologies need to be cognitively appealing; otherwise the trend of users developing their own methodologies will continue or they may revert to not using methodologies. What I am advocating is the need for methodologies to address the learning needs of the users. Socio-technical methodologies came into being to optimise the interaction between

methodology users and the client to remove communication barriers reaching "mutual understanding" (Hirschheim and Klien, 1992). Now, we need something similar to optimise the interaction between the methodology and the methodology users; to enable the methodology user to become an efficient change agent between the methodology and the implementing organisation.

Methodologies are developed on a certain paradigm and only their designers have the ability to pass their philosophies and internal operations to users efficiently and accurately. The transfer of knowledge in its purest form may be best ingrained in the mind of the practitioner through the triangulation structure of the methodology i.e principle, process and example elements; one would memorise the principle and understand it through examination of the process and look at examples for its application. As a result, the user would develop a meaningful mental conception of the principle. Similarly, in scientific research, we attempt to triangulate data from different sources to affirm our comprehension of the phenomenon.

The cognitive processes of a methodology user are a concern and receive very little attention from the IS community. It has been mentioned earlier that ambiguity will most likely lead to misinterpretations and eventual rejection of methodologies. On close examination of several prominent scholars' definitions of SDMs, we usually find the words 'principle' and 'process' or 'steps' being highlighted and the word 'example' or similar is absent (see Chapter 2 for definitions). These definitions emphasise that SDMs are explicit ways for problem-solving by providing 'what' (principle) 'how' (process), but, they do not inform us about how these ways are being cognitively communicated to the user. However, Lyytinen (1987b) mentions that methodologies include "material resources"; and Maddison et al. (1983) also mentions they include "documentation … training".

The emergence of the example as a basic element is not accidental but rather reflects an essential human quest for understanding. During field observations in the training sessions the word 'example' was frequently used and was requested explicitly. Sample

statements that were noted by the participants during the training sessions are shown to demonstrate that quest:

> Trainer - *we need a lot of practical applications – try to get examples from organisation is the way to go – we do not have a lot of examples to show you.*
>
> Participant - *One thing I found that could be probably be added- an example of how to put all the various output together into one document ... there is no example of how - what it would look like.*

This thesis is arguing that the existence of examples should be an integral and fundamental part of the methodology in achieving its implied objectives of its usefulness and ease of use. Examples must not be treated as an afterthought or regarded as something that comes with the packaging of the methodology. I am not stressing the importance of the documentation such as grammar and style, but rather stressing the need to clarify the intention of the principles of the methodology using one or many practical examples presented in different formats.

Methodology developers need to focus their efforts on examining the content of their methodologies to provide an appropriate learning process. Methodologies need to be designed in ways that provide users with effective means for skill and knowledge acquisition appropriate to their learner characteristics. Also, methodologies need to be formulated to allow for quick recall of their principles. Stolterman (1991, p.143) argues that designers view methodologies as "a way to remember" the knowledge portrayed by the methodology. Russo and Stolterman (2000) see methodologies as having the ability to pass the experience of others to systems developers as a way of teaching and guiding. Fitzgerald (1997a, p.209) found that methodologies are being adopted by experienced and inexperienced practitioners to guide them through uncertainty especially if they provide "methodological guidelines that make sense". Wastell (1996, p.37) also argues that methodologies have the 'potential to promote learning'.

As mentioned in the above paragraph, methodologies play a role in disseminating knowledge. The proposed theory provides a structure of elements that can be used for

effective knowledge organisation and dissemination. Wynekoop and Russo (1997, p.57) recommend a "clearing house for information on SDM – description, evaluations and tales from trenches". Ideally, such accumulation of knowledge fragments should be organised in the example element and interlinked cohesively to the processes and the principles element to provide regulated and contingent guidance, i.e., matching the problem solving approach with project contingencies (Slooten and Schoonhoven, 1996; Aurthur et al., 1997; Avison and Taylor, 1997).

Surely, such accessible knowledge in a coherent format will also address the "emotional factors" of the user in reducing "risk, conflict, change and uncertainty" (Wastell and Newman, 1993, p.121 & p.144). This build up of knowledge in the example element may be accrued internally from the successes and failures of the organisation's development experience (Scott and Vessey, 2000). This is also in agreement with Lyytinen and Robey (1999b) who argue that failure in systems development is attributed to organisations failing to **learn** from their previous experience and they suggest building a 'knowledge repository'. Such a 'Knowledge repository' or 'clearing house' provides the means and the access for dynamic learning of methodology users.

Roberts et al. (1999 and 1998) found that organisations benefit from external support through consultants who have accumulated practical knowledge gained from previous implementations in different organisations. However, as mentioned earlier, an ideal methodology should be self-contained and not rely on an external body for support. Therefore, the more the methodology moves towards self-dependency and towards completeness, the more the methodology would be seen as successful and obtain wider acceptance in the community. Wide acceptance will eventfully place the methodology in the public domain. Once the methodology has reached the public domain stage, we will find larger numbers of people taking interest in it and begin to publish material covering different aspect of it. Soft Systems Methodology is such an example and various agile methodologies are following the trend of placing methodologies by their authors in the public domain to attract acceptance. I am arguing that the more the example element is

comprehensive and practical, the more the methodology will be self-contained leading to more likelihood of adoption.

To highlight why the participants in the focus groups made repeated requests for the example element, a reflection on the literature on learning is deemed necessary.

5.3.2 Examples in Learning Theories

There are many studies from the Cognitive Psychology and Educational Psychology fields that methodology constructors can benefit from. Both fields emphasise making sense of the various cognitive processes such as attention, perception, learning, memory, language, concept formation, problem solving, and thinking, with the objective of creating principles of learning. Such issues are of importance on how to structure the knowledge being conveyed by a methodology with the objective of increasing its comprehension and consequently contributing to its successful adoption and infusion. Enhancing the learnability of a methodology will probably have a great effect on its transferability in the wider community, surely, a desired aim for methodology developers. During the training sessions on ISMS, observations were noted related to the understanding of the methodology such as “it is too verbose”, “we need more practical examples”, “overwhelming“, and “confusing”. The evaluation questions raised by the participants in the focus groups showed that learning the methodology is equally important.

5.3.2.1 Theories of learning

Theories of learning and instruction relate to the different kinds of knowledge – basic facts and rudimentary skills, composite forms, well structured knowledge, and knowledge in ill-structured domains (no single solution to the problem). Methodologies play a role in solving ill-structured problem.

There are three main formal learning approaches – the behaviourist, cognitive, and constructivist approach.

Behaviourist theories view learning as a change in overt behaviour, whereas the other two theories rely on covert mental operations. Behaviourist learning is activated by stimuli from the environment; the stimulus is in the form of a question and an answer as a response from the learner. The Behaviourist approach is more appropriate for well-defined problems and inappropriate for ill-structured domains.

Cognitive theories focus on the mental process (how & why) that occurs during learning of higher order thinking and the internal mental representations constructed during knowledge acquisition, with the aim of fostering understanding that develops the meta-cognitive (thinking about thinking) skills of learners and optimises the internal process of human cognition (Winn, 1990). Cognitive theories involve strategies to improve learning processes such as chunking, illustrations, concept maps, metaphors and analogies. Such strategies would be useful to be incorporated into the instruction of methodologies to enable practitioners to transfer knowledge to other domains i.e. solving problems in different context.

Constructivism theories view learning as an active process, rather than being the generation of products (Bruner, 1967). Learners under this theory are in full control of their learning process; they select, construct, transform information and make decisions using mental schemas to help them in discovery and go beyond the given information.

The three types of theories mentioned above all play an important part to varying degrees in imparting the principles of a methodology.

5.3.2.2 Learning by Examples

Many studies have demonstrated that learning from worked examples is important in the acquisition of cognitive skills especially for novices (Chi, 1989; Renkl, 1997; Renkl et

al.; 2002, Atkinson et al., 2000). Worked examples enable students to tap into their knowledge, creating an effective way of skill acquisition because it forces the student into "self-explanation" i.e. an elaboration of the problem and the solution (Chi et al., 1989). The use of worked examples as a strategy has only been recently brought to the attention of the software documentation field (Girill, 2001). Examples have to be structured and explained well (Atkinson et. al., 2000; Chi, 2000). Duffy (1992) argues that instructions should be given to users in concise increments, should be upon request, and should focus on endorsing understanding rather than on how to complete a task only (Duke and Reimer, 2000). Methodology developers need to be aware of the fact that different users have different instructional demands (Goldman, 2003; Seufert, 2003; Mitchell, 1993; Hidding, 1997).

Further, examples also have significant role in clarifying the interpretation of what is being implied by the instructions of a process. Ambiguity is created from 'what is said as opposed to what is implicated' (Gibbs and Moise, 1997, p.68). To put it differently, words from the explicit meaning are different from the implicit meaning that is being conveyed by the semiotics of the instruction.

5.3.2.3 Cognitive Load

Learning happens best under conditions when it is designed to meet human cognitive structures. This principle is described by the well known "Cognitive Load Theory"(CLT). CLT provides the necessary guidelines for information presentation to maintain simplicity, high level of interactivity, and eliminate redundancy (Sweller, 1988). Cognitive load theory states that if the working memory of a student exceeds its set capacity, learning will be slowed down (Sweller, 1994). To reduce the cognitive load, Sweller et al. (1990) recommend the integration of diagrams with text and to provide worked examples.

Lee and Truex (2000) have studied the relationships between training in ISD methods and changes in the cognitive structure of novice systems developers. They argue that the

system developer's cognitive structure is central to the development process and therefore influencing the development process of the information system. They further contend that "the cognitive structure governs how the developer is using methods and tools in terms of the level of usage and the degree of deviation from suggested guidelines" (p.360). The interaction between the developer and the methodology is a determinant of the quality of the system being developed. The conclusion of their study is that infusion of methodologies is closely related to the cognitive structure of the developer driven by appropriate forms of instructions.

In the education field, Bloom's Taxonomy of Cognition (1956) is used to measure student cognitive skills in the areas of remembering, thinking and problem solving after they have gone through the instructional material. Similarly, it would seem logical to measure the cognitive skills of practitioners after they have gone through a complete cycle of using the methodology to see how the methodology has contributed to their cognitive skills. A methodology that can not elevate such skills might be seen as powerless in assisting the organisation in constructing an efficient solution to the problem.

5.3.2.4 Knowledge Presentation

The use of diagrams serves their purpose best when the process being described is complex, descriptive or difficult to understand and the learner needs to correlate between multiple processes (Carlson et al., 2003). Polleck et al. (2002) argue that in order to reduce the cognitive load, the training material needs to be presented in phases; the first phase, the material describes the elements of the subject, while in the second phase, description of elements interacting to achieve this will allow better understanding by the working memory.

Sweller (1990) also argues that a presentation format of training material needs to be thought out carefully to make it suitable for schema acquisition. "A schema is an

essential ingredient of problem-solving skills. A schema is defined as a mental construct permitting problem solvers to categorize problems according to solution mode" (p.176).

Goldman (2003) argues that learners need to select, organize and integrate the given information, but a user with little prior knowledge faces the problem of what to select, how to organise it and how to integrate it. This problem can be eased by the methodology authors, by having an understanding of the characteristics of textual, verbal and visual representations and how best to use them. Combining different forms of representations in a coherent manner can have great effect on the comprehension and the recall of the content (Seufert, 2003; Lewalter, 2003). Text integrated with illustrations conveying the same meaning has been shown to enhance comprehension and also to generate multiform mental representations of the meaning, which also helps in recall (Paivio and Csapo, 1969).

A study by Mitchell (1993) of computer documentation/information showed that examples and scenarios are desired and clarity was seen as a highly important attribute. Clarity in the study refers to having meaningful examples and scenarios, not the writing style. The study concluded that users want information "that is clear and accurate and is loaded with examples and scenarios" (p.31) and that there is a need to understand the users' perspectives to enable better production of meaningful examples.

Minimalism is another important approach to be addressed when it comes to presenting instructions. It has four fundamental pillars: action-oriented nature, optimal usage of text, support of error recognition and recovery, and modularity (Carroll, 1990). The philosophy behind minimalism, as explained by Dubinsky (1999, p.35), means "drawing upon their (user/learner) prior knowledge, putting them to work quickly, and helping them work through errors that they might make while trying to discover solutions to problems. It is an action-oriented and task-based approach to instruction". Both minimalism and Constructivist learning are targeted toward the expert users, who need to capitalise on their knowledge and make inferences about their problem at hand. Again, methodology developers need to consider such concepts to ensure that the principles of

their methodology are being well communicated and comprehended. The emphasis should be on solving the users' problems and not a mere description of the principles or the processes. If the users fail to solve their problem after consulting the interpretation of the methodology, users will become cognitively overloaded, resulting in frustration and increased error rates, and may revert to the old ways and abandon the methodology (Albers, 1997). Such overload may be attributed to the methodology being an informative, unclear and rigid as revealed by the analysis in this study.

5.3.2.5 Metaphors and Analogies

Metaphors and analogies have also been used throughout history to represent abstract concepts in making them more imaginable and obtain a learning objective (Black, 1979; Petrie, 1979). Analogies make use of metaphors to allow the user to make inferences in order to understand the matter being conveyed by the author. Metaphors are useful for communicating concepts to new learners. Metaphors are not a mere representation of the object. Carroll and Mack (1999) clarify this by saying "it (metaphors) requires understanding of how mental mechanisms of active learning, in conjunction with metaphorical descriptions, provide the means for understanding some new knowledge domain … relations between the metaphor source and the target are brought into correspondence through the course of a process of thought" (p.397). A study by Mckay (1999) demonstrates that the performance of students is improved when instruction is accompanied by graphical metaphors rather than textual metaphors. Methodology developers need to become aware of the use of metaphors, how they can be used and how they work to provide an imaginable and more comprehensible framework for understanding.

5.3.2.6 Explicit and Tacit Content

The content of most methodologies is usually written in a task-oriented format, i.e. chunking activities into small tasks, to assist the novice learner to reproduce a similar

activity incrementally. Mirel (1998) questions the utility of task-oriented format to teach experts, since their needs are somewhat different from novices. Experts need to integrate their experience with new knowledge to determine an appropriate course of action in a shorter period of time. Task-oriented approaches are not suited for complex tasks where the goal of the activity is situational. Methodologies need to activate a higher order learning process, which may be achieved by the inclusion of rich examples in the form of cases or scenarios of a realistic nature, which experts can relate to their situation and learn to construct solutions. This concept is termed as "Applied Constructivism" (Mirel, 1998). Further, Mirel (1998) suggests that to convey such a higher order of learning, instructions should include both explicit and tacit knowledge.

Explicit knowledge can be easily represented by the principle element to include guidelines, rules and philosophy. Explicit knowledge can be further elaborated by the process element in providing detailed interpretation of the principle: what steps, by whom and under what conditions, including recommendations, things to avoid and highlighting uncertainties. Tacit knowledge can be embedded in many forms including: richly described and meaningful stories, cases that were successful and cases that were failures, metaphors, analogies and worked examples. Tacit knowledge in this format will enable the methodology user to analyse, synthesise and evaluate before taking the appropriate action. Principles or processes needs to be elucidated by many examples to give different perspectives for the user to gain full understanding of what is being demanded. In addition, learners solve problems by analogy, mimicking previously solved problems. Therefore, the more the methodology provides examples, the easier it will become for the user to find a solution to the problem. On this note and as previously mentioned, the establishment of a dynamic knowledge base containing 'real' examples that can be easily accessible by users would be useful.

Hirschheim and Klein (2003) argue that applicative knowledge is the biggest gap in comparison with the other types of knowledge (technical, theoretical and ethical knowledge). The authors have also highlighted the need to capture and record tacit knowledge. Applicative knowledge requires new research resources and research skills

Hirschheim and Klein (2003). Tacit knowledge should be incorporated as part of the example element. It is the recordings of this tacit knowledge that will provide a greater impact on the dynamic learning of organisations.

5.3.2.7 Building Champions

The ultimate aim of methodology developers is to have their methodologies propagated in the wider community. One of the means for spreading the methodology is to foster champions who can become advocates.

The role of a 'Champion' is an important factor in the adoption of technology. Premkumar and Potter (1995, p.120) argue that "IS managers need a committed management and a highly resourceful product champion to overcome all the obstacles and maintain a positive and favourable attitude for the technology within the organisation". Champions are not born, but developed by imitating ideal models. The methodology is seen to play a role in building such a character. The example element, as mentioned earlier, should provide sufficient stories, events, utterances, tacit knowledge, and exemplars covering socio-political and socio-technical matters relevant to the development process. Such combinations of knowledge, presented in an appropriate format, may have an effect on shaping the character of the champion.

Fitzgerald (1994, p.697) argues that a methodology should "fully leverage the wisdom of the developer ... if it is to make the most effective contribution to the development process". Also, Bosman et al. (1992) studied the success of system development methodology usage. The study found ineffective use of the methodologies was attributed to inadequate training, consequently the system developers either returned to adhoc practices or to no method. Building the skills and knowledge of practitioners should be a prime objective of methodologies, and in return they become advocates of the methodology.

To sum up, the example element serves as a multiform representation of the principles and processes in action; it is regarded as a communication medium to enforce understanding, eliminate ambiguity and to assure practitioners that the methodology is doable and credible. Most importantly, it motivates the practitioners to think and behave according to the tenets of the methodology in order to arrive at a solution in line with the methodology's philosophy and to eventually become an advocate of the methodology, better known as a 'champion'. The use of examples is motivated by human behaviour, which is to bring concepts into proximity and to preserve the intended meaning of the methodology philosophy. Probably the most important role of examples is to assist practitioners in resolving conflicts. When the example elements contain explicit and tacit knowledge and lessons from previous projects, they may contribute to the effective learning of organisations, provided the knowledge is appropriately presented.

5.4 Issue #3 & #7: Enhanced Adoption

What is the root cause of rejection? And how can methodologies enhance adoption?

What is the root cause of deviation? How can methodologies minimise the deviation and to assure practices are in accordance with methodological principle?

Issues three and seven are addressed jointly in this section since the analysis has revealed that the root causes of deviation and rejection may be the same. Users may reject the methodology at early or later stages of the project for reasons discussed in the following sub-sections. Users reject the methodology at the later stages as the result of gradual and accumulated deviation from the intended purpose of the methodology. If users continue to deviate from the methodology, they may not reap the benefits of it, leading to its rejection. In the light of the proposed theory, the following sub-section discusses some of the causes of deviation and rejection. These sub-sections also address

certain issues that may have a positive implication on increasing the adoption of the methodology, i.e. minimising the likelihood of rejection or deviations.

5.4.1 Root Causes of Rejection and Deviation

During the data analysis, it was revealed that when users are confronted with undesirable states, they may either deviate or reject methodologies. The analysis suggests that the root cause of rejection and deviation of methodologies can be created by three types of actions or threats:

- The threat of anxiety is created when the user is unable to adapt the 'rigid' principles in the methodology to suit project needs.
- The threat of uncertainty is created when users are unable to determine what action to take due to 'uninformative' processes or lack of information.
- The threat of equivocality is created when users are 'unclear' of the details of a certain action.

Uncertainty is defined as the lack of information or misinformation and equivocality refers to ambiguity resulting from multiple interpretations.

These threats affect the decision making process of the user and consequently open the door for deviation and rejection. Probably anxiety is the biggest threat, which tends to have functional and dysfunctional consequences (Barry et al., 1981).

The terms uncertainty and equivocality have been used in organisational contexts. Organisations process information to remove both uncertainty and equivocality (Kydd, 1989). Joshi and Rai (2000) found a relationship between 'quality information product', 'role ambiguity', 'role conflict', Job Satisfaction. Dissatisfaction may be caused by incomplete, erroneous and contradicting information, volume etc. Such a circumstance

results in dysfunctional consequences such as job dissatisfaction, tension and anxiety (Joshi and Rai, 2000).

These threats are remedied by the three proposed quality attributes (flexible, comprehensive, and practical) abstracted from the data collected. These three attributes represent the basic characteristics of the derived fundamental elements. This implicates that other attributes such as accuracy, precision and so on are meaningless without first ensuring the basic characteristics are met by the methodology. In the context of this research, these basic characteristics may be largely accountable for the deviation or rejection of the methodology and therefore may impact its adoption rate. These three remedial attributes are discussed in the next section.

5.4.2 Enhancing Adoption

I have already discussed certain issues that have positive implications on adoption while addressing issue #2 'Learning of Organisations'. This section discusses the three attributes that are believed to be fundamental quality attributes for enhancing adoption and to improve the adherence to the prescribed principles of the methodology. This section is divided into three sub-sections to discuss the three attributes in relation to the three basic elements - Section 5.4.2.1 covers the attributes' flexibility for the principle element; Section 5.4.2.2 covers the attributes' comprehensiveness for all three elements and section 5.4.2.3 discusses the practical attribute for both the process and example element. Finally, section 5.4.2.4 discusses additional quality attributes that may emerge when these three attributes are combined.

5.4.2.1 Flexible Principles for Enhancing Adoption

This study has proposed flexibility as a remedial attribute to overcome anxiety of the user when the principle of the methodology viewed as too rigid. Fitzgerald (2000)

states that system developers are departing (deviating) from the prescribed methodology consciously which was seen as evidence of maturity and autonomy. I contend that any deviation from the prescribed methodology is still a form of rejection. However, the maturity of the developers needs to be acknowledged by the methodology author(s), by designing flexible methodologies, which allow developers the desired autonomy. This is in agreement with Fitzgerald (1997b) who argues that the most cited reason for users not using methodologies is that lack of flexibility. Also, Stolterman (1991, p.144) agrees that system designers are aggravated when methodologies "do not credit the user of the method with a will and ability of his own to judge in the specific situation ... the designer wants to be the 'adjuster', the creator of the rationality."

To highlight further the issue of flexibility, I will draw on some of the observations from the field. I asked a practitioner from one of the organisations if she was adhering to the ISMS methodology – her response was, "No I do not have the time. I have only 80 days (with the organisation).", implying the methodology is too detailed and might be too time-consuming. The consultant was relying more on the 'Standards' booklet and cross-referencing it with ISMS and using her experience to make a judgment on what activities to carry out therefore bypassing the detailed processes in the methodology. People have different modes of operation that need to be considered by the methodology developers. Flexibility is the criteria, but it needs to be also bounded to prevent any deviations. Bosman et al. (1992) argue that methodologies should allow the selection of suitable tasks, techniques and tools within an 'accepted framework'. This view is also shared with the ISMS developer captured during one of the interviews:

> *Each agency will have its own approach. I do not have a problem with that, as long as the actual end result is consistent, and it should be, if they follow the methodology they will end up with something that is consistent with the standards*

Here are few statements from one of the organisations stressing again the need for flexibility:

A lot of time is spent to find out how appropriate the methodology is to our needs during each step and then we need to adapt it.

.. it is a very repetitive process. Even though we are using the methodology that we are following, it is not a matter of just following it. We need to look at the methodology. We have to think is this appropriate to us and how we are going structure our thing?

I do not see an obvious place in the methodology where you can reduce it. The methodology does not show you how to really reduce it.

Partial implementation of a methodology should not be viewed as flexibility. Bosman et al. (1992) studied the success of system development methodology usage. Their study has also shown that partial adoption of the methodology was ineffective.

The term flexibility is probably the most troublesome attribute to define. In IS we use the term flexible without having a true understanding of its meaning and its implication. How do we recognise flexibility when we see it? In this thesis the term 'flexibility' of the principle element was given a metaphorical definition as "the freedom for users to move within a fixed boundary around a fixed axis". This indicates the user has the freedom to operate around the principles with a degree of freedom but it is bounded by another principle to avoid violation of the main principle. The concept of flexibility is derived by having a primary principle that may branch to other principles to allow for contingent use. In this case the primary principle is the axis and the freedom to move within a boundary is supported by the sub-principles and their conditions for implementation. The processes need to give sufficient details in a practical manner to guide users on implementing these principles.

From this thesis's perspective, 'Processes' should not be flexible because of the danger of deviation. This was interpreted from data collected during the focus group, e.g.:

"If there is one person managing and performing the ISMS, what is the risk in it being biased towards their knowledge base? i.e. does the ISMS mitigate the risk of the instant (untrained) security expert and risk expert?"

If processes are flexible, they may lead to different interpretations being influenced by the experience of the user. Flexible processes may be one of the main reasons for deviation and that is to allow users to interpret according to their desires and thus violate a principle.

Further research would be required to determine what makes a methodology flexible while maintaining its integrity. The issue of flexibility is mostly researched in the engineering field and specifically in flexible manufacturing, an area worth investigating to understand how engineers view flexibility. Stolterman (1991) argues that system designers think about their roles as being engineers and artists. Engineers have a disciplined approach to design and artists have a creative approach to their work. Perhaps the study of these two combined roles can guide us to redefine the flexibility of methodologies.

5.4.2.2 Comprehensive Elements for Enhancing Adoption

Comprehensiveness was also revealed in the analysis as contributing a factor in enhancing adoption, which was attributed to all these elements (principle, process and example). Comprehensiveness was proposed as a remedial attribute to ease 'uncertainties'. Methodologies must be comprehensive to provide the information necessary to allow users to take justifiable decision and perhaps to demonstrate to users how to behave during unexpected situations. Roberts et al. (1999, p.36) found that "understanding methodology specifics and benefits" is an important factor to consider when implementing SDM.

To illustrate the value of this quality attribute, I will again draw on an observation from the data collected.

During the training session, one of the participants had already used the methodology before attending the training session. He discussed his experience in front of the other participants mentioning his difficulty in understanding it. His approach was a constant

shuffle between the 'Standards' and the methodology. The 'Standards' allowed him to understand the principles, while the methodology gave him detailed description on how to execute them. However, what he did not understand or disliked he skipped. One participant responded to him by saying:

> *What is the point of having a methodology if you are not going to follow it?*

The same participant also failed to notice a major and critical step in ISMS. This failure may have resulted from the methodology being incomprehensive, i.e. the methodology failed to provide enough information to guide the user in the right direction. The failure might also have been prevented if there were enough examples that could act as cues to lead the user in the right direction. A comprehensive set of principles also plays an important role in preventing deviations. This failure could have been prevented if there were enough principles that would bind the user from going astray. Freedom of movement is desired, as I have mentioned earlier, but boundaries also need to be determined. Therefore, ISMS might have failed to provide the users with enough information to guide them correctly.

According to Fitzgerald (1998), too comprehensive or cumbersome methodologies consume time causing further inertia to the development process. A balance of things is a virtue that needs to be considered in determining how much information or instruction should be provided.

While I was attending a steering committee meeting in one of the organisations, the Risk Manager was explaining his effort to increase cooperation with internal Audit.

> Risk Manager - I g*ave them* (the auditors) *all our documents and explained what we have done and so on. I gave them a book on the methodology and I have not heard from them since.*

The rest of the committee members laughed instantly, implying that the methodology is too comprehensive and hard to learn. One member replied "you probably won't".

From the point of view of this thesis, the term comprehensive means the elements have the essential details but covering the entire development process with a coherent and cohesive flow between the different phases. Principles and processes need not to be all obligatory. Therefore, the methodology need to express to the user what is essential and in what circumstance.

The ISMS developer expressed comprehensive as having the 'Standards' as the basis of the methodology.

> *I do not think there is anything that is quite as comprehensive as ours, none of them are based on the Standards; we have the advantage. Our starting point was the Standards.*

It seems best practices are the way to design methodologies. Best practices are proven records of tactics and strategies that have been successful in other organisations. Fitzgerald (2000) also suggests that next generation of methodologies needs to be based on best practices or sound principles. I tend to agree here, but what seems to be a common problem with best practices is that they are not well explicated and supported with real examples to demonstrate their operations and their environment. This was evident in the data collected and their analysis. The ISMS was motivated by the methodology developer because the Standards (AS/NZS 7799) were seen as an insufficient means to guide managers to establish an appropriate security environment, hence the methodology was developed. A statement from the developer illustrates this point.

> *The standards represent a body of knowledge, whereas we felt we needed a practical implementation tool.*
>
> Also on a different occasion:
>
> *Standards tell you what you are supposed to do, but they don't tell how to do it. The methodology of ours is more detailed on how to do it- that is the*

strength…The standards tell you what ingredients should be in the cake, the ISMS is supposed tell you how to bake a wonderful cake.

However, best practices cannot guarantee success since, other variables are always in control that are specific for each organisation.

Klein and Hirschheim (1993, p.275) argue that methodologies are deficient since they do not provide consideration for issues such as power, politics and tacit knowledge of expertise. Others important issues have also been suggested such as communication, project management (Jones and Kydd, 1988), support for problem analysis and understanding; automated support; and to allow for teachability (Wasserman et al., 1982). Hughes and Wood-Harper (1999) suggest that, if the development process is to be understood, attention should be given to organisational constraints: the social factors and the politics. Similarly, Jayaratna (1988) mentioned that if contributions to the IS field are to be made; methodologies need to be sensitive to the various organisational dimensions and their interrelationships. Such obstacles and dimensions are not purely technical and need to be addressed by methodologies. Therefore, methodologies should have a comprehensive set of principles that also address the non-technical issues. The data collected suggests that practitioners are aware of such issues and the obstacles that they may impose on the implementation of a methodology. To illustrate this viewpoint, a few statements from the field are cited:

Trainer – *One of the good things about the ISMS, is that it brings Executives on board.*

Developer – *The ISMS makes it part of your day-to-day business planning and makes it easier to justify budget.*

Trainer – *Information security is not just about IT ... How do we make everyone in the organisation responsible for information security? I think one way is the methodology,* (ISMS) *incorporates a lot of communication and consultation strategies at different stages.*

The principles of the methodology need to offer certain design ideals to choose from similar to those ideals summarised by Klein and Hirschheim (2001). The choice of a

design ideals allow the user to "set design constraints, which affect system boundaries, function, appearance or other properties of design options in a way that is consistent with their preference. Each stakeholder's preferences point to an underlying set of values" (Klein and Hirschheim 2001, p.75). Careful selection of these design ideals needs to be considered since the choice can affect the outcome and the organisation. Klein and Hirschheim (2001) have also suggested guidelines and logical reasoning based on Immanuel Kant's (1929) Classification of 'practical rules' to arrive at a sound judgment.

Systems development is complex and cognitively loaded. Lee and Truex (2000, p.360) argue that the cognitive structure of users has an impact on the 'mature' use of a method. The cognitive structure of a developer determines how a methodology should be used "in terms of the level of usage and the degree of deviation from suggested guidelines". Therefore, a comprehensive list of examples providing different perspectives would guide and condition the systems developer to follow the intended principles of the methodology.

5.4.2.3 Practical Processes and Examples for Enhancing Adoption

The elements of a methodology needs to provide 'all that there is to know' to reduce ambiguity. Equivocality is reduced by providing more clarity. Clarity and other issues related to ease of use are considered to be part of the attribute practical in the emergent theory. Practicality was proposed as an essential characteristic of both the process and the example element. These two elements, when combined, should provide more clarity on the principles of the methodology and thus reduce ambiguity. Below is a statement from the field to illustrate that practical guidance is a requested feature. This statement was considered as one of the risk factors found in a project implementation document under 'risk factors in the project'.

> *Delays due to project team's inexperience with ISMS methodology and lack of practical guidance from developers of the methodology.*

The above statement implies that lack of practical guidance is a concern and needs to be addressed for the proper adoption of the methodology.

A study investigating the intentions of practitioners to follow methodologies found usefulness is a determinant of their intension (Hardgrave et al., 2003). Complexity affects usefulness, which also influences the perceptions of practitioners. The methodology also needs to be compatible with existing working culture in order to minimise drastic culture change and to reduce uncertainty that comes with learning (Veryard, 1987). Mathiassen (1998, p.15) also argues that "Each environment had distinct characteristics that play an important role for the success and failure of projects" and "It was possible, but extremely difficult to change working practices."

Kautz and Pries-Heje (1999) found that the adoption of a methodology (ETHICS) is affected by the understanding conveyed by the methodology. They have also recommended that examples should represent real-life problem situations and not deal with abstracts.

Also, Bosman et al. (1992) found that one of the reasons of ineffective use of methodologies was attributed to unfamiliar terminology. This fact was also confirmed during my research. Here are few statements captured during the training sessions from different participants referring to issues that made practitioners to view the methodology as impractical:

> *It is not written in plain English. ... There is a lot of use of tautologies and those sorts of things. ...Glossary is not consistent. ...I think a step forward is a template for dummies. ... Terminology a bit tough in the ISMS. ... You need a structure to what you are doing. ... We were lost in the woods.... The amount of work is frightening – it is great but how practical is this. ... Use the word reduce instead of prevent* (need for realistic terminology)

The statements in the above paragraphs may be resolved by the methodology authors by constructing examples that meet the quality attribute 'practical' as proposed by the theory.

If the methodology is overly complex, it will also be viewed by practitioners as impractical. I have defined the attribute 'practical' in the previous chapter as "it is useful – dealing with realistic facts and relating to real existence". For something to be useful, it must conform to human natural behaviour. The more the methodology incorporates naturalistic behaviours, the more likely it will be adopted and followed. Research that pursues these naturalistic behaviours is commendable.

The methodology needs to also be seen as a contributing factor towards improving the productivity of developers (Nelson and Ghods, 2002). Of course, tools and techniques improve practitioners' efficiency and productivity. However, comprehending the philosophical underpinning takes precedence before progressing any further. Fitzgerald (1994, p.7) argues that "systems development is not just about knowing the phases and activities involved in a development methodology, rather the developer should comprehend the underlying concepts." Therefore, the first step towards improving productivity is to understand what is being demanded. The structure of the theory contributes towards the productivity and performance of practitioners by reducing the ambiguity and thus reaching an accurate interpretation of the methodology principles in a timely manner. The ambiguity is reduced by the expounding processes and the elucidating examples, which means less time in comprehending the methodology.

The reality of the development process may typically involve interruptions and unplanned stages (Nandhakumar and Avison, 1999). During my field observation, one of the organisations had interruptions, constraints and uncertainty. For example, that organisation had a lack of expert knowledge which extended the allocated time for the project. A statement from the field illustrates this point:

> *Things are taking longer than expected; even though we have a methodology to follow, we have to sort of adapt the methodology to our needs*

The processes in the methodology should be practical enough to meet the nature of human habit and to assist users in handling unexpected events.

5.4.2.4 More Quality Attributes

Close examination of the theory structure and its details, yields other possible quality attributes, for example:

Reliability of the methodology is achieved since ambiguity is reduced because comprehension is acquired through different and integrated channels (principles, processes and examples). Therefore, we can expect consistent interpretation and consequently repeated results from the methodology.

Integrity of the methodology is maintained, since misinterpretation of the philosophy of the methodology is reduced and the meaning of the principles is correctly preserved. Again, this is because comprehension is attained through different channels.

Efficiency and productivity of users, since the structure of the theory provides clarity for rapid comprehension of the intended purpose of the principle, i.e., understanding comes from pedagogical constructs through processes and examples.

To sum up, this study revealed that the root cause of deviation or rejection may be attributed to three main causes: anxiety, uncertainty and equivocality. As the result of the sequence of analysis, these threats were remedied by the three fundamental quality attributes. These basic quality characteristics are viewed as being responsible for enhancing the adoption of methodologies. To ensure that practices are in accordance with methodological principles, it is critical that such structures of elements and their attributes are portrayed in an effective manner. The structure of the theory aims at providing guidance without ambiguity in order to reduce the possibility of misinterpretation of a methodology's principles. Such a combination of quality characteristics would reduce misinterpretation, which otherwise may lead to biases, conflict, and accumulated deviations and end in rejection.

5.5 Issue #4 Mission of an Ideal Methodology

What do practitioners think about what constitutes an ideal methodology?

As mentioned in Chapter 4, the analysis in this study suggests that an 'ideal' methodology should provide three levels of needs i.e. vital needs, requirements needs and improvements needs, levels were derived by interrogating the participants' statements using the 'mission' dimension.

Vital needs are the essential features or principles in the methodology. Requirement needs relate to the usage of the methodology or techniques, while improvement needs relate to enhancements that facilitate understanding and usage of the methodology, such as tools, or the integration of the methodology with the existing work system and possibly other automation functions. Basically the improvement needs relate to objects or functions that improve the productivity of the methodology user.

The various topics raised by the participants' statements do not carry the same level of importance. 'Improvement' needs, such as tools, are not equally important to a 'vital' need, such as having risk management principles in the methodology. Therefore a division and a hierarchy of needs were evident. These needs are interlinked and support each other in a hierarchy see Figure 5.3. The level of importance was also evident during my observation of the discussions of the participants during the training sessions.

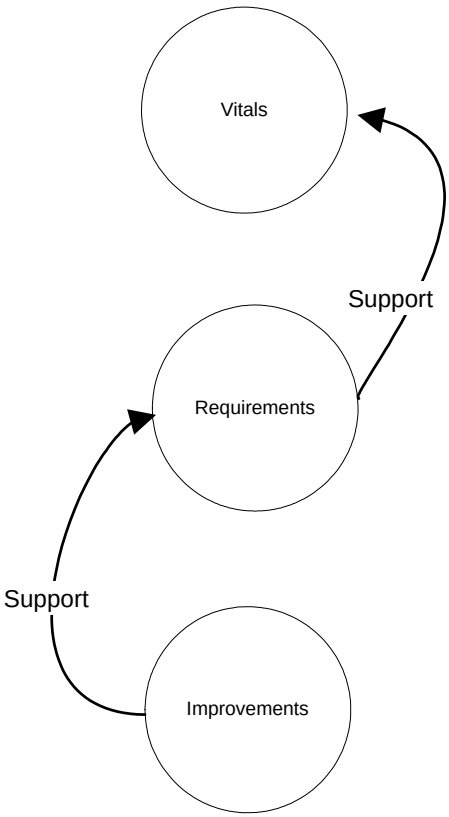

Figure 5.3: Hierarchy of needs

One can conclude from this, that the constituent of an 'ideal methodology', as conceived by practitioners relates to practitioners' three level of needs. Hence, a methodology that accommodates these three levels of needs would probably make the methodology more complete and more adoptable by users.

The value of such a division of needs has research significance. This division provides a different way to view and understand methodologies in terms of their purpose and provides a focal point to research these needs. However, future research would be required to identify the implications of these needs on the two derived contexts i.e. project context (Planning, Building, and Managing) and methodology context (Operation, Content, and Environment). Such research would also allow us to understand and to distinguish clearly between these three needs.

5.6 Issue #5 Methodology Measurement

Would a theory conceptualising an ideal methodology be useful to guide researchers and practitioners in understanding and predicting the use and effectiveness of methodologies?

This section intends to demonstrate that a theory such as MTT (Methodology Tripod Theory) to conceptualise methodologies is useful. Under this section other implications of MTT will be discussed. This section will also extend several other theories using MTT in order to demonstrate the wide applicability of the proposed theory. Finally this section will conclude with a proposal of a research model based on MTT that may be useful for understanding and evaluating methodologies.

Practitioners are always confronted with an evaluation of one form or another. Methodology evaluation may be performed to determine a course of action e.g. to select an appropriate methodology, or to continue or abandon the use of the methodology. Evaluation methods aim at determining if objectives have been met and to find reasons for successes and failures (Arnovick and Gee, 1978). An evaluation process is an effort to make a judgment of worth (Suchman, 1967). It is a process of assessment or appraisal of value and it aims to determine a net value or to measure the system effectiveness. Evaluation is basically a feedback process contributing to the organisational learning process to improve planning (Smithson and Hirschheim, 1998).

Methodologies in IS are being developed at a faster rate than ever making the choice for the practitioners problematic. During my field research, before project initiation in one of the organisations the risk manager had the job of persuading the IT director to choose ISMS as the appropriate information security methodology. He presented four alternatives and ISMS was chosen. The presentation of the four methodologies was rather primitive and did not use any formal method or framework to compare and select a methodology – his choice was based on pure convenience, ISMS was being offered for

free and the fact that ISMS is newly developed and had not been put to test did not affect his decision. I am arguing that the risk manager could have made a more informed decision if he had access to an effective framework such as MTT to assist him in understanding the methodology and to predict the impact on use and benefit of ISMS. The framework may not necessarily affect his decision, but would certainly have made him aware of certain important issues such as having the desired basic elements and their attributes.

There is no dominant method or framework for understanding or predicting the behaviour of methodologies. However, there are several theoretically grounded models of evaluating IS/IT artifacts to predict likelihood of acceptance or adoption by users using a variety determinants. MTT will be compared with other models used in the IS community. The purpose of the comparison is not to challenge existing theories but to bring the proposed theory closer to the understandings of common evaluation practices and to highlight its merits and to possibly extend them.

The proposed theory has the potential of being used as a model to understand and evaluate methodologies. The theory is relevant since it was empirically developed from the perception of methodology users while they were evaluating the ISMS. The theory provides a grounded and rich practicing lens to view the methodology in various contexts in order to better understand the parts and the whole in a hermeneutic circle. The following sub-sections provide different approaches in utilising the theory for understanding and predicting the behaviour of methodologies.

5.6.1 Contextualist Analysis to Understand Methodologies

The concept of contextualist analysis is a way to study a phenomenon using its 'true' dimensions (real setting) in an interconnected approach. Contextualist analysis was used by Pettigrew (1990) to research organisational change along a time scale by considering three components, namely, content, context and process. Walsham (1993) has also based a study on the concept of contextualism to study strategic content, the process of IS

strategy formation and implementation in an organisational context. These studies aimed at capturing the dynamics of the involved parts of the phenomena to reach a better understanding of the whole.

The proposed theory can also provide rich dimensions to construct and carry out a contextualist analysis to understand methodologies close to their reality. As previously mentioned, three layers were determined that in combination provide a context to view the main elements of the methodology i.e. mission, methodology context and project phase context. By combining these three contexts a three-dimensional structure is created. This structure may provide researchers with a better reality of the different dimensions of methodologies to carry out in-depth examination. Figure 5.4 illustrates these three contexts as a large cube sub-divided into smaller cubes. The figure illustrates the three contexts each having three variables arising in twenty-seven cubes, i.e. 3^3.

So, one could contextualise research by choosing one cube with its related variables to examine the core theory (three basic elements and their attributes). Researchers can formulate research questions by focusing on one cube, for example using the cube selected in Figure 5.4:

> *How are the vital needs of the practitioner addressed by the content of the methodology in carrying out the planning phase of the project?*

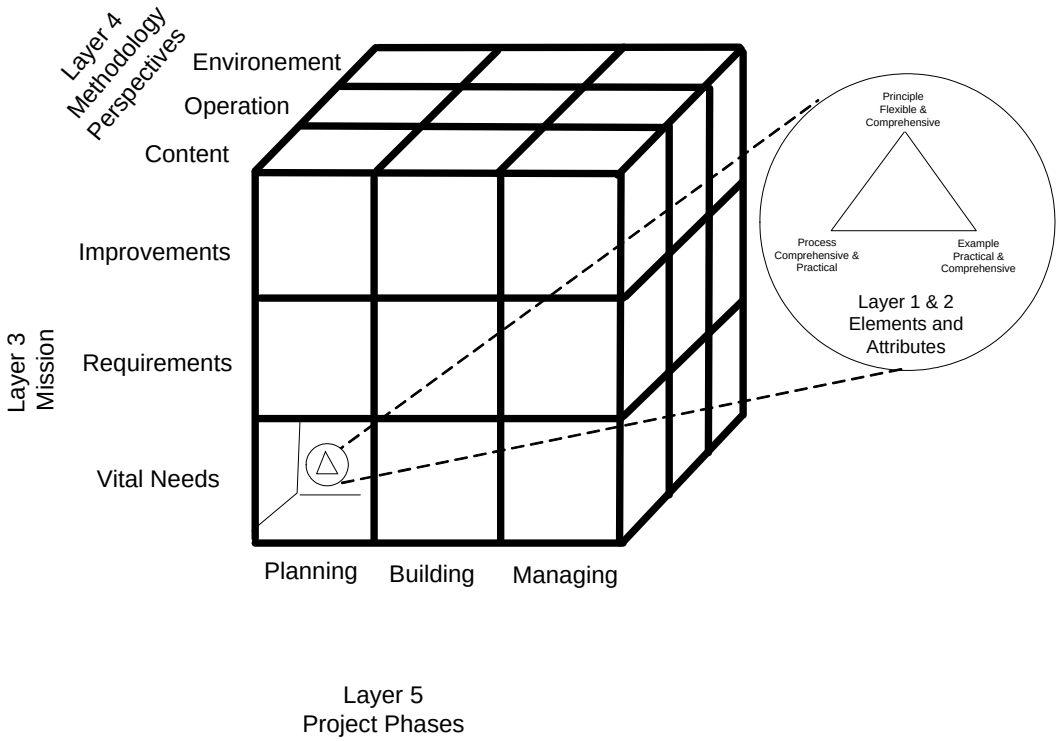

Figure 5.4: Contextualist Cube model

Such a composite of dimensions may provide a useful 'practice lens' to focus our attention on the interplay between the levels of user needs, methodology, project implementation and impact on the organisation (Orlikowski, 2000). These twenty-seven combinations of context can provide researchers with varying perspectives that can be used in different research projects. The compilation of the research results based on these small cubes provides illuminating perspectives to understand methodologies. I am arguing that utilising these three dimensional perception to understand methodologies is much more informing and will lead to better understanding of 'what is going on?' Nandhakumar and Avison (1999) and Little (1993) have also emphasised the importance of studying systems development in an organisational context, i.e., using an ecological approach.

The Contextualist Cube model is similar and complementary to one of the common frameworks that is used for understanding Information Systems Development

Approaches (ISDA) (Iivari et al. 2000/2001). The framework was suggested as a way of comparing and classifying methodologies according to their fundamental approaches by identifying four elements, namely: Goals, Guiding principles and beliefs, Fundamental Concepts and Principles of the ISD processes. The Goal is similar to the 'Mission' dimension. The mission dimension as previously mentioned provides a different way to view and understand methodologies in terms of their purpose at three levels i.e. vital needs, requirements and improvements. The 'Guiding principles' and 'Principles of the ISD process' are equivalent to the 'Principle' element. The 'Concept' element in the ISDA framework is not clearly identified in the proposed model, however examining the methodology through the other two dimensions i.e. methodology perspective and the project phases can give the researcher an understanding of the 'concept' of the methodology being examined. I contend that examination of methodologies through 'Contextualist Cube' may provide researchers with the richer understanding of methodologies and thus arriving at more accurate comparison of methodologies. After examining the methodologies using the Cube model as a tool for understanding, researchers could then classify and compare them according to the elements provided in the ISDA framework.

5.6.2 The Methodology Assessment Model

The general objective of IS development is to contribute to the effectiveness or correctness, yielding higher productivity and a better end product. The proposed theory is a conceptualisation of an ideal methodology, which implies that the theory has at least the basic categories or ingredients for effective development processes and outcome.

The proposed theory is better assimilated by examining the quantitative model proposed by DeLone and McLean (1992, p.87) known as D&M Model. D&M is based on Shannon and Weaver's (1949) theory of communication. The model is shown in Figure 5.5 and it is defined in terms of (DeLone and McLean, 1992, pp.83 & 87):

SYSTEM QUALITY and INFORMATION QUALITY singularly and jointly affect both USE and USER SATISFACTION. Additionally, the amount of USE can affect the degree of USER SATISFACTION – positively or negatively – as well as the reverse being true. USE and USER SATISFACTION are direct antecedents of INDIVIDUAL IMPACT; and lastly, this IMPACT on individual performance should eventually have some ORGANIZATIONAL IMPACT.

Success in the D&M model refers to IS effectiveness as perceived by the stakeholders, seen as value contributing to the productivity and performance of their daily tasks which will be positively reflected on the final outcome.

'System Quality' refers to characteristics such as response time, flexibility and accuracy. 'Information quality' relates to characteristics such as usefulness, understandability and clarity. 'Use' relates to items such as frequency, duration, and motivation to use. 'User satisfaction' relates to overall satisfaction and enjoyment. 'Individual impact' relates quality of decision, time taken, power of IS department and 'organisation impact' relates to items such as profit, innovation, and IS contribution. The D&M model is depicted below:

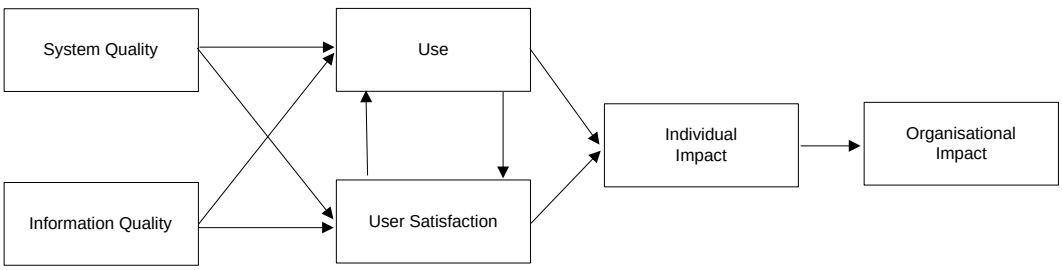

Figure 5.5: DeLone and McLean's original Success Model

Although the model relates to information systems, it can be well adapted to system methodologies. Veryard (1987) has argued for the similarities between SDM and information systems. Methodologies can be viewed as systems providing information on technical and social matters for change to occur. There are also interactions and impacts on the individual and the organisation during the process of planning, building and managing the implementation. Figure 5.6 shows how the D&M model can be adapted to study methodologies. The system quality dimension can be substituted by the principles

and its two attributes and the information quality can be replaced by the processes and its attributes. The rest of the dimensions remain the same since they are applicable to the use and usefulness of the methodology and impacts are also expected. The example element and its attributes are extended to the model.

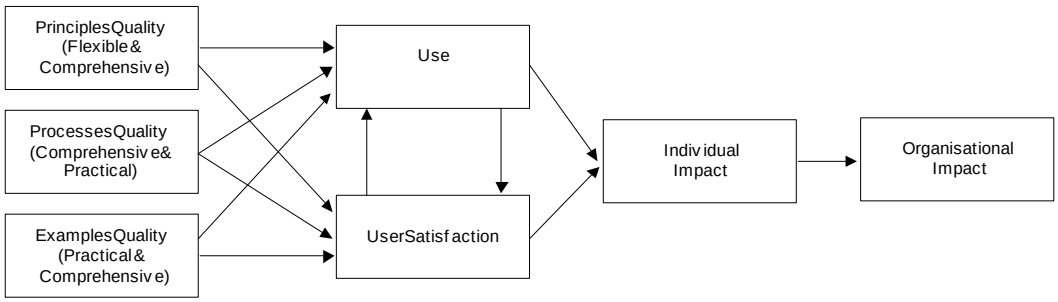

Figure 5.6: Extending D&M model with MTT

Similarly, the initial D &M model has also been modified to include Service Quality (Pitt et al., 1995). The Service Quality was borrowed from marketing literature and introduced to assess service quality in general (Jiang et al., 2002). This dimension was introduced to the D&M model on the belief that use and user satisfaction are also affected by service quality being provided by IS department or the information systems application (Pitt et al., 1995). The Service Quality would measure, the following:

- Tangibles – Physical facilities, equipment and appearance of personnel
- Reliability – Ability to perform the promised service dependably and accurately
- Responsiveness – Willingness to help customers and provide prompt service
- Assurance – Knowledge and courtesy of employees and their ability to inspire trust an confidence
- Empathy – Caring, individualized attention the service provider gives its customers

Another modification was also made to the D&M model based on the critique of Seddon (1997). Seddon introduced a new variable 'net benefit' which affects User Satisfaction and Perceived Usefulness. 'Net benefits' is the benefits that the individual or

organisation receives from use of information technology such as productivity, better decision-making, political advantage etc. Seddon's model (shown in Figure 5.7) does not include Service Quality which was seen by other scholars (Pitt et al., 1995) as a determinate of system success. Figure 5.8 shows the proposed theory mapped on Seddon's model and depicting methodology use in terms of quality of principles, processes and examples.

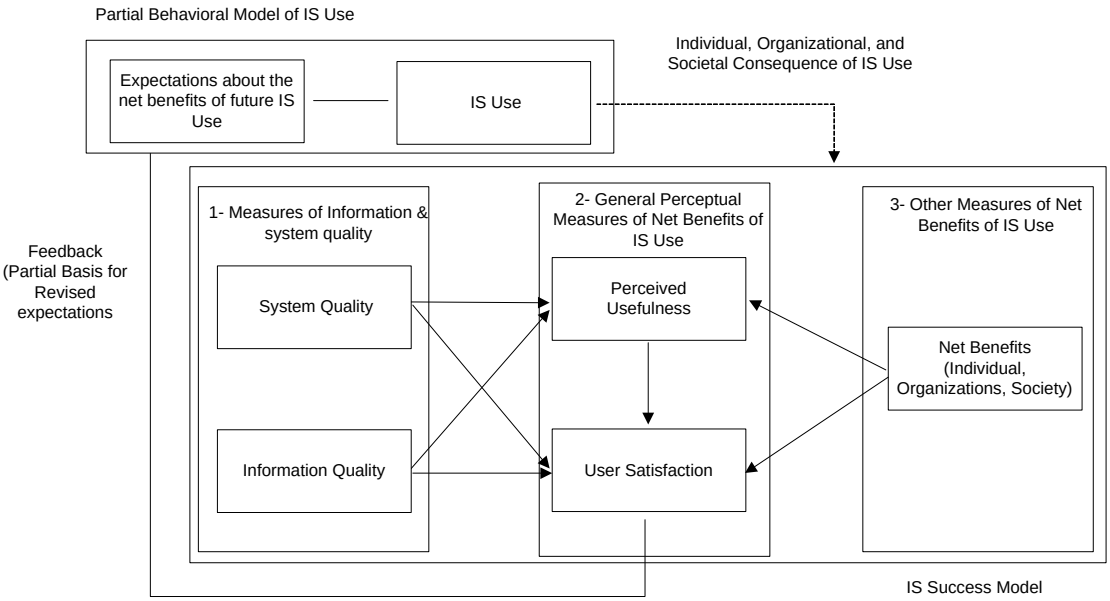

Figure 5.7: Seddon's model

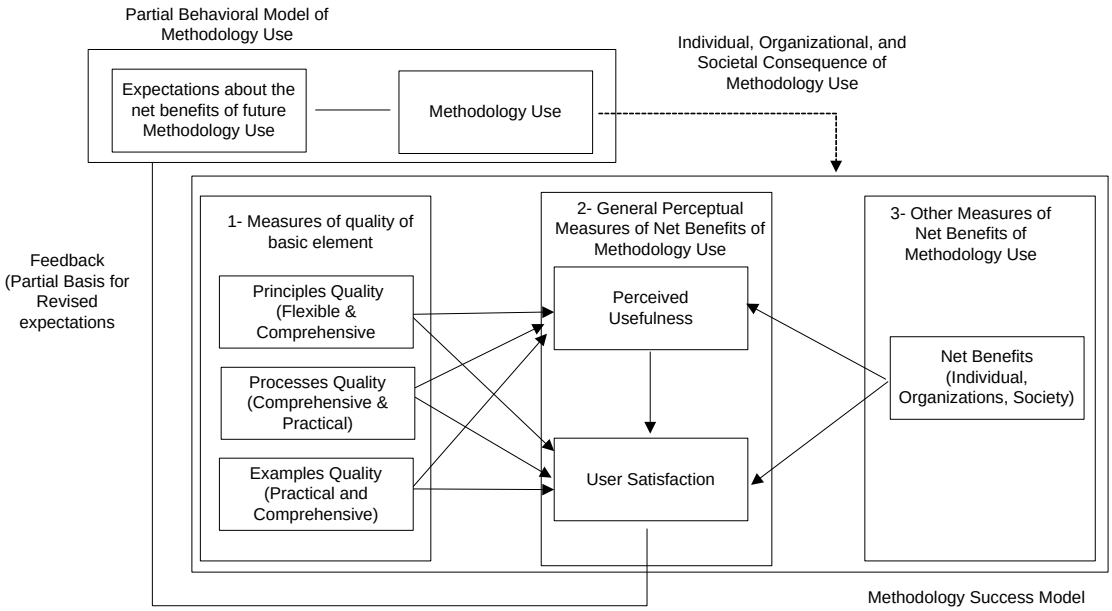

Figure 5.8: Extending Seddon's model with MTT

DeLone and Mclean (2002) recently have reformulated their model after ten years of its use by the IS community. The new model of D&M after reformulation is shown in Figure 5.9.

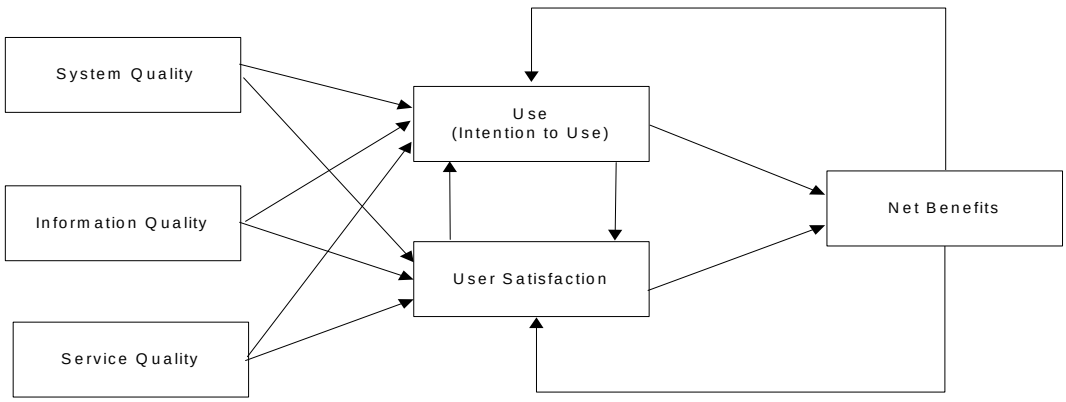

Figure 5.9: Reformulated DeLone and Mclean Success model (2002)

The Service Quality refers to the help and support provided to the information system. Service Quality is somewhat analogous to the example element. I have previously stated that an ideal methodology should provide the necessary support and help internally

within the methodology to make it self-contained and therefore the example element equates to the service quality determinant. It is evident that the mapping of the proposed theory on to the D&M model has a close match. Figure 5.10 reflects the quality dimensions of the methodology reflected on the modified D&M model:

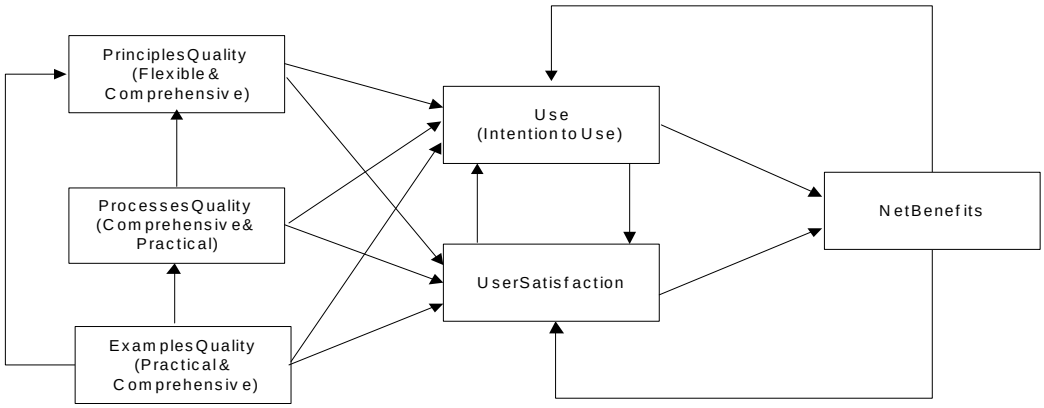

Figure 5.10: Extending the modified D&M model with MTT

One can conclude that the basic elements of the methodology have positive relations to methodology Use and the Satisfaction. This model configuration would be useful in assessing a methodology's adoption potential or to explain or predict use behaviour in organisations. The above model also depicts the relationship between the elements. However, an instrument needs to be developed specifically addressing the basic elements of the methodology.

5.6.3 Technology Acceptance Model

The Technology Acceptance Model (TAM) proposed by Davis (1989) may be also used to evaluate methodologies and is shown in Figure 5.11. It is based on the assumption that the perceived ease of use and perceived usefulness can predict the usage of technology and also provide an explanation of the usage of the technology. The model recognises that external factors affect Perceived Usefulness and Perceived Ease of Use. The model is adapted in the Figure 5.12 below to illustrate how it may be used in conjunction with the proposed theory:

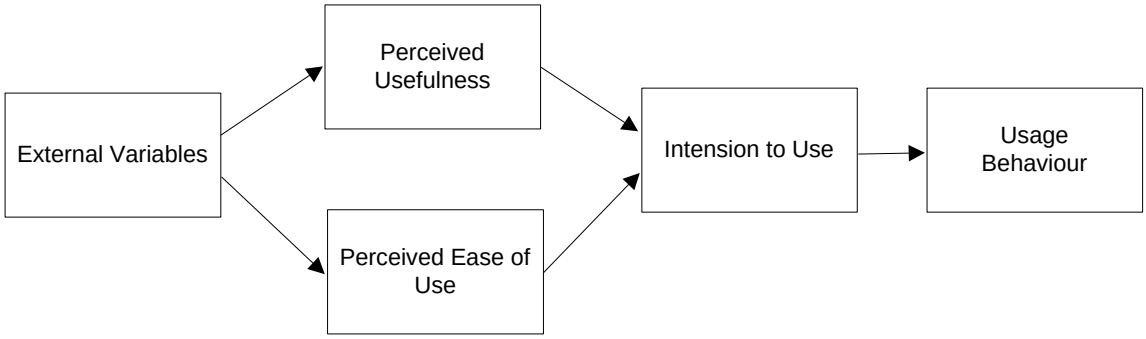

Figure 5.11: Technology Acceptance Model (TAM)

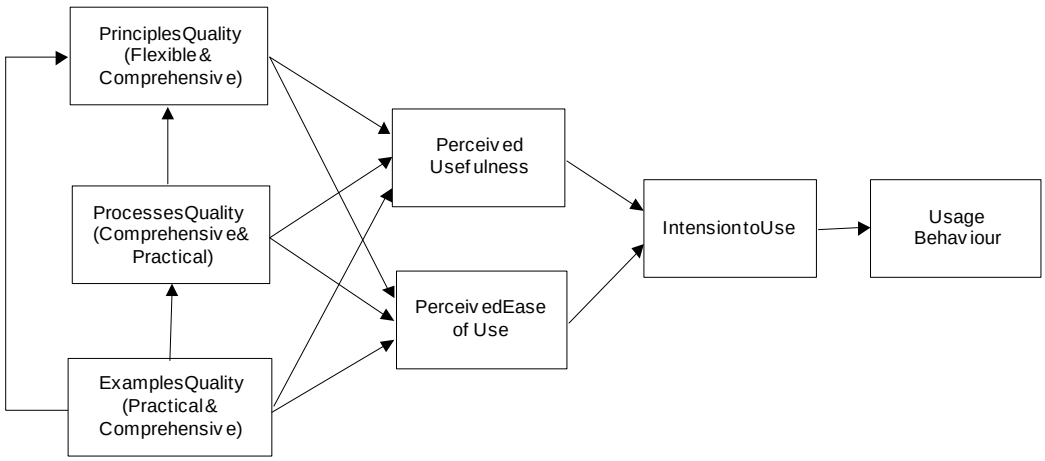

Figure 5.12: Extending TAM model with MTT

The element's characteristics used as determinates that impact both The Perceived Usefulness and Perceived Ease of Use. The above figure also suggests that there is a relationship between the three elements. The proposed theory has an added advantage of providing two fundamental attributes that should reflect the perceived usefulness and perceived ease of use for the basic elements of the methodology. Again, the proposed theory is mapped well to the TAM model, giving us another model to test methodologies use (intention to use) in organisations.

5.6.4 Normative Information Model-based Systems Analysis and Design

Normative Information Model-based Systems Analysis and Design (NIMSAD) is a common framework used to evaluate methodologies (Jayaratna, 1994). See Figure 5.13. The NIMSAD framework is the result of action research and it is viewed as a general purpose methodology that can be used to evaluate any methodology. The framework has been used mainly in the information systems development environment and BPR (Husein et. al., 1999). NIMSAD is built on four fundamental factors found in the problem solving organisation, namely, the problem situation (the methodology context), the intended problem solver (the methodology user), the problem-solving process (the methodology) in use and the evaluation of the above three factors. The framework recognises the complexity of the technical and social aspects of development and all the controversial issues that accompany development. The framework is based on asking numerous qualitative questions related to the first three factors. The questions may be applied at various stages of development (before, during and after). The framework is not a concrete guide, but rather is to be used as an 'epistemological device'. The framework also proposes a set of non-exclusive questions, which may be used to evaluate methodologies.

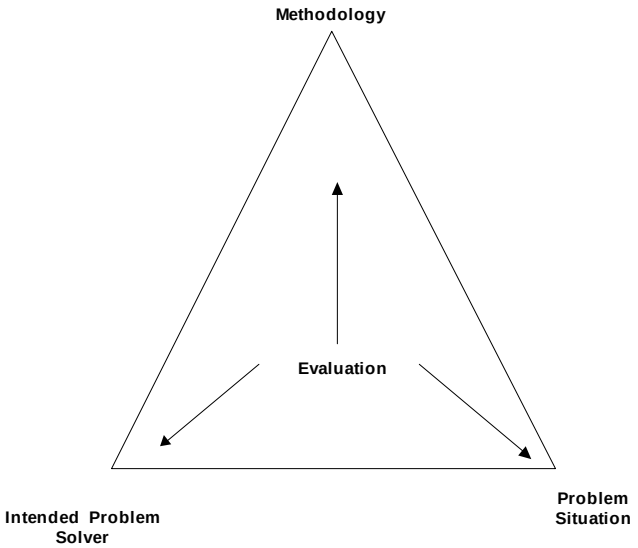

Figure 5.13 NIMSAD

Comparing the derived theory with NIMSAD, the following observations are made and summarised in the Table (1) below:

NIMSAD	MTT
Used for evaluation	May be used for evaluation and provides a foundation to build or improve methodologies. Also may be used for explanation and predicting user behaviour towards the methodology.
Intended for information systems development	Generic, addressing problem solving methodologies – value free
Treats the methodology as a whole to gain understanding	Emphasises the parts of the methodology. It has already been acknowledged that, in order to understand the whole, we need to understand the parts.
Does not enforce any 'ideals'	Enforces ideals in terms of the basic construction of the methodology consisting of three elements and their basic attributes.
From the Structure of NIMSAD, methodology can only be studied in context	The structure of the theory is independent of the three derived contexts. This makes the theory suitable for qualitative research when it is placed in the three contexts or may be used for quantitative research when contexts are removed.
No stated mission	The methodologies may be evaluated by considering their mission, i.e. meeting users' vital needs, requirements, and improvement.
The evaluator or the intended problem solver is part of the framework.	The evaluator is external to the framework and could be any of the stakeholders, including a researcher.

Table 5.1: NIMSAD compared with the proposed Theory

From the above comparison, the proposed theory may have greater utility and provides different and wider spheres to reflect on the methodology, while at the same time maintaining the law of parsimony. The two theories may in fact compliment each other. For example, NIMSAD poses many important questions that need to be considered by the problem solving originations, but there is a need to create more questions related to the parts of the methodology. NIMSAD can be made more useful and practical by substituting the 'methodology' node by the proposed theory (see Figure 5.14) since the proposed theory can provide an instrument for greater in-depth examination of a methodology.

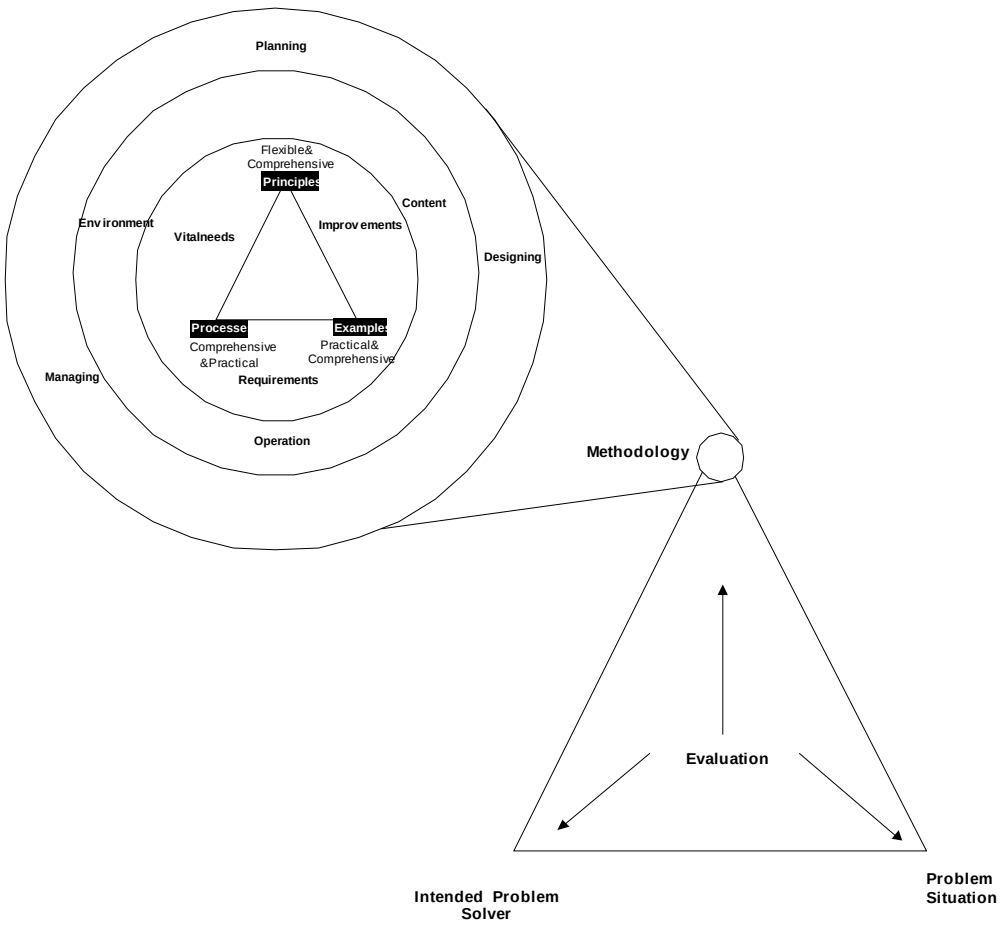

Figure 5.14: Extending NIMSAD Framework with MTT

The possibility of extending the NIMSAD framework also demonstrates that the proposed theory can be generalised. It is simplistic in nature and has well-defined variables, which allow it to fit existing theories. Extending existing theories raises the credibility of the proposed theory.

5.6.5 Research Model for Understanding Methodologies

So far I have used MTT to extend a few existing theories in order to demonstrate the utility of the proposed theory. I have extended the D&M model, TAM and NIMSAD to better understand and predict the behaviour of methodologies. I have also proposed a model earlier under the section of contextualist analysis (Contextualist Cube) to serve as a framework for studying methodologies in different contexts (see Figure 5.4).

The proposed theory may also be used as a standalone theory to measure the value and impact of methodologies. This section proposes a standalone model based on the proposed theory that may be used in both qualitative and quantitative research approaches. It is believed that a research that combines both types of approaches should provide better understanding of the reality of the phenomena being studied (Lee, 1991; Kaplan and Duchon, 1988; Gable, 1994). Therefore, a research model that can cater for both research paradigms is more meaningful and desirable.

The research model shown in Figure 5.15 is derived using the method of data analysis based on the Interrogative Framework. The method of analysis was in fact based on the relationships between the elements and their attributes, three consequences, and three contexts. I have also included the metaphors of 'political practitioners' discussed in Chapter 2 to give a fourth dimension, which was not included in the 'Contextualist Cube' model (see Figure 5.4). The three consequences (Methodology Consequence, User Consequence, and Adoption Consequence) are termed in this model as USER PERCEPTION, THREATS, and IMPACT respectively to provide more coherence for the model. To follow is an explanation of the model.

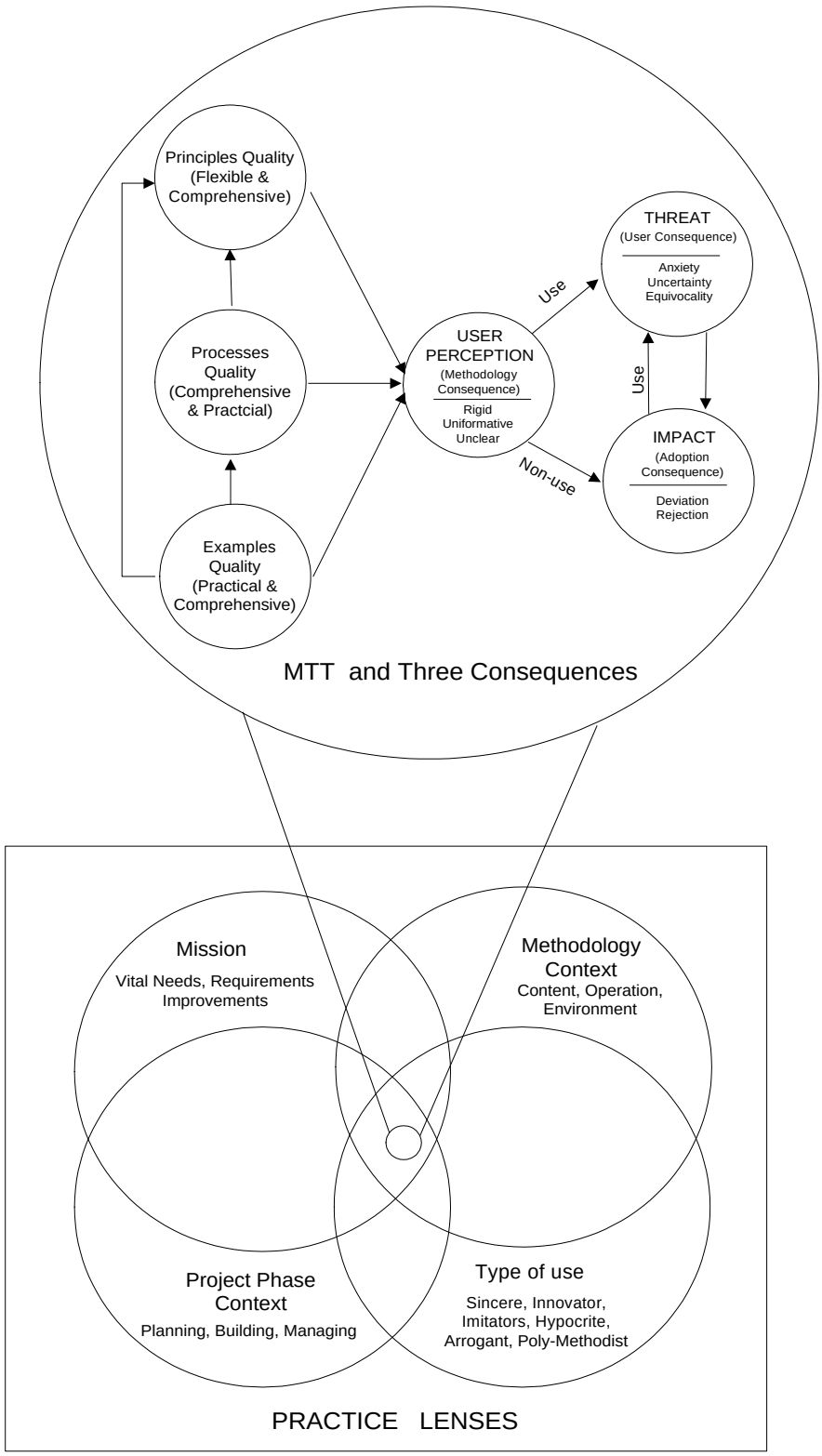

Figure 5.15: Interrogative Research Model

The three elements PRINCIPLE, PROCESS, EXAMPLE can have positive relationships between each other. The relationships are determined by their quality attributes (Flexible, Comprehensive and Practical). The principle guides, the process expounds on the principle and the example elucidates the process and the principle.

USER PERCEPTION (methodology consequence) on the methodology is impacted by the quality of these elements; if one or more elements are weak, the methodology will be perceived as Rigid, Uninformative, and Unclear. The IMPACT (adoption consequence) on the methodology resulting from negative perception is rejection. Otherwise, the user proceeds with the use of the methodology. During use, the user may face one or more THREATs (user consequences) i.e., Anxiety, Uncertainty and Equivocality; the consequences can be either a deviation from the original intention of the methodology or an outright rejection. If the consequence was a deviation, the user could continue to use and deviate until abandonment (rejection) of the methodology.

The proposed research model provides PRACTICE LENSES (Mission, Methodology Context, Project Phase Context and Type of Use) for researchers to examine the implementation process either separately or jointly. For example, it is not sufficient for the researcher to know if the methodology is being adopted or not. It is more informative to know the type of use (Sincere, Innovator, Imitators, Hypocrite, and Arrogant) and the specific reasons for people deviating and rejecting methodologies (see Figure 5.15).

In summary, it was evident the derived theory is plausible since it can be compared and mapped to existing theories. It has been shown that the derived theory corresponds with other models; therefore it fits the realm of standard practice of IS. As stated in Chapter 3, a good theory is one that clearly defines its variables and their relationships to allow for refutation.

To summarise, the advantages of the proposed theory over other theories are discussed in this section.

Wider applicability: The theory provides wider perspectives to study methodologies' elements, characteristics and their various contexts; thus a rich picture may be formulated using the theory. The richer the picture obtained, the better the approximation to reality. Theory facilitates answering research questions that seek the 'what', the 'how' and the 'why'.

Multiple purpose theory: The proposed theory acknowledges the various aspects of studying methodologies such as to construct, evaluate and research methodologies. Therefore the theory is holistic in that it serves multiple purposes with implications for research and practice. It integrates diverse perspectives of methodology to allow for understanding, constructing and predicting behaviour of methodologies. The theory also suggests basic fundamental elements that need to be considered by methodology authors for enhancing adoption.

General, parsimonious but not limiting theory: The proposed theory although parsimonious is not simple. The theory provided in total of 18 variables, three levels of needs, three methodology contexts, three project phases contexts, and three elements with two attributes each. Looking at Figure 5.4, the theory can allow single or multiple focal points on the cube to be identified for examination.

NIMSAD is based on a life-cycle approach and does not consider other approaches of development such as prototyping. The proposed theory has a higher level of abstraction and does not target any specific paradigm, method or philosophy.

Multidisciplinary theory: The proposed theory is not disadvantaged over the other theories, since it includes and combines the essential variables from the discussed theories in one form or another.

5.7 Issues #6 & #8 Methodology Structure and Quality Characteristics

Is there a generalisable basic structure of these new methodologies?

What are the desired quality characteristics of a methodology that we can agree on, so that we can convince other practitioners of the value of a methodology?

Issues pertaining to the basic structure, consisting of the three elements and their attributes, have been discussed throughout this chapter. However, this section also contains discussions on the structure and the characteristics of methodologies with the purpose of further enforcing the logic and the value of the proposed theory from different perspectives.

5.7.1 Reading behaviour of methodologies

Westrup (1993, p.269) argues that "written documentation is the methodology". This assumption creates an interest in examining practitioners' documentation reading habits to determine what parts of methodology documentation are they reading. Hidding (1997) carried out a study of the reading behaviour of practitioners about methodologies and found that systems developers spend 50% of their time reading information provided by the examples, templates, and other deliverables, while reflecting 10% of time on the principles (way of thinking) provided by the methodology or method. Reading the details of the process took the remaining time (40%). This signifies that methodology users are basically interested in these three fundamental elements of the methodology, with the emphasis on the examples in its different forms and format.

5.7.2 The construction of ISMS

Examining how ISMS was constructed indicates that there is a governing structure that embodies methodologies. The following excerpts explain how ISMS was actually developed:

> *I took my knowledge of the standards and took my knowledge of what we did here at CA and what I had done at another company, and used that to actually develop the methodology. The Standards tells what you need to do but not how. The standards were so complicated that we couldn't interpret them. So, what we decided was, in my consultancy role, we basically reviewed several types of standards. Once we had a full understanding of specific type of standard, we interpreted that into how we would go about implementing that in an agency and we put together the actual methodology.*
>
> *…we took the standards and broke down into to a series of steps.*
>
> *…so, a hierarchy of things emerged. So, the methodology emerged as series of stages, each of which had a number of steps, and each step of course had a number of tasks.*

From the above excerpts, we can infer that the standards have guided the developer in establishing the principles of the methodology. However, the interpretations of these standards or principles were a major issue for developers. They had to seek other sources and examples of standards to reach a consensus on their interpretation, which means that understanding is easier when it comes from different sources. The developer finally took the principles and broke them down into a series of steps or processes. The behaviour of the developer had depicted the basic structure of a methodology that seemed to be consistent with the proposed theory.

5.7.3 People and Methodologies in Software Development

The title of this section is actually the title of a PhD dissertation covering ten years of research carried out by Cockburn (2003). The thesis raises many interesting issues and some are controversial. Cockburn determined that we will always need new

methodologies and considered that each methodology is a ‘one-off’ a ‘personalised methodology’, is a ‘draft formula’ and ‘changes as technology changes’ and there ‘can be no convergence’ between methodologies. Cockburn found that a methodology is a mere collection of principles that people decide on to fit the project. A framework has also been proposed to assist in the methodology design based on four principles (p.42):

> 1) Recognise that a larger team needs a large methodology
> 2) Recognise that the more critical the target system being developed, the more publicly visible correctness is needed in its construction.
> 3) Recognize that relatively small increases in methodology weight add relatively large amounts to the project cost – weight is referred to as the number of elements in the methodology (its size) and rigour (strict adherence).
> 4) Reveal that methodology weight can be traded off against personal communications. With better communication, we can shed bureaucracy. Conversely, to the extent that the group cannot get frequent and rich personal communicating, it must add compensation elements to the methodology.

Cockburn is an advocate of light methodologies, but he has recognised that lightness has limits and there is a need for “balancing lightness with sufficiency”.

In the title of this section, the word ‘people’ precedes the word ‘methodology’ to demonstrate that ‘people’ is a success factor of the first order. Cockburn goes on to list characteristics of people that were seen as contributors to the trajectory of a project. Two characteristics were of interest and directly related to the construction of methodologies.

The first characteristic is that “people vary” and therefore they like to work differently, Cockburn explains (p.52):

> *Methodologies are largely group coordination rules, and so a recommendation appropriate for one person or group will be rejected by another. What applies to a consensus-minded group might not apply to a culture in which people wait for the boss to make a pronouncement.*

> *Methodologies currently are written to dictate the cultures and work habits of their target organisations. As described above, the group can, and often does, simply reject it.*

The above quotes, demonstrate how important quality attributes of the elements in a methodology. The attributes flexibility, comprehensiveness and practicality, do set the path for better design criteria for constructing methodologies. Practitioners are unlikely to reject methodologies if it fits their needs, covers different areas of the problem solving process and they are being educated and guided in a practical way.

Another characteristic that is relevant to this thesis from Cockburn's research, is working from examples. Cockburn argues that "People often get their best productivity by copying an existing snippet of design and changing it to meet their current needs ... The copied snippet provides both the structure and a sample of use of it ... They can get away with just changing parts that are different ... In some cases, a person will change all of the sample, using just the provided structure and the memory of example … People constantly request examples. It is as though they operate internally and directly from the examples … it certainly is clear that most people work better given examples than simply working from abstract theory' (Cockburn, 1996, p.8). Cockburn also states that the area of working from examples is lacking the attention of methodologist.

Cockburn later describes a structure of a new family of methodologies called 'Crystal' based on the findings of his research. It is called a family of methodologies because they adhere to a **common philosophy and principles.** His conclusion was that "While no single methodology can satisfy all projects, it is possible to have a family of methodologies (convergence) related by a common philosophy, and that project's specific, tailored methodology can economically be constructed at the start of the project and evolved during the course of the project" (p.61).

Do the above paragraphs oppose the idea of an ideal methodology? On the contrary, an ideal methodology could, by definition meet the majority of needs. An ideal methodology in its purest form may be used to solve different types of problems in

different areas meeting the variation in people. Certain principles of the ideal must be presented as a set of well categorised and coherent maxims, so that people can deduce the principles that are needed for the project specifics. However, such deductions should not violate the fundamental philosophy of the methodology.

The extant literature has useful principles that can be utilised. For example, principles from the works of the architect Alexander (1979) were deduced by Introna (1996) to argue for 'ateleological' information systems development. Alter (2004) recognised and proposed a set of principles that can be applied to IS projects, for example:

> Principle # 7 Monitor the quality of both inputs and outputs
> Principle # 18 Support the firm's strategy
> Principle # 21 Maintain the ability to adapt, change, and grow.

Critical Success Factors have also been proven to illuminate practice; therefore they need to be determined and incorporated in methodologies as principles and to provide guidance on their use contextually (Butler and Fitzgerald, 1999).

One can conclude that each methodology should prescribe to the user what principles are obligatory, what is permissible and what forbidden issues need to be avoided. Sufficient examples and explanations should be provided to illustrate how such deductions should be performed to prevent distortion of the original methodology. Therefore, under the ideal methodology, personalisation and freedom are the norm illuminated by these types of principles.

Future research should be directed towards uncovering these ideal maxims and to become part of IS best practices as a contribution towards cumulative tradition (Iivari et. al., 2004). As mentioned earlier, these principles may already exist in the literature, but need to be formulated into maxims. The proposed theory provides a foundation and a starting point to towards this path.

5.8 Chapter Summary

I have argued that the MTT has a structure and wide scope for providing rich theoretical foundation to understand, construct and evaluate methodologies. The proposed theory has been shown to be a viable foundation to harbour other theories in order to make the fundamental elements of the methodology more flexible, comprehensive and practical and consequently more adoptable and adaptable. This chapter aimed at addressing the primary question and the subsequent eight issues. The discussion of these issues has also demonstrated that the theory is capable of being integrated with existing theories. Although the theory is parsimonious, I was able to summarise a wide spectrum of the literature on methodologies while reflecting on the proposed theory, which is also an indication of its credibility and its potential utility to theory and practice. The major contribution of this chapter was the clarification of these three elements and their attributes, integration of the proposed theories with extant literature and the proposition of two standalone research models (Figure 5.4 and Figure 5.15).

The next chapter will conclude this dissertation by highlighting the main events and milestones achieved in this research, listing its limitations and recommending areas for future research.

6

CONCLUSIONS

In this final chapter a review of the significance of this research and its contribution to practice and theory is provided. Limitations and future research are also discussed.

The motive of this thesis has been the continuing interest in methodologies by practitioners and academics. Another motive was that universally accepted theories on methodologies are lacking. Methodologies of different natures have been used extensively in many of the facets of the IS discipline. This thesis has attempted to generalise between methodologies by determining common problems found in these methodologies. This thesis has endeavoured to address these problems by theorising a common foundation theory that can be used to guide construction of more adoptable methodologies that may lead to projects being successfully completed.

6.1 Contribution

This research adopted an integrated, interpretivist research framework (see Figure 3.1), which was used to establish the philosophy that drove the research process. The framework was uniquely constructed and implemented based on my adopted ontology, epistemology and various research methods.

The uniqueness of the framework is provided by the adopted Interrogative Framework, used as the theorising processes (see Table 4.1, Figure 4.4 and 4.5). The Interrogative Framework may be considered as one of the contributions of this thesis. The framework was useful and successful in producing a theory building process in order to generate categories, which were later used to develop the emergent theory. The nine questions provided by the Interrogative Framework are independent of the data collected from this thesis, and therefore the framework may be applied in different contexts. The framework also employed a common set of principles and criteria for ensuring rigour and relevance.

Reflexivity in this research was demonstrated by capitalising on opportunities, such as the introduction of the exercise used during the focus groups after the participants' training sessions. The exercise was a subtle way to 'capture the reality' of practitioners' perceptions of what may constitute an ideal methodology by generating evaluation questions. The participants had the opportunity to express their opinions while being reflective on their individual needs and sharing their experiences with others. The use of focus group interviews has proved to be useful in generating rich data to explore new ideas and to build theories. Creativity was an essential ingredient of this thesis, which is an issue being overly stressed in the IS literature to develop new theories that can be uniquely identified to the IS discipline (Weber, 2003).

Diversity was also an essential concept to learn and understand the problem on hand by examining other sciences. Al-Shafi'i (767-820 - a prominent Islamic scholar) was once asked, "When will a man become learned?" He replied, "When he concentrates on one science until he masters it and at the same time addresses himself to the other sciences and surveys what he does not know; then he would become learned." In the course of this research I have examined many other sciences such as religion, education, psychology, and social science to grasp a small part of the whole.

This thesis has put forward several well-founded and plausible arguments that may be considered as a contribution to the extant literature on methodologies, mainly to their

adoption, construction and their evaluation. One of the useful contributions has been the categorisation metaphorically of the use of methodologies by practitioners (The Hypocrites, The Imitators, The Innovators, The Poly-Methodist, The Arrogant, The Sincere). These six metaphors (see Table 2.1) of users were proposed that should benefit methodologies developers, implementers and researchers to understand their characteristics.

The major contribution of this thesis is the substantive theory (MTT) represented by the triangle. The triangle is an explanation of the three determined fundamental elements (principle, process and example) and their suggested quality attributes (see Figure 4.9). The proposed theory seems simple, but it has wide applicability, which was demonstrated during the weaving of the theory's details with the extant literature. The theory is generalisable, but is yet to be confirmed by further testing. The theory is generalisable because it has been abstracted at high level and not based on a certain methodology or philosophy. It therefore, has the potential of becoming a general theory. The proposed theory has well-defined constructs and relationships that may facilitate falsification.

Chapter 5 gave an extensive discussion on how the proposed theory can inform the extension of existing theories (see Figure 5.6, 5.8, 5.10, 5.12. and 5.14) and also provided two standalone research model (see Figure 5.4 and 5.15) that can be used in both positivist and interpretivist research paradigms. Researchers can benefit from the rich theory as a research framework for data collection and to understand the complex technical and social process of building systems and solutions.

The theory that emerged from this study may be considered as a contribution towards conceptualisation of methodologies and a step towards "theorizing the IT artifact". The theory can be viewed as a theoretical foundation to build or evaluate methodologies for improvement purposes or comparisons. The theory is relevant since it was conceptualised from the perceptions and apperceptions of practitioners.

The proposed theory has been metaphorically termed Methodology Tripod Theory (Figure 5.2). Each leg of the tripod signifies an element of equal quality and purpose. The three elements in association can effectively support the methodology. The existence of these three elements with their basic characteristics gives rise to a synergetic effect. We probably can predict that the user will deviate or reject the methodology if one of these elements lacks one of its quality attributes.

The theory offers a complementary perspective on methodologies - a new and rich way to understand methodologies. Its constructs and their description have also facilitated in meeting the research objectives and answering the nine research questions that were raised in Chapter 2. Answering the nine research questions whether in full or partial, is an indication of the theory being credible.

Summary of the contributions to theory and practiced are listed in the table below:

Contribution	Value	Reference
Metaphors of Political Practitioners	Practicing lens to understand methodology users	Table 2.1
The Adopted Research Framework	Proved useful for theory building	Figure 3.1
Interrogative Framework	Useful set of dimensions to construct scenario building analysis process of events and actions in a Hermeneutic circle.	Table 4.1 Figure 4.4 Figure 4.5
Conceptualisation of an Ideal Methodology & its metaphor	Theory of methodology construction, evaluation and adoption	Figure 4.9 Figure 5.2
Contextualist Cube model & Interrogative Research Model	Useful to contextualise research to understand methodologies in-depth	Figure 5.4 Figure 5.15
Extension to various models D&M, Seddon, TAM, NIMSAD	Evaluate methodology use	Figure 5.6 Figure 5.10 Figure 5.8 Figure 5.12 Figure 5.14

Table 6.1: Summary of contributions

6.2 Research Limitations

This research is probably the first of its type to attempt to unravel or conceptualise methodologies theoretically and empirically. For this reason, caution is required in interpreting its findings. Some of the limitations are:

- This study did not build on existing theory due to lack of prior research. This research is based on developing new theory, which needs additional research to confirm the results.

- As usual, there is a concern with qualitative analysis. If the data collected were given to other researchers, they might arrive at a different set of categories? The analysis is subjective and relies heavily on the adopted perspective taken by the researcher. However, the subjectivity of the analysis may be judged by how plausible the findings are.

- The data collected was obtained from an Information Security Methodology as used by the public sector. Variations in methodologies and participants are needed to confirm the proposed theory. Such confirmation may extend the generalisablity of the theory to other methodologies or contexts.

6.3 Future Research

This research could potentially trigger new avenues for research. Some of the areas that need further research are suggested below:

- The theory provides one perspective on what should be ideal about a methodology. The findings of this research may be compared with other perspectives.

- There are no standard definitions of attributes or quality characteristics in the IS discipline that can be used as references similar to those found in the software engineering field. In the context of this thesis, I have provided explanations/definitions of the three elements and their quality attributes, however, the definitions provided needs to be extended and refined, therefore, measurements are needed.

- The recognition of the 'example' in this thesis as a fundamental element of methodologies creates a need to develop and research this element and its characteristics. Any research towards developing the example element would be a significant contribution in furthering our understanding of methodologies. This would also allow us to judge and evaluate the quality of the examples provided in a methodology.

- The validity and the reliability of the proposed theory needs further testing to promote it from a substantive theory to a general theory.

The theory may be tested using a questionnaire to measure the value of the three elements (principles, processes, and examples) and their attributes (flexible, comprehensive and practical) on the use of methodologies. Researchers may benefit from the definitions and the understandings provided in this thesis and from the data collected to construct the measurements. The participants should be both novices and experts in using an IS methodology regardless of its objective.

Alternatively, researchers may carry out ranking and matching exercises whereby the fundamental elements and the attributes are embedded among other possible elements and attributes. The participants could be asked to rank the elements and to match each one with its corresponding attributes. Again, the participants need to be a mixture of novices and experts.

6.4 Experienced gained and the IS Crisis

Reflecting on this research, I wonder if having a core for IS (see section 2.3.1) would have simplified the progress of this research. My answer to this question would be a 'no'. Explorative research requires an open ended approach to allow for different possibilities. Working around a core would have restricted my thoughts and ideas. As previously mentioned, diversity in my research was essential to explore new ideas and possibilities. I tend to agree that IS should be trans-disciplinary requiring trans-disciplinary scholars and approaches or, as Galliers (2003) puts it (p.347):

> *IS as a field is, indeed, multi-leveled and multi-faceted. Overly constraining the IS academy to a narrow field of interest is self-defeating. Closed systems exhibit entropy; open systems do not.*

However, through the experience gained from this research, I have developed a conviction that there is a core, but it is bigger than what we can imagine and our research is a journey of discovery of the different pieces of the core. It is agreed that the IS field lacks solid theoretical propositions that can assist in the discovery journey and in building traditions of knowledge. Therefore, the core of IS should not be attributed to artifacts, models, or to specific areas, but rather to instruments of discovery. Michael D. Myers (2003) argues that defining the core of the IS field as the IT artifact is potentially life- threatening for the field as a whole.

Regardless of whether there should be a core or not, we should always engender ourselves with humanistic views that can stand the test of time Therefore, a core defined with the people outside the centre can threaten the IS discipline, lose track of progress and hinder advancements. Medicine became a science to cure human diseases; transport was invented to move people from one place to another; a core defined without humans in the centre is dangerous. People evolve and technology becomes obsolete. It is a question of relevance, not a core. The idea of having peopled as central is expressed by Markus (1999) as having the mission of IS focusing on customer ***needs***.

Customer needs may be divided into three levels as suggested by the 'Mission' dimension from the data analysis of the research. These levels are: vital needs, requirement needs and improvement needs. This may be translated that the Mission is to meet these three levels of customers needs. However, the mission should contain principles, criteria and constraints to guide researchers in understanding and meeting these three levels of needs better.

I will conclude this thesis with a short note from Ibn Kahludin (1967, p. 459):

> *A person who creates a new discipline does not have the task of enumerating all the problems connected with it. His task is to specify the subject of the discipline and its various branches and the discussions connected with it. His successors, then, may gradually add more problems, until the discipline is completely (presented).*

This thesis has dealt with several persistent problems and has raised several other problems as my contribution to unravelling one branch of this discipline.

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APPENDICES

Appendix 1 - ISMS Training schedule

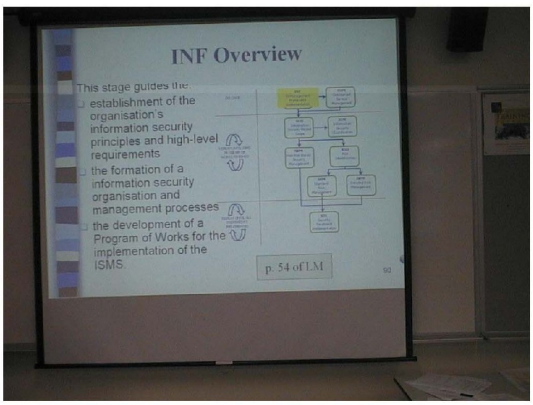
Overview of Day 1

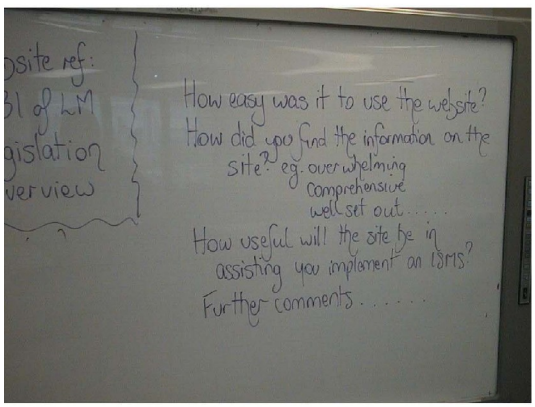
Session	Content	Time
1	Introduction and welcome Information security – an introduction	9.00-10.00 60 minutes
	5 minute break	
2	Information security Information security framework Threat environment	10.05-11.10 65 minutes
	Morning tea	
3	Legislation Standards	11.25-12.15 50 minutes
	Lunch	
4	Standards Information Security Management Systems (ISMS)	1.00-2.00 60 minutes
	5 minute break	
5	Information Security Management Systems (ISMS)	2.05-3.00 55 minutes
	Afternoon tea	
6	Information Security Management Systems (ISMS) benefits Scenarios Review and evaluation	3.10-4.00 50 minutes

Overview of Day 2

Session	Content	Time
1	Introduction to Day 2 Revision - Day 1 ISMS methodology – Govsecure website	9.00-10.00 60 minutes
	5 minute break	
2	ISMS methodology – Govsecure website	10.05-11.10 65 minutes
	Morning tea	
3	Review - ISMS methodology – Govsecure website Review ISMS stage – INF Case study	11.25-12.15 50 minutes
	Lunch	
4	Review ISMS stage - SCO Case study	1.00-2.00 60 minutes
	5 minute break	
5	Case study	2.05-3.00 55 minutes
	Afternoon tea	
6	Case study presentation Evaluation and feedback	3.10-4.00 50 minutes

Appendix 2 - Photos from two focus groups carried out during one of the training sessions





Appendix 3 - ISMS Evaluation Exercise

Day 1

Exercise description

Suppose you have been assigned the task of implementing the ISMS methodology in your organisation. As part of the preparation for the implementation you have to evaluate the ISMS methodology in terms of its strengths and weaknesses.

Your task

Please write down ten evaluation questions over the two days of training. These questions are to be written to evaluate the strengths and weaknesses of the ISMS methodology presented. You will be asked to answer these evaluation questions at the end of the second day.

Day 2

Your task - Preparation (25 min.)+ Discussions (20 min.)

1. Break up into two groups.
2. Please collect questions from your group members, discuss and select ten questions that you feel are most important for evaluation, and rewrite them clearly in priority order.
3. Exchange the questions between the two groups.
4. Attempt to answer the other group questions for the ISMS from your knowledge gained in the methodology and your previous experience.
5. Select a representative from your group to discuss your questions and answers in front of the other participants.
6. Hand in your questions and answers to the trainer.

Thank you
End of exercise

Appendix 4 - Participants Questions – Full List

The questions were coded as: the first digit represent the focus group number, the second two digits the question number. The letters A and B indicate that the statement was split into two separate questions.

Question #	Participants' Questions
203	Are all the steps well defined so that a person with little training can proceed thru the entire methodology or is a training course necessary?
409	Are the hyperlinks useful, kept up to date?
307	Are the intensive resource requirements a bar to the ISMS implementation?
301	Can the methodology be stream lined without losing integrity?
104	Does the ISMS only apply to the overall department, or is it anticipated each unit/division will conduct ISMS as part of their business plan? How adaptable is this methodology?
402B	Does the ISMS provide examples to facilitate and disseminate communication?
405	Does the ISMS provide meaningful examples?
403	Does the ISMS provide tools & techniques to evaluate the outputs from each stage?
402A	Does the ISMS provide tools to facilitate and disseminate communication?
106	Does the methodology give clear and easy to understand steps that could be taken by a person with limited security or risk management understanding?
401	Does the methodology supply ways of implementing cultural change?
201	Does the methodology work in a cyclical fashion so that once it has been set up it moves back into a review mode?
306	Does the understanding and the full implications of prevention procedures response and recovery result from the ISMS process?
209B	How comprehensives are the outputs and sample documents?
303	How are existing standards and procedures incorporated into ISMS?
308	How can the benefit or ROI from implementation of an ISMS be measured?
206	How compulsory will the methodology be & how much will it need to be followed exactly?
302	How do we explain ISMS to executives?
410	How do you get executive level to commit to the progressing of ISMS?
406	How flexible is the ISMS?
408	How secure is the tool and backend database?
209A	How useful are the outputs and sample documents?
210	How well does methodology integrate with other processes (e.g. business risk management)?
102	If there is one person managing and performing the ISMS, what is the risk in it being biased towards their knowledge base? i.e. does the ISMS mitigate the risk of the instant (untrained) security expert and risk expert?
305	Is full understanding of each business service risk management process achieved in ISMS?
108	Is ISMS practical i.e. logical, language used, and clear statements and directions?

Question #	Participants' Questions
109	Is ISMS supported i.e. training available, expert for advice and case studies?
204	Is the methodology practical or will it cause angst in trying to implement the system thru the general user community?
202	Is there a defined manner for capturing the required data i.e. if two people use it their results would look similar e.g. can templates be developed?
407	Is there a support structure behind to provide advice and assistance when work is in progress?
304	Once ISMS is done; what triggers reviews/repeats of whole process?
110	Some of the information required for ISMS will exist in the agency. Can you work that out from the flow or examples?
310	The AS/NZs standard requires the development of a statement of applicability – where does the this step fit within the ISMS methodology?
103	What is the interoperability of the methodology between the states / territories of Australia?
207	What level of executive commitment & support is required prior to implementation of the methodology?
309	What measurements should be captured to assess the ongoing effectiveness of the ISMS?
208	What skills are needed for a successful implementation team?
107	What steps can be taken if the ISMS is opposed at a management level as they feel security reduces operability?
404	Will ISMS be supported in the future?
105	Will the cost of the ISMS be relative to the outcomes (Benefits etc)?
205	Will the methodology link to the proposed database so that when you read a task requiring output it will link to relevant part of database?
101	Will the methodology still be applicable in a) 5 years time ? b) 10 years time?

Appendix 5 - Typical Project Steering Committee meeting agenda from Alpha Organisation

Appendix 6 – Resultant Categories

ID	Question #	Statements	Intention	Mission	Element	Methodology Context	Project Context	Methodology Consequences	User Consequences	Adoption Consequences	Remedial Attribute
25	308	How can the benefit or ROI from implementation of an ISMS be measured?	Verifiability	Improvements	Process	Operation	Managing	Uninformative	Uncertainty	Rejection	Comprehensive
8	201	Does the methodology work in a cyclical fashion so that once it has been set up it moves back into a review mode?	Cyclic process / Learning Org	Improvements	Principle	Operation	Managing	Uninformative	Uncertainty	Rejection	Comprehensive
12	205	Will the methodology link to the proposed database so that when you read a task requiring output it will link to relevant part of database?	Useful features	Improvements	Example	Operation	Building	Unclear	Equivocality	Deviation	Practical
14	207	What level of executive commitment & support is required prior to implementation of the methodology?	Success Factor	Improvements	Principle	Environment	Managing	Uninformative	Uncertainty	Rejection	Comprehensive
15	208	What skills are needed for a successful implementation team?	Success Factor	Improvements	Principle	Environment	Managing	Uninformative	Uncertainty	Deviation	Comprehensive

ID	Question #	Statements	Intention	Mission	Element	Methodology Context	Project Context	Methodology Consequences	User Consequences	Adoption Consequences	Remedial Attribute
16	209A	How useful are the outputs and sample documents?	Useful samples	Improvements	Example	Content	Building	Unclear	Equivocality	Deviation	Practical
17	210	How well does methodology integrate with other processes (e.g. business risk management)?	Integration - Internal	Improvements	Example	Operation	Building	Unclear	Equivocality	Rejection	Comprehensive
19	302	How do we explain ISMS to executives?	Success Factor	Improvements	Process	Environment	Managing	Uninformative	Uncertainty	Rejection	Comprehensive
44	410	How do you get executive level to commit to the progressing of ISMS?	Success Factor	Improvements	Process	Environment	Managing	Uninformative	Uncertainty	Rejection	Comprehensive
24	307	Are the intensive resource requirements a bar to the ISMS implementation?	Practical during implementation	Improvements	Whole	Operation	Managing	Incomplete	Doubtness	Rejection	Complete

ID	Question #	Statements	Intention	Mission	Element	Methodology Context	Project Context	Methodology Consequences	User Consequences	Adoption Consequences	Remedial Attribute
21	304	Once ISMS is done; what triggers reviews/repeats of whole process?	Cyclic process / Learning Org	Improvements	Process	Operation	Managing	Uninformative	Uncertainty	Deviation	Comprehensive
26	309	What measurements should be captured to assess the ongoing effectiveness of the ISMS?	Verifiability	Improvements	Process	Content	Managing	Uninformative	Uncertainty	Deviation	Comprehensive
28	401	Does the methodology supply ways of implementing cultural change?	Success Factor	Improvements	Process	Content	Managing	Uninformative	Uncertainty	Rejection	Comprehensive
36	408	How secure is the tool and backend database?	Integrity of tools	Improvements	Process	Content	Planning	Unclear	Equivocality	Rejection	Practical
43	110	Some of the information required for ISMS will exist in the agency. Can you work that out from the flow or examples?	Understanding by example	Improvements	Example	Operation	Building	Uninformative	Uncertainty	Deviation	Comprehensive

ID	Question #	Statements	Intention	Mission	Element	Methodology Context	Project Context	Methodology Consequences	User Consequences	Adoption Consequences	Remedial Attribute
42	109	Is ISMS supported i.e. training available, expert for advice and case studies?	Understanding by support and examples	Improvements	Example	Content	Planning	Uninformative	Uncertainty	Deviation	Comprehensive
41	108	Is ISMS practical i.e. logical, language used, and clear statements and directions?	Practical and Clear	Improveme nts	Process	Content	Planning	Unclear	Equivocality	Rejection	Practical
40	209B	How comprehensives are the outputs and sample documents?	Comprehensive samples	Improvements	Example	Content	Building	Uninformative	Uncertainty	Deviation	Comprehensive
39	402B	Does the ISMS provide examples to facilitate and disseminate communication?	Understanding by examples	Improvements	Example	Content	Building	Uninformative	Uncertainty	Deviation	Comprehensive
37	409	Are the hyperlinks useful, kept up to date?	Useful features	Improvements	Example	Content	Building	Unclear	Equivocality	Deviation	Practical
29	402A	Does the ISMS provide tools to facilitate and disseminate communication?	Tools for communication	Improvements	Process	Content	Building	Uninformative	Uncertainty	Deviation	Comprehensive

ID	Question #	Statements	Intention	Mission	Element	Methodology Context	Project Context	Methodology Consequences	User Consequences	Adoption Consequences	Remedial Attribute
35	407	Is there a support structure behind to provide advice and assistance when work is in progress?	Understanding by support	Improvements	Example	Content	Planning	Uninformative	Uncertainty	Deviation	Comprehensive
33	405	Does the ISMS provide meaningful examples?	Understanding by example	Improvements	Example	Content	Building	Unclear	Equivocality	Deviation	Practical
30	403	Does the ISMS provide tools & techniques to evaluate the outputs from each stage?	Tools & Techniques for evaluation	Improvements	Process	Content	Building	Uninformative	Uncertainty	Deviation	Comprehensive
6	106	Does the methodology give clear and easy to understand steps that could be taken by a person with limited security or risk management understanding?	Usability	Requirements	Process	Content	Building	Unclear	Equivocality	Deviation	Practical
7	107	What steps can be taken if the ISMS is opposed at a management level as they feel security reduces operability?	Success Factor	Requirements	Process	Environment	Managing	Unclear	Equivocality	Rejection	Comprehensive

ID	Question #	Statements	Intention	Mission	Element	Methodology Context	Project Context	Methodology Consequences	User Consequences	Adoption Consequences	Remedial Attribute
4	104	Does the ISMS only apply to the overall department, or is it anticipated each unit/division will conduct ISMS as part of their business plan? How adaptable is this methodology?	Flexibility of implementation	Requirements	Principle	Operation	Planning	Rigid	Anxiety	Rejection	Flexible
34	406	How flexible is the ISMS?	Flexibility of methodology	Requirements	Principle	Operation	Building	Rigid	Anxiety	Rejection	Flexible
13	206	How compulsory will the methodology be & how much will it need to be followed exactly?	Flexibility of methodology	Requirements	Principle	Operation	Building	Rigid	Anxiety	Deviation	Flexible
3	103	What is the interoperability of the methodology between the states / territories of Australia?	Integration - external	Requirements	Principle	Operation	Planning	Rigid	Anxiety	Rejection	Flexible
11	204	Is the methodology practical or will it cause angst in trying to implement the system thru the general user community?	Practical during implementation	Requirements	Principle	Operation	Planning	Rigid	Anxiety	Deviation	Flexible
10	203	Are all the steps well defined so that a person with little training can proceed thru the entire methodology or is a training course necessary?	Understanding well defined steps	Requirements	Process	Content	Building	Uninformative	Uncertainty	Deviation	Comprehensive
9	202	Is there a defined manner for capturing the required data i.e. if two people use it their results would look similar e.g. can templates be developed?	Consistence Outcome (templates)	Requirements	Example	Operation	Building	Unclear	Equivocality	Deviation	Practical

ID	Question #	Statements	Intention	Mission	Element	Methodology Context	Project Context	Methodology Consequences	User Consequences	Adoption Consequences	Remedial Attribute
18	301	Can the methodology be stream lined without losing integrity?	Flexibility with integrity	Requirem ents	Principle	Operation	Planning	Rigid	Anxiety	Deviation	Flexible
5	105	Will the cost of the ISMS be relative to the outcomes (Benefits etc)?	Cost-effectiveness	Vital Needs	Whole	Content	Managing	Incomplete	Doubtness	Rejection	Complete
2	102	If there is one person managing and performing the ISMS, what is the risk in it being biased towards their knowledge base?i.e does the ISMS mitigate the risk of the instant (untrained) security expert and risk expert?	Consistence Outcome (affected)	Vital Needs	Process	Operation	Building	Uninformative	Uncertainty	Deviation	Comprehensive
1	101	Will the methodology still be applicable in a) 5 years time ? b) 10 years time?	Continuity of Methodology / Expandability	Vital Needs	Whole	Content	Planning	Incomplete	Doubtness	Rejection	Complete
22	305	Is full understanding of each business service risk management process achieved in ISMS?	Tactics and strategies	Vital Needs	Principle	Operation	Building	Uninformative	Uncertainty	Rejection	Comprehensive
23	306	Does the understanding and the full implications of prevention procedures response and recovery result from the ISMS process?	Tactics and strategies	Vital Needs	Principle	Operation	Building	Uninformative	Uncertainty	Rejection	Comprehensive

ID	Question #	Statements	Intention	Mission	Element	Methodology Context	Project Context	Methodology Consequences	User Consequences	Adoption Consequences	Remedial Attribute
27	310	The AS/NZs standard requires the development of a statement of applicability – where does the this step fit within the ISMS methodology?	Tactics and strategies	Vital Needs	Process	Content	Building	Uninformative	Uncertainty	Deviation	Comprehensive
31	404	Will ISMS be supported in the future?	Continuity of Support	Vital Needs	Whole	Content	Planning	Incomplete	Doubtness	Rejection	Complete
20	303	How are existing standards and procedures incorporated into ISMS?	Integration - Internal	Vital Needs	Example	Operation	Building	Uninformative	Uncertainty	Rejection	Comprehensive