EXPLORING IT BENEFITS EVALUATION EFFECTIVENESS AT EX-ANTE PROJECTJUSTIFICATION STAGE

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Abstract

The business benefits of IT projects are becoming the main determining factor in selecting projects at the ex-ante justification stage. The core stakeholders, i.e. the business management and IT professionals are charged with the task of evaluating the benefits of IT investment. Despite high adoption rates of formal IT investment appraisal methods, there is still on-going evidence that show organisations not being able to appropriately evaluate IT benefits. This study investigates the process of IT project evaluation at the ex-ante justification stage to understand factors that contribute to ineffective practical application of evaluation and based on the findings, to explore how these factors can be redeemed to improve the benefit evaluation process.

A case study research was conducted to explore how benefits can be evaluated appropriately within its context in a tertiary educational institution. The case study research approach enabled the researcher to gain a complete and in-depth understanding of the process and activities involved to identify and measure benefits at the justification stage. Business middle managers that are involved and responsible for IT project justification were approached from various business units as case study participants. Interview questions addressed various aspects of the benefits evaluation process in reference to participants' experience and past IT project justifications. Content analysis was used to identify frequencies and intensities with which themes and concepts appear in interviewee responses. In addition, a cause and effect relationship tool was used to summarize the research findings for better data analysis and interpretation.

The findings indicate factors that contributed to ineffective benefit evaluation in the organization. Close collaboration and partnership between business management and IT professionals is shown to be a crucial component of the justification process. The suggested role of IT management exceeds beyond the task of technical advisor

and involves the task of being a coach, informer, educator, assessor, transparency and communication agent. The results also show how best the measurement process can be performed at this stage. This study confirms that business management's clear understanding of IT benefit concepts is necessary in the evaluation process. Based on the findings, an IT benefit evaluation method is developed as a modification of the current justification process in the organisation. The results presented in this study lay plausible insights for additional approaches to IT benefit evaluation research. It compels researchers to consider new methodologies in the quest for improving benefit evaluation.

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CHAPTER 1:   Introduction

1.1 Introduction

The purpose of this chapter is to outline the general content of the dissertation for prospective readers. The chapter discusses the reasons for this study, the contribution to the field of IT evaluation research, the problem and objectives pursued on this research.

This chapter presents the challenges of IT benefit evaluation and the need for understanding the nature of IT project benefits. The problem presented in this chapter is concerned with the current situation facing benefit evaluation at justification stage. The chapter explains the cause for some of the challenges and the need for understanding the benefit evaluation process. The chapter presents the research objectives, research questions and how the study intends to contribute to informatics environment. Towards the end, this chapter presents the research design, and overview of the ensuing chapters.

1.2 Background

Information technology (IT) project benefit evaluation is very important for organization. Organizations may invest considerable amount of resource in IT projects that ultimately fail to deliver any appreciable benefits (ITGI, 2008a). IT projects success is increasingly being defined as achieving the *expected* benefits rather than the traditional focus on completing on time and delivering within the allocated budget (Berman, 2007; Thorp, 2007). To identify and select IT projects that contribute comparatively more benefit to the organization; business and IT professionals must first identify the expected benefits with best possible accuracy.

IT project benefits are defined as anything the organization perceives worthy that contributes to the achievement of the business objectives (Renkema, 2000). The *benefits* are considered as the outcome of business changes, which have been brought about by the introduction and use of IT solution (Ward & Daniel, 2006). The benefits are then the difference between the desired outcome and the current situation (Dhillon, 2000). For instance the *outcome* of an IT system implementation

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may be a customer satisfaction – the *benefit* is customer retention or increased sales.

The established underlying business principle suggests that during the initial IT requests evaluation stage, IT initiatives (projects) that have greater expected business benefits should be ranked high and selected for development to ensure success in IT investments (ITGI, 2008b; Thorp, 2007; Ward & Daniel, 2006; Farbey, Land & Targett, 1999). The notion of IT success is fundamentally linked to benefit, and the more the business selects IT initiatives that have more benefits, the higher cumulative gain will be attained by the organization.

However many organizations struggle to identify and measure benefits effectively (ITGI, 2008b; Lin, Pervan & McDermid, 2005). The recent empirical investigation preformed on 102 organizations in the UK and Benelux show that not more than 35% of respondents claim to be successful in identifying available benefits for a project and only 31% believe they quantify benefits adequately (Ward, Hertogh & Viaene, 2007).

According to Remenyi (2000) the four major areas that have contributed to the difficulty with IT benefits identification and measurement are:

- **Identifiable performance improvements**: It is seldom possible to produce a definitive statement of all the benefits that an IT initiative will produce.
- **The issue of IT reach**: IT often plays an important integrating type role in organizations and this role brings together a number of different organization issues, problems and resources. It is often difficult to understand exactly what the results will be of bringing together information about different business issues.
- **Tangible and intangible benefits**: Intangible benefits may often be quantified by qualitative measuring instruments such as questionnaires and interviews, but it is very difficult to make a credible connection between what can be measured with such instruments and the impact on the organization's financial results.

- **Benefit evolution**: The benefits of IT are unstable, and some benefits dry up while other unforeseen benefits materialize. Therefore, it is very hard to look into the future to create a comprehensive list of potential benefits.

The main reason that benefits are identified and quantified seems to be to gain project approval (Ward, Hertogh & Viaene, 2007; Saloojee, 2006; Lin, Pervan & McDermid, 2005). In the justification process, the proposed IT initiatives benefits must be able to link into the objective of the business (Murphy, 2002). According to Dhillon (2000), the proposals should take the form of a business case with an explicit statement of how the system will contribute towards business objectives or goals via the changes in the business it will facilitate or support. The contribution should also be measurable or at least observable – in terms of the business objective.

The IT project's support to the business such as to enhance business performance is expected to be provided or initiated from business management (ITGI, 2008b; Remenyi & Sherwood-Smith, 1999). It is well accepted by many researchers and practitioners that IT evaluation has become a key business management issue (Thorp, 2007; Ward & Daniel, 2006; Murphy, 2002). Apparently the business management better understands the impact of IT projects in their business (Dhillon, 2000). Therefore, the business management is usually charged with the responsibility to identify and measure the business benefits at the justification stage (ITGI, 2008a).

The business management should be able to identify and measure the benefits to demonstrate the attention the project deserves. The selection committee also requires such justifications to make better decisions in selecting projects. This demands a close collaboration between business management and IT management (Remenyi & Sherwood-Smith, 1999). The business management defines business objectives while the IT management supports as technical advisors (ITGI, 2008b; Berman, 2007; Avgerou, 1995).

There are high adoption rates of formal IT investment appraisal methodology in organizations (Ward, Hertogh & Viaene, 2007; Lin, Pervan & McDermid, 2005). Despite the availability of many evaluation methodologies, organizations often fail to

identify and measure benefits (Peppard, Ward & Daniel, 2006; Counihan, Finnegan & Sammon, 2002; Cronk & Fitzgerald, 2002). The business management's perceived benefits are often poorly defined at the justification stage (Remenyi & Sherwood-Smith, 1999); and as a result the measurements may reflect arbitrary values for benefits (Lin, Huang & Cheng, 2007). According to ITGI (2008b), vague statement of benefits leads to an unnecessary allocation of resources that may not support the organization strategy.

Brynjolfsson, Hitt and Yang (2002) observed that the confusion with IT benefits evaluation can be attributed to inappropriate use of units of analysis. Andresen *et al.* (2000) point out that benefits are difficult to quantify, and HDR (2004) relates the measurement challenge to the ambiguity of intangible benefits' unit of measure. Moreover, the benefits are often difficult to attribute to a single factor of unit of measurement (Gibson *et al.,* 2004).

IT evaluation researchers continue attempting to resolve the problems and challenges faced with benefits evaluation (Berghout & Remenyi, 2005). Some of the popular IT investment benefits appraisal methodologies published include: Val IT 2.0 Framework (ITGI, 2008b), Project Portfolio Management (Apfel, 2007b), Delivering Value from IS/IT Investments (Ward & Daniel, 2006), Applied Information Economics (HDR, 2004), Quantification Techniques (Hares & Royle, 1994), and Multi-Objective, Multi-Criteria Methods (Farbey, Land & Targett, 1993).

However, the existing literature identifies noticeable gaps between academic theories, commercially available methodologies and actual evaluation practice within organizations (ITGI, 2008b; Serafeimidis & Smithson, 2003).

1.3 Research motivation

Benefit evaluation is often ignored or carried out ineffectively because it is deemed an elusive and complex process (Serafeimidis & Smithson, 2003). The organization under this study, adopted a method of benefit identification and measurement for the purpose of IT projects selection. Like in many organizations, the mismatch between management theories with actual practice is prevalent.

A better understanding of the basis and practice of IT justification in organizations is essential. The difficulties of benefits evaluation processes are often the determining factors in the application of any formal methodology, and must be addressed if the processes are to be understood (Lin, Pervan & McDermid, 2005).

1.4 Aim of the study

Given the above background, this research seeks to provide insight into some factors that will ensure the proper identification and measurement of benefits of IT initiatives at the ex-ante justification stage. The research argues that although the choice of an appropriate benefit evaluation method is important in ensuring benefit identification, it is not the only factor. It is equally, if not more, important to examine the organizational context in which the evaluation is carried out to seek solutions for better benefit evaluation. The argument of this research is conducted by understanding and examining the existing justification process in a single organization.

1.5 Problem statement

IT project benefits evaluation is very important for organizations and therefore it needs to be performed adequately to provide more accurate statements of the gains that can be achieved from requested projects. While achieving benefits is regarded as one of the main factors for determining project success (ITGI, 2008a; Berman, 2007, Thorp, 2007, DeLone & McLean, 2002), it is crucial to evaluate project benefits adequately for decision-makers to make better judgments in selecting projects from competing IT initiatives. IT benefits evaluation entails both identifying and measuring the benefits at the justification stage. However, identifying and measuring benefits are seen as one of the challenging issue for many organizations (Ward, Hertogh & Viaene, 2007; Lin, Pervan & McDermid, 2005; Seddon *et al.*, 2002).

The ineffective evaluation of IT benefits is also apparent in the organization under this study. Therefore the primary problem addressed in this research is: most IT benefits either go unrecognized or poorly identified and measured at the ex-ante IT project justification stage.

The following problems associated with primary problem are identified:

- The lack of awareness of the concepts of IT benefits. Most business managers and IT users do not know clearly the nature and characteristics of the IT project benefits (Lin, Huang & Cheng, 2007; Ward, Hertogh & Viaene, 2007).
- The limitations of benefit evaluation methods. IT project measurement techniques still have unresolved challenges and inadequacies for appropriate IT project evaluation (Berghout & Remenyi, 2005).
- Communication gaps between the business management and IT management. In practice, there is a lack of collaboration among these groups as evaluators in the justification process (ITGI, 2008a: 21).

1.6 Research objectives

In order to solve the primary problem stated in the previous section, this study aims at understanding and explaining the factors affecting the current IT benefit evaluation process and based on the findings, propose an improved method to the process at the ex-ante justification stage in the organisation. The scope of this study is limited to the following three research objectives:

- To understand the characteristics and nature of IT benefits and the current practices of benefit identification in the organization.

- To investigate and specify the limitations of available IT benefits measurement methods.

- To determine the effect of the relationship type between business and IT management during the benefits evaluation process.

1.7 Research questions

Based on the argument presented above the following research question can be identified.

1.7.1 Primary research question

- How can benefits be identified and measured appropriately at the ex-ante justification stage in the organization?

The question above directly leads to the following sub questions:

1.7.2 Secondary research questions

- Why are IT benefits not appropriately identified at ex-ante justification stage in the organization?

- What are the limitations of available IT benefit measurement methods?

- How does the relationship between businesses and IT function at the justification stage affect the benefits evaluation process?

The above mentioned secondary research questions are expected to provide explanations of relevant factors that contribute to inappropriate benefit evaluation. Once the secondary questions have been answered can the main research question be answered. Plausible factors that may influence effective benefit evaluation are expected to emerge while answering the primary research question. The research questions will be revisited at the end of each literature study chapter.

1.8 Contribution of the study

This study contributes to the general area of Informatics and specifically in IT benefits evaluation. It elevates the need to understand the concept of IT business benefits, and highlights the necessary factors that can influence effective benefits evaluation at ex-ante justification stage for the readers.

Despite a plethora of IT evaluation methods available, benefits evaluation is a good example of a substantial gap between theoretical management prescriptions and actual practice (Berghout & Remenyi, 2005). In pursuit of effective practical-oriented method for the organization, this study will make contribution by providing insights

into how benefits-oriented practices might best be utilized and incorporated into organizational context. Moreover, most evaluation researches largely focus on after (ex-post) IT implementation (Lin, Huang & Cheng, 2007). In addressing the challenges of ex-ante evaluation, this study will make a contribution by providing insights into how IT initiatives at this stage can be evaluated appropriately.

1.9 Research design

A research design is a master plan specifying the methods and procedures for collecting and analysing the needed information (Oats, 2006). It is the overall plan for obtaining answers to the research questions (Myers, 2009). This study has undertaken rational steps to ensure the validity of the research results. The next section will discuss the methods and procedures applied in this research.

1.10 Research methodology

The methodology of research deals with ways of finding knowledge (Guba & Lincoln, 1989). Myers (2009:24) defines a research method as "a way of finding empirical data about the research subject". It is the strategy of inquiry and it influences the way in which the inquiry is conducted (Kumar, 2005:9). This research will attempt to follow procedures to ensure that the data collected are relevant, appropriate and justified. The following sections will discuss the research method that is expected to be appropriate to this research.

1.10.1 Philosophical approach

The researcher will follow an interpretive research paradigm where the research is expected to be conducted from the author's observation, investigation and analysis to understand the occurrences to a particular situation within its real-life context (Myers, 2009; Kumar, 2005). The research aims to understand what people make sense of their experience to the situation. The researcher will interact with the research subjects to interpret and derive meaning of the situation. Thus, an interpretive research approach will be followed where the research objectives include gaining a deeper understanding of the situation (Myers, 2009; Oats, 2006).

1.10.2 Explanatory and exploratory research

The research method of this study entails integrating relevant elements of explanatory and exploratory research. Explanatory research aims to explain why a

particular event occurs (Myers, 2009, Oats 2006) and exploratory studies are conducted "to develop, refine or test concepts and methods" (Kumar, 2005: 10). Kumar (2005) commented that in practice most studies are a combination of the theoretical research study types and encourages integrating relevant elements of the research types in the study. The main purpose of this research is to explore how IT benefits can appropriately identified and measured through deeper understanding and investigating the current situation.

1.10.3 Case study as a strategy

In business research and uses, a case study is defined as "empirical evidence from one or more organizations where an attempt is made to study the subject matter in context" (Myers, 2009: 76). This research seeks to understand in depth the IT benefits and the process of identifying them in the organization to obtain a rich and detailed insight into the reality in its context.

Case study research is considered suitable for the research since it seeks to understand how and why the benefit evaluation process works the way it does, where the case study method allows the researcher to answer 'how' and 'why' questions, and to understand the nature and complexity of the process that is taking place (Myers, 2009).

1.10.4 Qualitative research

The research approach from the perspective of inquiry mode to be employed is qualitative research. Qualitative data are mostly records of "what people say about a particular topic and documents record of what the author of the document wrote at the time" (Myers, 2009: 8). Qualitative research is best performed in a social setting, and it is designed to help this research understand people, their motivations and actions, and the broader business contexts within which they live (Oats, 2006).

1.10.5 Activities to be performed

1.10.5.1 Literature study

A literature study was conducted in order to gain theoretical knowledge as well as relevant information on the research problem. The literature study was utilized to apply theoretical knowledge to develop the method of IT benefits evaluation. The sources of information included academic journals, books, conference papers,

whitepapers and previous studies on the topic. The dissertation will consist of a literature study that covers information relevant to the research objectives:

- The concept of benefits of IT and approaches for IT benefit identification.
- Different types of available IT benefit evaluation approaches and measurement techniques.
- The task and responsibility of business and IT function in IT benefit evaluation.

1.10.5.2 Source of data

A case study research requires empirical evidence and needs multiple sources of evidence. According to Myers (2009: 76) most of the evidence comes from interviews and documents.

In-depth interview

An in-depth semi-structure interview is a data generation technique, in which frameworks of themes to be explored are questioned in a flexible order depending on the flow of conversation in the interview process (Oats, 2006). An in-depth semi-structure interview was conducted with managerial level individuals that participated or are responsible for the justification of IT initiatives in their business units of the organization. An in-depth interview of 11 individuals was therefore sampled across the selected business units of the organization.

Documents

In case studies, documents can be used to corroborate or question data obtained from other data generation methods (Oats, 2006). The organization of which this study was carried out has produced documents that are useful sources of data. The documents are the formal records of the business units' justification of IT initiatives. Document records of 11 business units were collected and 21 cases were studied for new understanding and to substantiate the claim of the interviewees.

1.10.5.3 Data analysis

Data analysis is the application of reasoning to understand and interpret the data that have been collected. The descriptive qualitative data was communicated using coding procedures and the process of content analysis. The descriptive responses were categorized into meaningful themes and the emergent factors from the findings

were presented. Transcript extracts, tabulations and cause and effect relationships tools were utilised to analyse the data.

1.11 Limitation and bias

The study was set out to assess the overall situation of benefit evaluation in the justification process and it was expected the "why" and "how" research questions require qualitative approach to the research. An interpretive qualitative research is especially subject to bias (Leedy & Ormrod, 2005). Although, bias cannot be totally discounted, the author will attempt to minimize the bias through the use of triangulation.

The organisation on which this study was conducted does not institutionalize IT benefit management. The IT benefit evaluation is conducted only during the IT project ex-ante justification stage. The source of information may cause distorted responses due to the understanding of the nature and characteristics of IT benefits concepts. Constraints and limitations will be highlighted as this dissertation develops.

1.12 List of terms

Various sources of the business benefits of IT make use of terms in slightly different ways. The terms used in this dissertation are applied in the most generic manner. The broad view of the business benefit of IT related terms used in this dissertation is defined as follows:

Business benefits: "…financial and non-financial impacts together determine the (business) value of an information system. Benefits refer to all positive impacts of an IT investment and sacrifices to all negative impacts" (Dhillon, 2000).

Ex-ante evaluation: Predictive evaluations that are performed to measure and/or predict the impact of a system in a given future situation (Remenyi & Sherwood-Smith, 1999)

IT benefits: Same as business benefits.

Information technology (IT): A general term used to refer to all aspects of computing and communication technology, including hardware and software (both systems and application software) that encompasses the creating, storage,

processing, distributing and display of information for a variety of uses in business (ITGI, 2008b).

IT initiative: a proposed IT project, a requirement for IT solution that is yet to be confirmed for development (ITGI, 2008b).

IT investment: IT project from the financial and executives perspective, a term used to analyse the resource put to the IT projects that is expected to bring some return (ITGI, 2008b).

IT investment evaluation: "…taking a management perspective, IT investment evaluation is about establishing by quantitative and/or qualitative means the worth of IT to the organization" (Lin, Pervan & McDermid, 2005: 122).

IT project: a group of activities concerned with delivering a defined capability based upon an agreed schedule and budget (ITGI, 2008b).

Justification process: Appraising the value of IT initiatives. IT involves defining possible benefits of the initiatives and quantifying the business process improvements (IT Director, 2010).

Justification stage: A proposal stage where the emphasis is on defending the rationale for the project (Irani, 2002).

1.13 Overview of chapters

This study is structured as follows. Chapter 1 serves as an introduction to the study by presenting the problem identified and the importance of the study. The study consists of six more chapters whereby the first chapters provide an overview of related literature, followed by the results of the case study content analysis and ending with IT benefits evaluation method, summary, conclusions and recommendations.

Chapter 2: A theoretical overview and discussion of "IT benefits" concepts. The importance of defining IT benefits is emphasised and the concept is further explained to elucidate the main characters of IT benefits for deeper understanding.

Chapter 3: A theoretical overview, explanation and discussion of available IT benefit measurement approaches. The limitation of measurement towards IT benefits is broadly emphasized and discussed. This chapter also discusses the role of evaluators.

Chapter 4: Research Methodology – the chapter provides a description of the research method pursued in the study. The chapter will justify for selection the method and approach.

Chapter 5: Results of the research – The chapter begins with the introduction of the organization. Thereafter the results of data generated will be presented and discussed in relation to the conceptual framework and literature study.

Chapter 6: IT benefits evaluation method – the chapter introduces the IT benefits evaluation method that is developed through extensive literature review and empirical evidence of the study. The evaluation method is a proposal that characterises an improvement to benefit evaluation process at the organization.

Chapter 7: Conclusion and recommendations – the final chapter will focus on the results obtained throughout the literature study and the empirical evidence.

1.14 Conclusion

Chapter 1 served as in introduction to the study by outlining the problem identified as an outcome of current actual situation of occurrence in a study area. The commonality of the problem is also backed by the literature review. The aim for conducting the research, the research contribution, the research objectives, and overall research methodology of the study is discussed. In addition, the structure of the remainder of the study is provided. In Chapter 2 the study will focus on understanding IT business benefits.

CHAPTER 2:   Understanding the concept of IT benefits

2.1 Introduction

As discussed in Chapter 1, the business benefits of IT are becoming the main criteria of IT project selection. Businesses are required to identify and clearly define the expected benefits of their proposed IT initiatives. The business benefits of IT continue to be difficult to justify because traditional IT investment appraisal methods are becoming less effective.

This chapter provides the theoretical overview and discussion of the "the business benefit of IT" concept. The importance of understanding the business benefit of IT is highlighted and the concept is further defined to illustrate the key elements of benefits. The business and information perspective toward benefits is discussed in detail for clarification and classification of IT benefit. The approaches to identify business benefits are presented to show the process required to evaluate IT benefits.

2.2 The need for understanding IT benefits

IT benefits are still elusive and are not clearly understood by most businesses and IT professionals. It is one of the main causes for poor IT benefits identification for IT project evaluations (Ward & Daniel, 2006). An understanding of IT benefits is very important for several reasons (Lin & Pervan, 2003):

- It can give researchers an opportunity to characterize IT projects thematically.
- It can create top business management's expectation for the outcomes of IT project
- It may help predict the achievable IT projects outcomes better and thus realize them more often.
- It can give some guidance for businesses and IT professionals in proposing new projects and recommending their priorities.

2.3 Reasons for investment in IT

Information Technology (IT) represents a substantial financial investment for many organizations (Gartner, 2010). Organizations spend a large amount of resources on IT related projects for several reasons and expect returns from their investments.

Therefore before discussing business benefits of IT, it is essential to know the reasons for investing in IT solutions.

The main logical reason for an organization to invest a substantial amount of money in IT is to see a positive impact to the organization goal. From a business perspective there are many different reasons for investing in IT projects. According to Ward and Daniel (2006), it is important to categorize IT projects into different types of investments. According to Van Grembergen's (2004), the type of IT investments can be classified as follows:

- **Mandatory IT**. IT initiative is required to satisfy regulatory requirements, to meet internal and external organizational requirements.

- **Efficiency and Effectiveness Improvement**. IT initiative is aimed at reducing or avoiding operational and labour costs, increasing business productivity and revenue, and monitoring business activities.

- **Strategic IT**. IT initiative is aimed at gaining a sustainable advantage over competitors and improving the organization's share of, or position in, existing and new markets.

- **IT Infrastructure**. IT initiative is aimed to support other IT investments on which other IT applications are built. They do not offer direct benefits, but enable the benefits of other IT investments to be realized.

- **IT Investigation**. IT initiative is aimed to ensure that the business is not left behind by technological progress.

- **Transformational IT**. IT initiative is aimed to be combined with change management, for agility in a dynamic business environment and for fast response to business environment change.

All IT projects are initiated for the purpose of executing one or more of the abovementioned reasons and these reasons become the main objectives of IT projects. The expected benefits emerge when these objectives are achieved successfully in the organization (Ward & Daniel, 2006).

2.4 Defining IT benefits

The benefit of IT (IT benefits) is defined as a business outcome whose nature and value expressed in various ways are considered advantageous by an organization

(Thorp, 2007: 167). Ward & Elvin (1999) associate business outcomes to a needed business change and consider benefit as the effect of the changes. The *change* is the difference between the current state and the better and desired proposed state. The business outcome to be considered as benefit, it should be aligned and support the organization's goal (ITGI, 2008b; Thorp, 2007; Ward & Daniel, 2006).

Technology by itself does not confer any benefits or create value. The benefits emerge from the changes in the ways of working in the organization (Peppard, Ward & Daniel, 2007: 23). Technology can enable and shape these new ways of working and the benefits arise when these business processes are performed in more efficient or effective ways (Andresen *et al.*, 2000).

According to Fulton (2004) it is essential to refer "IT benefits" in business terms by applying business language and common business metrics. In business terms, the three essential elements that comprise a significant IT initiative are (Fulton, 2004: 3):
- Business objectives – goals, strategies or tactics that the IT project addresses.
- Implementation – technical and business design, deployment and operation.
- Business outcome – assessing the success of how the initiative meets its objectives.

IT business benefit researchers such as ITGI group (2008), Berman (2007), Ward and Daniel (2006), Irani (2002) and Murphy (2002) assert that the expected business outcome should be the basis for justifying an IT initiative. However, Peppard, Ward and Daniel (2006: 6) warned that all IT projects can have outcomes but not all outcomes are benefits. Thus, the successes of achieving the business objectives should be distinguished as positive outcome.

The concept of "positive outcome" is one of the characteristics of IT benefits. However, the intrinsic nature of IT benefit can be seen from the relationship of information technology with business change. The role of IT in enabling business change will be subsequently discussed.

2.4.1 IT role in business change

Information technology has a key role in enabling business change (Ward & Daniel, 2006; Farbey, Land & Targett, 1999). Dhillon (2000) argues that real business benefit only arises when either IT investment is supplemented by business changes or business change drives investment in IT and other resources.

IT can, therefore, relate to the business change at a number of levels (Ward & Elvin, 1999):

- the change may need IT to *initiate* it – i.e. it creates the opportunity for change;
- the change may need IT to *facilitate* it – i.e. it is an integral component of the change;
- the change may need IT to *support* it – i.e. it is required to effect the implementation of other changes; or
- IT may cause unexpected changes to occur.

IT enables business change and the change delivers business outcome. The following section will discuss how IT achieves business benefits through the process of change.

2.4.2 The process of change and benefit

The need for change arises when the current state of business area or the organization is seen to be problematic, or will become in the future if no action is taken to address the situation (Ward & Elvin, 1999). The change can also arise from an opportunity the businesses intend to pursue (Ward & Elvin, 1999). Figure 2.1 depicts the process of change and how IT achieves business benefits.

The process of change is described by the following terms and logic given by Ward and Elvin (1999):

- ***The Context***: The current state of the organization. It has three components, the historical events giving rise to the current state of the organization; internal state of the organization; and external environment of the organization.
- ***The intent***: The people concerned (the 'owners') that have intent to take action to address the problem.
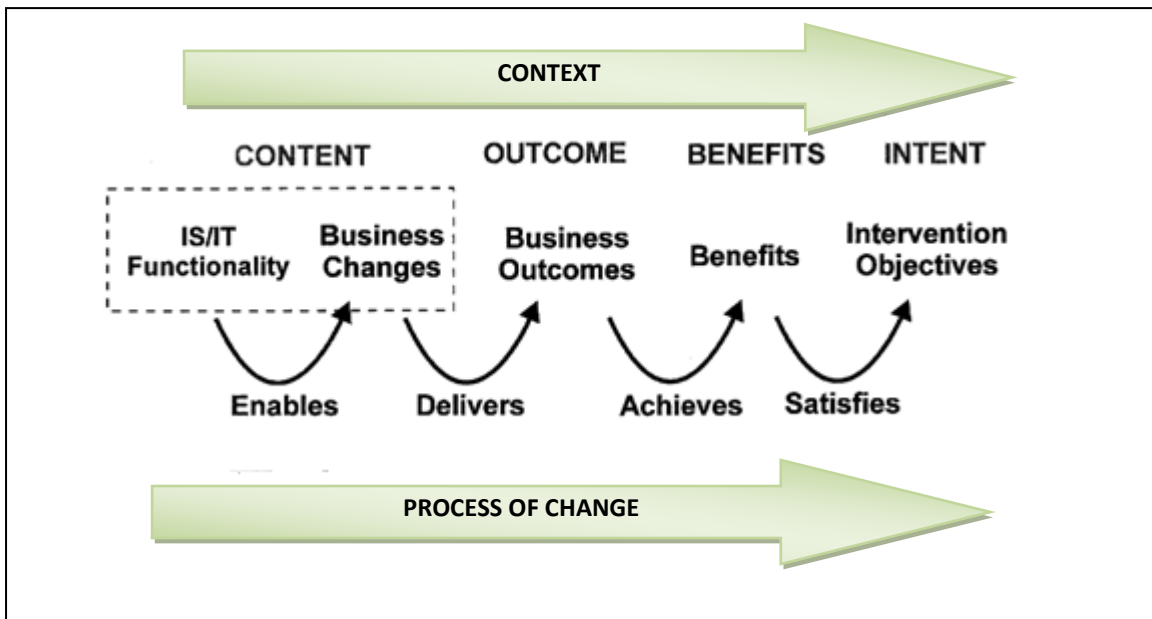
Figure 2.1: The process of change (adapted from Ward & Elvin, 1999)

- **An intervention:** intended to deflect the organization from its current state into a new and different state in which the problem is perceived not to exist. The intervention will consist of a set of actions designed to give rise to the required outcome.

- **Outcome:** A new state of the organization that is intended `ideal future situation'.

- **Content of Change**: What has to be changed? Content is either or both business activity/process and individual.

- **Process of Change**: the means by which the changes are to be effected.

- **Actors:** A group that is empowered and given responsibility to carry out the actions. They decide the content of change and process of change.

The IT solution enables change to occur in the business process. The outcome is the effect of change and if it satisfies the "intent", it is then a benefit. The "intent" can be seen as business management that have goals and formulate the business objectives. The satisfaction occurs when IT serves in achieving the business objectives.

2.4.3 IT business value

The term "IT value" or business value of IT is frequently used to describe different concepts and its interpretation is dependent on an organization perspective and context (Cronk & Fitzgerald, 1999: 41). The ITGI (2008b: 23) defines value of IT as "*relative worth or importance of an IT investment for an organization or its key stakeholders*". The expression of "IT value" may take various forms, including monetary or material, substitution equivalence, or subjective judgment (Thorp, 2007).

Fulton (2004:2) proffered the definition "…the business value of IT, are measures that demonstrate how IT related changes and investments contribute over time to improved business performance, competitiveness and economic growth."

Hares and Royle (1994:3) defined the concept of benefit as a "discrete measurement of economic effect" and defined *IT Value* as a broader concept based on the effect that IT investment has on the business performance of the organization. An *IT benefit* is a single component of "IT Value" as such "customer satisfaction" or "increase sale" are two of a several components of *IT value*.

Moreover, the ITGI (2008b:8) elaborates the definition of IT value in context of managerial perspective and measurement as "total life-cycle benefits net of total life-cycle costs adjusted for risk". Therefore, in this context IT value may be viewed as a combination of benefit measures – worth such that any substantial business benefits exceeding the relative cost threshold. Whereas benefit can be broadly defined as any discrete change in the business process or individuals, that the organization perceives desirable and that contributes to achieve business goal.

2.5 The characteristics of IT benefits

IT provides wide range of benefits (Dhillon, 2002; Remenyi, 2000). The concept of IT benefits can be described by unravelling key characteristics of the benefits. The characteristics are the area of impact, the directness of impact, the certainty of impact, the description of the effect and the measurability of the effect (Ward & Daniel, 2006; Farbey, Land & Targett, 1993). The research will subsequently discuss these characteristics.

2.5.1 Area of impact

According to Dhillon (2000), the 'area of impact' is an entity that the IT system affected or enabled change. The area in which IT has an impact is a good starting point of recognizing benefits (Ward & Daniel, 2006; Andresen, 2000). In literature the area of impact types used by practitioners and researchers are (Ward & Daniel, 2006; Lindfors, 2003; Andresen *et al.*, 2000; Farbey, Land & Targett, 1993):

- *Individual:* a person, or group of individuals such as employees, customers, supplier.
- *Functional:* business processes – grouped activities that produce output.
- *Organizational:* structured and linked processes that delivers product or service.

2.5.2 Directness of impact

The IT benefits can be characterized by directness of impact. The type of benefits depends of the directness of the impact (Farbey, Land & Targett, 1999). This characteristic has a cause and effect relationship.

- *First order effect.* If the impact is direct on the intended area, IT has an immediate first order effect (Remenyi, 2000). An example is an automated system, where the system acts to replace manpower and thereby reduce costs.
- *Second order effect.* If the impact is indirect on the intended area, IT has a second order effect (Ward & Daniel, 2006). A system intended to provide a manager with 'better information' in order to improve decision-making does not have a first order effect. It depends upon the capability of the manager to use the 'better information' to deliver the expected benefit (Farbey, Land & Targett, 1993). In this case the acquiring 'better information' is the first order effect. However it is not yet a benefit since the intention (objective) is better decision-making.

2.5.3 Certainty of the impact

The impact of new system may be almost completely predictable or totally uncertain. Again it depends on clarification of the area of impact (Farbey, Land & Targett, 1999).

- **Predictable:** If it is a well-defined area, the impact of the system is clear (Farbey, Land & Targett, 1999). For example, the new *point of sale system* computes faster than the current system thus reduces worker time.

- **Uncertain**: If the area of impact is not clear, the degree of certainty is low (Farbey, Land & Targett, 1999). For example, the likelihood of retaining customers without understanding the cause of it or not knowing the actual area of impact where the change is taking place has uncertain effects.

  The degree of uncertainty depends (Farbey, Land & Targett, 1999) on:
  - the understanding and clarity of the area of impact
  - the understanding of the *causes* of any changes on the area of impact.

2.5.4 Indicators of the effect

The impact of IT has an effect on the *area of the impact*. The effect is described and assessed by management as productivity indicators of efficiency, effectiveness, performance and transformation (Berman, 2007; Thorp, 2007; Murphy, 2002; Andresen *et al.*, 2000). The business indicators are (Lindfors, 2003; Farbey, Land & Targett, 1993):

- **Efficiency:** concerns with the optimal (most productive and economical) use of resources.

- **Effectiveness:** deals with accomplishing the intended purpose (objectives).

- **Performance:** demonstrates the likelihood of effectiveness.

- **Transformation**: concerns with the process and effect of change, the level of effect on the intended area of impact.

2.5.5 Measurability of the effects

Benefits arising from IT are often described as either tangible or intangible.

- **Tangible** benefits are those that can be measured by an objective, quantitative and often financial measure (Ward & Daniel, 2006). These benefits can easily be measured and the unit of measurement could be financial. Such benefits are often termed 'hard' benefits.

- **Intangible** benefits are those that can only be judged subjectively and tend to employ qualitative measures (Ward & Daniel, 2006). Examples of intangible benefits include improvements in utility – satisfaction, either of customers or of employees, or "better information" for an improved performance.

2.5.6 Unplanned or emergent benefits

In addition to the anticipated benefits, many IT projects give rise to unplanned or emergent benefits. Many of these unplanned benefits appear to be 'second order' benefits that arose from achieving an initial or planned benefit (Ward & Daniel, 2006; Farbey, Land & Targett, 1993).

2.5.7 The Disbenefits

The focus for realizing organizational benefit may ignore the benefits at the level of individuals or groups within the organization. According to Ward and Daniel (2006), the organizational benefits are often accompanied by some form of disadvantage, either to the organization, or to groups of individuals within. They termed these occurrences as "Disbenefits".

This Section (2.5) discussed the characteristics of IT benefits for better understanding of the nature of IT benefits. The benefits characteristics include the concepts of area of impact, the directness of impact, the certainty of impact, the indicators of the effect and the measurability of the effects. These concepts of benefits combined should be applied to properly recognize and identify the business benefits of an IT project.

The following section will discuss the description of IT benefits in the organization. One of the major contributing factors for the difficulty of IT benefits evaluation is the issue of IT reach (Remenyi, 2000). Benefits do not reside within IT but instead in the changes IT has enabled in the organization. Therefore, it is important to categorize them in order to recognize and identify them easily (Lindfors, 2003 cited in Dehlin & Olofsson, 2008). The next section discusses three such classification methods used from literature. These three different classification methods are presented for deeper understanding of the business benefits of IT. The classification methods are expected to be used and merged to develop part of the benefit evaluation method of this research.

2.6 Classification of benefits

In literature, researchers differentiate benefits based on area of impact at individual level (Farbey, Land & Targett, 1993; DeLone & McLean, 1992 and 2002), business

process level (Andresen *et al.*, 2000), and on organizational level (Lindfors, 2003; Farbey, Land & Targett, 1993). The benefits are grouped in efficiency, effectiveness and performance on each area of impact.

2.6.1 IT benefits from information perspective

The relationship between technology and business has been one of the focal point of information system (IS) research. One such research that brought much attention is DeLone and McLean's (1992, 2002) model of information system success. The original model (1992) and the reformulated model (2002), attempts to demonstrate the link between the technologies that produces "information" with (its) business benefits.

2.6.1.1 DeLone and McLean model

DeLone and Mclean (2002) based their development of the model from an IS perspective where "information" is considered as the output of an IS or/and is a "message" in a communication system. The model identifies the following three levels of information (DeLone & McLean, 1992):

1. Technical level – the accuracy and efficiency of the system which produces the information
2. Semantics level – the success of the information in conveying the intended meaning
3. Influence level – the effect of the information on the receiver.

The series of influence events include (DeLone & McLean, 1992):

- the receipt of information
- an evaluation of information and
- the application of the information.

These series of influence events all lead to a change in recipient behaviour and a change in system performance (DeLone & McLean, 1992). According to DeLone and McLean (1992), the concept of levels of output demonstrates a serial nature of information. As shown in Figure 2.2, the information system creates information which is communicated to the recipient who is then influenced (or not) by the information. In this sense, information flows through a series of stages from its production through its use or consumption to its influence on individual and/or organizational performance.

Production	Product	Consumption	Influence on recipient	Influence on System
System	Information	Use	User Satisfaction/ Individual impact	Project/ Organizational Impact
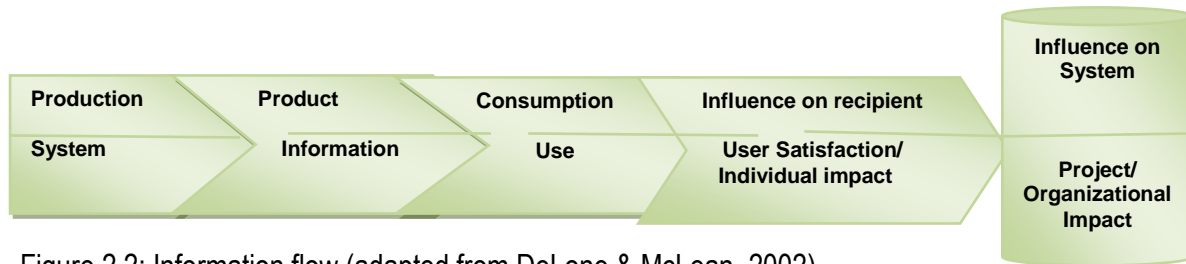
Figure 2.2: Information flow (adapted from DeLone & McLean, 2002)

The model of IS success by DeLone & McLean (1992, 2002) is based on information theories, communication theories, and influence theories and consists of the following dimensions:

- **Information quality** – accuracy, meaningfulness and timeliness of the information produced
- **System quality** – effect on the information system itself which produces the information
- **Process quality** – effect on the information management process (Lindfors, 2003).
- **Service quality** – effect providing support for end-users
- **System use** – use of the information system
- **User satisfaction** – interaction of the information system with its recipients: users and project owner
- **Individual impact** – influence on any affected individual
- **Project/organizational impact** – effect on organizational performance

As shown in Figure 2.3, the information system success model (ISS) by DeLone and McLean (2002) and the modified Lindfors (2003) model has four major quality dimensions: "Information Quality", "System Quality", "Service Quality" and "Process Quality". These dimensions are used to evaluate the contribution of IT to the organization.

The first dimension is evaluating the contribution by the quality of the *information* that the system produces. This includes the completeness, accuracy, timelines, etc. The second quality attempts to evaluate the system (IS) itself. This includes the system reliability, flexibility, ease of use and so forth (see Table 2.1).
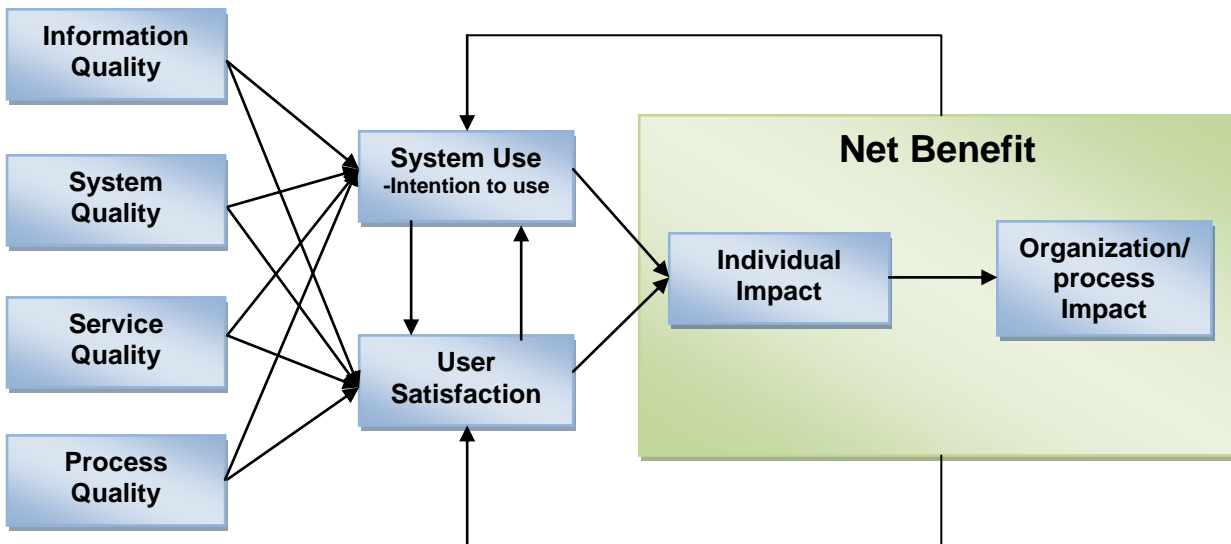
Figure 2.3: Information System Success Model (adapted from DeLone & McLean, 2002 and Lindfors, 2003)

The "Service" quality deals with the support provided for the use of the system, such as training. The "Process" quality focuses on managing the information produced in the organization. These dimensions are used to evaluate the IT project's contribution to the organization. Components of each dimension are laid down in Lindfors' (2003) table of benefits variable (Table 2.1).

The "Use" and "User Satisfaction" are part of the influence level and are closely interrelated. According to DeLone and McLean (2002), "Use" precedes "User Satisfaction" and positive experience with "Use" will lead to greater "User Satisfaction" in a causal sense. Similarly, increased "User Satisfaction" will lead to increased intention to "Use". As a result of this "Use" and "User Satisfaction", certain "Net Benefits" will emerge. The "Net Benefits" are the *positive* influence on the individual ("Participant Impact") and the effect on the business processes ("Project "Impact") dimensions. The term "net benefit" is used for the characterization of the outcomes. If the perspectives of business management are positive (achieves business objectives) on the last two dimensions, thus "Net benefits", it will influence and reinforce subsequent "Use" and "User Satisfaction" (DeLone & McLean, 2002).

2.6.1.2 Lindfors' benefit variable structures

The model of DeLone and McLean (1992) was further modified by Lindfors (2003) by including additional dimension – process quality. Lindfors' Information System Success Model (ISSM) contains a list of information system success categories with

adjacent benefit variables. The lists of benefits variables represent the expected positive effects in each category.

Lindfors' model can be used for identification, structuring and quantifying the expected benefits (Dehlin & Olofsson, 2008). Lindfors (2003) argues that using the "benefit variable structure" allows organizations to establish project specific benefits and to make sure that no intangible benefits are overlooked.

System quality variables	Process quality variable	Information quality variable	System use variable
Database content Ease of use Ease of learning Convenience of access Usefulness of system features and functions System flexibility System reliability Integration of systems System efficiency Response time	Information development Information acquisition Information identification Information preservation Information utilization Information dissemination	Relevance of information Usefulness Usableness Understandability Clarity Format Accuracy Sufficiency Completeness Reliability Timeliness	Frequency of report request Appropriate use Purpose of use Number of reports generated Regulatory of use Amount of connect time Frequency of access
User satisfaction variables	Participant impact variable	Project impact variable	
Software satisfaction Decision-making satisfaction Satisfaction with specifics Information satisfaction Overall satisfaction	Information understanding Learning Information awareness Decision effectiveness Decision quality Improved decision analysis Correctness of decision Time to make decision Confidence of decision Improved individual productivity Change in decision Task performance Personal valuation of IS Information management	Operating cost reduction Staff reductions Overall productivity gains Increased work volume Product quality Contribution to achieving goals Service effectiveness Time effectiveness Improved information management Increased profit	

Table 2.1: Lindfors' categories with adjacent benefit variables (adapted from Dehlin & Olofsson, 2008)

In the process of identifying potential benefits, the evaluators can use the list of ISSM categories and their adjacent variables. According to Dehlin and Olofsson (2008) one variable can include several different benefits (discrete measures) and one benefit can be divided into several variables. Dehlin and Olofsson (2008) stated that the "benefit variable structure" makes it easy for the evaluation group to include, add or change new benefits.

Lindfors (2003) also argues that by being able to link the impact of an IT project to a structure of predefined quality variables, a deeper level of understanding can be brought to the identification of specific benefits.

2.6.1.3 Information and business benefit

Information has an impact on people and thus on the business. If the *information* supports the business objectives, then it is a benefit (Section 2.4.3). Farbey, Land & Targett (1993) expounded on the use of "better information" and "better communication" for business benefits attainment. Benefits that can arise from information relate to information quality variables (Table 2.2). The first column lists the categories from the information perspective and the second column presents explanatory description of the category.

Class	Description
Information/ Forming	Information used to support organizational activity. Two kinds of information. Information 1. Carried in the organization database, packaged, *Outcome:* 'Better Information' *Benefits*: 'Better Information' used for sound decision making.
	Information 2. Carried by informal systems Information about the organization and its environment, about what one needs to know to operate within and beyond the organization environment. Includes formal and informal structures of organization, its rules, its culture, the meaning of words and phrases – the jargon. Understandings of how relationships with customer, supplier and others regulated. *Outcome*: 'Better Information' *Benefits*: 'Better Information' for fulfilling tasks.
Communication	It is a human process and evolves through communication between people. Computer-based communication technology affects and is affected by such processes.

	Outcome: Better communication.
	Benefits: include benefits which come from improved mutual understanding, or from clarification of terms leading to improved dialogue.
	Extension of the range of ideas which are commonly understood.
	The ability to involve more people in decision-making, using communication channel, thereby creating a better consensus.

Table 2.2: Information Perspectives (adapted from Farbey, Land & Targett, 1993)

The benefits described on Table 2.2 have a nature of second order effect (Section 2.5.2). It is the actions of individuals that received *better information*, *better communication* or *learning* that determines if it turns into actual business benefit.

2.6.2 Categorization of benefits based on business process

A typical IT business benefit variable can be "reduced operational costs", "increased business process output" or "improved customer service". The benefits of IT are so widespread that many researchers and practitioners attempt to describe them in different ways.

Andresen *et al.* (2000) summarized typical IT benefits found on their empirical research and provide a list of IT benefits grouped on the impact that IT has on typical organizational business units such as Sales, Human Resources, Finance, Manufacturing and so forth. The business benefits are categorized on efficiency, effectiveness and performance for each business unit. Andresen *et al.* (2000) suggested that every organization develop its own list of already identified and expected benefits of each main organization business unit.

2.6.3 Categorization of benefits based on organization structure

Farbey, Land & Targett (1993) presents a generic list based on their empirical study of project evaluation spanning a range of industry sectors. Farbey, Land & Targett (1993) used to categorize benefits according to the model of organizational structure. Their intention was to differentiate the elements of an organization according to the *people* contained in each and the activities they undertook. These individuals' centric view of the organization is a valuable starting point for considering the benefits that arise from the use of IT (Ward & Daniel, 2006).

Farbey, Land & Targett's (1993) classification method used the levels of organization structure as an area of IT impact. The classification is based on the tasks involved and the needs of individuals in each organization structure, and attempts to include business benefits that are likely to be associated with each structure.

Organizational structure element	Description
Strategic	Includes people charged with overall responsibility for the organization's direction. **_Duties_**: includes direct supervision, management of the organization's boundary conditions and the development of the organizations' strategy. **_Benefits:_** Abstract, wide-ranging and which affect the organization as a whole
Management	Includes middle managers who operate in order to transform the strategic vision into operational reality **_Duties:_** includes collection, aggregation and passing of information, decision-making and the allocation of resources. **_Benefits:_** support these particular duties
Operational	Refers to people who perform work related directly to the production of products and services. **_Duties_**: includes producing, rendering service, transforming inputs to output **_Benefits_**: support the basic work of the organization, benefits relates to the efficiency and effectiveness of the business processes. Improvement to one or the core process of production
Functional	Includes people who serve the organization by affecting others' work **_Duties_**: to influence the way in which people work. E.g. work-study teams. **_Benefits_**: anything enabling new ways of working, or allowing people to do things which were not feasible before.
Support	Includes people who provide support for the organization outside the basic production of goods or services. These are often specialists in certain disciplines **_Duties_**: support operations, business activities. **_Benefits_**: efficiency and effectiveness,

Table 2.3: The five elements of an organization (adapted from Ward & Daniel, 2006 and Farbey, Land & Targett, 1993)

The nature of the benefits depends on the position of business manager or user seeking the benefits. Irani and Love (2001) follow the management levels of strategic, tactical and operational and relate the benefits characteristics (tangible,

intangible) to top management, middle management and operation level. As shown in Figure 2.4, the benefits characteristics correlate with Farbey, Land & Targett's (1993) benefit descriptions of each organization structure levels.
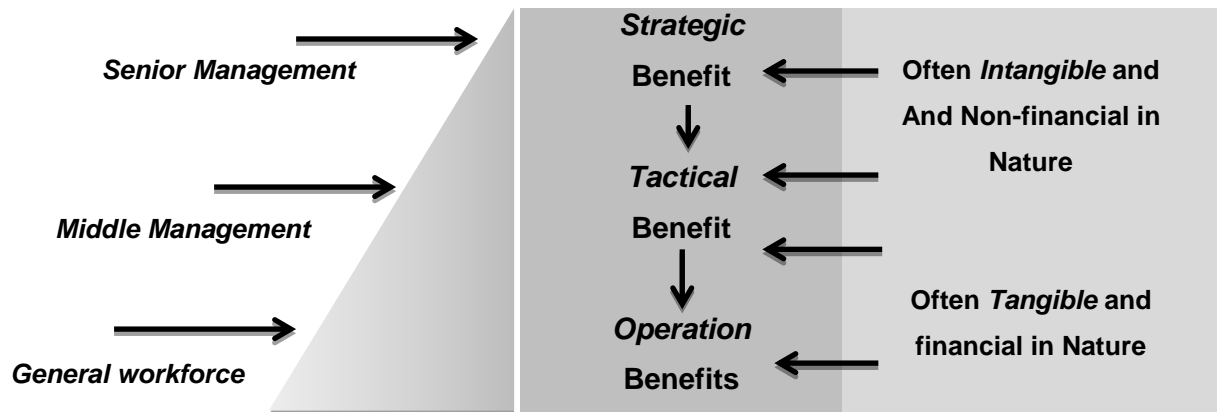
Figure 2.4: Management levels with the nature of benefits (adapted from Irani & Love, 2001)

2.6.4 Summary and comparison of the three benefit classifications.

The classifications of Andresen *et al.* (2000) "business process" (Section 2.6.2) and Farbey, Land & Targett (1993) "organization structure" (Section 2.6.3) have a business perspective while DeLone & McLean's (2002) "quality" dimensions (Section 2.6.1.1) and Farbey, Land & Targett's (1993) "information & communication" (Section 2.6.1.3) have the information perspective towards IT benefits. Lindfors' (2003) extension of DeLone and McLean's (2002) can be seen as a comprehensive structure of benefit catalogue containing various characteristics of the IT contribution to an organization.

However, Lindfors' structured benefit variables categorization does not explicitly classify benefits on specific business process nor associate them with the specific areas where the needs are sought in the organization.

Andresen *et al.* (2000) classification shows how the quality of information affects the business process but focused on the high level business unit/division level. The identification of benefits process from direct impact area at a higher level description may obscure the detail level of actual work process (business process) that the

change is taking place. However, their classification uses productivity indicators of efficiency, effectiveness and performance and categorize on specific business unit area.

Farbey, Land and Targett's (1999) classification system addresses the area of IT impact in each level of organizational structure. The classification is based on the tasks involved and the needs of individuals in each organization hierarchy level, and attempts to describe the business benefits characteristics that are likely to be associated on each level. Irani (2002) further attempted to associate the nature of benefits with the management level.

Ward and Daniel (2005), Lindfors (2003), Andresen *et al.* (2000), and Farbey, Land and Targett (1999) recommend that organizations should develop a catalogue of benefit variables that are closely related to their business context to make it easier for them to recognize the potential benefits.

2.7 Synthesized description of the IT benefits concept

The researcher will attempt to summarize and describe "IT benefit" for the purpose of IT benefit evaluation process by extracting the main concepts used to characterize IT business benefits. The next chapter will discuss benefit evaluation approaches and thus the following description serves for this purpose. The main concepts extracted from the discussion are:

Business objectives – goals, strategies or tactics that the IT project addresses

Business change – the difference between the current state and the future state

Business outcome – change that meets intended objectives (effect of change).

Area of Impact – individual impact, business process impact, organizational impact

Indicators – efficiency, effectiveness, performance and transformation.

Direction of Impact – first order effects, second order effects

Certainty of Impact – predictable and uncertain

Nature of measurement – quantifiable (tangible) and qualitative (intangibles)

IT Value – A broader concept that is the combination of discrete benefits (as components) based on the effect of IT have on the performance of an organization.

In view of the literature account and extracted concepts, the researcher attempts to synthesize and summarize the concept of IT benefit in context of benefit evaluation as:

"a discrete measure of IT enabled business outcome"

The description encapsulates three major elements and is explained in Table 2.4 below.

Elements	Expansion
A discrete measure	The metrics and methodology used to estimate a single business performance change (Sections 2.3.3, 2.4.2, and 2.5.2). A benefit is about improvement and betterment and represented in "increase" or "decrease cost" so it has a metric element.
of IT enabled	The change is enabled by IT (Sections 2.3.1 and 2.3.2)
business outcome	Change that meets intended business objective. The outcome is the effects of change. It is positive in the sense that it fulfils the business objective (Sections 2.3, 2.3.2 and 2.3.4)

Table 2.4: Description of "IT business benefits" for evaluation

2.8 Research question

2.8.1 Secondary research question 1:

Based on the literature review in Chapter 2, and problem statement in Chapter 1, this study will pursue the following research question:

- Why are IT benefits not appropriately identified at ex-ante justification stage in organization?

  This research question intends to address the elusiveness of IT benefit to business and highlight the need for business management and IT professionals to understand the nature and concept of the business benefits of IT. It addresses the reason for business inadequacy in identifying the business benefits of IT.

2.9 Conclusion

Chapter 2 provides an overview explanation and discussion of IT business benefits. The difficulty of recognizing benefits suggests a need for understanding the concepts

and the nature of IT benefits. This chapter explained definitions and characteristics of IT benefits in existing literature.

The benefits reside in business and not in technology. Therefore benefits should be described in business terms with the enabled area of business. For the purpose of easily understanding and identification, it is suggested to classify IT benefits in different categories. Three IT benefits classification methods were discussed, namely Farbey's (1993) categorization on organisation structure, Andresen's (2000) categorization based on business process and the IS success dimensions categorisation of DeLone & McLean (2002) and Lindfors (2003).

IT solutions enable a wide variety of benefits to the organization depending on the business goal and the nature of business, thus, "IT benefit" is a variable. The benefit classification and categorization methods are used to structure the benefits variable for easy identification and recognition of the benefits.

IT benefits should be measured appropriately for decision makers to make better judgments for allocation of resources. Therefore, in Chapter 3 the literature study will provide an overview and discussion on IT projects and benefit evaluation methods.

CHAPTER 3:   IT project benefits evaluation

3.1 Introduction

Chapter 2 focused on defining and understanding the business benefits of IT systems. The aim of this chapter is, by means of literature study, to present available approaches for measuring IT projects benefits.

Once the nature and characteristics of IT benefits is understood, it is essential to measure and manage IT contribution to the organization. A theoretical overview of the necessary means needed to measure and manage benefits will be discussed in the context of the pre-development stage of projects.

The chapter further will discuss the techniques of quantifying intangible benefits as it is one of the major concerns in IT projects evaluation. This chapter will also discuss the roles of evaluators that are charged with a task of benefits evaluation for ex-ante justification of IT projects.

3.2 Need for IT project evaluation

The increasing budget on IT and the evidence of many IT project failures with unrealized return (ITGI, 2008a; Seddon *et al.*, 2002), made some to doubt in the early 1990s whether IT really matters. This brought a phenomenon known as the productivity paradox of information systems (Brynjolfsson & Hitt, 1998). Succinctly put, productively paradox from business management perspective is *organizations are increasingly spending extensive amount of IT expenditure, while there is no foreseeable return on investment* (Brynjolfsson & Hitt, 1998)*.*

IT appears to be worth something because organizations continue to invest substantial amounts of money. The worth or the value of IT should be measured appropriately to reveal the success or the likelihood of success of the investment. To do so, an organization needs to establish and implement an evaluation method to assess the contribution of the IT investments. However, in literature, there are still issues to be addressed on IT evaluation methods and the insufficient measurement practices that are exercised in most organizations (Ward, Hertogh & Viaene, 2007; Lin & Pervan, 2005; Serafeimidis & Smithson, 2003).

3.3 IT evaluation definition

IT evaluation is defined as: *a process, or group of parallel processes, which take place at different points in time or continuously, for searching and for making explicit, quantitatively or qualitatively, all the impacts of an IT project on the strategy of which it is a part* (Lin, Huang & Cheng, 2007: 8). Therefore, IT project evaluation is about establishing by quantitative, and/or qualitative means the worth of IT to the organization at the justification stage (ITGI, 2008b).

3.4 IT evaluation objectives

According to Farbey and Finkelstein (2001), IT evaluation serves four different objectives:

- Evaluation is used as a part of the process of justification for a system.
- Evaluation enables an organization to make comparison between different projects competing for resources.
- Evaluation provides a set of measures, which enables an organization to exercise control over the organization project.
- Evaluation and the subsequent measurement and comparison with actual achievements provide organisations with the learning experience that is necessary if an organisation is to improve its system evaluation and development capability.

As businesses continue to invest in IT projects, there is a growing awareness of the need to derive value from them. The subsequent section discusses the different stages of the evaluation process so as to assess the benefits.

3.5 IT evaluation life cycle

Information systems evaluation is an integral part of the IT systems development life cycle (Berman, 2007). Val IT 2.0 framework (ITGI, 2008b) indicated that benefit evaluation methods do not limit the evaluation life until the completion of IT solutions, but extends to the end of the operation life of the project. The truncated evaluation life cycle is shown in Table 3.1. The first column describes the stage where the evaluation is carried out. The stages denote the life of the IT project from inception, through development and operation. The second column describes the activities

involved in the evaluation at each stage the third column describes the approach of the evaluation.

Stage	Process/ Task	Approach
Strategy formulation (Ex-ante evaluation)	Define goals, and constraints, set priorities	Top down approach: Exploratory business stakeholders formulate needs and objectives
	Define business objectives	Exploratory with main business stakeholders and users
Requirement	Elucidate requirements; gain consensus, enumerate and classify benefits	Top down and bottom up involves all stakeholders (IT business analyst)
Specification	Design to meet requirement; develop alternatives, enumerate and classify costs, check benefits	Choose from alternate designs; involve experts
Post implementation (Ex post evaluation)	Check on success of implementation, learn from experience, determine follow up	Measure outcomes, involves all stakeholders, responsibility of middle managers.
Operation (Ex post evaluation)	Monitor the operation of the system to check and ensure the benefits are consistently realized	

Table 3.1: Life cycle of evaluation (adapted from Farbey & Finkelstein, 2001)

3.6 Predictive and post implementation evaluation

The evaluation approaches are categorized on the timing effect. The evaluation purpose and task differ in each stage of the project life. The timing dimension broadly categorizes evaluations as predictive (ex-ante) evaluations and post-implementation (ex-post) evaluations (Remenyi & Sherwood-Smith, 2001). Predictive evaluations (ex-ante) are performed to measure and/or predict the impact of a system in a given future situation. Post-implementation evaluations are carried out to assess the value, or to determine if a contribution to the organisation's success has been made by an implemented information system (Remenyi & Sherwood-Smith, 2001).

The purpose of the ex-ante evaluation is to help make decisions as to whether a system might be effective or acceptable. The focus of this research is on pre-project appraisals that are conducted for decision makers to decide between competing IT

projects. Therefore in the remaining portion of the chapter, the research will discuss IT/IS evaluation with large emphasis on ex-ante evaluation

There are a variety of methods and approaches to IT evaluation. According to Farbey & Finkelstein (2001) the evaluation methods are not only different in detail, but in the fundamental assumptions they make about the world and in the purposes they serve. In the next section, the research briefly discusses the common IT benefits evaluation methods.

3.7 IT evaluation methods

In literature, there are several clear and well-established methods for calculating benefits where there are straightforward criteria for efficiency and effectiveness. In most organizations, the three basic techniques used to evaluate proposal for IT Projects are (Mohagheghi, 2008; Smith, 2008):

- **Cost-Benefit analysis** (CBA) and related return of investment (ROI) approaches: These techniques view the decision as a capital investment;
- **Scoring evaluation:** this technique views the decision in terms of weighted scores to some characteristics and is useful when comparing several alternatives;
- **Feasibility study:** this approach focuses on defining specifications of a complete system and identifying costs and benefits.

However, as mentioned in the problem statement of the research, business managers often face difficulty when attempting to measure the benefits that information technology brings to an organization (ITGI, 2008a). According to Irani and Love (2001), the financial techniques (CBA) are not entirely suitable for the effective evaluation of IT. The basic principles of CBA is to apply financial tools like net present value (NPV) and ROI that are dependent on the estimate *number* (quantifiable) for every relevant factor in the cost and benefits of an IT solution (HDR, 2004). Often a benefit that was identified as intangibles would be left out of the calculation altogether. This tended to ignore some of the largest benefits of information systems (Ward & Daniel, 2006).

The other two methods also have limitations for ex-ante justification. The scoring evaluation method does not measure the financial value of the intangible, it measures their "value" on the basis of the score (Finkelstein, 2005; Murphy, 2002), It has the merits that it is easy to apply but this can be misleading (HDR, 2004). The main reason is that it uses multiple unit measures. The intangibles are not common to each other and each intangible needs its own units of measure (Hares & Royle, 1994). This will be further discussed in Section 3.9.3.

The feasibility study is conducted usually after justification process. It is concerned with development issues after the IT project is considered for development by the IT management. Business analysts or system analysts are assigned to conduct the feasibility study.

3.8 Problems and challenges of ex-ante evaluation

The traditional evaluation methods of cost and benefit analysis (CBA) techniques and the scoring evaluation become inadequate where:

1. The IT project benefits have a high degree of uncertainty, which happens more at ex-ante or the initial IT project appraisal stage. This is the stage where the justification process is carried out and presumably the initial stage in the evaluation life cycle. At this stage, the benefits are predicted and more often are not clearly understood or recognized to be defined in most organizations (Ward & Daniel, 2006).

2. The IT project benefits have second order effects (Chapter 2, Section 2.5). Technology contributions to the organization such as *better Information* has no intrinsic value but the business benefit that it creates is related to the individual that uses it and the success of achieving the intended business objectives of it at that moment (Farbey & Finkelstein, 2001). Measuring the effects may require assessing individual or human aspects that may lead to subjective or inter-subjective judgments.

3. The benefits are often difficult to attribute to a single factor or unit of measure. Each utility benefits may require a different and specific measurement unit (Gibson *et al.*, 2004; Hares & Royle, 1994).

In literature, researchers have made numerous attempts to overcome the limitations of traditional techniques, using frameworks and models to classify the benefits. Some provided monetary measure by integrating all areas of effect of a particular benefit, others giving a subjective quantification using proxy indicators for intangible benefits. These evaluation methods that provided additional measures are briefly described in the following section.

3.9 IT evaluation techniques

There are many techniques and models which can be adduced in the evaluation of IT projects during justifications process. Some of the techniques that provided additional measure are as follows:

Value Analysis

The method is introduced as an alternative approach to traditional cost-benefit methods. Rather than reducing all benefits variables into monetary terms, the value analysis (VA) approach acknowledges that the perceived benefits are significant determinants in justifying investment in the system. The method provides the ability to establish agreed values for outputs, which may otherwise be classified as intangible. Value analysis may prove a useful technique for strategic evaluation, particularly when evolutionary development is used (Gibson *et al.*, 2004; Keen, 1981).

Total Cost Analysis

The method suggests that the benefits may be quantified by using surrogate or proxy indicators. Once the measures are chosen, it relies on proven financial calculations such as return on investment (ROI) and net present value (NPV) to determine their worth (Gibson *et al.*, 2004).

NPV with Discussion

The method aims to incorporate many intangible benefits through conducting discussions with employees from all divisions affected by the IT implementation (Gibson *et al.*, 2004).

Quantification Technique

The Quantification Technique is a formal way of measuring intangible benefits. This technique is also known as "bridging the gap" and involves identifying the benefits, making the benefits measurable, predicting in physical terms and evaluating in cash flow terms. The identification of intangibles depends on the stakeholders involved in the process (Gibson *et al.*, 2004; Harris & Royle, 1994). This will be further discussed in Section 3.10.

Multi-Objective and Multi-Criteria (MOMC)

This is a qualitative and exploratory method that accommodates intangible factors based on multi-objectives and multi-criteria (MOMC). It attempts to create a measure of utility in terms of users' own preferences and opinion. Users and stakeholders are required to evaluate the relative usefulness of different outcomes; they then rank those preferences by applying a weight to each. When many stakeholders are involved in the evaluation process, the preference that provides the highest aggregate utility, or highest overall measure of satisfaction, is considered the most viable (Gibson *et al.*, 2004). According to Farbey, Land and Targett (1993), this method is useful when applied to complex projects, particularly if there are a large number of stakeholders. It is also suggested by many IS researchers as a viable method at ex- ante justification stage (Farbey, Land & Targett, 1999).

Outcome Indicators

The method focuses on measuring the achievement of a business goal. Business managers are required to set up and define a business goal. The achievement of the goal is determined by the expected outcome indicators. The outcomes are placed with metrics to indicate whether the goals have been met. Key performance indicators (KPI) are used to indicate whether the goals are likely to be met (ITGI, 2007).

3.10 Discussion on additional techniques for ex-ante benefit evaluation

The following sub sections will attempt to elaborate some of the abovementioned evaluation techniques in reference with the challenges and problems of ex-ante evaluation described in this chapter (Section 3.8).

3.10.1 Measuring at the justification stage

The benefits may not be visible at the ex-ante justification stage. The main topic of this research focuses at this stage and the research will discuss possible techniques proposed to identify and expect benefits at initiation stage.

According to the ITGI (2008b), for establishing a specific IT requirement that support business, the business management must first define a business goal. The business goal should support the organization's strategy to successfully deliver estimated benefits.
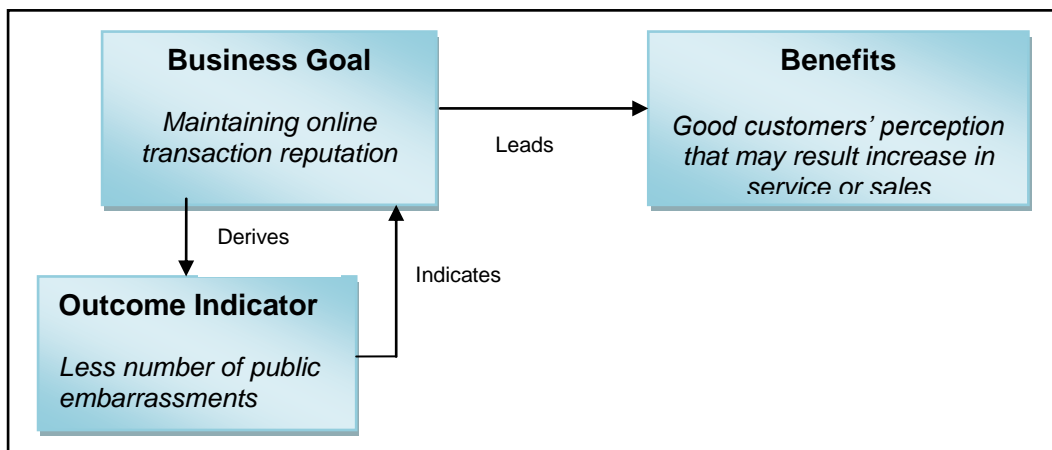
Figure.3.1: An example of the relationship between business goal and benefits (adapted from ITGI, 2007).

Each business goal has an outcome that indicates whether the goals have been met (ITGI, 2007). The outcomes are the effects of change (see Chapter 2 Section 2.4). The example in Figure 3.1 shows that a measure or metric can be placed to the outcomes to indicate whether the goals have been met (ITGI, 2007). The expected benefit emerges as consequences of achieving the goal. Therefore, business goal and expected outcomes can be used as a ground to recognize possible benefits.

3.10.2 Quantification of benefits

The quantification of tangible benefits is a direct conversion of the extra amount of unit (physical volume) to any representation of the increased level in measurement

system. The measurement system can be percentage rate using simple mathematical calculation to measure the expected improvement. The attempt to quantify intangible requires converting intangibles into measurable units (Harris & Royle, 1994:196).

According to HDR (2004), intangibles seem to be immeasurable because they are ambiguously defined. They attempt to remove any type of ambiguity by focusing on definitions that can be expressed in a *unit of measure* (HDR, 2004: 4). They claim that all intangibles have a unit of measure definition or proxy indicators. For example, "Employee Empowerment" could be:

- Decreased employees/year (turnover)
- Decreased supervisor overhead
- Decreased time to make certain decisions

These are units of measure and, as shown in Figure 3.2, once the business objectives and outcomes are defined (Section 3.10.1), the following step is to define and decide the type of *units of measure to* use as indicators of the outcome. The outcome will be made measurable by placing a numeric metric as a unit of measure. The next step is converting the measurable into actual numbers. The exact physical volume will be given to each outcome. For instance, as the example of tangible benefit in Figure 3.2 shows, the expected number of *research output* after the change can be estimated to be extra 20 more research outputs (Section 3.10.4). At this point, the *increased research output* can be calculated as percentage improvement. If the current output is 35, then the outcome indicator will show 57% increase in business process output.

The quantification process ensures that all benefits can be presented in measurable units. This measurement method is the work of Hares and Royle (1994), and HDR (2004) as additive measures for traditional evaluation methods. However, there are challenges of having multiple measures of units for the intangible benefits. Discussion on a single factor is presented in the following section.

Business Objectives	Expected Outcome	Intangibles Result in: (Unit of measure)
Intangible Examples	*Example*	*Example*
• Product/Service quality • Customer satisfaction	• Improved product quality • An improvement in customer response time	• Complaints received per month • Customers that repeat business
Tangible Examples	*Examples*	
• More research output • More distinctions	• Increased research output • Improved distinction rate	

Evaluate in cash terms

Predict in physical terms

Increase distinction by 12%
Increase research output by 57%
Decrease time by 25%
Sales saved by 80% (Risk)
Cost reduction by 20%

Make Benefits Measurable

Number of extra distinctions
Number of extra research output
Number of time reduced
Number of customers retained
Number of complaints

Figure 3.2: Quantification Technique (adapted from HDR, 2004 and Hares & Royle, 1994)

3.10.3 Multiple Units of Measure

The scoring evaluation method (Section 3.7) uses multiple attribute decision models for intangible benefits (HDR, 2004). The main reason is that intangibles are not common to each other (Hares & Royle, 1994: 203). An intangible benefit such as "improved quality" cannot be measured on the same basis as "quicker delivery" and

in turn the "quicker delivery" benefit cannot be measured on the same bases as other intangible benefits variables. Table 3.2 shows that there is no common basis to measure the intangible benefits. It has therefore been necessary to use three different units of measure for the three intangibles.

| Score | Intangible Benefits | | |
	Quality (complaints /week)	Delivery (mean delivery time)	Response time
0	> 40	20 days	24-72 hrs.
1	20-30	10-20 days	12-24 hrs.
2	10-20	5-10 days	6-12 hrs.
3	5-10	3-5 days	2-6 hrs.
4	1-5	1-3 days	1-2 hrs.
5	<1	<1 day	<1 hr.

Table 3.2: Example of Intangible "Units of Measure" (adapted from Murphy, 2002)

The results of a scoring evaluation method must be regarded with considerable suspicion since scores have little meaning unless they are based on a common unit of measure (Hares & Royle, 1994). A quality measure unit may not result in the same monetary value with the measure of delivery time. In the score 3 of the example (Table 3.2), the complaint/week may result in reduction of cost by R20,000; whereas the delivery time of 3-5 days may result in increased sales of R40,000. Translating each unit of measure in monetary value serves to have a common measure factor to all benefits. The use of common factor will be discussed in Section 3.10.5.

3.10.4 Predicating in physical terms

The units of measure can be converted into actual numbers to indicate the change level. This can be done by estimating the improvements in actual physical terms (or numbers). This is the most important and laborious step of the justification stage (Murphy, 2002; Hares & Royle, 1994). There are many ways to predict in physical terms:

- Surveys: a tool to investigate or understand customers known intentions.
- Decision support system and expert systems. Technology that forecasts trends through analysis of the current performance and past history data.
- Management estimates: Supported with operational managers who make estimates based on current and past evidence and experience.

- Comparative studies: considering similar business that has been conducted in the past within or in other companies.

3.10.5 Benefit evaluation in monetary terms

Evaluating in monetary terms can be used to measure benefits as a common factor or single unit of measure (Hares & Royle, 1994). It is a simple mathematical process converting the (increased) physical volumes to the monetary value. For example, the change in the number of complaints from 10 to 5 per week may reduce the replacement of defects by 5 products. If each product costs R10, 000, the cost reduction will be R50, 000. The appropriate ranking of IT projects can be achieved by the use of monetary terms to distinguish the standing of benefits on their level of financial contribution to the organization.

The use of monetary terms as a measure of unit also resolves the problem of having different units of measure for intangibles. Evaluating in cash flow terms results in using a single unit of measure for all types of benefits.

3.10.6 Summary on benefit evaluation at ex-ante justification stage

The benefits evaluation at ex-ante justification stage can be properly conducted by first defining or using the business objectives that the IT solution is expected to enable (Section 3.10.1), formulating and deciding the unit of measurement for evaluation (Sections 3.10.2. and 3.10.3), then assigning numeric metrics and predicting in physical terms (Section 3.10.4) and finally measuring it in monetary terms (Section 3.10.5). This evaluation process includes the practices of defining the business goal to deriving the outcome indicators which are critical steps to provide most probable estimation.

3.11 IT benefits evaluators

The business management have the responsibility in defending the business rationality used to justify the IT projects (Thorp, 2007; Dhillon, 2000; Remenyi, 2000). The Val IT 2.0 framework (ITGI, 2008b) puts much emphasis on the responsibility and accountability of business managers for IT benefits.

When the roles, responsibilities, and accountability of the business management and IT management are unclear, IT management tends to determine which IT projects should be pursued and prioritize based on its limited business insights (ITGI, 2008a).

The process and the content of the evaluation process extend far beyond the professional capacity of IT experts (Lagsten & Goldkuhl, 2008; Frisk, 2007). The decisions on the value of new IT projects take place at the business management level, and the role of IT experts is given as technical and technological advisors (ITGI, 2008a; Avgerou, 1995). IT professionals as technical supporters with the protagonist the business as IT project evaluators has been widely accepted by many IT evaluation researchers (Berghout & Remenyi, 2005).

Close collaboration between the IT function and other business functions is crucial in the justification. ITGI (2008a:10) point out that "when partnership is absent, communication suffers, inefficiencies mount, synergies fail to emerge ….and the IT management engage in proposal too late to contribute significant value".

This is one of the sub-problems associated with the problem statement of this research, which is the communication gap between business and IT management. It is the issue of collaboration (ITGI, 2008a). The evaluation is best conducted if the evaluators comprise representatives of the business and the IT professionals (Ward & Daniel, 2006).

The business management that requested for IT projects are responsible for establishing the value of their proposed IT solutions. IT professionals play a role in collaborating with business to determine expected results and to evaluate the impact of the systems that they are responsible to develop or procure (ITGI, 2008b; Thorp, 2007; Irani & Love, 2001; Serafeimidis & Smithson, 1998). Therefore, both main stakeholders group of business management and IT management have the responsibility of being IT benefits evaluators.

3.11.1 Paradigm shift in justification

Traditional evaluation methods such as CBA treat the evaluation process in isolation from its human and organization components and place excessive emphasis on the technological and financial aspects (Serafeimidis & Smithson, 2003). Moreover, the

ability of traditional evaluation methods to measure sufficiently the softer (intangible) benefits has been put to question and led the IT evaluation research to move towards interpretive perspectives (Thorp, 2007; Serafeimidis & Smithson, 2003; Remenyi & Sherwood-Smith, 1999; Avgerou, 1995; Walsham, 1993).

In expanding this approach further, IT evaluation researchers propose the development of an IT project specific evaluation model, which goes beyond the confines of traditional (generic) financial appraisal (Irani, 2002). This type of justification process requires more interaction and dialectic approach, and is one that is predominantly interpretivist in nature. This approach is used to communicate the issues and concerns surrounding the adoption of new technology to either the project stakeholders, or larger population of the organization.

Symons (1993) argues that effective evaluation means understanding and taking seriously the perspectives of individual stakeholders and interest groups. Following the interpretive approach trend, Avgerou (1995) proposed that the main purpose of evaluators should be to achieve understanding of the proposed IT initiative impact to business and to legitimize the decisions for IT projects. Walsham (1995b) also argues that evaluators need to have deeper understanding of the subject matter to generate motivation and commitment of a wide range of stakeholder groups for change. Remenyi and Sherwood-Smith (1999) further propose that the objectives for IT initiatives should come as a result of evolved ideas among business and IT professionals through an iterative dialectic process.

3.11.2 Close collaboration during evaluation

The evaluators are expected to organize and facilitate or conduct discourse sessions with main stakeholders for understanding the various aspects and issues of the proposed IT initiative (Remenyi & Sherwood-Smith, 1999; Avgerou, 1995; Walsham, 1995b). This type of evaluation approach entails the engagement of stakeholders in an informed exchange of concerns, claims and views (Avgerou, 1995; Guba & Lincoln, 1989). The evaluators must focus on the views of the stakeholders concerning the project and manage the evaluation process using business objectives and business users' responses. In other words, the evaluators aim is to legitimize the

claim and the objectives of IT projects through partnership and close communication during the evaluation process.

3.11.3 Evaluators participation at the justification stage

The participation of IT professionals at the proposal stage has been highlighted by many IT evaluation approaches (ITGI, 2008b; Thorp, 2007; Remenyi & Sherwood-Smith, 1999). In most organizations, the participation of a business analyst from IT management begins at the feasibility study stage rather than the earlier stage of ex-ante justification (Irani, 2002). In the evaluation cycle, the feasibility study stage focuses on the development viability issues; whereas the justification stage puts emphasis on the importance and rationale of the project.

The *project definition* stage in the life cycle of the project attempts to set the business goals and objectives of an IT project (ITGI, 2008b; Farbey & Finkelstein, 2001). Remenyi and Sherwood-Smith (2001) proposed that at this stage both the business and IT professional should work together to reach to agreed and refined IT project objectives. In doing so, this implies that both groups can participate in justifying (evaluating the benefits) to show the attention that the project deserves.

3.11.4 The role of evaluators

The role of evaluators is shaped by the evaluation approach that is applied. Changchit, Joshi and Lederer's (1998) widely accepted benefits identification model used interviews and discussions in the evaluation process to identify benefits. Murphy (2002) and HRD (2004) also espoused the use of discussions with business stakeholders to remove ambiguities of intangibles and to make them measurable.

A jointly participative approach to IT project evaluation adopts Checkland's *Soft System Methodology* (1999) and the *Fourth Generation Evaluation Methodology* by Guba and Lincoln (1989). The main characteristics of these methodologies are a dialectic approach of a discourse process to IT evaluation. The roles and task of the evaluators include:

- A "facilitator" of the evaluation discourse amongst a wide variety of stakeholder groups. The evaluator in this context can be seen as a

"collaborator, learner and teacher, reality shaper, and change agent" (Walsham, 1993: 180).

- An organizer of dialectic evaluation process, "to assess quantitatively or qualitatively the IT initiatives under evaluation as seen appropriate by stakeholders, and to inform about issues that might have been ignored by the participants" (Avgerou, 1995: 432).

- An evaluator must have a deeper understanding of the IT initiative and generate responsibility and commitment of stakeholders (Serafeimidis & Smithson, 1998; Walsham, 1993).

- An evaluator must focus on the business objectives of the IT projects. An evaluator must ensure that perception of business management towards that business objective for an IT project will evolve appropriately and will be refined to be realized as possible expectation (Remenyi & Sherwood-Smith, 1999).

According to Remenyi and Sherwood-Smith (1999: 113), the evaluators are "primarily communications agents facilitating a constructive dialogue that is essentially a hermeneutic process between the concerned stakeholders". This indicates the underpinning paradigm of the new trends for IT evaluation methods which is interpretive evaluation.

3.11.5 Evaluation as a learning process

Serafeimidis and Smithson (2003) argue that evaluation must focus on a discourse process for learning and understanding in order to generate involvement and commitment. Avgerou (1995) suggests that the evaluation process should be an educative process which provides information to participants and provide a dialectic environment to argue the validity of stakeholders' claims. Remenyi and Sherwood-Smith's (1999) approach to participative evaluation process leading to co-evolved ideas entails the process of learning. The role of an IT evaluator therefore includes creating and supporting an evaluation climate within which learning should flourish.

3.11.6 Summary on the roles of evaluators

The business management that requests for IT projects is responsible for establishing the value of their proposed IT solutions. IT professionals are also responsible to collaborate with business to evaluate the impact of the IT systems that they will be charged to develop. Close communication and joint participation in the justification process is necessary or else the true value of the projects may not be defined appropriately because of the limited insight of a specific group of stakeholders. The inadequacies of traditional evaluation methods tend to direct IT project evaluation towards interpretive approaches. The evaluators are expected to incorporate dialectic process to evaluation with roles of facilitators, learners, teachers, communication and change agents, to understand deeply the views, concerns and issues of stakeholders and to assess quantitatively or qualitatively the IT projects under evaluation as seen appropriate by the stakeholders.

3.12 Research questions

3.12.1 Secondary research question 2:

Based on the literature review in Chapter 3, and problem statement in Chapter 1, this study will pursue the following research question:

- What are the limitations of available benefit evaluation methods at the justification stage? This question intends to investigate the evaluation methods adequacy in measuring IT benefits. It also intends to highlight deficiencies of current evaluation methods that need improvement for better measurements.

3.12.2 Secondary research question 3:

- How does the relationship between businesses and IT management at the justification stage affect the benefits evaluation?

  This question aims to investigate the communication and collaboration of business and IT management in the justification process and to find out how the current nature of relationship contributes to inappropriate benefit evaluation. It highlights the importance of joint participation by both groups in the benefit evaluation process.

3.13 Conclusion

This chapter, by means of literature study, discussed the need for IT project evaluation, the objectives of IT evaluation, the evaluation life cycle, and the evaluation methods. The chapter also presented the problems and challenges facing the current evaluation methods and discussed additional measures and concepts that are employed to mitigate the challenges. This chapter also discussed the trends of IT evaluation and the expected roles of IT project evaluators. The next chapter discusses the research methodology of the research. The research focuses on the betterment of IT business benefits evaluation at ex-ante justification. The methodology is expected to give an ideal structure for the purpose of the study.

CHAPTER 4:   RESEARCH METHODOLOGY

4.1 Introduction

Chapters 2 and 3 discussed by means of a literature study, the concept of business benefits of IT, and IT benefits evaluation methods. This chapter deals with the research methodology of the study. It will therefore discuss in detail the research philosophy, research design, and the research process. The chapter will describe the mode of inquiry that has been followed to provide answers to the research questions. This chapter will also present the case study protocol that was followed to conduct the case study research.

This chapter will further explain how content analysis is used to analyse the data collected, and the data analysis method to interpret the findings. It will describe how the results of the data analysis will be interpreted and how the findings will be generalized.

4.2 Research Philosophy

The basic beliefs pursued in the research can be clearly understood by answering three basic philosophical questions that are used by researchers. The following three questions adopted from Guba and Lincoln (1989; 83) combined contain the ontological, epistemological and methodological branch of philosophy to characterize the approach for research:

1. What is there that can be known?
2. What is the relationship of the knower to the known (or knowable)?
3. What are the ways of finding out knowledge?

4.2.1 Ontology

The first question deals with ontological aspect of philosophy that is concerned with "what is there", hence issues of existence or being. Ontology is the study of the nature of being, existence or reality and deals with what entities exist or can be said to exist, thus the primary task of ontology comes down to define what is reality and truth (Merriam-Webster Dictionary, 2010a).

The interpretivist asserts that humans devise reality in their mind as they attempt to make sense of the world and of their experience (Myers, 2008; Walsham, 1995a). Interpretivists argue that we constantly negotiate this individual reality with others with whom we interact. Hence, from the position of the interpretivism, as Walsham (1995a) argue, reality is a social construction.

4.2.2 Epistemology

Epistemology is a branch of philosophy that deals with the origin, nature, and limits of human knowledge (Merriam-Webster Dictionary, 2010b). It deals with the limits of our mind and what knowledge is. It focuses on the relationship between the inquirer and the inquired into known or knowable (Guba & Lincoln, 1989).

From the interpretivist stance, the knowledge people build arises from their particular experience, culture, goals, history, and so on. From this standpoint, the inquirer of the knowledge cannot maintain an objective position with respect to the phenomenon being investigated, and that the values, beliefs, presuppositions etc. held by the inquirer and the respondent exert influences in the findings (Cuba & Lincoln, 1989). Walsham (1993: 5) expressed his view that interpretivism is thus "concerned with approaches to the understanding of reality asserting that all such knowledge is necessarily a social construction and thus subjective".

4.2.3 The research persuasion

The core knowledge this research is seeking is twofold:

- the phenomenon and
- the experience people have on the nature of the phenomenon.

The phenomenon in this research is "IT benefits". IT benefit can be described in this context as the effects of artefacts. The artefacts are IT products constructed through human *imagination*. These effects can be what people make sense of their experience with the artefact.

The phenomenon in this research is not an independent reality that is governed by natural law regardless of our perception; rather it is the interaction between people

and the artefact; human dependent "reality" of what people make sense of their experience. Moreover, we might not yet recognize fully the various effects of the artefact.

The second core aspect, "the experience people have on identifying the phenomena" as *knowledge* is also about human dependent reality, it is people's observations, actions and behaviours for a specific purpose. It should be noted that the experience here is not for making sense of the phenomenon (reality) but the process of identifying the phenomena.

This research needs to understand the human dependent reality through the experience of respondents. The researcher aims, with the limitation of the research scope, to understand their lived experiences in its context. The researcher finds it fit to follow the interpretive persuasion on the epistemological possibilities. The interpretivist paradigm also supports the objectives of the research.

4.2.4 Methodology

The methodology of research deals with ways of finding knowledge (Guba & Lincoln, 1989). The methodology of any research depends on the ontology and epistemology persuasions. The interpretivist espouses hermeneutics approach as a process of finding knowledge about the human dependent reality (Myers, 2009). Hermeneutics is a "*methodology and praxis of interpretation that is geared towards the recapturing of meaning of a text, or a text-analogue*" (Demeterio III, 2006).

This research is not attempting to alter or add to the social construction of the participants during the inquiry process. Therefore, it uses Ricoeur's theory of interpretation of hermeneutics process. Ricoeur's theory of interpretation is underpinned by the following two concepts (Webb & Pollard, 2006: 41):

1. *Explanation,* or what the text says; and
2. *Understanding***,** or what the text talks about.

The explanation of the text refers to the detailed and careful analysis of the individual components of the text, while understanding the text requires the researcher to lift their focus to take in the whole meaning of the complete text (Webb & Pollard, 2006: 41). In this research the text consists of case participants' interviews, documents and the organization as they are the source of the phenomenon that the researcher is

attempting to understand. A descriptive hermeneutics circle diagram is shown in Figure 4.1.
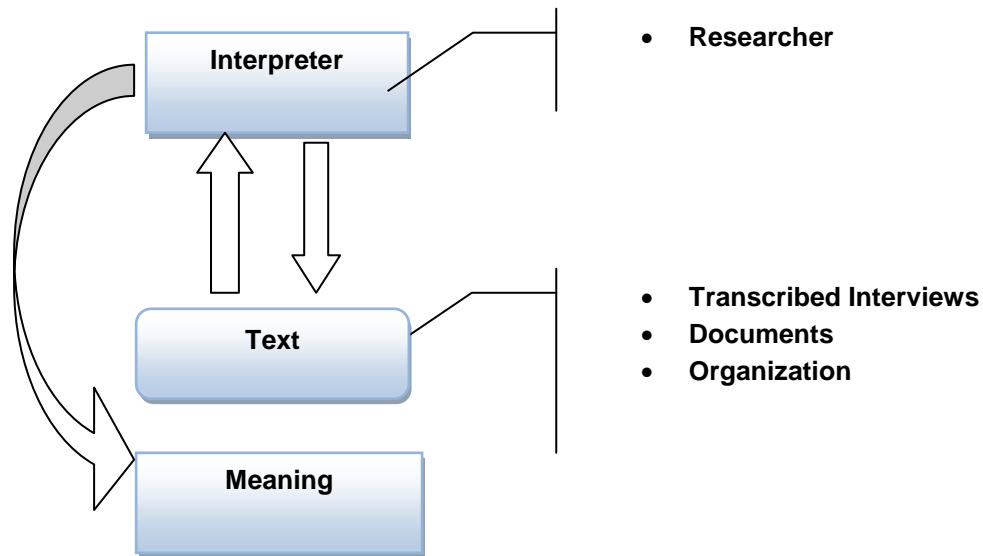
Figure 4.1: Hermeneutics circle for data analysis (adapted from Demeterio III, 2006)

A dialogue between the interpreter and the text is necessary for the interpreter to gain a new understanding of the text, and with this new understanding develops an updated view of the phenomenon. With this new understanding, new meanings are sought from the text about other parts of the phenomenon. The interaction with the text should be iterative to strengthen the depth of interpretation and to have deeper and more complex subsequent meanings. In this research, this approach is adopted to analyse the qualitative data. The research design will be discussed in a subsequent section.

4.3 Research design

Myers (2009) describes research design as a blueprint, or outline, for conducting the study systematically in such a way that it is undertaken in a rational fashion that will ensure the validity of the research results. The research design is the overall plan for obtaining answers to the research questions. Myers (2009: 223) states that designing "a study helps researchers to plan and implement the study in a manner that will obtain the intended results and increasing the chances of obtaining information that could be associated with the real situation". An overview of the research design is laid down in Table 4.1. It will be discussed in the subsequent sections.

Research	Method	Activity
	Philosophy	Interpretivist epistemology
	Literature study	Extensive literature review
Study type	Explanatory and Exploratory	Why and how questions
Strategy	Case Study	Single Organization
Data generation	Triangulation	In-depth interview, Document
Data analysis	Qualitative, few quantitative	Hermeneutics and Content analysis
Recommendation	Implications, New concepts	Emergent concepts into managerial guidelines
Future Study	New theory	Emergent theory for best practices

Table 4.1: Overview of research design

4.3.1 Explanatory and Exploratory

This research contains relevant elements of both an explanatory and exploratory study as it met the criteria by Oats (2006) and Kumar (2005). An explanatory study tries to explain why a particular outcome occurred and attempts to compare the case to theories from the literature in order to see which theory matches better (Oats, 2006). This research attempts to analyse and describe the business benefits of IT evaluation and thereafter the justification process of IT in the organization.

Exploratory studies are conducted "to develop, refine, and/or test measurement tools and procedures" (Kumar, 2005: 11). The main objective of this research is to propose and design an operational method that is expected to result in better evaluation of IT benefits in the organization. There are unresolved problems and issues in IT evaluation research in literature and very few research on IT benefits evaluation in the South African context. This research is also conducted with the expectation that subsequent research will be required to provide conclusive evidence.

According to Kumar (2005) in practice most studies are a combination of the theoretical research study types (descriptive, correlational, explanatory, exploratory) and encourages integrating relevant elements in the study.

4.3.2 Literature study

A literature study is conducted to gather relevant information that has been published and to gain theoretical knowledge of the research problem (Olivier, 1999). An

extensive literature study was conducted to apply theoretical knowledge to derive concepts to be used in the study.

4.3.3 Case study as strategy

The research strategy is a case study as it met the criteria described by Myers (2009), Oats (2006), and Yin (2003) in that this research focuses on the evaluation of business benefits of IT within its context to understand the total situation as a combination of different factors. A case study focuses on the description of the process or sequences of events in which the situation occurs in its environmental setting (Myers, 2009).

Case study research can be used to examine the possibility of developing and implementing best business practices in an attempt to discover its feasibility and applicability (Yin, 2003). Case study research can be used in exploratory stage of research to discover the relevant factors or issues that might apply in other similar situations (Myers, 2009). It can also be used in explanatory research, when there is already a large body of literature on the subject to test a theory or develop casual explanation (Myers, 2009).

This research attempted to investigate the current IT justification process in its current natural setting at the organization whereby the process and outcome are influenced by the business environment and culture.

4.3.4 Single case study and generalization

A single organization was selected to conduct the study. A survey conducted in 2006 of six reputable corporates in South Africa showed that only 33% are using formal IT benefit evaluation (Saloojee, 2006). Similar studies conducted in UK and Australia indicates on average less than 32% of benefit management adoption (Ward, Hertogh & Viaene, 2007; Lin, Pervan & McDermid, 2005). The chosen case is typical of many others in that it does not institute formal IT benefits management and, as discussed in Chapter 3, the problem of ineffective benefit identification and benefit evaluation is commonplace like in many organizations. Therefore the organization stands as a representative case. With the industry context and rigour involved in the research, it

suffices to conduct the research in one organization. The organization also allowed the research to be conducted and rendered time and resources for the research.

Walsham (1993: 15) argued from an interpretive position in favour for using case studies in information system research:

"the validity of an extrapolation from an individual case or cases depends not on the representativeness of cases in a statistical sense but on the plausibility and cogency of the logical reasoning used in describing the results from the cases and drawing conclusions from them".

4.3.5 Selection of case and contextualization

In order to conduct a research study that requires empirical evidence of the actual management practice of IT project justification, the organization was chosen for the following three reasons.

1. The problem this research attempts to address is apparent in the organization and is partially based on the experience of the organization.

2. The organization's IT service department (IT management) has proposed "IT projects prioritization method" that is intended to be effective to rank and select IT initiatives for development. The IT project prioritization method was adopted from Gartner's *project portfolio management processes* (Apfel, 2007b), and Tony Murphy's (2002) practical guide for "*achieving business value from technology*". The prioritization method adopted from these two sources has been widely accepted and recommended internationally for profit or non-profit organizations (Apfel, 2007a). Therefore, the organization presented a favourable ground to conduct an empirical research for deeper understanding of practical IT benefits identification process and the practical IT initiative justification process.

3. The researcher approached the organization and it agreed to allow managers and business representatives to be interviewed concerning their tasks towards the justification of their IT initiatives.

Interpretive researchers argue that "any observable organizational patterns are constantly changing because organizations are not static and as a consequence, interpretive research seeks to understand each instance of occurrence" (Klein & Myers, 1999: 73). The contextualization principle requires that the subject matter be set in its social and historical context (Klein & Myers, 1999). In doing so each instance is treated as a unique historical occurrence, and required to be explicitly reflected in the research. This research attempts to expose the factors such as people, culture, procedure, and industry that contributed a particular situation to occur. The findings of the research, therefore, are the results of the data that are in production at the time of the research and represent the current moment with its organizational context. A synopsis of the case study is provided in the next chapter to reveal the context of the findings.

4.4 Data generation method

A data generation method is the means by which the research produces empirical data or evidence. A case is studied in depth, using a variety of data generation methods such as interviewing, observation, documents etc. (Oats, 2006). The research used triangulation method for data generation.

4.4.1 Semi-structured interviews

An in-depth semi-structure interview is a data generation technique, in which a framework of themes to be explored is questioned in a flexible order depending on the flow of conversation in the interview process (Oats, 2006). Themes to be covered in the interview were compiled in an open-ended, and few in close-ended, format. The interviewees were given latitude to be able to speak with more detail on issues raised at the interview, and to introduce issues of their own that they thought relevant to the research themes. The interviews were conducted with managerial level individuals that were involved in the justification of IT projects in the organization. The selection of research participants is further discussed in Chapter 5, Section 5.4.1.

4.4.2 Observation

Observation as a data generation method is used to find out what people actually do, rather than what they report they do when questioned (Oats, 2006). An overt

observation approach was conducted at the selection committee during the selection process of IT initiative.

The researcher was a complete observer, as such attended in the IT projects selection process, observing everything that occurred, but took no other part in the proceedings. The observation was taken during the meeting of IT selection committee for making decisions on IT requests (proposal) that will be considered for development.

4.4.3 Documents

In case studies, documents can be used to corroborate or question data obtained from other data generation methods (Oats, 2006). The organization of which this study was carried out produced documents that were useful sources of data. The documents are the formal records of business units' justification of IT initiatives. The organization instituted an *IT request form* on which the justification and motivation of every IT request should be clearly expressed*.* This form is distributed to each business unit.

The documents are sensitive and confidential as they are internal records of the organization. The documents were obtained by the consent of the IT service department and each business unit. The documents were analysed in this research in two approaches described by Oats (2006: 239):

- Documents as the vessels and seen as receptacles that hold content (data). The records (justification) of the business units were analysed to identify themes discussed in the research, and
- Documents as an object. The form that is used as an instrument for justification was analysed to understand how it is developed and how it has been used.

4.5 Data collection plan

A case study protocol was drawn up as a detailed and formal master plan for the data collection (Yin, 2003). The protocol is a major way of increasing the reliability of case study research and is intended to guide the researcher in carrying out the data

collection from a single case study (Yin, 2003:67). The case study protocol will be laid out in Section on 4.6 of this chapter.

A gatekeeper from the IT service department (ITSD) of the organization was approached to identify individuals that are involved in the justification process within the organization. Gatekeepers are individuals that act as entry point to facilitate gaining access to the interviewee (Leedy & Ormrod, 2005: 137). The gatekeeper has prior knowledge of the selected individual's IT requests and knows well the culture and climate of the organization. The gatekeeper also assisted in gaining access to documents that are needed for the case study research.

The selected individuals were contacted for an interview appointment with the gatekeeper as reference. The case study method is expected to have a well-defined problem with clearly defined research questions. The researcher therefore ensured that these aspects were in place before data collection commenced. Before the actual data collection, the case study protocol was tested with two independent participants and the gatekeeper to determine whether the questions are clear and understandable and whether some questions are possibly a repetition of themes. These pilot interviews also confirmed the time needed for each interview. It is expected that each interview would be approximately 60 minutes. Each interview was digitally recorded and analysed at a later stage to cause minimum interference with the interviewee's thinking and responses.

4.6 The case study protocol

The protocol contains the instrument with which the case study is conducted, as well as the general rules and procedures with which the work is carried out (Yin, 2003, 67). According to Yin (2003: 69), a case study protocol should have the following sections:

- An overview of the case study project – research objectives, case study issues
- Field procedures – presentation of credentials, access to the case study sites
- Case study questions – interview schedule
- A guide for case study report – outline, format for data.

4.6.1 Objectives of the research

The objectives of the case study are to obtain evidence as to how the business units formulate the IT benefits and how they justify (evaluate) their IT project initiatives. This will be achieved by a series of semi-structured interviews that will allow respondents the opportunity of supplying information on a wide range of issues related to their experience and practice. The justification document provided how the IT benefits are actually identified and defined. The document is a justification instrument and represents the evaluation techniques. The documents will also be used to corroborate and to substantiate the claim of the interview evidence.

There are three main objectives of this study:

- To understand the characteristics and nature of IT benefits and the current practices of benefit identification in the organization
- To investigate the limitations of available IT benefits measurement methods
- To determine the effect of the relationship type between business and IT management during the benefits evaluation process

In addressing the abovementioned research objectives, the research aims at providing improvements and plausible factors for effective benefits evaluation at ex-ante justification stage.

4.6.2 Interview schedule

The heart of the protocol is a set of substantive questions reflecting the actual line of inquiry (Yin, 2003)**.** The questions are reminders to the inquirer regarding the information that needs to be collected. It is expected that each question will initiate a discussion on the issue at hand. The rationale behind each interview question is laid out in Table 4.2.

	Interview Question	Purpose of the Question
i.	What are the contributions of IT to your faculty or department and how are they identified?	The question involves an enquiry into IT use and its contribution to the business. This question will establish the interviewee's perception and value of IT as a user, operator, consumer, owner, requester and stakeholder. This question also aims to establish how the interviewees come to a decision for the need of an IT solution to enable their business. The reason for this is to determine the interviewee's exposure and knowledge of IT

		solution pertinent to their business and how it possibly influences their decision and their business plan/objectives. IT business benefits are IT contribution to business that align with the business plan (see Section 2.4, Chapter 2). This question serves as an introduction to discussion on IT benefits which is the focal area of the study. Although not explicitly stated, these prompting questions will furthermore assist in reminding the participant of their possible focus on "IT benefits" that can be gained by their proposed IT projects.
ii.	How are the business problems or opportunities addressed in your business and how do you identify the need for an IT solution?	This question is intended to understand how the business needs for IT is communicated among stakeholders. The problems or opportunities that necessitated IT projects must be clearly understood and identified for appropriate benefits identification. This question aims to determine whether the interviewees have considered the views, issues, and concerns of users and IT management concerning the decision for the proposed IT projects (see Sections 3.11.2 and 3.11.4, Chapter 3). This question also aims to establish how the stakeholders are involved in the justification process to identify the problems, i.e. through formal meetings, discussions or observations and to determine whether the concerned stakeholders participate in attempting to resolve these problems with possible solutions. The dominance of one part of the stakeholders in justification may affect the proper benefit evaluation and the claim for the project (see Sections 2.5.7 and 3.11.4). These prompting questions are intended to determine the effect of the relationship between business management and IT management.
iii.	How has your faculty/department objective or strategic plan been used during your IT request justification process?	This question aims to investigate the practices of the interviewees on how they consider and apply the business plan during the justification process. IT enables and contributes to the business. If the support and contribution is not to achieve the business goal, then it is not regarded as a business benefit (see Sections 2.4.2 and 3.10.1). This question is posed to find out whether a proper procedure is undertaken to identify the benefits of IT projects. This may also indicate the interviewees' understanding of the concept of benefits and the knowledge they have in identifying the benefits of IT projects.
iv.	How do you express your business needs and IT request in the justification instrument?	This question aims to gain an understanding of the interviewees' skill of reformulating their needs of IT solution into "benefits" of these IT solutions for the justification purpose. The needs for an IT solution should be translated to benefits for the justification process (see Addendum C). This question will establish the maturity level of benefit evaluation in the organization. The question intends to examine the interviewees' awareness of the concept of IT benefits and the use of benefits as the basis for the justification. These prompting questions also assist in informing them of IT benefits concepts and emphasis on the IT benefit during the justification process.

	Interview Question	**Purpose of the Question**
v.	How do you identify the business process that will be affected by the IT solutions you are requesting?	The purpose of this question is to make a detailed inquiry into the practices of the interviewees in identifying their project benefits. The identification of the benefits process requires that the *area of impact* (or targeted business process) be clearly understood and identified (see Sections 2.5.1 and 2.5.3). It is in the area of impact that the change will occur and the actual benefits might emerge. This question is intended to determine the interviewees' ability to identify the actual work process that needs to be targeted. The question leads to further discussions on the concepts of the *directness of impact* and the *certainty of impact* for better identification of benefits (see Sections 2.5.2 and 2.5.3).
vi.	How do you identify and define the expected improvements of the business process?	This question is a follow-up of the previous question to inquire in detail the practices of the interviewees in identifying and defining the "benefits variables", and their understanding of the effects of the proposed IT projects. The benefits emerge when a desired change occurs on the targeted business process (see Sections 2.4.2 and 2.5.2). The effect of change can be an improvement to multiple business processes. The question involves the last step of the benefits identification process. This question is intended to determine the interviewees' understanding of the association between the improvements and the area of impact. This serves to assess the interviewee's capability of identifying the actual and relevant benefits.
vii.	Do you consider the intangible contributions of IT in your justifications for IT projects?	This question aims to acquire a general perception of interviewees regarding intangible benefits as a justification claim. In some projects, intangibles contribute the larger portion of possible benefits (see Section 2.5.5). This question is intended to investigate the interviewees' awareness of intangible benefits and its significance to their justifications. This question also assists in opening follow-up discussion on recognizing and quantifying intangibles and to examine their perception toward intangibles for justification after the discussions (see Section 3.10.2).
viii.	How do you quantify the expected improvements on the business processes at your faculty or department?	This question aims to gain an understanding on how the current measurement method may affect the attainment of proper benefit evaluation and to the ways interviewees' measure the improvements and benefits. The interviewees were required to quantify the improvement rate as a percentage and specify the benefits in monetary terms such as cost avoidance, saving etc. in the justification process (see Addendum C). In literature, most organizations have a problem of measuring benefits and this question is raised to establish the situation in the organisation at ex-ante stage (see Sections 3.8 and 3.10). The prompting questions also provide information on the skills and knowledge of the interviewees on benefits measurement and open the discussion on their views, issues and concerns in measuring the benefits as part of the justification process. The question should also provide the deficiencies (if any) in the practical measurement process to understand ways to improve it for better evaluation results.

	Interview Question	Purpose of the Question
ix.	How do you determine to prioritize or rank among multiple IT projects in your faculty/department?	The purpose of this question is to gain insight into the interviewees' understanding and purpose of the justification process. It aims to establish to which degree the benefits are used in deciding for IT requests. It also provides information to determine how projects are ranked for request, whether it is on the IT support to business objectives or the amount of benefits an IT project is expected to deliver.
x.	Do you have any comments or questions you want to add on the justification process or the inquiry itself?	The purpose of this question is to give interviewees the opportunity to add anything that they feel might be relevant to the inquiry. The question is aimed to solicit other pressing issues that contribute to the problems or factors that may contribute for the betterment of the evaluation. It also assists the researcher to establish the possible need for future research.

Table 4.2: Interview Questions

4.6.3 Field procedure

Case studies are studies of events within their real life context. In a case study, "the investigator must learn how to integrate real-world events with the needs of the data collection plan" (Yin, 2003: 72). This research planned to collect data from the individuals in their everyday situation; therefore the research needs to have an explicit and well-planned field procedure for coping with the research participants.

The protocol for field procedure

1. Make initial contact with the organization at the highest level possible in order to get consent for conducting the interviews for research purposes.

2. Obtain information regarding individuals that participated or were responsible for the justification of IT initiatives to target and select the research population.

3. Find at least two research participants from each business division.

4. Ensure the organization's sections are well represented for the research.

5. Find a friendly gatekeeper (see Section 4.5) to arrange the introductions with interviewees.

6. Schedule a convenient interview time and setting for the interviewee.

7. Inform each interviewee at least two days before the interview schedule time with the purpose of the research and summary of the questions that will be presented so that they are prepared with the understanding of the interview to provide better information.

8. Each interview will commence with the assurance that their responses will be treated as private and confidential.

9. Ensure that the interviewee consented to be digitally recorded.

10. Request interviewee discretion with a written document of their participation.

11. Support verbal information with documentary evidence if possible.

12. Ensure the direction of the interview is in order in a semi-structured fashion and not to stray off the subject.

13. During the interview ensure, as far as possible, that the interviewee is at ease at all times.

4.6.4 Selection of research participants

The case study was employed because it allows the use of a wide range of data generation techniques, including interviews, document reviewing, direct observation, as well as the forming of a group for data validation. The number of interviews was determined to include at least one interview with each main business unit of the organization.

In the organization each main business unit, such as faculties and support services, has a "point person" to the IT service department during IT budget cycle period. The main task and responsibility of the "point person" is to ensure the IT requests in their respective unit are justified in the IT request document and submit to the IT service department in the annual IT budget cycle process. The "point persons" are middle managers in their respective unit and are aware of the IT needs of their unit. Each represent the various parts of the organization, therefore, it was determined that these groups are the best candidates to conduct the empirical research.

4.6.5 Case study report guidelines

An outline or a guide of the case study report should be included in the case study protocol (Yin, 2003). The guideline forces the investigator to think about the audience for which the case study is intended early in the case study process. The investigator should be concerned throughout the study with the design of the final report (Yin, 2003).

The following are the primary headings that were established as the focal points of the case study reports. These were established earlier in the research process so that they could be used by the author as a supplementary *aide memoir* in conducting the semi-structured interviews.

1. Introduction and general background of the organization.
2. The organization's IT project selection process.
3. The implemented IT benefits measurement technique and justification instrument.
4. The practical application and the current state of IT benefit identification process.

The research assumes using a well-defined protocol; the case study method complies with the basic tenets of a systematic method as it involves classification, observation of relationships, and causal explanations.

4.7 Matters of confidentiality

Before any data generation was conducted, it was necessary to get consent from the organization that information gathered in the research could be published for research. It was approved that internal documents can be used for analysis without revealing the organization's name or the business units that created such documents of sensitive information.

For individuals that participated in the interview, it was necessary to agree that nothing will be revealed of the interviews that linked their names to the statements that could be published without their written consent. However, most preferred their secrecy to be kept and were prepared to speak freely about their experiences about

IT project justification. As a result, the actual data has been used, but with entity and title names such as "Faculty 1 manager", or "Respondent", given to the participants. This was done in order to publish the data without revealing the identity of the informant or the organization.

4.8 Analysis of case study evidence

The main approach to the analysis of the evidence obtained from the case study was to use both hermeneutics and content analysis. Hermeneutics attempts to make sense and make clear the subject matter of the study (Oats, 2006). The subject can be an organization or a phenomenon. As discussed in Section 4.2.3, phenomenological study of hermeneutics branch is applied to understand the ineffective benefit evaluation process in the organization. Phenomenological study is conducted to "understand the participants' experience of a particular situation from the participant point of view" (Leedy & Ormrod, 2005: 159). The author attempts to group segments of texts into categories that reflect the various aspect of meanings. In addition, a content analysis is applied to quantify some of the qualitative data to generate patterns of aspects to assign appropriate meanings.

Content analysis method systematically allocates the research material content to pre-determined and detailed categories, and includes the following steps (Leedy & Ormrod, 2005: 172):

- defining the characteristics or quality of the research material,
- grouping each characteristic into manageable segments to analyse separately and,
- scrutinizing the segments for instances of each characteristics and qualities.

To make the analysis process more objective as possible, content analysis involves tabulating the frequencies of the instance of each characteristics. Thus, it attempts to quantify the qualitative study material (Kumar, 2005). This technique is expected to provide specific definition and description of the characteristics, frequencies and percentages for each characteristic and, identified themes of the research material on its context.

However, content analysis is most useful when the meaning of text (Section 4.2.3) is relatively straightforward and obvious (Myers, 2009). Moreover, the pre-determined categories contain built-in bias that may isolate bit of relevant and necessary information linked to the context (McNabb cited in Myers, 2009: 172). It is for this reason that the researcher acknowledges the bias (Section 5.6) and adopted phenomenological hermeneutics to complement the process of data analysis. The main advantage of using hermeneutics in analysing and interpreting qualitative data is, it enables a much deeper understanding of people in business settings and allows the researcher to portray the complexity of the organization from the social, cultural and political perspective (Myers, 2009). Although hermeneutics focuses almost entirely from the text (interviews and documents) and not from the lived experience of the researcher, it is combined and utilized to achieve the goal of this research.

Descriptive qualitative data of the empirical evidence will be systematically categorized in a meaningful category and the standard code procedures will be utilized. Additional tools such as cause-and-effect diagrams (Ishikawa, 1982) are used only to summarize and describe the concepts that emerge as a result of data analysis. The research techniques that are employed require the researcher to carefully comb through the qualitative evidence collected from the case study interviews and supplied documents. As a result, an emergent concept and empirical generalisations are expected to be developed.

4.9 Conclusion

This chapter discussed the research methodology followed in conducting the study and described the research philosophy, research design, research study protocol, data collection method and data analysis methods. Chapter 5 will present the analysis of the data obtained from the empirical evidence.

CHAPTER 5: Data analysis and results

5.1 Introduction

This chapter describes how the empirical data of the case study evidence was analysed. The chapter provides the finding of the empirical research in a systematic classification of thematic analysis and presents the deductive and inductive concepts that emerge from the study. This chapter also presents the synopsis of the organization, the justification instrument and the justification process in the organization.

5.2 Key terms used in the analysis

In data analysis, this research labelled group of individuals or entities in the following terms:

***Academic*:** business unit, which has core operation of academic – *faculties.*

Business: business unit including IT requesters.

Business unit: business divisions in the organization.

***IT management*:** the IT service department of the organization (ITSD).

IT requesters: individuals or groups of individual that requested and proposed an IT initiative.

***Justification instrument*:** the IT request forms that the businesses are expected to fill in for the justification process (Addendum C).

***Non-Academic*:** business unit, which support the core operation of the organization. This includes Facility management, Human resources, Client service, Library and Information etc.

5.3 Synopsis of the organization

The organization is an academic institute – a university, with more than 40 000 IT users that include staff, customers and students. It is one of the leading universities in Africa and has many faculties, departments, centres, and support services in the main and satellite campuses. The university's IT service department (IT management) has proposed "IT projects prioritization method" that is intended to be

effective to rank and select IT initiatives for development. The IT project prioritization method currently adopted is from Gartner's (Apfel, 2007b) project portfolio management processes, and Tony Murphy's (2002) practical guide for "achieving business value from technology". These two sources of the method have been widely accepted and recommended for profit or non-profit organizations (Apfel, 2007b; Murphy, 2002). Therefore, the organization has favourable grounds to conduct an empirical research for deep understanding of IT benefits and the practical IT project justification process.

5.3.1 The context of IT initiative justification process

The organization's IT executive committee has an investment framework that categorizes spending of IT investments. It is intended that the framework resonates the business nature, strategy and the role of IT to the organization.

The spending categories are: Run the Business (RTB), Grow the Business (GTB) and Transform the Business (TTB). These spending categories are grouped into Non-Discretionary investments and Discretionary investments (see Figure 5.1).

RTB investments or projects are initiatives proposed to maintain the on-going performance of the organization's activities. GTB investments are initiatives proposed to improve the business, enhance performance and increase productivity. TTB investments are initiatives that break the organization into new markets or dimension, expanding it beyond the current scope.

All IT initiatives (projects) will be allocated to one of the spending categories and assigned to one capital portfolio. More than 80% of the IT budget is allocated to keep the operation of the institute. The remaining portion is allocated to the discretionary investments of GTB and TTB categories.

The focus area of this research relates to the IT initiatives that are requested and justified to be included in the discretionary investment of GTB category. The investments (initiatives) that fall under discretionary spending need approval for development by the IT executive committee.
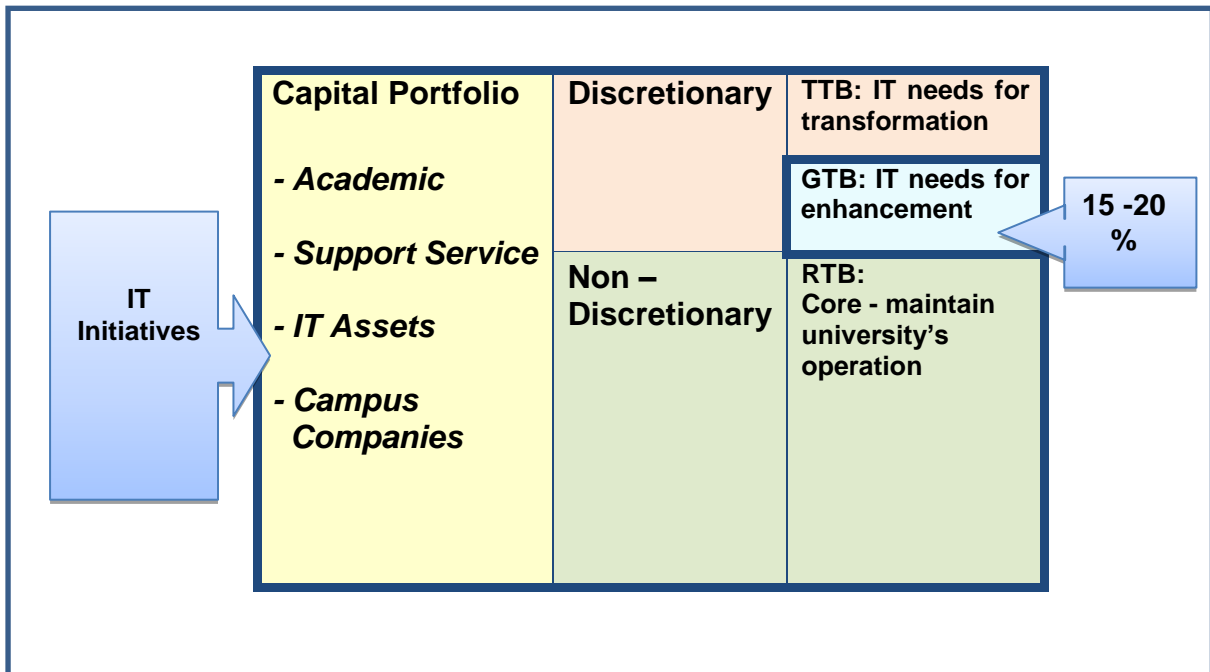
Figure 5.1: IT budget allocation of organization

5.3.2 Assessment criteria for discretionary projects

Information technology benefits, in the context of the organization are used to evaluate potential projects. The IT service department designed six assessment criteria perspectives to evaluate IT project benefits and to make better judgment on selecting for development approval. They were adopted from Gartner's "beyond ROI" ethos (Apfel, 2007a) and Murphy's (2002) practical guide for benefit realization to provide an adequate basis for IT investment decisions:

1. **Strategic Alignment:** how the organization realizes benefits by achieving the organization's goal and objectives. It represents the organization's main business goals. The metrics are derived from the organization's main strategic thrusts (see the justification instrument in Addendum C).

2. **Business Process Impact:** how the business segment (unit) realizes benefit by the improvement of business processes. The evaluators are expected to define or identify their own functional process that they expect to be improved by the IT initiative. After identifying the business process they are expected to provide the business process improvement or expected change.

Examples of business process improvements are provided in the justification instrument. It is expected that it will assist evaluators (business) to formulate their own business process impact and expected output. The business process improvements are measured using a scoring method in percentage format (see the justification instrument in Addendum C).

3. **Technical/ Enterprise Architecture:** The benefit that could be realized by an IT initiative, compliance with the existing systems and its contribution on integration, scalability and resilience to what the university has implemented and/or plans to implement.

4. **Direct Payback:** The benefit that could be realized in financial terms; on cost saving, productivity and cost avoidance.

5. **Institutional Risk:** The benefit that could be realized by alignment with the institution's risk register.

6. **Project Risk:** The benefit that could be realized by identifying the exposure of the proposed initiative to failure or underachievement.

The business management is expected to fill the strategic alignment, business objective, project direct payback, and institutional risk portion of the assessment criteria.

5.3.3 Business management responsibility as evaluator

The business units (faculty, support services) are supplied with a standardized IT request form (justification instrument) to be used for requesting specific IT needs. The form is distributed to each business unit representative and it is also available through the university's intranet portal. The IT requests (justified) are submitted to the IT service department before the month of June each year to be considered in the IT budget of the following year.

5.4 Work conducted in the case study

In conducting the case study, the author visited the IT service department several times. There have been six informal interviews with the IT service department director, spanning one year, February – October 2010. These visits were deliberately sought in order to obtain a deeper understanding of the context where the IT

initiative justification is carried out and for data triangulation that assists in the corroboration of the facts supplied. The average length of the interviews was 40 – 50 minutes.

5.4.1 Work conducted in collecting the case study evidence

The research requires collecting data of the experience of individuals in justifying the business IT needs. The researcher met with business units within the organization at least once, but occasionally two informants from each business units were present during the interviews. The visits were to collect evidence by means of semi-structured interviews or discussions. The average length of the interview was 50 – 60 minutes. Table 5.1 shows the number of interviews conducted in the organization.

All participants selected for the empirical study are responsible or involved in the justification processes. These participants are the point people (or representatives) to IT management and are middle managers in their respective business units. The interview was conducted to understand and investigate their experience and perception of IT benefits, their skill of identifying and quantifying IT benefits, and how they determine to rank among multiple initiatives. More than 80% of the interview discussions revolve around these aspects and the research collected 80 pages of transcribed document.

The business units were categorized into two main group as Academic and Non-Academic depending on the broad nature of the business. The Academic category consists of faculties and the Non-Academic includes support service bodies that support the main business of the organization. There were 21 IT initiative justification documents collected for data analysis. The academic side of business is represented by seven business unit and nine justification documents were provided for the study. The non-academic side of business is represented by four business units and 13 justification documents were offered. These documents are used in the data analysis of the research.

There are eight faculties in the university, and seven main support service bodies that are served by the IT service department of the organization. Each business unit consists of multiple schools, departments, institutions and centres. Three of the faculties interviewed are in different locations. In order to obtain introductions to each

interview, a gatekeeper (see Section 4.5) that happens to be a change manager from the IT service department was accompanying the researcher.

		Total business units in the organization	Business units participated in Interviews	Number of Documents Collected
Business	Faculties	8	7	9
	Support service bodies	7	4	12
	Subtotal	15	11	21
Number of informal interview with IT Service Department				
IT Function	IT Director	4		
	IT Deputy Director : Users Support	2		
	IT Deputy Director : Client Relations	2		
	Subtotal	8		

Table 5.1: Data collection at the participating organization

5.4.2 The interview schedule

The interviews were given by list of direction by the researcher. The reason for the direction is in order to control the direction of the interview not to stray off the subject. However, the interviewees were given much latitude and they were allowed to raise issues that they thought were important to discuss about the justification (or evaluation) process.

The researcher consulted the interview schedule. Having conducted the interviews and transcribed recordings of the interviews the researcher was in possession of almost 80 electronic pages of textual transcript.

5.4.3 Data document

There is at least one justification document collected from each participant business unit totalling 21 data documents. The documents contain information of what IT requesters provide as IT benefits variables and the measurements of these benefits which is crucial to the area of this study.

It was subsequently necessary to analyse the data that had been collected in order to see the relevance to the general concepts and themes of the three general areas that this study explores.

5.5 Data interpretation and data analysis

The research attempts to communicate the finding of the study by coding descriptive qualitative data through the combination process of phenomenological study data analysis and content analysis. The focus during data analysis of phenomenological study is to identify common themes in people's description of their experience. The tasks include breaking the relevant information into small segments that each reflects specific thought, grouping these segments into categories that reflect the various aspects ("meanings"), and using these meanings to describe the phenomenon as people typically experience it (Creswell, 1998, cited in Leedy & Ormrod, 2005).

Kumar (2005: 240) defines content analysis as "analysis of the content of an interview in order to identify the main themes that emerge from the responses given by respondent". The crucial step in content analysis is to tabulate the frequency of each characteristic found in the material being studied (Leedy & Ormrod, 2005). McNabb (2002, cited in Myers, 2009: 172) comments that "the main advantage of content analysis is that it provides the researcher with a structured method for quantifying the contents of a qualitative or interpretive text, and does so in a simple, clear, and easily repeatable format".

The researcher carefully went through the descriptive responses to each question in order to understand the *meaning* they communicate. This is done in the hermeneutic circle described in the research (Chapter 4, Section 4.2.3). From these responses the researcher developed themes that reflect the meanings. The researcher selected the wording of the themes in a way that accurately represents the meaning of the responses categorised under the theme.

The transcripts were extensively reviewed and the relevant responses to the research question were classified under the different themes. The research attempts to demonstrate how the finding has emerged by presenting transcript extracts to readers. This is expected to provide evidence for the researcher's interpretations, and the linkage made to other factors. It is also expected to provide evidence for the

appropriateness of the meanings assigned to the themes. The data analysis is expected to offer readers a deeper understanding of the case as it relates to the research question and themes presented in the literature review.

5.6 Researcher bias

In conducting the thematic content analysis, from epistemological stance the researcher cannot be totally objective, it is impossible to completely exclude the researcher priory idea and concept (Gadamer, 1994). The researcher attempts as much as possible to describe the phenomenon as the respondents experience it and offered his thoughts in parts of the comments and discussions in the analysis.

5.7 The analysis

The initial categories used in the content analysis are those that arose from the literature review (Chapter 2 and Chapter 3) and were consequently the main content categories that the researcher sought out during data collection (see Chapter 5, Section 5.7).

The researcher groups and distils from the data a list of common themes in order to give expression to the communality of voices across participants. This is a natural aspect of qualitative research (Leedy & Ormrod, 2005; Kumar, 2005) and during the data collection process, the researcher established inductive themes that emerge from the interviewees' responses and data document into three content categories. The themes are grouped into the main categories of the research:

Category A: Identification of IT benefits

Category B: Measurement of IT benefits

Category C: Collaboration between IT benefit evaluators.

Each of these categories has a number of themes grouped under it. Each theme on the other hand consists of various concepts relating to that particular theme. The themes tables summarising detailed concepts for each theme as well as all individual concepts can be viewed in Addendum A. The themes grouped under the A content category are numbered A1, A2, A3, etc., while the B themes are numbered B1, B2, etc. and the C themes numbered C1, C2, C3, etc.

Concepts are primarily emanated from the interviewees' responses to the various questions in the interview questions. Frequency tables (Table 5.2, 5.3 and 5.4) display related themes showing the number of occasions in the discussion of the main themes that occurred during the case study interviews. Tables 5.2 and 5.3 laid out related themes in the sequence order of the steps followed by the interviewees in the justification process.

Some interview questions may have caused participants to address certain themes more than others. Therefore the frequencies should not be seen as some order of importance of themes but rather as a point of departure for discussion (Krauss, 2007). The frequency tables will be discussed in the next section.

5.7.1 Category A. Identification of IT benefits

This category discusses the experience and practices of the participant in identifying the business benefits of IT in their justification of the IT initiatives. This category broadly focuses on the concept of IT business benefits.

	Themes	Theme code	Total	%	Accum. %
1	The need for IT are clearly identified	A1	17	7	7
2	Skill is required to identify benefits	A2	33	14	21
3	Organization strategies are easily linked	A3	35	15	36
4	The business plan/objectives is important	A4	31	13	49
5	The justification is not primarily based on benefits	A5	18	8	57
6	IT requests reformulated into benefits by chance	A6	33	14	71
7	The need for list of benefit variables	A7	33	14	85
8	Intangible are seen as not credible claims for justification	A8	26	12	97
9	Quality of information as a business benefit	A9	4	2	100
	TOTAL		230		

Table 5.2: Content analysis showing relative frequencies and percentages for identification of benefits during IT project justification process (Content category A)

Table 5.2 shows that in the transcript of the case study interviews, there were 17 major references to ways that the business needs for IT solution are identified

(Theme A1) and 33 references to the need for skills to identify benefits (Theme A1), 35 references that in justification, the organization strategy is too broad to somehow link any IT project for justification (Theme A3), 31 reference on the importance of business objects during justification (Theme A4), 18 references that indicate that most requesters do not focus on IT benefits but rather on the severity of business risks if the IT project is not attended (Theme A5) and 33 references that show that IT benefits are formulated without the intention of IT requesters (Theme A6). There were another 33 references to the utilization and need for a list of benefit variables to be provided (Theme A7), 26 references that show intangibles are not seen as credible claims (Theme A8) and four references that indicate the use of "information" as the business benefit (Theme A9). The process of identifying IT benefits at the ex-ante justification stage is discussed in the following sections.

5.7.1.1 Theme A1: The needs for IT are clearly identified

This theme groups concepts that show the ways of identifying the business problems or opportunities that require IT solutions. The model of benefit identification by Changchit, Joshi and Lederer (1998) recommends that the first step to identify and realize benefits is to clearly understand the business problems. The *process of change* (Section 2.3.2) shows that the change is initially intended to resolve the business problems. This theme shows that most participants use various ways to identify the problems (see Heading 1.2.1 in Addendum A). Surveys, observation, and contact with affected individuals are listed as the ways of recognizing the business problems. The concepts under this theme indicate that the business group can identify the problem that needs the attention of an IT solution. This can also enable them to rationally defend the IT project they are proposing. Benefits are the difference between the desired outcome and the problems (Ward & Daniel, 2006). In order to identify the benefits, it will be necessary to identify the problems and the *changes* in the way that business work is hitherto done. The more the business problems are visible, the more the benefits of IT become recognized. The following theme discusses the issues surrounding the identification of benefits practice in the organization.

5.7.1.2 Theme A2: Skill is required to identify benefits

This theme groups concept that shows the evaluators awareness and skill of identifying benefits is crucial in justifying projects. In the organization, the process of benefit evaluation is conducted by filling in the justification instrument (Addendum C). This theme shows that most participants have difficulty in using the justification instrument. Misunderstanding of the procedure, lack of knowledge, limited experience, time constraint and so forth are given as the main reasons (see Heading 1.2.2 in Addendum A).

The request for IT solutions is supposed to be addressed by making visible the potential benefits. It involves following *the process of change* (see Section 2.3.2). The justification instrument guides the business management to provide information on the *business process* (area of impact) and *expected improved process output* (change effect).

In general, this theme shows that most participants do not have a clear understanding of how to specify their requests in the way the justification procedure requires. This has a negative effect on the IT benefit identification process. Concepts under this theme imply that a skill to identify and formulate benefits is required to justify projects. The following theme focuses on the process of benefit identification

5.7.1.3 Theme A3: Organization strategies are easily linked

This theme groups concepts that show the alignment of specific IT projects to the organization's strategy. IT benefits are defined as the effects of changes that are aligned and support the organization's strategy (Ward & Daniel, 2006). This theme shows that any IT initiative requests can easily be associated to the generic high level organization strategy. It is necessary that it is aligned with the organization's strategy, but it should not be used to recognize benefits since it might lead to ambiguous and irrelevant benefits (Dhillon, 2000)

Concepts under this theme confirm that the strategy thrusts of the organization are generic to derive many arbitrary benefits. This theme also shows that the organization strategy is embedded in most of the participant's business plan (see Heading 1.2.3 in Addendum A). Unless IT requesters can describe how their IT project links to their specific immediate business objective, the actual IT benefits

cannot be clearly defined (Dhillon, 2002). The following theme focuses on the uses of business objective in the justification process.

5.7.1.4 Theme A4: The importance of applying business plan

This theme describes the use of a business plan in justifying IT projects. In literature, the benefits are considered as the achievement of the intended business objective (see Chapter 2, Section 2.3 and 2.5.1.1 and in Chapter 3, Section 3.8 and 3.8.1). Concepts under this theme relate to the link between IT projects and the business plan (objectives). This theme shows that the participants implicitly ensure that their proposed IT project fits and supports their business plan.

However, this theme also shows that most requesters do not use or express their specific business objectives during the justification process (see Heading 1.1 in Addendum B). Only eight out of 21 IT requests (documents evidence) indicate that the requesters describing their specific business objectives. The reasons given include that they were not aware of the need to specify their business plan/objectives.

This theme confirms that without the use of a business plan in the justification process can result in poor business benefit identification. This leads to the following theme that focuses on the concept of benefit that the requesters have during the justification process.

5.7.1.5 Theme A5: The justification is not primarily based on benefit

This theme groups concepts that relate to the aim of the justification instrument in the justification process. The author sought to understand IT requester's intention in filling in the justification instrument. This theme shows that the justification claim is mostly based on the needs and requirement for IT solution rather than the benefits (see Heading 1.2.4 in Addendum A). The data document evidence indicates that the IT requesters focus on filling in the severity of the risk if the proposed IT project is not attended. The act of filling the form is supposed to be converting the IT needs into benefits (Section 5.2.2).

This theme concept confirms the IT requester's misunderstanding of the aim and the intended output of the justification process may affect the effort to identifying benefits

appropriately. This shows the level of maturity in the organization with regards to evaluations based on benefits.

5.7.1.6 Theme A6: Benefits formulated by chance

This theme groups concept that indicate IT requests specification being easily formulated to benefits following the steps found in the justification instrument. The justification instrument has sections for components that represent the nature of IT project benefits (see Chapter 2, Section 2.4 and 2.5). These components include *affected business process* – which is "area of impact" and *associated process improvement output*, that is, the "effect of change". The instrument also provided examples of the type of information to be filled in this section (Addendum C).

This theme shows that IT needs are reformulated into benefits without clear understanding of participants. The participants follow the descriptive instructions and utilize the examples provided in the instrument into their own justification. In doing so, their IT initiative's benefits emerge. However, this theme reveals that these benefits do not necessarily reflect the actual project benefits. There are a number of instances where the business process (area of impact) and the expected improvement do not link and they are not the actual and relevant benefits (see Heading 1.5 in Addendum B). The outcome of the change is supposed to relate to business process (Ward & Daniel, 2006).

The concepts in this theme indicate that participants unintentionally identify benefits. Concepts from this theme indicate that a proper evaluation method cannot guarantee reliable results without the evaluators' awareness of the nature of IT benefits.

5.7.1.7 Theme A7: The need for list of benefit variables

This theme groups concepts that relates to the use of benefit variables listed in the justification instrument. Lindfors (2003) and Andresen *et al.* (2000) argue that organizations must have a catalogue of benefits to easily recognize IT benefits in the evaluation process (see Chapter 2, Section 2.6.1.2 and Section 2.6.2). This theme confirms that the list of benefit variables as examples make it easier for the participants to recognize and specify the business process improvement. This theme also shows that the business group (non-academic) whose line of business did not relate to the list of variables provided had difficulty in identifying the improvements on

the business process. Concepts under this theme confirm that evaluators need "benefit variables" examples in the justification process. This theme has an implication that it is important to develop an IT benefits variables catalogue for business units in the organization.

5.7.1.8 Theme A8: Intangibles are not credible claims

This theme groups concepts that show the views of IT requesters towards the credibility of intangible benefit for justification in the organization. This theme shows that most participants do not have a perception of intangibles to be an impressive claim for justification at this stage.

This theme shows that most of the participants perceive intangibles as a wish list with minor importance than the real critical needs. This theme confirms that there is lack of deeper understanding about the intangible benefits. Intangibles can result in productivity and can be measurable using units of measure (HDR, 2004). Intangibles may have the larger portion of the IT projects benefits (Dhillon, 2000; Remenyi, 2000).

The empirical evidence indicates that the main cause for not considering intangibles is fear of rejection of their IT request. In conclusion, intangibles are neglected to be identified because they are not seen as a viable claim at the justification stage. The following theme is a follow up of this theme that focuses on "information", as the basis for justification.

5.7.1.9 Theme A9: Quality of *information* as benefits

This theme groups concepts that show participants regard of "having information" as benefits. Benefits have a second-order effect (Chapter 2, Section 2.5.2) as such acquiring *better information* is a contribution to the organization but the effect of information is the actual IT business benefit (Ward and Daniel, 2006; Lindfors, 2003; DeLone & Mclean, 2002). This theme shows that the quality of information is seen as benefits. Some participant's use "access to information", "having integrated information", "process information availability improved" and "easier accessible information" as benefits without these qualities' effect of impact to business. The concept under this theme confirms lack of understanding of the concept of *benefit* and may result inadequate benefit evaluation.

The quality of *information* such as availability, completeness and timeliness are all regarded as the contribution of IT. According to McLean & DeLone (2002) and Ward and Elvin (1999), the effect of the information on the individual or organization is IT business benefit. Having better information or acquiring information is not a benefit to the business unless it is put in use to achieve the intended business plan or objectives.

In general, this theme shows *the quality of information and processing* (Table 2.1 and Figure 2.3) is put as the reason for justification. They can be the basis for benefits identification but are not eligible claims since the justification requires business benefits. This shows the confusion of reformulating the IT needs on the basis of IT business benefits. This theme reveals the level of understanding of *IT benefits* among evaluators.

5.7.1.10 General comments and summary of identification of IT benefits

The practices of business management for the identification of IT benefits (content category A) confirm that clear understanding of the concepts of IT benefits is important for successful benefit evaluation (Theme A1). The content category shows that evaluators' awareness of the intention of the evaluation process is crucial for better justification (Theme A5). In the process of identifying benefits, it is important for evaluators (business management) to revisit or define their business goal/plan and demonstrate the link to their IT requests (Theme A4). It also shows that the use of organization strategy alone in benefits identification can result in misleading benefits (Theme A3).

The content category shows that the IT needs are reformulated into benefits without clear understanding of the requesters (Theme A6). This becomes possible by IT requesters utilization of available benefits variables examples (Theme A7). However, this confirms the importance of developing a benefits variables catalogue in the organization for better recognition of potential benefits. The lack of good understanding of the concept of IT benefits was deep rooted by the evaluators' limited awareness and perception towards intangible benefits (Theme A8). It shows that most evaluators do not view intangibles as a viable claim to justify their IT requests. For some IT initiatives, intangibles may represent the bigger share of the benefits. Moreover, evaluators confuse "the quality of information" as business

benefits (Theme 9). The effect and the impact of the *information* to business are supposed to give rise to the actual benefit.

In general, this content category implies that evaluators (business managers) need to have a good understanding of the concepts of IT benefits and skill in identifying benefits for better evaluation results. Business management must also focus on the benefits of their IT requests for the discretionary investment portfolio.

5.7.1.11 Discussion on the process of benefit identification

This subsection will discuss the process of benefit identification and the practical application of the process in the organization. The concepts of benefit identification process from literature review are compared with the practical steps required to be followed by the participants. The category of identification of benefits (Content category A) provided the actual practices of the business management. The main deductive concepts of benefit identification process are:

- The business plan
- The targeted business process
- The expected improvement
- The link between the targeted process and the effect of improvement.

The business plan

To establish a specific IT business requirement, the business must first define a business goal (ITGI, 2008b). Moreover, the business goal (plan) should support the organization's strategy to successfully deliver estimated benefits.

Each business goal has an outcome that indicates whether the goals have been met. These outcomes can be used as premises to recognize the benefits. Theme A4 has confirmed that the absence of considering a business plan in the justification process is a contributing factor for poor benefits identification. The business management must ensure that IT requests are linked to their specific objective/plan to transpire the exact estimated benefits. Theme A3 also showed that IT projects can be somehow linked to the organization's strategy. It is necessary that it is aligned with the organization's strategy, but it should not be used to recognize benefits since it might bring out ambiguous and unfitting benefits.

The targeted business process (area of impact)

The first step of identifying benefit is to understand clearly where the problems lie and where the IT solution will have an impact to rectify it. The area of impact can be represented as *individual*, or *business process* of the organization (sees Chapter 2, Section 2.5.1). It should be clearly understood for the benefits to be recognized and be predictable (Chapter 2, Section 2.5.3).

The empirical evidence collected from data document indicates that the participant business units specify the *area of impact* in their request form (Theme A6 and A7). This is a good indication that business are managing to locate the area of impact. This became possible because the justification instrument has a section with examples to be filled in and this led them to identify and locate the area of impact.

The empirical evidence also indicate that almost all academic units pick the exact examples provided by the justification instrument as the actual area of the impact for their request (see Heading 1.4 in Addendum B). However, this may lead to negative consequences. If the requesters use the examples without clearly recognizing the actual impact area, it will be difficult to identify the exact benefits (Chapter 2, Section 2.5.3). Theme A7 shows the difficulty for some participants (non-academic) in recognizing the *area of impact* and *benefit variables* because the examples provided are not relevant and fitting to their line of business.

In the non-academic side, five out of 13 justifications (see Heading 1.3 in Addendum B) did not use the exact examples but put their own specific descriptions of the area of impact. The empirical evidence indicated that the examples that are provided in the instrument are entirely related to the academic type of business and it leads the non-academic business unit to have difficulty in identifying and expressing them (See Theme A7 and A9).

Benefits arise when there is a desired change in the area of impact. If the area of impact is not clearly understood, it is difficult to identify the benefits. Although participants manage to specify the area of impact; taking the examples and utilizing them without fully recognizing them may affect the legitimacy of benefits variables.

The expected improvement

The justification instrument provided some relevant examples of the types of improvements to be filled in the justification instrument (see Addendum C). The empirical evidence shows that there are 31 improvement variables (benefits) on the 21 justification documents collected (see Heading 1.4 in Addendum B). Theme A6 shows that the requestors utilize the examples provided by the justification form. The empirical evidence shows that 19 out of 31 benefit variables specified are the same as the actual examples provided in the justification form (See Figure 5.2).

The extensive utilization of benefit variable from the examples may pose a negative effect on the pursuit of proper benefit identification. These benefits that business use for their specific request are already identified before and there is little indication, especially from academic business side, to come up with new benefit variables that are more relevant and applicable for the proposed IT projects.

The author of this research infers that the businesses that rely much on these examples may limit their capacity to define new benefits that accurately represent the contribution of the IT project. In addition, the repetition of using the same benefit variables may lead to overlooking new types of benefit variables.
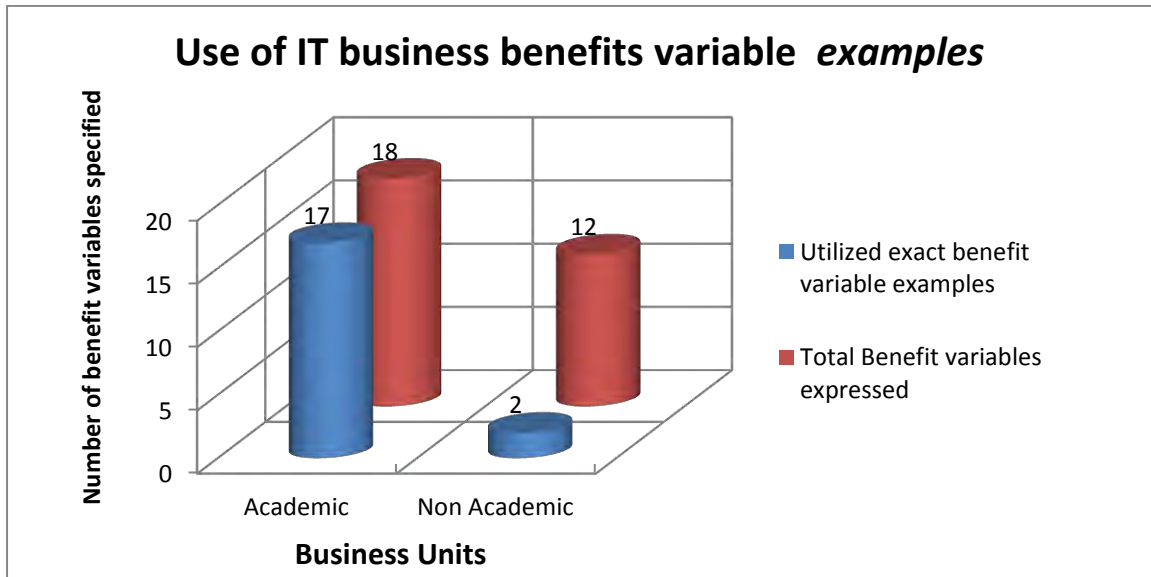
Figure 5.2: The number of used IT benefits variables examples

The link between the business process and effect of improvement

Themes A7 and A6 show that most requesters attempted to input the expected improvements. However, the evidence indicates that there are many instances

where the effect of the expected improvement is not directly linked with the business process (see Heading 1.5, Addendum B).

For example, in one of the justification documents, the requester listed "All our clients" as the business process that will be affected by the IT initiatives. "All our client" as a *group of individuals* is an acceptable area of impact description (Chapter 2, Section 2.5.1). The benefit arises from this area through the process of change. A change will take place in the clients; it can be "satisfaction", "high performance", or "learning". However, the requester put "improved and convenient access to information" as the outcome of expected improvement. The outcome is supposed to be the effect of the *improved access to information* on clients.

Another simple example is the requester selecting "Undergraduate student teaching and learning" for the business process as the area of impact and put "Improved project quality and reduce cost". It became evident that the evaluators have a misunderstanding or association problem between the business process, its expected improvement and the effects of improvement (see Heading 1.5, Addendum B).

The empirical evidence also indicates that even with the IT requests that manage to link these concepts, the relevance of the benefits to the IT projects is questionable. For example, in the academic side there are 17 *business improvement variable examples* that are linked with 17 *areas of impact examples*. Concepts under theme A7 show that participants acknowledge it is easier for them to pick and match the examples. Therefore, it is not definite whether the IT requesters really put effort and understood the concept of change in the benefit identification process. This raise questions whether the benefits provided are valid.

In conclusion, the lack of awareness of both the concept of IT benefits and the steps to identify benefits is found to be one of the main reasons for the apparent ineffective benefit evaluation in the organization. This is confirmed by Theme A5 which shows that when the business management are the evaluators they focus on the severity of the problem or risks to claim for IT solutions.

5.7.2 Category B: Measurement of the IT benefits

In general this content category summarises concepts and themes that describe the measurement approach that participants use in the justification process. It provides data on IT requesters' experience on benefits measurements, how they attempt to calculate the level of benefits, and their practices of quantifying benefits. The content category also provides data on the application of measurement method and related themes.

	Themes	Theme Code	Total	%	Accum. %
1	The measurement method does not provide proportionate figure	B1	24	32	32
2	The measurement is judgment not calculation	B2	25	33	65
3	The measurement unit is used to describe change	B3	3	4	69
4	Deliberate overestimation	B4	4	5	74
5	Difficult to measure at ex-ante justification stage	B5	18	24	98
6	Cost-benefit to attain proportionate percentage rate	B6	1	1	100
	Total		75		

Table 5.3: Content analysis showing relative frequencies and intensity for the measurement of the business benefits of IT in the justification process (Content Category B)

Table 5.3 shows that in the transcript of the case study interviews, there were 24 major references to the measurement method that might result in flawed figures during the justification process (Theme B1), 25 references that indicate that most requesters use their subjective judgment to assign measurement figures to the expected improvements (Theme B2). There were three references to the use of a measurement unit to describe change as improvement in measurement process (Theme B3), four references to intentional overestimation during measurement (Theme B4), 18 references to difficulty to measure at ex-ante justification stage (Theme B5) and one reference to use cost-benefit analysis to attain proportionate measurement (Theme B6). The process of benefits measurement at ex-ante justification stage is indicated in the following sections.

5.7.2.1 Theme B1: Measurement does not provide proportionate improvement figure

This theme groups concepts that show the mis-measurement of the improvement of the business process. The theme focuses on the quantification process of the percentage rate.

This theme shows that the measurement method is ambiguous for most of the evaluators. If the requesters attempt to *calculate percentage increase*, for example if an IT initiative that is expected to increase post graduate students from 10 to 15, the improvement percentage increase is expressed as 50%. Another IT project from other department that currently has two postgraduate students and if the increase is expected to be four students; the improvement will be represented as 100%. The latter figure shows an impression of the IT solution to be ranked higher than the other. These examples question the use of increase percentage calculation as one of the criteria for selecting IT projects. This method is attempted by some IT requesters in their measurements and the selection committee put more weight in the score evaluation method (Addendum C).

This theme shows that direct *percentage increase calculation* is based only on an increase or improvement rate but not on its value. It does not extend to measure in financial terms or other non-financial factors that determine the worth/amount of the improvements. If financial terms are used, the first initiative may seem worthwhile to be ranked high. In literature, the quantification process should follow the steps of making benefits measurable and predicting in physical terms (see Chapter 3, Section 3.8.1.1 and 3.8.2). However, this theme shows that most IT requesters did not have the knowledge to calculate the value of IT-enabled business process improvements.

This theme confirms the need to adopt additional measurement methods such as quantification techniques (Hares & Royle, 1994) and setting up outcome indicators (ITGI, 2008a) for benefits evaluations. It also shows the need for the business management to be trained to apply these additional measurement methods. The next theme discusses the practice of most IT requesters to quantify the business improvement.

5.7.2.2 Theme B2: The measurement is a judgment not a calculation.

This theme describes the practice of most IT requesters in measuring the expected business improvement output at the justification stage. Concepts under this theme show that the improvement percentage rate given by IT requesters may not represent the actual expected improvement rate. Most participants acknowledge that they put the numeric percentage without rigorous calculation. Most managers use gut feeling and justify an act of faith in deciding the importance of the IT projects at the justification stage (Ward & Elvin, 1999; Farbey, Land & Targett, 1999).

The instructions in the justification instrument state that IT requesters should indicate the expected business process improvement impact, as a percentage (0=zero, 50%= significant, 100%= total transformation (Addendum C). This theme shows that the participants and other IT requesters rate the improvement looking at the non-numeric scale values to determine the percentage rate. The "Direct Payback" section of the justification instrument intended to show the contribution of the IT solution request to business (see Addendum C). However, this theme shows that evaluators use subjective judgment to determine "productivity improvement" or "saving cost" rather than using mathematical calculation.

Concepts under this theme confirm that the percentage rate is the subjective judgment of the requester, how they value the importance of the initiative. This indicates that the percentage rate is not the actual increase measurement of benefits and the direct payback is a subjective judgment. The following theme focuses on the use the measurement unit by some participants.

5.7.2.3 Theme B3: The measurement unit used to describe the change

This theme contains a concept that highlights the apparent misuse of the measurement unit of quantification. This theme shows the uses of the quantification to describe the change of the business process but not the improvement. The following narrative example from the data document best describes the situation.

A requester put 100% as the improvement because the requested new software will enable them to operate in another way. Since it enables a different and new method, the requester assigned 100% as process improvement impact because it transforms the way they operate in the department.

The change of work method does not necessarily guarantee improvement. The 100% rate given does not indicate the degree of improvement in the business process. The increased work (double) output can be measured and may be attributed to the assigned figure. The concept under this theme shows that the measurement unit is used to describe the change work process but not the improvement. This theme confirms the evaluators' lack of knowledge to measure improvements.

5.7.2.4 Theme B4: Deliberate overestimation

This theme groups concepts that show the attempts made by IT requesters to ensure that the IT requests are approved in the organization. This theme shows that some IT requesters overestimate the business improvement percentage in order to make it impressive to the selection committee. Ward, Hertogh & Viaene (2007) found that in many organizations, users overestimate the value of IT project to get approval. For better benefit evaluation process, this theme has an implication that there is a need for control to validate the improvement percentage figure during justification.

5.7.2.5 Theme B5: Difficulty to measure prediction

This theme describes the difficulty IT requesters have in predicting the benefits at the ex-ante justification stage. In literature, one of the challenges and problem of measurement is quantifying the estimated benefits at ex-ante justification stage (see Chapter 3, Section 3.7). This theme confirms that the participants find it difficult to predict and estimate the level of improvement at this stage.

Evaluators at the ex-ante justification stage can place outcome indicators once the business plans are defined to predict approximate level of potential benefits (Section 3.8.1). The quantification technique also suggests the use of Decision Support Service (DSS), surveys, review past history and managers' experience to predict the approximate future amount (Hares & Royle, 1994). This theme relates Theme A2 in that the evaluators at the earlier stage need to define business goal and formulate a possible outcome.

5.7.2.6 Theme B6: Cost/benefit to attain proportionate percentage rate

This theme contains concept that show the intention to use cost-benefit relationship method at ex-ante justification stage. This proposal is suggested from non-academic

side of business so that their IT requests can be easily interpretable in terms of cost-benefits relationship.

The cost-benefit technique (CBA) is practiced in the organization during the requirement stage of the project. The ex-ante justification stage precedes the requirement stage to select the IT initiative to be considered in the investment portfolio as a project and passed to requirement stage. The concept in this theme is reasonable if most business groups have the capacity to produce a mini business case that also include the additional measurement techniques discussed in Theme B1 to quantify the benefits.

5.7.2.8 General comments and summary on measurement of IT benefits

The measurement of IT benefit at the ex-ante justification stage (content category B) contains themes that show the measurement method to be not sufficient enough to be used for evaluating IT initiatives. Theme B1 shows that the measurement method provides increased improvement percentage figures. However, the measurement method is not a proper quantification technique that can measure the amount of improvement in terms of value. This implies there is a need for adopting an additional measurement method. Theme B2 confirms that the quantification of the improvements is more of the IT requesters' subjective judgement on the importance of the IT project to their business.

The procedure to assign percentage amount for improvement is not clear in the justification instrument (Theme B3). This led requesters mistakenly to apply the unit of measure for other reasons but not for improvement. Theme A5 confirmed the difficulty facing evaluators in estimating the improvements. This content category grouped themes that contain the following problems that are identified with quantification and measurement process:

- The increase percentage calculation is misleading (Theme B1).
- The measurement method is ambiguous to evaluators (Theme B2 and B3).
- The evaluators' skill to measure business process improvement is limited (Theme B1, B2, B3 and B5).
- The percentage figures can be overestimated (Theme B4).

- The estimation of expected benefit at the justification stage is difficult (Theme B5).

The content category contains a suggestion provided by the participant to commensurate the attention the IT project deserve. The use of mini *business case* is suggested to interpret clearly cost-benefit relationship (CBA). This content category also contains a suggestion concerning the deliberate overestimation of the measurements. It is suggested that a business analyst be involved earlier in ex-ante justification stage to validate the measurement figures.

In general, this content category shows that the measurement figure (percentage rate) does not reflect the expected improvements (benefits); rather it represents a highly subjective judgment of the individual's perception about the importance of their requests. This content category also implies the need for the organization to adopt additional measurement techniques from available evaluation method prescriptions (quantification techniques and outcome indicators) and train the business management to measure their requests appropriately.

5.7.3 Category C: Collaboration between IT benefit evaluators

This content category summarises concepts and themes that describe the nature of relationship and communication between the business and IT service department during IT initiative justification process. The category presents the experience and expectations of the participants with IT service department at the time of their justification process.

	Themes	Theme code	Total	%	Accum. %
1	Limited involvement of IT function in justification	C1	42	32	32
2	There is no IT benefits orientation	C2	12	9	41
3	Need of IT personnel to identify benefits	C3	28	21	62
4	Lack of formal feedback	C4	29	22	84
5	Low expectation of approval	C5	21	16	100
	Total		132		

Table 5.4: Content analysis showing relative frequencies and percentages for collaboration between IT management and business management in justification process (Content category C).

Table 5.4 shows that in the transcript of the case study interviews, there were 42 major references to IT management having limited participation at the justification process (Theme C1), 12 references for the need of IT benefits concepts orientation and training (Theme C2), 28 references of business management expected role of IT management function (Theme C3), 29 references on the effect of lack of feedback (Theme C4) and 21 references indicating to business managements' low expectation of approval affecting the process of benefit evaluation (Theme C5).

5.7.3.1 Theme C1: IT management supports on how to justify

This theme groups concepts that show the roles of business management and IT management during the justification process. This theme shows that IT management does not participate in identifying and measuring the benefits. The reason given is that business management knows its own business best to justify and IT management will support as advisory. This is supported in literature that it is the role of business management to identify the benefits of IT for its functional process (ITGI 2008b; Ward & Daniel 2006; Dhillon, 2000). This theme shows that IT management supports the business by hosting a presentation annually to show how to use the justification instrument.

The theme shows all the participants attending these presentations. However, very few other IT requesters within each participant's business unit attend the presentations. The reason given is schedule conflict and the perception that the instruction in the justification instrument is sufficient enough to justify. In addition, the participant that attended does not transfer the information to other interested individuals on how to fill in the justification instrument.

This theme shows that most participants do not involve IT management during the justification process. The concepts in this theme confirm that the lack of awareness on how to evaluate the IT requests may stem from less interaction and communication with IT management.

This theme indicates that business management should demonstrate responsibility and commitment to understand how to justify. This theme also raises conflicts with Theme A4 in that if the participants attend meetings on how to use the justification

instrument, why then do participants focus on making the risk and problems more visible than the benefit? The following theme focuses on this issue.

5.7.3.2 Theme C2: IT benefits concept is not conveyed well

This theme describes the argument raised in the last theme that why are the participants not orientated with the concept of IT benefits for the justification purpose. This theme shows that the participants are not informed about IT benefits. The IT director of the organization acknowledges that IT benefit is not discussed in the meetings.

"IT benefit management is not yet implemented in the organization; we use the benefit identification procedure only for this purpose (discretion investment selection). Our internal clients are not IT oriented and are from various businesses and they are busy with their work. They just want to request their IT needs. Therefore the presentations are to explain to them how to fill in the form, when to submit and about the current budget cycle. We gave them examples (variables), but we don't go deep on telling them about IT benefits"

Concepts under this theme confirm that the reason for ineffective benefit identification and measurement can be attributed to the lack of awareness of IT benefit concept in the organization.

5.7.3.3 Theme C3: The need for IT personnel to participate

This theme groups concepts show business managements' need for IT personnel to participate in their justification activities. Theme C1 showed that IT management do not participate in evaluation and the justification process. However, the IT personnel should be participating in the evaluation (ITGI, 2008b; Remenyi & Sherwood-Smith, 1999). As an evaluator, the task involves being an informer, educator and agent of communication (Section 3. 9.4).

This theme shows that participants want an individual from IT to assist in the justification process (see Heading 3.1.3 in Addendum A). Table 5.5 shows a summary of the participants' suggestions for the involvement of IT personnel at the justification stage. The author of this research assigned role names for the

descriptions provided by the participants. The first column describes business management's aim for the need of the IT personnel, the second column describes the reason they want the IT personnel, the third column describe role name and the fourth column describe what they expect from IT personal.

Business Objective	Reason/ problem	IT Personnel Role	Tasks
Improved quality of justification document	The needs and requirement expressed may not be up to the standard to make a decision by selection committee	*Coach/trainer*	To train and reformulate the needs/requirement as required by the selection committee
Acquire knowledge of IT trends to harness opportunities	Business might not know the full range of possibility IT brings	*Technical technology advisor*	To provide technological and technical information, additional insights
Unrecognized output (benefit) will be visible	Business have problem in identifying expected outputs	*Identifier/ Collaborator*	To guide, share ideas and collaborate in identifying outputs…
Understand IT service department resources	The IT schema (IT resource) of the university in not known, to know their request viable and acceptable	*Informant*	To inform the capacity and technical feasibility of delivering IT service
Validate the claims	The improvement rate and justification may be overestimated	*Assessor*	To check the motivation and percentage for validation
To learn from past mistakes how to justify, not to be despondent	Rejections of IT requests	*Agent of Transparency*	To get formal feedback why others were selected

Table 5.5: Suggested roles of IT personnel during the justification process

The concepts under this theme confirm that IT personnel should participate in the justification process.

5.7.3.4 Theme C4: Lack of formal feedback

This theme also describes the importance of close communication between business management and IT department. It shows how the outcome of the IT requests is communicated to business. This theme groups concepts that show the effect of not getting formal feedback.

Most participants do not get formal feedback about the status of their request from IT service department (see Heading 3.1.4, Addendum A). Concepts under this theme show the lack of feedback has affected their will, commitment and responsibility to justify their requests.

Most participants associate not getting feedbacks with rejection of their requests. Some participants indicate that even if it is approved they do not get feedback until IT department started to develop an IT solution. This theme shows that participants want to know why their proposals are not approved so that they can justify better next time. Concepts under this theme show participants need to learn from past experience.

This theme also shows that if IT requesters get proper feedback, they will be more fervent in filling and completing the justification instrument. In general, this theme shows that the business is developing lack of interest towards the justification process because they are not getting a response on the status of their previous requests. Inductive concept that can derive from this theme is lack of feedback will reduce the effort of identifying and measuring benefits properly.

5.7.3.5 Theme C5: Low expectation of approval

This theme groups concepts that relate to the effect of participants' perception towards the outcome of their requests. The relevance of this theme in this content category relates to the communication not only between business management and IT management but also with the executives of the organization. Most participants repetitively mention their low expectation of their IT request to be approved. This theme shows that participants' cynicism has caused them not to put much effort into the justification process. Some participants questioned the worth of justifying, if there is no hope of attaining their request. The concept in this theme shows that

participants do not submit many requests because they believe they will be turned down.

Concepts under this theme also show that IT requesters use other venues to get approval to their requests. This becomes possible by means of direct communication to executives during executive meetings. This theme shows IT requester finding it effective to communicate to executives directly instead of justifying their project through the benefit evaluation process.

In general, the concepts under this theme show that the effort to benefit identification and measurement is hampered by lack of will to justify projects. This is due to low expectation of approval. The inductive concept that emerges from this theme is that low expectation of approval demoralizes business management to conduct the practice and proper application of benefit evaluation.

5.7.3.6 General comments and summary of collaboration between IT benefit evaluators

This content category contains themes that relate to the importance of IT management participation in the justification process. Theme C1 shows that IT management supports business in how to use the justification process. In literature, the business management have the responsibility to identify the expected business benefits and IT management supports in technical and technological aspects. Theme C1 confirms that. However, the business suggested that IT management extend its role and participate in the justification process. IT management's participation in the evaluations should take a role of facilitator, educator and agent of communication and so forth (see Section 3.9.4). Theme C3 confirms that the role of an evaluator should include being an educator, advisor, informer, consultant and coach. Theme C2 shows that the concept of IT benefits is not well communicated from IT management to business and may have a contributing factor for inadequate benefits evaluation.

Theme C4 also describes the importance of close communication between business management and IT department. Concepts under this theme confirm that the lack of feedback has affected the business management will, commitment and responsibility to justify their requests. The business management questions the purposes of justification, if there is no hope or response about their previous IT requests. The

business benefits are not thoroughly evaluated because there is no motivation from business to justify. Theme C5 shows that low expectations of project approval can demoralize business management from justifying their initiatives appropriately. This has a negative effect on benefit identification and measurement process at ex-ante justification stage.

5.8 Summary of the findings

The researcher will attempt to summarize the findings of the empirical data in the structured diagrams of Figure 5.2 and Figure 5.3. These two cause-and-effect diagrams (Ishikawa, 1982) will be used to graphically illustrate, (a) the relationship between the research problem and the contributing factors to the problem, and (b) the relationship between the possible solution and the possible contributing factors to achieve the solution.

A cause-and-effect relationship diagram is a tool that helps to identify, sort, and display possible causes of a specific problem or solution. Fillery, Ruslie and James (1996) indicate that in describing the problem situation within soft system methodology, cause-and-effect diagram is one of the supplementary techniques used in IS studies. The benefit of using a cause-and-effect diagram includes (Ishikawa, 1982; Balancedscorecard, n.d):

- Helps determine the *root causes* of a problem using a structured approach
- Uses an orderly, easy-to-read format to show cause-and-effect relationships
- Indicates possible causes of variation in a process
- Identifies areas where data should be collected for further study.

5.8.1 Factors contributing to the problem

A cause-and-effect diagram is constructed to illustrate a list of causes that are discussed in content categories to show their relationship to the problem statement. The diagram has a cause side and an effect side. The effect is the problem identified in this study that is "inappropriate IT benefit identification and evaluation". The aim of the diagram is to depict and explain why the problem occurred.

In the diagram the horizontal arrow is pointing to the right and pointing to the effect. The major branches of the diagram are the categories or the main causes. The categories are labelled and under each a list of many causes that are related to the categories are attached as sub-branches. These minor contributing factors are labelled in detail and if one applies to more than one major cause or category, it is listed under both.

Additional factors in more detailed level of the cause or categories are identified from relevant themes and are organized on the related causes or categories. Each lower level cause is attached to the associated upper cause. The causes that appear repeatedly *may* represent root causes.

The major categories of the diagram are the similar to research categories:

- The business benefit of IT, labelled as "Benefits", under which all factors related to the concept of IT benefits and the identification of benefits.
- The business benefit of IT evaluation, labelled as "Measurements", under which all the factors related to the measurement process of IT business benefits.
- The business benefits evaluators, labelled as "People", under which all the factors are related to the evaluators.
- The communication, labelled as "Communication", under which all the factors related to communication and collaboration. This category is part of evaluators' category, but it has emerged from the empirical data as a substantial factor and was made as a major category for the diagram.

The cause-and-effect diagram is intended to illustrate the findings from the empirical data in a structured format. The data presented in the diagram is entirely generated from the empirical study. The diagram is used to integrate the themes to the focal goal of the study. It is also used to depict the relationships of concept derived from themes that are under a different research category.

The following cause-and-effect relationship diagram (Figure 5.3) illustrates the relationship between the research problem and the contributing factors discussed in the themes.
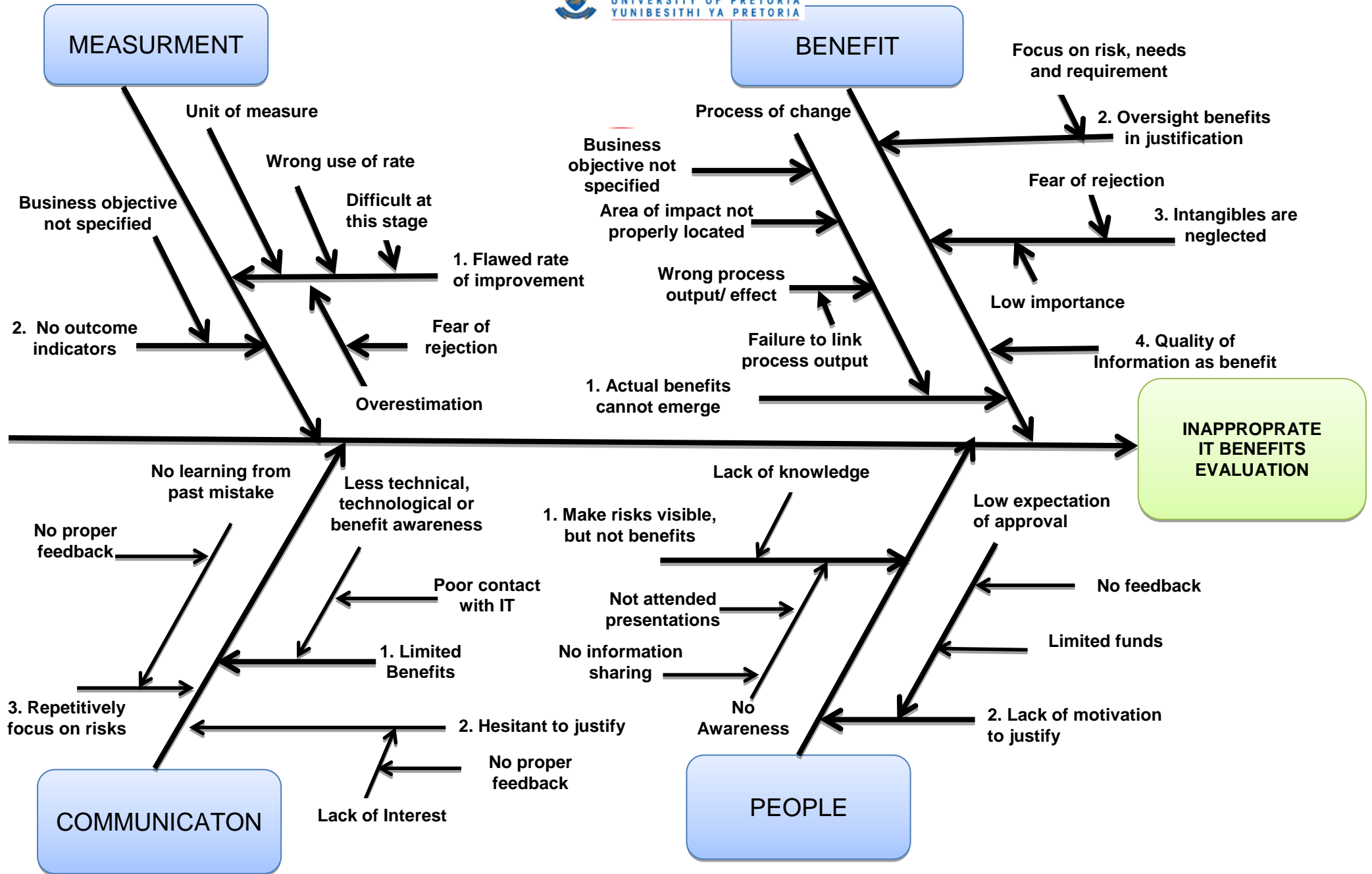
Figure 5.3: Cause-and-Effect diagram illustrating main causes for inappropriate IT benefit identification (adapted from Ishikawa, 1982)

The explanation of the factors affecting the benefit evaluation in the cause-and-effect diagram is described in the following tables. Each numbered heading is the sub-branch under specific category in the diagram.

Benefit Category
This category contains identified causes for inappropriate benefit identification that are related to the ineffective practical application of benefit identification process and minimal utilization of the concepts of IT benefits.

1. The actual benefits cannot emerge. This is caused by:
    a. The *process of change* for identification is not undertaken (Theme A2, and Theme A7). This is due to:
        i. Business objectives are not specified and used to formulate outcome (Theme A4)
        ii. The specific area of impact is not identified or selected properly, requesters depend heavily on predefined examples (Theme A6)
        iii. Wrong effects of improvements identified. This is the result of:
            - Inconsistent link between the area of impact (business process) and the improvement output (Theme A6 and A7).

Conclusion: The proper steps for identifying benefit are not practised. Benefits had emerged using pre-defined benefit variables (examples) without the knowledge of evaluators.

2. Benefits are not considered during the justification process. This is caused by :

    a. The justification is seen as an invitation for business requirement "imperatives" because:
        i. They focus on the risk and problems

Conclusion: The benefits are not noticed during the justification process. Business management focuses on describing the risk and needs for IT solution.

3. Intangible benefits are neglected (Theme A8). The reason given is:
    a. Business management perceive intangible as not being a credible claim fear of rejection
    b. Business management regard them as low importance for their business,

and viewed as a wish list
Conclusion: The impact of intangibles is not clearly understood, thus evaluators do not put effort into identifying intangibles.
4. Quality of information is seen as benefit (Theme A9).   **Conclusion:** Information is put as benefit, however, the *effect* of quality of information is supposed to be a benefit.
General comment of the category: There is lack of awareness of IT benefit concept and lack of knowledge in how to identify benefits. The intended output from the justification process for discretionary investment requirements is not clearly understood. Therefore, intangibles are neglected, the quality of information is seen as benefits and the proper benefit identification process is non-existent.

Table 5.6: Factors contributing for inappropriate IT benefit evaluation - Benefit category

Measurement category
This category groups causes that contribute to inadequate measurement of IT benefits that relate to measurement practice in the ex-ante justification stage.

1. The measure does not represent the improvement level. This is due to:
     a. The unit of measure is ambiguous (Theme B1 and B2)
     b. Wrong use of unit of measurement (Theme B3)
     c. Difficult to predict at ex-ante stage (Theme B5)
     d. Overrated estimation (Theme B4).
 Conclusion: The benefits contribution level is determined by the requester's subjective judgment without proper calculation. There is no control to validate the estimation.

2. The metric for outcome indicators are not prepared (Theme B2). This due to: a. Business objectives are not specified (Theme A4)   **Conclusion:** The expected benefits can be estimated by setting the expected outcome of the business plan. However, the evaluators did not explicitly measure expected improvements using their business plan.

General comment of the category: The measurement is highly subjective. The measurement method led IT requesters to use their judgment to estimate the improvement. In addition, IT requesters have limited skill to measure the expected improvement.

Table 5.7: Factors contributing for inappropriate IT benefit evaluation - Measurement category

Communication Category
This category contains causes that contribute to inappropriate business evaluations that are related to lack of proper communication.

1. There is limited awareness of new benefits possibilities as a result of:
     a. Lack of awareness on the technical and technology aspect, due to
         i. Poor contact with IT management during justification.

Conclusion: There might be many unrecognised benefits of IT to business because of a lack of information regarding new trends from IT experts.

2. Hesitant to justify the IT initiatives as result of:
     a. Lack of effort and interest (Theme C4), due to
         i. There is no feedback on the status of past and present request.

Conclusion: Benefits might not be appropriately identified because there is no effort put into their justification activity because they do not know the status.

3. Repetitively justifying based on the risks and needs (Theme A5, Theme A6), as a result of:
     a. There is no learning from past mistakes, due to
         i. Lack of feedback.

Conclusion: Benefits cannot be identified since requesters repeatedly justify on the basis of needs since there is no learning taking place from past mistakes.
General comment and conclusion: The lack of formal feedback proved to be detrimental for the benefit evaluation process. It is one of the main factors for inappropriate benefit identification and measurement in the organization.

Table 5.8: Factors contributing for inappropriate IT benefits evaluation - Communication category

People category
This category contains causes that contribute to inadequate benefit evaluation that relate to evaluators' awareness of IT concepts, skills and behaviour during the justification stage.

1. Evaluators do not attempt to make benefits visible, as a result of:
 	
    a. Lack of knowledge about IT benefits (Theme C2, B5)
 	
    b. Lack of awareness that the justification is on the basis of benefit, due to
 	
        i. Do not attend presentations (Theme C1)
 	
        ii. The information about the justification is not cascaded or shared at the work place (Theme C1).
 	
Conclusion: Business does not put effort to learn how to fill in the forms (to make the benefits visible).

2. Evaluators are not motivated to request IT initiatives using the justification form. The reason given is :
 	
    a. Low expectation of approval (Theme C5), due to:
 	
        i. no feedback for past rejections (Theme C4)
 	
        ii. Limited fund in GTB spending (Section 5.2).
 	
Conclusion: Low expectation of approval reduces the effort in identifying benefit.

General comment and conclusion: Businesses are reluctant to justify for IT solutions because of past experience of low probability of their initiatives being acceptable. Low expectation has caused them to have low perception of the value of justification.

Table 5.9: Factor contributing for inappropriate IT benefits evaluation - People category

5.8.2 Summary of factors contributing to inappropriate IT benefits evaluation

There is lack of awareness of the IT benefit concept and lack of knowledge in how to identify benefits. The evaluation basis for determining IT initiative for discretionary investment portfolio is not clearly understood by most respondents. Therefore, intangibles are neglected, and benefits are not properly identified.

The measurement of benefits is highly subjective. Most IT requesters do not conduct mathematical calculation and use their judgment to estimate the improvement. The

measurement method led them to quantify the improvements in figures as they see it fit in their perception the importance of the IT projects. In addition, IT requesters have limited skill to measure the expected improvement.

The lack of feedback proved to be detrimental for benefit identification. It is one of the main factors for inappropriate benefit identification in the organization. Businesses management are also reluctant to justify for IT solutions because they have low expectation of approval.

These reasons explain why benefit evaluation is not appropriately identified and measured in the organization. The root causes are laid down in detail in the cause-and-effect diagram (Figure 5.3) and explanation tables (Table 5.5 to 5.9). Once these contributing factors for inappropriate evaluation are identified, the next step is to propose ways of improve the evaluation process.

5.8.3 Plausible factors that may contribute for betterment

The main objective of this study is to propose ways to improve the current benefit evaluation process in the organization. The following diagram illustrates the relationship between the proposed solution for the problem and the contributing factors to achieve it. The effect in the diagram is the positive outcome and focuses on a desired outcome that tends to lead to betterment. It is expected to resolve the problem after understanding the main factors contributing to the problem. The positive outcome (effect) is "Better IT benefit identification and measurement".

The positive outcome and the possible factors that contribute to achieve it are taken from the empirical data. The factors are not the assumptions of the researcher but the compilation of suggestions made by the research participants and literature. The data were analysed and synthesized in the following diagram (Figure 5.4). The format of the diagram is as described in section 5.8.1.
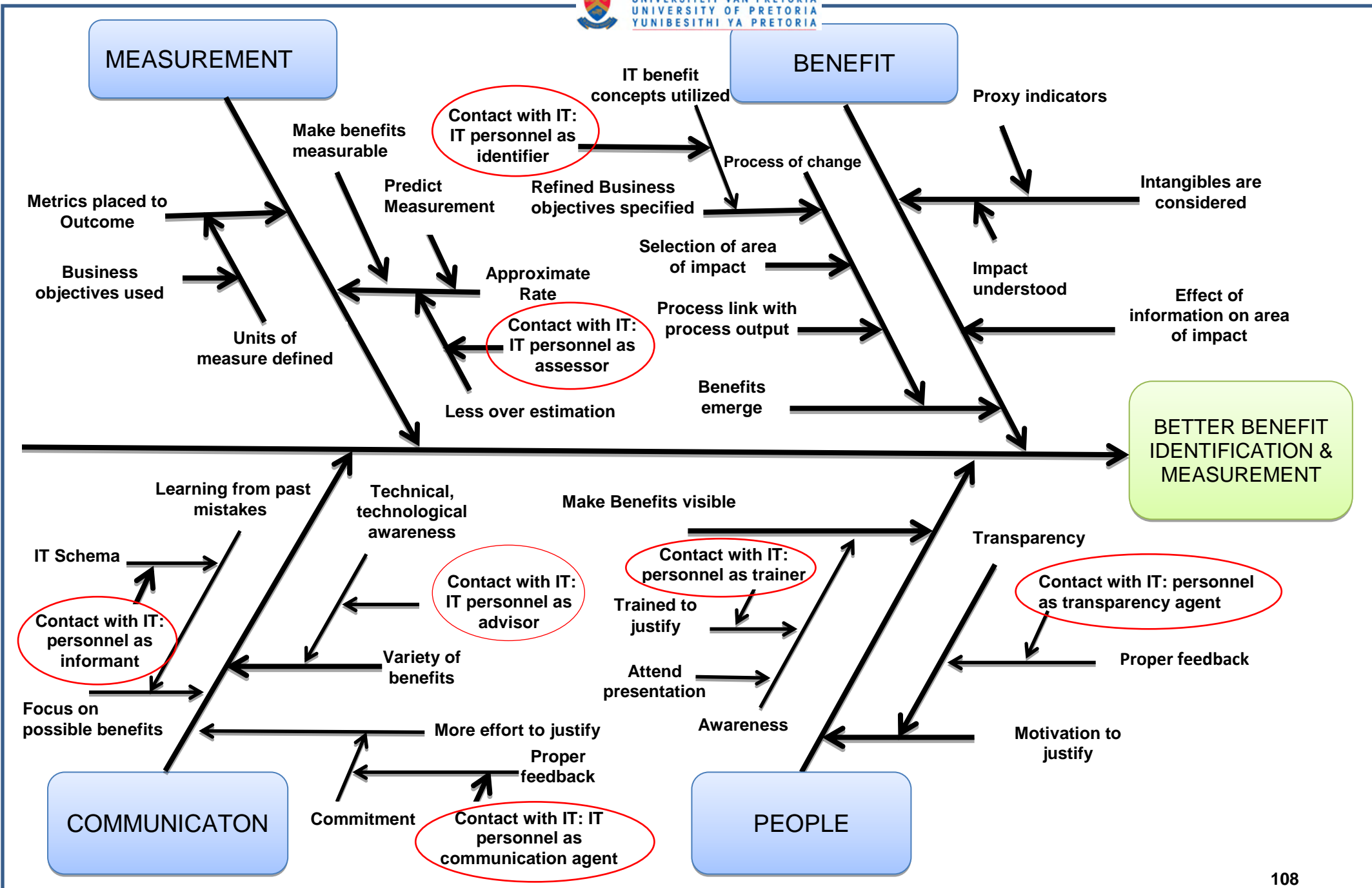
Figure 5.4: Cause-and-Effect diagram illustrating plausible factors contributing for better IT benefits evaluation (adapted from Ishikawa, 1982)

People category
This category contains possible contributing factors for better benefit evaluation that relate to the change of perception of IT requesters.

1. The benefits will be made visible, this is due to:
    a. The business awareness of the justification basis, due to
        i. Business attending presentations (Theme C1,)
        ii. Business trained to justify on the basis of benefit (Theme A2, Theme C2, Theme A5) as a result of
            • An IT personnel charged with training task (Theme C3)
 	
Conclusion. The business perception of justification will change towards benefits during the evaluation. Instead of focusing on risks or problems; they will attempt to make benefits visible. The main reason would be business awareness of IT benefits and training they get from IT management on how to identify benefits.

2. Business will be earnest to justify, as a result of
    a. Information of the status is understand budget allocation
        i. Receive feedback (Theme C4)
            • IT management contact (Theme C3)
 	
Conclusion. The business managements' low expectations of project approval might be reduced by providing information (proper feedback) for the reasons behind the decisions so that they know the situation. This may regenerate commitment and motivation.

General comments and conclusion. The involvement of IT management on the justification process is expected to have an impact on business. IT management should train business how to justify initiatives based on benefit and make the business aware of IT benefits. A close contact or communication would also foster transparency of the selection process to reduce the negative perception of bossiness (low expectation) towards project approval and this may revive commitment and motivation to justify.

Table 5.10: Plausible factors contributing for better IT benefits evaluation - People category

Communication category

This category contains factors that may contribute to better benefit evaluation that relate to the close relationship and communication between business management and IT management.

1. Variety of benefits that were unrecognized will be identified, as a result of:
   a. Technical and technological awareness, due to
      i. IT personnel participation as technical advisor (Theme C3, Theme A2).

Conclusion: IT personnel participation as a technology advisor will lead to recognition of many opportunities and IT benefits to the business.

2. Business put more effort to justify IT initiatives, as a result of:
   a. Commitment (Theme C4), due to
      i. If they get any feedback whether it is positive or negative (Theme C4)
         - And it can be achieved by assigning IT personnel as communication agent.

Conclusion: Proper feedback will ensure commitment to justification and there will be a possibility of motivating business to put more effort to justify, and in doing so business will attempt to identify benefits. IT management as a service department has the responsibility to provide proper feedback. IT personnel can be charged with the role of communication agent to provide formal and proper feedback.

3. Business focuses on viable benefits, as a result of:
   a. Business learning and understanding the current capacity, due to
      i. Awareness of the organization IT schema (Theme C4), due to
         - Contact with IT (Theme C3).

Conclusion: Business is expected to be informed of IT management's IT schema (IT management goals and capacity) of the organization. Business will understand the capacity of the IT resource and justify projects within the limits of feasible capacity of IT management. This might increase the probability of acceptance of projects. IT benefits that are realistic and practical are expected to be identified.

General comment and conclusion. IT management collaboration and close contact is expected to enable business to commit and justify appropriately their proposed IT initiatives. Business will be responsible for their justification and IT personnel can be assigned as technical advisor, communication agent, and informer.

Table 5.11: Plausible factors contributing for better IT benefits evaluation - Communication category

Benefit category
The IT benefit category contains contributing factors for better benefit evaluation that are related to the understanding of IT business benefit concepts and its effect on practical application of the IT benefit identification process.

1. Benefits will emerge, as a result of:
    a. Process of change is understood and applied in identification process, because
        i. Business objective is clearly defined and refined (Theme A4), due to
            1. The concepts of IT benefits are clearly understood and applied. This is due to,
                a. Better awareness and IT personnel involvement (Theme C3)
        ii. Business is able to locate specific area of impact (Theme A6)
        iii. The change in the area of impact will be defined and specified (Theme A7)
        iv. The effect of change (improvement) is clearly understood and specified.

Conclusion The business objective will be used and clearly expressed. The business objective of IT will be modified and refined in accordance to the IT management goal and capacity. IT management may participate in identifying potential IT benefits. The concepts of IT benefits are understood and proper steps to identify benefits are expected to follow.

2. Business will attempt to consider intangibles (Theme A8)

    a. Business will use proxy indicators (Section 3.8.2)

        i. The impact and importance become visible

    b. The effect of *information* will be considered (Theme A9)

Conclusion: Once the concept of benefits is understood, intangibles are expected to be considered and identified. Intangibles may weigh more in some IT initiatives and will be considered.

General conclusion and comments: Once the concept of benefit is clearly understood, the proper steps of identifying benefits are expected to be followed and the impact of intangible is expected to be considered. The objective of IT will be modified and refined in accordance to the IT management goal and capacity. Business management is expected to understand and utilize the concept of IT benefits in their justifications.

Table 5.12: Plausible factors contributing for better IT benefits evaluation - Benefits category

Measurement category

This category contains plausible contribution factors that relate to the modification of measurement method.

1. The outcome indicators will be specified and the improvement can be estimated (Section 3.8.1).

    a. Business translates the problems and needs into expected benefits through the effect on the business plan/objectives (Theme A4, Theme A5)

        i. Business plans will be used during measurement.

Conclusion: The business plan will be revisited during measurements of the benefits. The performance and outcome indicators specify metrics to measure achievement of the business plan.

2. The identified benefits will be measured appropriately:

    a. The measurement of the expected improvement in business area is close to the approximate rate, due to

        i. The benefit will be made measurable (Section 3.8)

        ii. The measurement will be predicted in volumes (Section 3.8.1.1)

            1. IT function participate in calculation and to ensure for validity if possible (Theme B4)

        iii. The estimation can be done in terms of monetary flow (Section 3.8.3.1).

Conclusion: The measurements take formal quantification techniques and expected to reflect approximate level of the improvement. The quantification technique steps include deciding the units of measure for the business plans outcomes, to make the outcomes measurable, predict in volumes (numbers) of the improvement and make the estimation using monetary flows.

General conclusion and comments: The business plan will be revisited during the measurement of IT benefits and the outcome indicators will be specified. The outcomes will be made measurable by predicting in volumes and estimating in monetary terms. The result is expected to be better approximate figures to potential benefits. This method is expected to minimize the highly subjective nature of benefit measurements at ex-ante stage to be more objective.

Table 5.13: Plausible factors contributing for better IT benefit evaluation - Evaluation category

5.8.4 Summary of factors contributing to better benefit evaluation

The participation of the IT service department in the justification process is expected to have significant contribution to the betterment of benefit evaluation at ex-ante stage. The IT department should train business management how to justify IT initiatives based on benefit and make the business management aware of IT benefits. Closer contact and good communication could also foster transparency that may reduce business management's low expectation of approval to generate motivation and commitment.

IT management's personnel participation as a technology advisor will lead business management to recognize many opportunities and benefits to the business. The close contact and good communication that may result in providing proper feedback will ensure commitment and there will be the possibility of motivating business management to put more effort towards justification. Hence, in doing so, business will attempt to evaluate benefits. The feedback also serves business management to learn from past mistakes and attempt to refine their justification in the future. This will also enable them to learn how to identify IT benefits better.

Once the concept of benefit is clearly understood, the proper steps for identifying benefits are expected to be followed and the impact of intangibles is expected to be considered. The business objective/plan should be used and clearly expressed in the justification process. The objective of IT to business will be modified and refined in accordance to IT management's goal and capacity. It is also expected that IT management will have a responsibility to communicate its goals and capacity.

The business plan will be revisited during the measurement of benefits. The performance and outcome indicators specify metrics to measure the likelihood of achieving the business plan. These indicators will be made measurable by predicting in volumes and estimating in monetary terms. The result of the measurement is expected to produce better approximate figures of potential benefits. This method is expected to reduce the current highly subjective practices to become more objective through appropriate steps and calculation.

The factors that contribute to better benefit evaluation are identified in more detail from relevant themes and are organized on the related categories. The causes that appear repeatedly represent root causes. As shown in Figure 5.4 and Tables 5.9 to 5.13, the participation of IT management in benefit evaluation repeatedly appears in the categories. The main contributing factor for the betterment of the current IT benefit evaluation is the collaboration, partnership and participation of IT management in the justification process. The results of the findings indicate that IT management collaboration and partnership is crucial in the ex-ante justification process. The findings further show that the task of IT management is expected to exceed beyond the role of technology and technical advisor. This is confirmed by the

roles suggested to IT management as a coach, trainer, educator, informer, technology advisor, and agent of communication and transparency.

5.9 Conclusion

This chapter carried out the research methodology laid out in Chapter 4. It described and explained how content analysis was used to analyse concepts and themes that emanated from the case study data. It showed the analysis of the case studies and the empirical evidence summary. The cause-and-effect diagram was applied to summarize and to show the relationship of the themes that emanated from the study. The study used hermeneutics to looking carefully at the text and assign meaning to the case situation. In general, the findings of the empirical data presented in this chapter explain the factors contributing to ineffective benefit evaluation in the organization and it is being used to propose ways to improve the evaluation process as a solution to the problem addressed in this study. Therefore, based on the empirical findings an evaluation method is developed for the participant organization. The next chapter will discuss the IT benefits evaluation method of this study.

CHAPTER 6: IT benefits evaluation method at ex-ante justification stage

6.1 Introduction

The previous chapter presents the data analysis and results of the study. This chapter will discuss an IT benefits evaluation method proposed for the organization under study. The method is developed from literature review and empirical evidence. It has three sections for each main category of the benefit evaluation study in this research. The first part consists of steps for identifying IT benefits; the second part focus on the technique for benefits measurement and the third part discusses how to conduct the evaluation method based on evaluators' responsibilities in the process. Towards the end of this chapter, the three parts will be integrated to present IT benefits evaluation method at ex-ante justification stage.

6.2 The method of IT benefits evaluation

According to Hirschheim *et al.* (1996), a methodology can be interpreted as an organized collection of concepts, methods, beliefs, values and normative principles. In IS development, a methodology has a set of goal-oriented procedures that guide the work and cooperation of various involved parties or stakeholders (Hirschheim *et al.*, 1996). These procedures are usually supported by a set of preferred methods and activities. A method is defined as "a well-defined sequence of elementary operations which permits the achievement of certain outcomes if executed correctly" (Iivari, Hirschheim & Klein, 1998: 165).

The IT benefit evaluation method is a product of the empirical findings (Chapter 5) and supported by IT benefits evaluation concepts reviewed from existing literature (Chapter 2 and 3). The proposed method consists of a sequence of activities that aims at achieving effective IT benefits evaluation in the organization.

The benefits evaluation method diagram (Figure 6.6) shows the integrated steps and the responsibility of the evaluators for joint participation. The steps laid out in this method are to be used to identify IT benefits and to measure them. The method is presented as a proposal of benefit evaluation improvement at ex-ante justification stage. The benefits evaluation method is presented in the following three sections.

6.3 Part I: IT benefit identification

The first part of the benefits evaluation method focuses on how to recognize and identify IT benefits in the organization. This first part of the method is developed from the findings of empirical evidence with the support of the classification methods of Lindfors (2003), McLean and DeLone (2002), Andresen *et al.* (2000), and Farbey, Land and Targett (1993). These benefits categorizations methods have been used extensively to develop this part of the evaluation method. The IT benefit identification method is shown in Figure 6.1. The steps in sequential order are as follows.

6.3.1 IT benefit identification process

Step 1: Define business objective that align with organization strategy

The business unit first defines the business objective (Theme A3). The IT solution is needed to support the existing business plan or a new business plan is introduced to take advantage of IT opportunities.

The organization's strategy is too broad to be used to identify clear and specific benefit (Theme A2); instead it should be embedded in the business unit plan (Chapter 2, Section 2.4.2 and Chapter 3, Section 3.10.1). The business plan should be used to set up the expected outcomes (Chapter 2, Section 2.4). The outcome refers to the business processes that are involved to successfully achieve the plan (ITGI, 2007). These expected outcomes can be used as a basis to recognize possible benefits.

Step 2. Identify business problems or opportunities

This step focuses on the business responsibility to clearly understand and identify the problems or opportunities that necessitated the IT solution. Changchit, Joshi and Lederer (1998) showed that problem identification is essential in the process of identifying the relevant and proper benefits. In content category A, it is found that most businesses attempt to identify problems and justify their proposals on the basis of their problems. This step is not the end of justification process but it is the process that indicates what changes are desired to occur. Andresen *et al.* (2000) suggested that it is important for each business unit to identify benefit similar to their own type of business (Section 2.6.2). Theme A5 shows the business groups' difficulty in formulating their justification is because they were not provided with the benefit variable examples fitting or related to their line of business.

Organization Strategy

Step 1
Define objectives

Business objectives

Step 9
Ensure the positive outcome link to business process

Step 8
Ensure it is positive outcome

Expected Positive Outcome

Business Units

HR Department

Academic: Faculty

Sales Department

Organization Structure

Strategic

Management

Operational

Functional

Support

Business Processes

Information & Technology

Information

System

Service

Process

Individual

Indicators

Efficiency

Effectiveness

Performance

Transformation

Automated Process

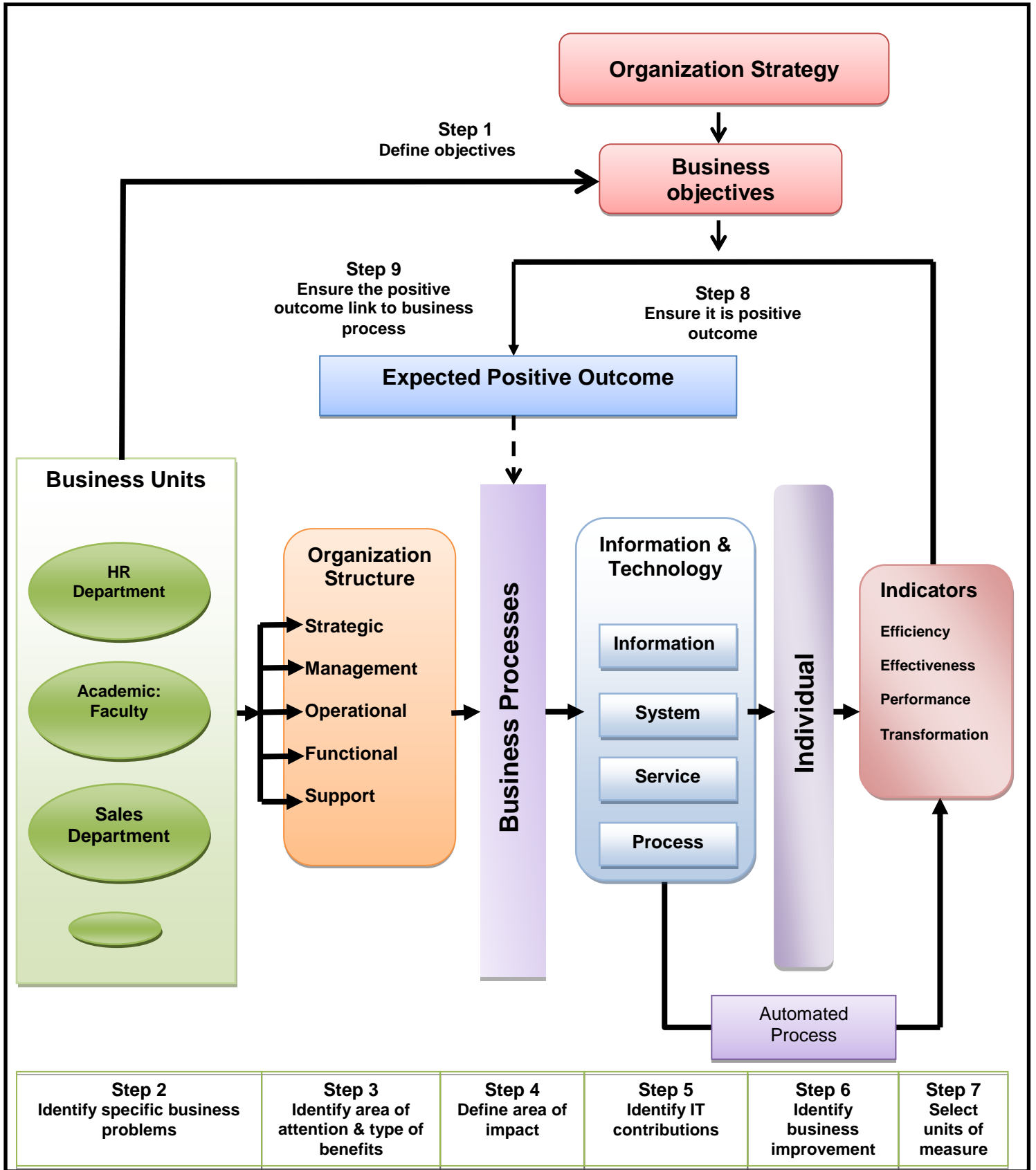| Step 2 Identify specific business problems	Step 3 Identify area of attention & type of benefits	Step 4 Define area of impact	Step 5 Identify IT contributions	Step 6 Identify business improvement	Step 7 Select units of measure

Figure 6.1: Proposed IT benefits identification method

Therefore, it is important for each business unit to identify problems that deter or support (opportunities) their own business plan to understand the possible benefit that may emerge by introducing the IT solution. This step also highlights the need to relate benefit to the type of business.

Step 3. Identify area of attention and type of benefits

Iran's (2002) and Farbey, Land & Targett's (1993) organizational hierarchy structure is applied to identify the type of work the IT initiatives are enabling or supporting. This step provides, with detail, the area of impact where the change should take place (Chapter 2, Section 2.6.3). It will also show the nature benefits that are to be expected (Irani, 2002). Theme A4 and C2 show the participants have a lack of awareness of IT benefits. Adapting the organization hierarchy structure benefit classification will enable them to understand the type of benefit they are expecting.

Step 4. Define the area of impact

The business plan, and the problems identified points to the business process that needs to be targeted (Chapter 2, Section 2.3). In this context, the business process is the *area of impact* (Section 2.5.1). The business process is the actual work activity or work flow that is carried out to achieve the business objective and plan. The process of change is expected to be carried out on this business process (Section 2.4.2). Theme A5 showed that the IT requesters should identify the business process that is affected. However, it also showed that they become dependent on the examples provided to them. In the process of identifying benefits, the area of impact or the specific business process should be clearly identified and defined.

Step 5. Identify Information and Technology contribution

Once the area of impact is identified the following step is to understand how "information technology" enables the change in the business process. DeLone and McLean's (2002) and Lindfors' (2003) dimensions of "information", "system", "process", and "support" variables will be linked to specific area of impact to easily recognize the possible business benefit variables (Chapter 2, Section 2.6.1.1 and 2.6.1.2).

Step 6. Define the business process improvement

The effect of change on the individual or business process will emerge in this step. The impact on the individual and how the change is expected to influence the behaviour of the user will be understood (Chapter 2, Section 2.6.1.1). Consequently, it is expected to lead change in the business performance through the action of the individual. Theme A8 shows that IT evaluators assume the quality of information as benefits. This step will allow them to see that some benefits are second order effects (Chapter 2, Section 2.5.2). The benefits are the effect of quality of information on the individual (Section 2.6.1.2). Some effect of changes may not involve direct human connection in the process and completely be to automate the business process. This type of benefits has first order effect.

Step 7. Select units of measure

The outcome of a change is determined as a discrete measure (Section 2.6). The *unit of measure* describes the expected effect of intended change. The units of measure can be made measurable by assigning countable metrics. This will make it an outcome indicator of the business objective/plan (Chapter 3, Section 3.8.1). The units of measure determine and show whether it is a measurement of efficiency, effectiveness, performance or transformation (Section 2.5.4).

Step 8. Ensure it is a positive outcome

The expected benefit variable that will emerge should be the expected positive outcome of the business objective. It should be for the purpose of achieving or maintaining the business objectives. Change in individual or business process does not guarantee expected benefit. An employee may gain better information but, if it is not for the achievement of the business objective, then it is not a business benefit (Chapter 2, Sections, 2.3, 2.3.1). This requires revisiting and aligning to the business objective (Theme A2).

Step 9. Ensure the positive outcome relate to the business process

The positive outcome that has been defined following steps from 1 to 8 must be associated with the affected business process (area of impact) to ensure validity of the benefit (Theme A6). If it is not clearly linked with the business process then it

may lead to an inaccurate benefit variable for that particular IT request (Section 5.7.1.10).

6.3.2 Summary of IT benefits identification process

The steps from 1 to 9 are expected to lead to identify and describe a specific and accurate potential benefit variable. The positive outcome indicates the type and characteristics of the benefit that is expected to emerge. The IT benefit identification method describes the steps that are necessary to be exercised (taken) to formulate the positive outcome. This method largely requires evaluators (business management) to understand the concepts of IT benefits. This can be possible during the annual presentation hosted by IT management on how to justify IT projects (Theme C1) or if IT management participate in justification process (Theme C3). If this method is applied properly it is expected to provide better benefit evaluation result at the ex-ante justification process.

6.4 Part II: IT Benefit Measurement

Measurement is part of the process of IT project justification. The problems and challenges of IT projects measurement was discussed in Chapter 3, Section 3.9. In literature, three main measurement challenges were identified: the degree of uncertainty at the ex-ante justification stage, the intangible nature of benefits and inability of having a single unit of measure. The empirical evidence shows that the following list of measurement problems are found in the organization. The problems closely correlate with the challenges identified in literature.

- The estimation of expected benefit at justification stage is difficult (Theme B5).
- The increase percentage calculation method used is misleading (Theme B1)
- The measurement method is ambiguous to evaluators (Theme B2 and B3)
- The evaluators' skill to measure business process improvement is limited (Theme B1, B2, B3 and B5)
- The percentage figures can be overestimated (Theme B4).

The following section will discuss possible approaches to alleviate the problems.

6.4.1 Measurement at the ex-anti justification stage

The identification of the benefit during justification process was addressed by providing the method for identification (Section 6.3). The first step of the method is defining the business plan. Each business plan has an outcome that indicates whether the goals have been met (ITGI, 2007). In benefit identification context, Section 6.3 presents how to formulate a positive outcome. At the ex-ante justification stage, a measure or metric can be placed to the outcome and performance to indicate whether the goals can be met. The indicators relate to the expected improvement on the affected business project.

The following figure (Figure 6.2) depicts with examples the relationship between the business goal, outcome and performance indicators. The relationship concept is adapted from COBIT Framework 4.1 (ITGI, 2007) for control measures of IT governance. This study applied and reformulated this method for benefit evaluation research.
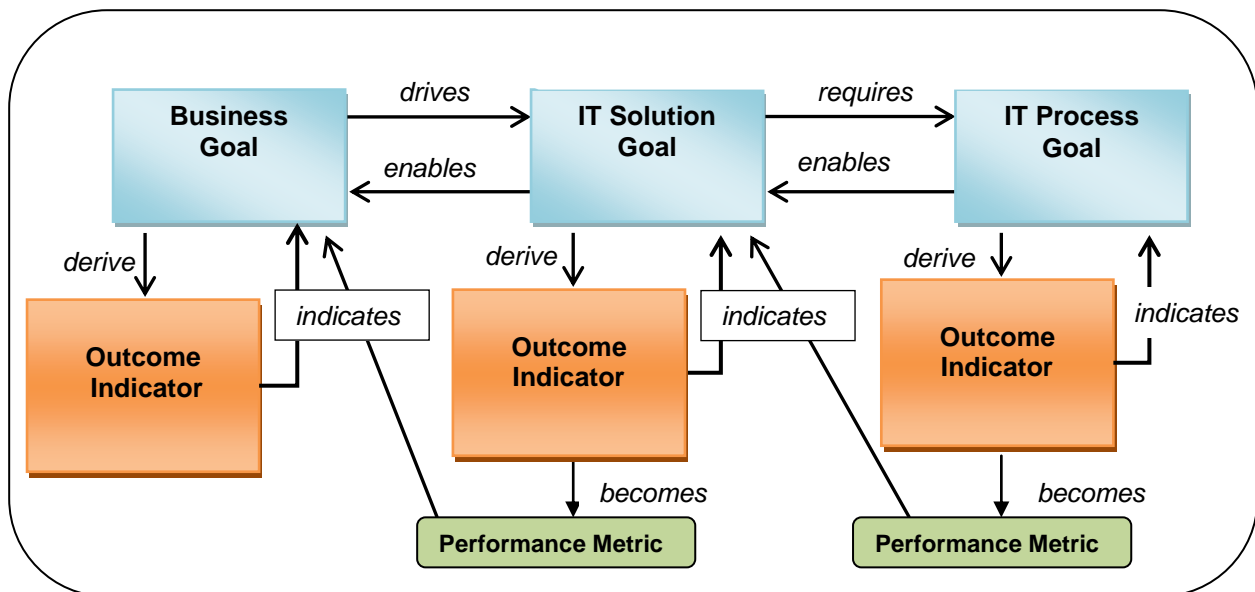
Figure 6.2. Modified business goal and outcome indicators for benefits evaluation (adapted from Cobit framework - ITGI, 2007)

The "business goal" may require and initiate an IT solution. The IT solution will enable changes to occur in the business processes. The relationship between the business goal and proposed IT solution should be clearly understood. The IT solution establishes its own goal that aims to ensure the "business goal" will be achieved. The "IT solution goal" focuses on the impacts on the business. The IT

solution has processes that operate and integrate to make it a system. Each IT process also establishes its own goal. The "IT process goal" is to become effective and efficient to achieve the goal of the IT solution.

The outcomes as discussed in Chapter 2, Section 2.4 are the effects of change. A measure or metric can be placed to the outcomes to indicate whether the goals have been met (ITGI, 2005). Performance indicators, also known as key performance indicators (KPI), indicate whether goals are likely to be met (ITGI, 2005). The IT process has its own outcome indicator and performance indicator. Both types of indicators have the same metric and content. While the outcome indicator shows whether the "IT process goal" is met, the performance indicator shows the likelihood of the "IT solution goal" is to be met.

The performance indicator of the "IT solution goal" reveals how well the IT solution is performing in enabling the business goals to be achieved. In turn, the outcome of the "business goal" indicates whether the goal is met and may indicate the expected benefit to be gained (Section 3.10.1).

The process of defining the business goal and deriving the expected outcome covers steps 1 to 9 of the business benefits identification method in Section 6.3. At the justification stage of the project, more importantly for ex-ante evaluation, defining the business goal and deriving the outcome indicators is critical to estimate better the expected benefits. Once the outcome indicator is specified, the estimation and quantification process will proceed.

6.4.2 Benefits measurement method

Theme B1 shows that the measurement method at the organization is not adequate enough to measure predicted benefits. The quantification and measurement method of IT benefits, tangible or intangible, will follow the method laid out in Figure 6.3. Moreover, Figure 3.2 in Chapter 3 shows with examples the adapted quantification technique for this specific measurement method.

The problem in the organization is that the measurement methods led to subjective judgment rather than using mathematical calculation (Theme B2). The following

steps are expected to minimize the practice of subjective judgment in measurement to make it more objective by applying the following quantification and calculation process.
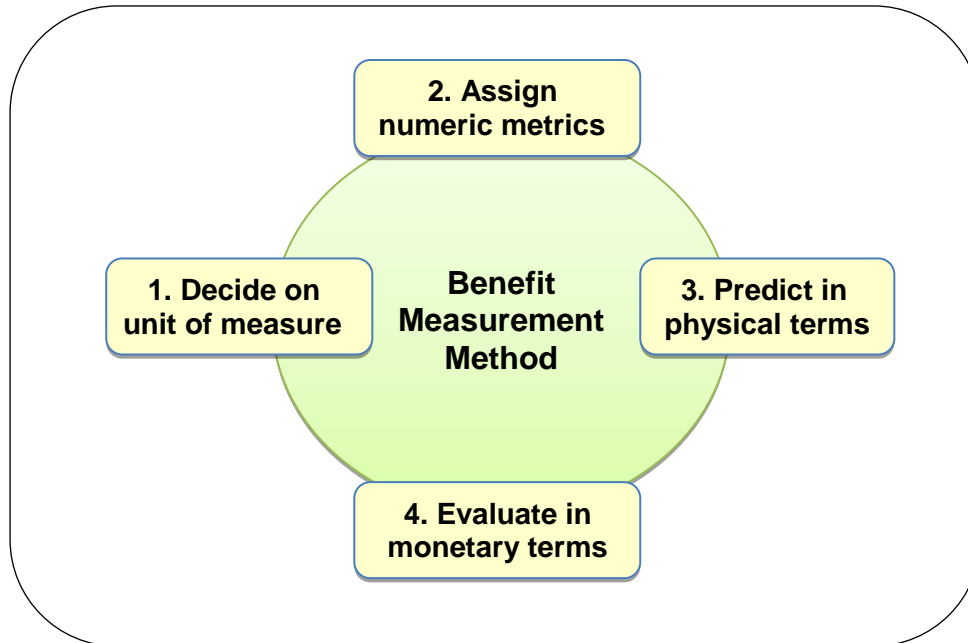

Figure 6.3: Modified benefit measurement method (adapted from Hares & Royle, 1994)

Step 1. Decide on unit of measure

This step is similar to step 7 of benefit identification method (Section 6.3). It is deciding a unit of measure for both tangible and intangible benefits. This step in this part of evaluation method expands further by focusing on measurement and will be used to quantify intangible benefits. Any intangible benefit has unit of measure (HDR, 2004; Hares & Royle, 1994).

According to HDR (2004) intangibles seem to be immeasurable because they are *ambiguously* defined. The process of converting intangibles into *measurable units* can be achieved by removing any type of ambiguity. This can be possible by focusing on definitions that can be expressed in units of measure (HDR, 2004: 4). For example, a new IT project may claim that it increases "employee empowerment". To remove ambiguity the following questions should be asked:

- Does "employee empowerment" mean that cost per employee is reduced because less supervision is required?

- Does it mean that employee turnover is reduced along with recruiting and training costs?

An evaluator can be able to remove the ambiguity by finding out and answering such type of questions, and construct a unit of measure that indicates the actual nature of the benefit. In doing so fulfils the task of converting intangible to quantifiable objects of proxy indicators.

The unit of measures in this example can be:
- Reduced employee supervision, or
- Reduced employee turnover.

It should be noted that these units of measure can be positive outcomes if they align with the business objective. Therefore, they can at the same time be used to measure the benefits. A single *unit of measure* or group of *units of measure* will be used for IT project evaluation (Section 2.4.3).

This step requires the business management to identify and to decide the units of measure for both tangible and intangibles that clearly conform and exhibit (the intention of) the business objectives/plan. The evaluation may also need to incorporate interpretive evaluation and discourse method (discussion or interviews) to remove the ambiguity of intangibles (Murphy, 2002).

Step 2. Assign numeric metrics

This step shows how to assign metrics to units of measure and make the benefits measurable. The empirical evidence (Theme B1) shows that some IT requesters attempt to calculate the improvement percentage increase. As shown in Figure 3.2, the tangible benefits can be measurable by determining the quantifiable metrics (e.g. number of research output). The intangibles benefits can also be expressed in measurable terms (HDR, 2004). As discussed in the previous section (Section 6.4.2), an evaluator can use proxy indicators to express the actual benefits by converting the qualitative into quantitative criteria of measurement (e.g. number of supervisors).

Step 3. Predict in physical terms

This step addresses the problem of estimation at the justification stage (Theme B5). At this stage the measurable is converted into actual numbers. This is the most important and laborious step of the quantification stage at ex-ante justification. The ways to gather information for prediction includes, DSS & expert systems, surveys, comparative studies etc. (Section 3.10.4).

This step is predicting in physical terms (numeric) of outcome indicators (Section 6.4.1). The exact physical terms will be given to each metrics. For example, extra 20 more research outputs or 5 less employee supervisors. This is a measure of IT benefit.

The empirical evidence (Theme B1) indicates that at this point, the change in business processes such as *increased research output* or *decreased number of supervisors* are calculated in percentage as improvement. This is not measure of benefits but merely an improvement increase. The benefit evaluation method proposes the use of the estimated number of physical terms as a measure of benefit. The following section will discuss the use of percentage rate as a measurement for benefits.

Step 4. Evaluate in monetary terms

This step addresses the valuation of the benefits. This last step can be used to measure benefits in a single unit of measure. It involves a simple mathematical process with the physical volumes being related to the monetary value of benefits. For example, an increase of postgraduates by 20 students and linking it to its effect (e.g. external research funding, tuition fees, etc.), and if the average amount is R30, 000 per head, the cash flow is expected to be R600,000. Then the increased monetary amount is calculated to the current monetary amount as a percentage (e.g. 8% increase in sales).

This increase of sale (8%) is also a measure of IT benefit. The reason why a direct increase in physical term as a percentage rate is not applied is (Section 6.4.4), each single increase may have different benefits amount. For example, the benefits

gained from a student from abroad compared to a local student might not be the same because of different rate of tuition. Measuring the IT benefits requires recognizing the ripple effects (other benefit) of each increase (Dehlin & Olofsson, 2008). Therefore, to use a percentage rate, it is essential to measure in monetary terms especially if the measurement is used to rank and select projects in terms of their value to the organization.

The current benefit measurement in the organization is located in "Direct Payback" section of the justification instrument (see Addendum C). It only requests the evaluators to specify whether the IT solution can "Save cost", provide "Productivity improvement", or enable "Cost avoidance". The empirical evidence shows that the requesters' estimate is by choosing one of these options with their subjective judgments without any mathematical calculation (Theme B2).

A single IT project more often has multiple positive outcome indicators. Therefore, the method for measurement has a recurring nature. Each defined positive outcome indicator will follow the steps and eventually the cumulative benefits (amount) will be used to value the IT project.

If this step is properly applied, it is expected to resolve the challenges facing measuring benefits. The evaluators must be aware of this technique and must be instructed to apply it appropriately. The use of monetary term also resolves the problem of having different units of measure for intangibles. Evaluating benefits in monetary terms will result in using a single measurement unit for all type of benefits.

6.4.3 Summary of IT benefits measurement method

This section of the method proposes a measurement method that has adapted synthesized concepts from ITGI's (2007) COBIT 4.1 framework, HDR's (2004) Applied Information economics and Hares and Royle's (1994) quantification technique. These sources are widely known publications in IT management research. The proposed measurement model is relevant to the case study and is expected to resolve the challenges facing benefits measurement in the organization.

6.5 Part III: Joint participation in the justification process

The proposed justification process requires the dialectic approach. This approach is sought by business management of the organization. The approach is expected to be used to communicate the issues and implications surrounding the adoption and justification of new technology.

The ultimate goal of close collaboration and communication is that it leads to better understanding of the potential benefits of the IT projects. Content category C shows the need for better communication and IT management participation in the justification process (Theme A). The role of the IT management is suggested to inform about issues that may have been ignored in the evaluation of benefits.

The empirical data (Section 5.7.3.3) indicate that the IT management has to expand its task:

- To provide technological and technical information. Business management needs additional insights and acquire knowledge of IT trends to harness opportunities.
- To guide, share ideas and collaborate in identifying unrecognized benefits.
- To inform the resources and capacity available by IT management.
- To assist in the quality of the justification and to reformulating the risk and needs to benefits. Table 4.5 shows that business management need some training on how to identify benefits.
- To validate the claims and check the percentage numeric figure representation.
- To be an agent of transparency, to provide feedback why other projects are selected so as to learn for future requests and to reduce despondency of business.
- To be an agent of communication, a liaison between IT management and business.
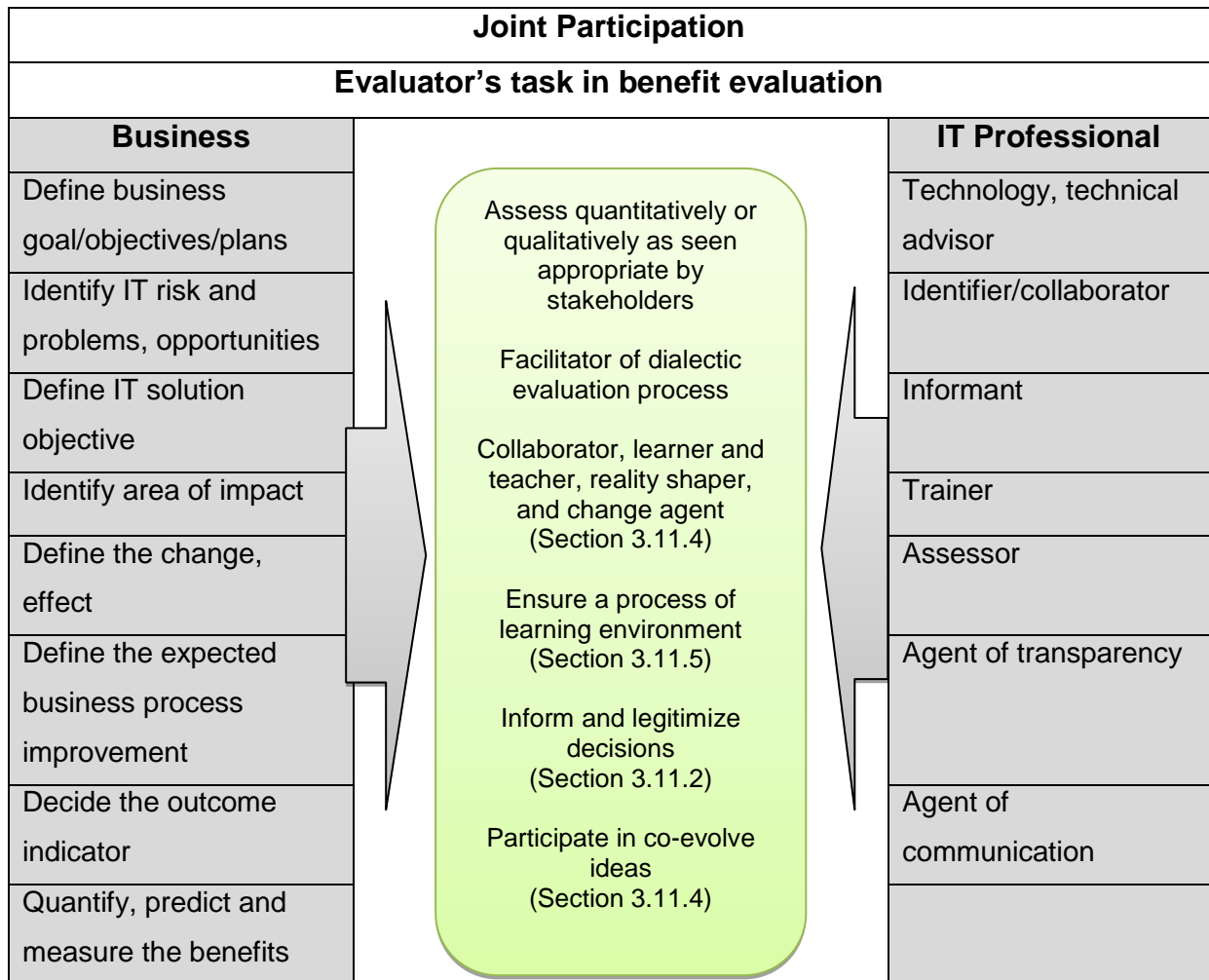
Joint Participation		
Evaluator's task in benefit evaluation		
Business		**IT Professional**
Define business goal/objectives/plans	Assess quantitatively or qualitatively as seen appropriate by stakeholders	Technology, technical advisor
Identify IT risk and problems, opportunities		Identifier/collaborator
Define IT solution objective	Facilitator of dialectic evaluation process	Informant
Identify area of impact	Collaborator, learner and teacher, reality shaper, and change agent (Section 3.11.4)	Trainer
Define the change, effect		Assessor
Define the expected business process improvement	Ensure a process of learning environment (Section 3.11.5)	Agent of transparency
Decide the outcome indicator	Inform and legitimize decisions (Section 3.11.2)	Agent of communication
Quantify, predict and measure the benefits	Participate in co-evolve ideas (Section 3.11.4)	

Figure 6.4: Proposed roles of evaluators in the justification process

6.5.1 Business management task in justification process

The proposed roles of evaluators in the justification process are shown in Figure 6.4. The business management task is laid down in the first column. These activities are the proposed prescripts for benefits identification and measurements. The activities were discussed in the last two sections of the evaluation method (Section 6.3 and 6.4) and supported from literature review. The business management is supposed to undertake these activities to evaluate IT benefits appropriately.

6.5.2 IT management task in justification process

The result of this study indicates that IT management participation is crucial in the justification process (Section 5.7.3). It is shown that in the absence of IT management participation, the benefit evaluation provided unreliable and inaccurate figures to IT projects. The IT management is expected to fill the tasks laid down in the third column. These roles are extracts from the empirical findings and are suggested to be exercised by IT management (Section 5.7.3.3).

6.5.3 Joint participation in justification process

The proposed justification process requires a more discourse approach between business and IT management, and is one that is predominantly interpretivist in nature. This type of approach is sought by business management (Section 5.7.3.3). In literature, the roles of IT project evaluators include:

- Facilitator of dialectic evaluation process (Section 3.11.4)

- Collaborator, learner and teacher, reality shaper, and change agent (Section 3.11.4)

- Ensure a process of learning environment (Section 3.11.5)

- Inform and legitimize decisions (Section 3.11.2)

- Participate in co-evolve ideas (Section 3.11.4)

The evaluators are expected to assess quantitatively or qualitatively as seen appropriate by stakeholders. The main purpose of interpretive evaluation is to have a deeper understanding and learning, to achieve legitimate decisions for further actions, and to realize benefits (Remenyi & Sherwood-Smith, 1999; Walsham, 1993). The emphasis incorporates the views, concerns, claims, and issues of the stakeholders.
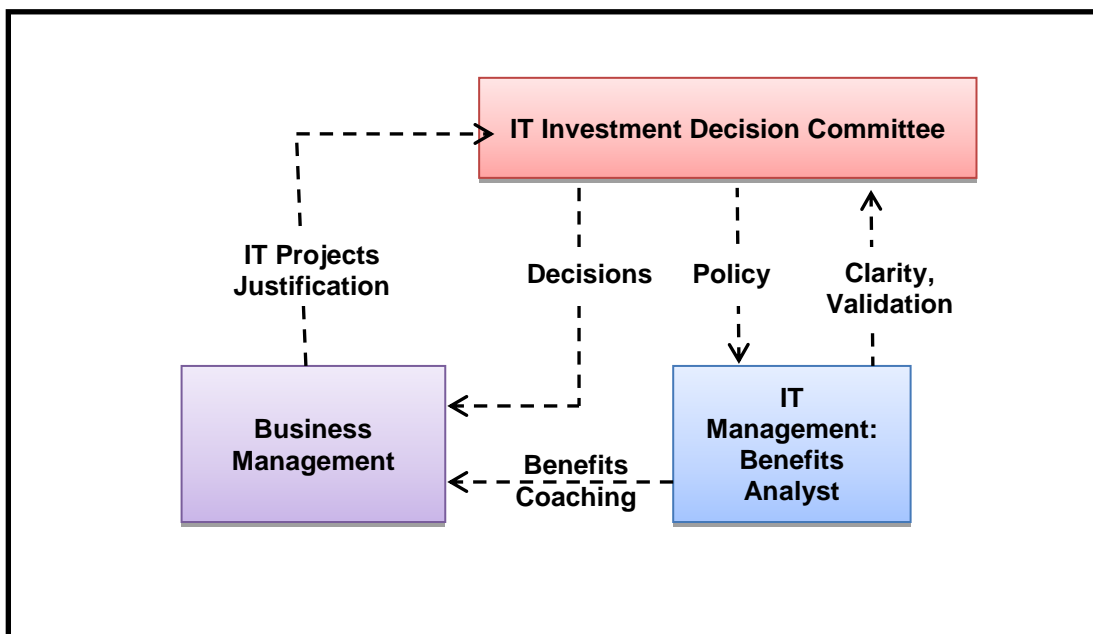

Figure 6.5: IT benefit analyst during ex-ante justification stage

The benefit evaluation methodology of this study, proposes that IT management assign an IT person that is charged to play the role of an informer, educator, and

advisor during the justification process. The person is not only expected to be technology oriented but must know well the business context, culture, and environment.

The IT person is expected to have good communication skill and business background to execute effectively the suggested roles. It is also expected that the person have thorough understanding of IT benefits concepts. Although, it is not his/her responsibility to define the business objectives or to identify problems and needs, the person is expected to understand them and collaborate in refining the objective of the IT solution. If there is a need, the person also will be charged with reformulating the benefits and measuring them appropriately together with business management. This is more likely to be the business analyst job but with the added task of "IT benefits analyst" during the ex-ante justification process.

As shown in Figure 6.5, the IT management personnel have to participate in benefit evaluation with a task that includes coaching business on IT benefits concepts and how to evaluate the benefits. He/she is also responsible to clarify the IT initiative claim to the selection committee. This will also serve the selection committee to minimize subjective decisions and make it more objective in selecting IT initiatives. The selection committee may change and expect some rules and policies to be followed and the IT person as a communication agent will be informed to guide the business management appropriately.

6.5.4 Summary of IT benefits evaluator roles

It is proposed that joint participation of business and IT management is crucial in the justification process. This entails more involvement of the IT management in the IT benefit evaluation activities. The method requires IT management to assign IT professionals to execute the roles suggested by the business management. The evaluator's task also has a tendency to incorporate an interpretive type of evaluation.

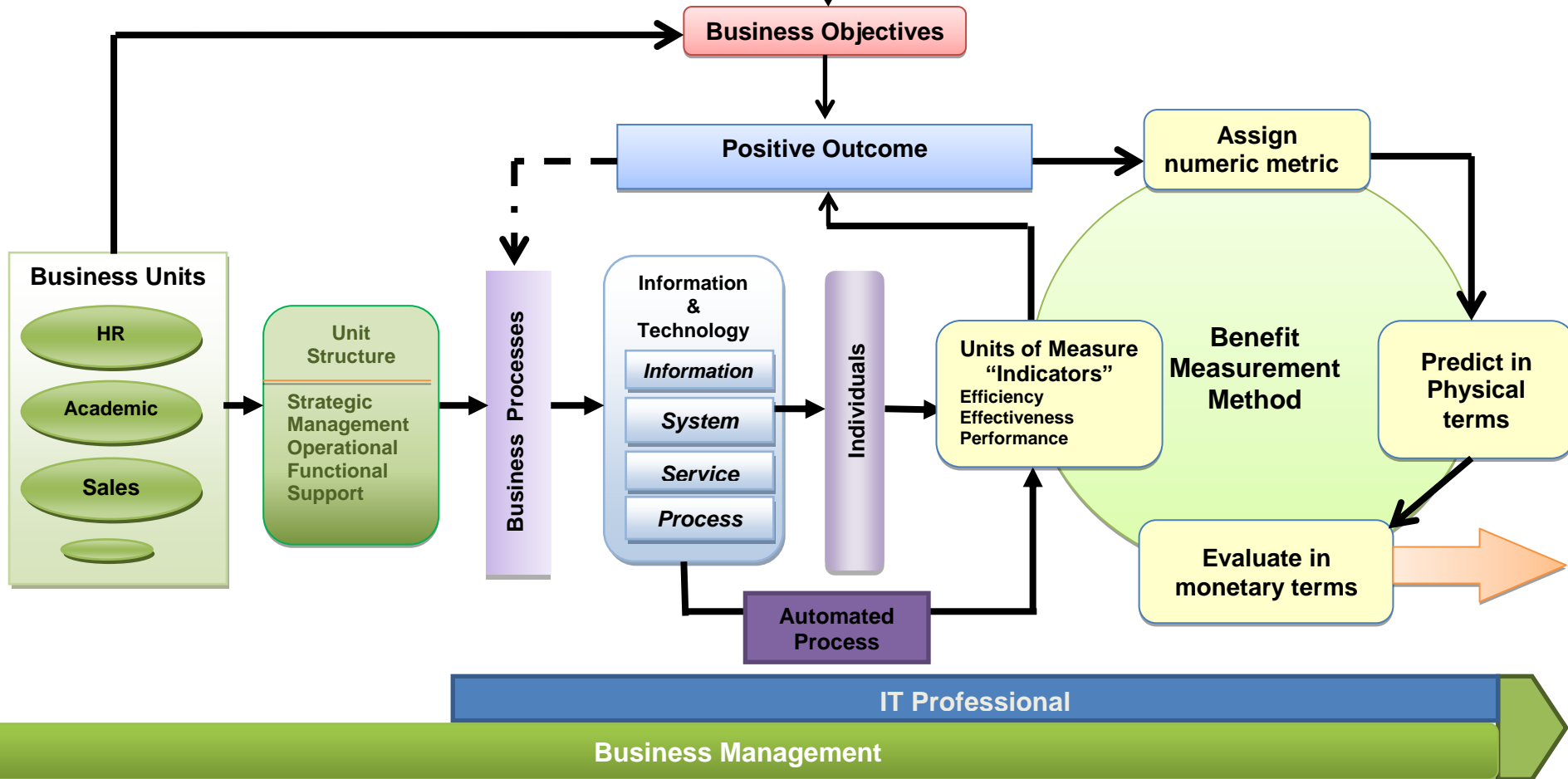### 6.6 The methods of IT benefit evaluation for ex-ante justification

It is expected the current justification process of the organization can be modified for better IT benefits evaluation by following the proposed method. The three parts of the method discussed in the previous sections are integrated to form a method of IT

benefit evaluation. The evaluation method is graphically illustrated in Figure 6.6. The link between the method for benefit identification (Part I) and the measurement of benefit (Part II) is the "selection of unit of measure" step found in both methods. As shown in Figure 6.6, the measurement method proceeds after appropriate benefit identification process is performed. The method also incorporates the proposal of joint participation and collaboration between business management and IT management (Part III) during the identification and measurement phases.

6.7 Remarks on the IT benefits evaluation method

The method is a proposal to improve the current justification process in the organization. The method consists of the main categories discussed in this study, namely, (a) the nature of IT benefits and the process of identifying them, (b) the measurement method and the process of quantifying benefits, and (c) the evaluator's role and the need for partnership and collaboration.

The method is developed from literature review and empirical findings. However, it needs empirical testing for further modification and better practical application. The aim of developing the method is to bridge the gap between academic theories (or models) and actual management practices by providing modified practices that are applicable and relevant for effective benefits evaluation to the case study organization. It is not intended to be a comprehensive solution addressing all factors affecting to the achievement of proper benefits evaluation. It addresses prominent factors in the current situation of the organization. Some factors such as the issue of business management's low expectation of approval in justification process are beyond the scope of this study and relate to IT governance. Therefore, the research did not address the situation in the benefit evaluation method. However, some implications are drawn in that better communication and collaboration may resolve this issue to some extent. The proposed method is expected to provide some insights and ways that can be applicable to other organisations.

Figure 6.6: IT benefits evaluation method at ex-ante justification stage

	Identify problems or opportunity	Identify type of benefits on organiz-ation structure	Identify area of impact & expected improvements	Acquire Information , technology and technical awareness	Selection of unit of measure, ensure it aligns with business plan	Assign numeric metric	Predict in physical terms	Evaluate in cash terms
Tasks	Identify problems or opportunity	Identify type of benefits on organiz-ation structure	Identify area of impact & expected improvements	Acquire Information , technology and technical awareness	Selection of unit of measure, ensure it aligns with business plan	Assign numeric metric	Predict in physical terms	Evaluate in cash terms
Output	Business objectives/ plan	Rationale for IT project	Targeted business process	Type of improvement, first order or second order effects	Selected outcome indicators	Quantification of tangible and intangible		Expected (estimated) IT benefit
Collaboration	Informative & educative, legitimizing IT proposals, co-evolved idea, better identification				Validate measurements			

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6.8 Conclusion

This chapter utilized the research findings that identified plausible factors that influence better benefits evaluation to develop an evaluation method at ex-ante justification stage. The method is a proposal for the improvement of the current justification process in the organization. The three main sections, namely the awareness and identification of IT benefit, the measurement techniques, and the communication factors for effective IT benefits evaluation were discussed in detail to develop the method. This method is presented as a solution for the current ineffective evaluation practice of the organization. The next chapter will discuss the summary and conclusion of the study.

CHAPTER 7:   Conclusions and Recommendations

7.1 Introduction

This chapter will revisit the research objective and primary research question and will draw conclusions from the empirical research that has been done in the case study in an attempt to answer the research question. Recommendations for further study will also be made.

7.1.1 Research objective and primary research question revisited

The primary research question of this study is to explore ***how benefits can be identified and measured appropriately at ex-ante justification stage in the organization.***

This problem arises as a result of the fact that benefits are not properly identified and measured in the justification process and when attempted to do so, leads to arbitrary and highly debatable figures. It is therefore problematic when benefits are used as a justification base for the selection of competing IT initiatives for discretionary investment portfolio in the organization. Most businesses do not define clearly the benefits and allocate arbitrary figures for such requests, thus the question remains: how can benefits be identified and measured appropriately at ex-ante justification stage? The research attempts to explore ways to improve benefits evaluation process through literature review and empirical finding in the context of the organization under study. Once the following secondary research questions have been answered, can the main research question be answered.

7.2 Secondary Research Questions

In Chapter 1 three critical secondary questions were put forward:

- Why benefits are not appropriately identified at the ex-ante justification stage in organization?
- What are the limitations of the current benefit measurement method at the ex-ante justification stage?
- How does the nature of relationship between businesses and IT management at the justification stage affect the benefits evaluation?

In order to understand the detailed results and interpretations presented in this research, the reader should refer to Chapter 5. However, a summary of the conclusions of this research are discussed under the headings described above.

7.2.1 Secondary Question 1.

- **Why are IT benefits not appropriately identified at the ex-ante justification stage in the organization?**

The findings show that proper steps of identifying benefits are not practiced by IT requesters. The justification instrument guides IT requesters with structured steps to follow in order to identify the benefits. However, a variety of benefits cannot emerge from the way the current practices are done. The IT requesters do not emphasize on benefits while justifying the initiative they are proposing. Moreover, they seem not to understand the process of identifying benefits. The results also show that IT requesters do not regard intangibles as viable claim for justification and thus the requesters do not put much effort into them.

There is a lack of awareness of IT benefit concept and a lack of knowledge how to identify benefits. The intended output of the justification process that is to make the benefits visible is not known by most of the participants. Therefore, tangibles and intangibles are neglected, and the proper benefit identification process is not exercised adequately.

This study concludes that the main contributing factor for poor identification of benefits lies on the evaluator's (business management) awareness and understanding of the concept of IT benefits and lack of skill to identify benefits. It is not the instrument that is used for benefit identification. There is a need for awareness and understanding of the concepts of IT benefits and how to identify them.

To resolve this sub-problem, the factors that contribute to ineffective benefit identification has been identified and considered to design a solution for the organization. The method is explained and summarized in Section 6.3 and Section 6.3.2. It is also possible to provide concluding remarks on the proposed solution of this sub-problem:

- The benefit identification method largely requires evaluators (business management) to have a better understanding of the concepts of IT benefits, but this can be possible through the training sessions as it is suggested in Section 6.3.2. Moreover, the empirical findings show that the participants requested IT professionals to take the responsibility as trainers. This clearly indicate the need for IT benefit knowledge for the justification purpose in the organization.

- The benefits will be firmly on the agenda of evaluation; most IT requesters used to focus on expressing the severity of their problem as a justification for discretionary IT investments.

- A better understanding of the concept of IT benefits makes it easy for the evaluators to understand the expectations and other possibilities that can be harnessed from IT.

7.2.2 Secondary Question 2

- **What are the limitations of current benefit measurement method at the ex-ante justification stage?**

The empirical findings show that the improvements measurement output does not represent the actual improvement level. The result indicates that measurement is determined by the IT requesters' subjective judgment without proper mathematical calculation. Moreover, the measurement method only allows measuring the improvements quantitatively; the benefits inadvertently were measured qualitatively.

The reason for ineffective measurement include the ambiguity in the use of metric, incorrect use of the unit of measure, difficulty to predict improvement level at the ex-ante justification stage and the absence of validation control for overrated estimation. Therefore, the limitations of the current benefit measurement method are:

- The measurement method is confusing; the instruction makes evaluators assign numeric figures for improvements without calculation.

- The measurement method focuses on direct percentage increase of improvement. It is does not allow one to predict and place actual number of

physical volume to determine the increase amount. The proper quantification technique is not incorporated.

- The measurement method does not have a provision to convert multiple units of measure into a single factor for evaluation. The percentage rate does not show the expected amount of benefits gain. It can be misleading for the selection process.

- The measurement method is prone for overestimation of figures. There is no control and provision to show how the improvement figures are derived to validate the claims.

In conclusion, the benefits measurement method applied in the organization allows evaluators to be highly subjective. Business managers use their judgment to estimate and quantify the impact of improvement. There is a need for modification of the measurement method to incorporate available and proven quantification techniques. A new method of measurement (Section 6.4) is proposed after considering the contributing factors affecting appropriate measurements (Section 5.8.2 and Table 5.7).

7.2.3 Secondary Question 3

- **How does the relationship between businesses and IT management at the justification stage affect the benefits evaluation?**

The result found out that there is limited interaction between business and IT management at the time of ex-ante IT initiative justification. The ramifications of this include business managements' inadequate awareness of the technical and technology aspect that may hinder the recognition of many advantages of IT that can be beneficial for the business.

The limited awareness and understanding of the concept of IT benefits and the skill to identify benefits can also be associated with the communication and collaboration gap between business management and IT management. Close communication collaboration might inform and train business management to justify their proposals appropriately.

The results show that that IT project benefits might not be appropriately identified or measured because less effort is put in the justification activity. The reason given is that business did not get satisfactory formal feedback for their requests. The absence of proper feedback makes business management question whether it is worthwhile to justify. The lack of feedback also contributed to having repeated justifications that are based on risks and needs rather than benefits since there is no learning taking place from past mistakes.

The past experience of project rejection made business reluctant to justify for IT initiative. This low expectation of approval also reduces the effort of identifying benefits.

In conclusion, the communication gap between business and IT management significantly affects the benefit evaluation process in the organization. Active participation of IT management in the justification process is voiced by many participants. The need for close communication and collaboration is confirmed by business management's expectation from IT management. This includes the IT management providing formal feedback, and to assign an IT expert to participate as a trainer, educator, informer, technology advisor, and agent of transparency.

Based on this result, business management and IT management joint participation in a dialectic approach is recommended to rectify this sub-problem (Section 6.5). It is expected to lead to a better understanding and hence better evaluation of the potential benefits of the IT projects.

The following section will attempt to answer the primary research question once the secondary research questions are addressed. The secondary questions identified the main factors of the problem statement and highlight what must be done to alleviate the problem. The proposed solution is emerged from the empirical data with the support of literature.

7.3 Primary question:

- *how can benefits be identified and measured appropriately at the justification stage in the organization.*

As mentioned in the previous questions the lack of IT benefit awareness, the inadequacy of the current quantification technique and the absence of IT management's participation are the major factors for the current situation to occur in the organization.

This study found that IT management must play a critical role in benefit identification and measurement in the organization for the following reasons:

- The need for business management to understand the concept of IT benefits
- The need to reduce subjective benefit measurements
- The need for ensuring businesses' commitment and responsibility.

This can be achieved by active participation of IT management at the justification stage. The IT management task is suggested to involve being a coach, informer, educator, assessor, advisor and transparency and communication agent. This study proposed a benefit evaluation method in the previous chapter (Chapter 6) to improve the current justification process to evaluate IT benefit appropriately. The evaluation method comprises the responsibilities of the business management and IT management, the practices to identify and measure the benefits, and the expected collaboration between the evaluators.

Factors that can influence effective benefits evaluation at ex-ante justification stages were identified and utilized to develop improvements on the three areas addressed in this research:

- Benefits identification,
- Benefits measurement and
- Benefits evaluators communication

This research proposed an evaluation method by integrating the improvements of these areas as a solution for the current ineffective benefits evaluation practices at the ex-ante justification stage in the organization. It is expected that an array of appropriate benefits will be identified and estimated with the best possible accuracy at ex-ante justification stage.

7.4 Contribution to information technology evaluation research

There have been calls for research in IT evaluation to address issues and problems that still persist in IT project evaluations (Berghout & Remenyi, 2005). Consequently, there is a need for new contributions that present insights into how benefits-oriented practices might best be utilized and incorporated into the organizational context (Ward & Daniel, 2006; Lin & Pervan, 2003).

This study pursues the quest for better IT benefit evaluation and focuses at the first stage of the IT evaluation life cycle (ex-ante justification stage). The study findings were presented by developing a method of IT benefit evaluation for the organization.

The study results indicated plausible factors that can influence better benefits evaluation to develop an evaluation method at ex-ante justification stage. The method is a proposal for the improvement of the current justification process in the organization.

The concepts that are derived from this research revolve around the type of evaluation to be conducted in the justification process. The implication of this study is that there is need for clear understanding IT benefit concepts among stakeholders and this can be achieved by active IT management (IT benefit expert) participation in the benefit evaluation process. The finding of this study shows that collaboration between IT management and business should have a tendency towards a dialectic evaluation where the understanding of the concerns and perception of stakeholders is important, and to incorporate learning and educative practices in the benefit evaluation process.

The inductive concept that this research also presents factors such as business management's low expectation of project approval at the justification stage to affect proper IT benefit identification and measurement. It is not within the scope of this research to explore how to mitigate IT initiative rejection caused by the scarcity of resources. Nevertheless it has an implication of the importance of close *communication* not only between IT management and business but with the executives of the organization. This is beyond the scope of the research and relates

to IT governance. However, this research also shows these types of factors that have negative effect on IT benefit evaluation at ex-ante justification stage. It opens the discussion for the further study.

7.5 Recommendation

The results of the study show that collaboration between business and IT management is critical in the justification process. IT management must participate in IT project benefit identification and measurement in the organization. This task is more likely to be the function of a business analyst but with the added task of "IT benefits analyst". In literature and in the participant organization, business analysts are usually involved at feasibility and requirement stage for the development of the IT projects. This research is recommending that they should participate at the initial ex-ante justification stage to execute the proposed roles.

The justification process should not be confined to identifying and measuring benefits. It should also focus onto the softer issues that include the views, issues, concerns and claims of stakeholders as much as possible for deeper understanding through a dialectic approach. This is expected to generate commitment to the justification process (Irani, 2002). Consequently, it may be used to communicate the issues and implications surrounding the adoption of new technology to either the project stakeholders, or larger population of the organization. It is also expected to bring evaluation success in recognizing various type of IT benefits and to conduct better estimations (Serafeimidis & Smithson, 2003; Remenyi & Sherwood, 2001). It would be more likely to be predominantly an interpretive evaluation.

7.6 Limitation of the study

As mentioned before, the aim of the study was to understand and investigate the current situation of project justification to address why there are inadequate benefit evaluations and to propose better solutions in the context of the organization. The study set out to assess the overall situation and it was expected the why and how questions primarily require qualitative approach to the research. An interpretive qualitative research is especially subject to bias. Although, bias cannot be totally discounted, the author tried to minimize the bias through the use of triangulation.

The study interview participants were selected from different business divisions that are responsible for ensuring the justifications were made and submitted to the selection committee. This focus group are middle business managers in an administrative position. The perspectives of other stakeholders such as users, operational workers and professionals were limited. Although, the participants are believed to be more knowledgeable about the affairs of their respective business units, they discussed on behalf of the business unit as representatives to IT department. Furthermore, most were involved in formulating the justifications.

Information and concepts used in the empirical finding closely relate to the participants experience. Nevertheless, difficulty in understanding most IT benefit characteristics and concepts curtail further discussion relating to explicit IT benefits phenomena. However, the interview resorts not to focus about their experience in evaluating benefits but rather in their experience of justification. The justification process is indirectly the act of benefit evaluation. The research implicitly gathers relevant data through their experience of justification.

The benefits evaluation method is primarily intended for the participant organization within its context. However, the plausibility of the logical reasoning can be used for other organizations. The conceptualized method is limited to the theory and no empirical testing has been done leaving it for other future research.

7.5 Further study

The result of the research proposes a close relationship and collaboration between business and IT management toward benefit evaluation at the ex-ante justification stage. There are two areas proposed for further study.

The first is to test empirically the benefit evaluation method on its practicality, and the second is to explore how the dynamics and the relationship between main stakeholders affect benefit evaluation by adopting new concepts that have strong philosophical and theory underpinnings in evaluation research. This includes dialectic hermeneutics and constructivist paradigms on the roles of evaluators towards better IT benefits evaluation.

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Addendum A

Theme Tables summarising detailed evidence for all three content categories

1. **Content category A: Identification of IT benefits.**

1.1 Summary of themes including frequencies of respondents (content category A)

	Themes	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic	Total
A1	The need for IT are clearly understood	2	1	1	0	1	2	1	8	2	2	2	3	9	17
A2	Skill is required to identify benefits	4	4	2	3	4	1	2	20	4	6	0	3	13	33
A3	Organization strategies are easily linked	1	3	4	4	4	4	2	22	2	4	4	3	13	35
A4	The business plan/objectives is important to identify benefits	2	4	2	2	3	3	3	19	2	4	4	2	12	31
A5	The justification is not primarily based on benefits	2	2	1	2	1	1	2	11	1	2	1	3	7	18
A6	IT requests reformulated into benefits by chance	3	4	3	2	4	3	4	23	3	2	3	2	10	33
A7	Examples of benefit variables utilized	4	5	5	2	5	4	4	29	1	1	1	1	4	33
A8	Intangible are seen as not credible claims for justification	2	4	1	3	3	3	3	19	3	1	2	1	7	26
A9	Quality of Information as a business benefits	0	0	0	0	0	0	0	0	1	2	0	1	4	4
	TOTAL	20	27	19	18	25	20	21	151	19	24	17	19	79	230

1.2 Evidence for each theme in content category A.

1.2.1 A1 – The need for IT are clearly understood

		Participants											
	Concepts	Academic							Non Academic				
		Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	Contact with affected group is conducted to understand problems, concerns and issues	1	1	1		1			4	1	1	1	1	4
2	Survey/Research is conducted to understand issues and opportunities			1					1		1	1		2

		Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
3	Stakeholders complains are used				1		1	1	2				1	1
4	Observation of the problem is conducted	1	1	1	1		1		4	1			1	2
	TOTAL	2	1	1	2	1	2	1	10	2	2	2	3	9

1.2.2 A2 - Skill is required to evaluate benefits.

	Concepts	Participants												
		Academic								Non Academic				
		Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	Difficulty in specifying the needs the way justification instruction applied		1		1	1		1	4	1	1			2
2	Confusion, the aim of the content in not clear/ there is lack of knowledge how to specify	1	1	1	1	1			5	1	1		1	3
3	Time constraints/ takes a lot of time to justify	1				1			2		1			1
4	There is a need for oral presentation of the request, it becomes clear	1	1					1	3		1			1
5	First time after long time, there is no experience				1	1			2					0
6	Close ended questions with scales and checkbox will be better								0		1			1
7	Plain open ended questions will be better								0	1				1
8	Mini business case with cost/benefit is better								0			1		1
9	Better if IT personnel/ Business analyst assist	1	1			1	1		4	1	1		1	3
	TOTALS	4	4	2	3	4	1	2	20	4	6	0	3	13

1.2.3 A3 – Organization strategies are easily linked.

	Concepts	Participants												
		Academic								Non Academic				
		Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	The organization strategy are well understood and considered during justification, and it is embedded in the business plan	1	1	1	1	1	1	1	7	1	1	1	1	4
2	The IT request supports the strategy of the		1	1	1	1	1	1	6	1	1	1	1	4

	Concepts	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
	organization													
3	It is easy to pick the strategy thrust and link to the IT project request		1	1	1	1	1		5	1	1	1		3
4	The strategy is too broad and high level; every project somehow can be linked		1	1	1	1			4	1	1			2
	TOTAL	1	3	4	4	4	4	2	22	2	4	4	3	13

1.2.4 A4 – The business plan/ objective are important.

		Participants												
	Concepts	Academic								Non Academic				
		Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	The IT requests (projects) support the business plan	1	1	1	1	1	1	1	7	1	1	1	1	4
2	The IT requests emanates from our business plan	1	1	1	1	1	1	1	7	1	1	1	1	4
3	We set up business plan for emergent (urgent) IT requests		1			1			2		1	1		2
4	The expressed objective In justification form is of the IT solution but not of business		1			1		1	3		1	1		2
	TOTAL	2	4	2	2	3	3	3	19	2	4	4	2	12

1.2.5 A5 – The justification is not primarily based on benefit

		Participants												
	Concepts	Academic								Non Academic				
		Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	The aim of the justification process is to make the problems/needs visible	1		1	1	1	1	1	6	1	1	1	1	4
2	To make the IT requirement		1						1		1		1	2
3	To describe how the project impact could be		1						1					0
4	To look at the benefits/cost-benefit				1			1	2				1	1
5	There is no need to justify since funds are available	1							1					0
	TOTAL	2	2	1	2	1	1	2	11	1	2	1	3	7

1.2.6   A6 - IT requests reformulated in benefits by chance.

| | Concepts | Participants | | | | | | | | | | | | |
| | | Academic | | | | | | | | Non Academic | | | | |
		Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	The descriptive instructions were followed to justify/ the instructions are understandable		1	1	1	1	1	1	6	1			1	2
2	The instruction guide to recognize the affected process and improvements	1	1			1		1	4	1	1	1	1	4
3	Utilized the examples because it make it easier to justify	1	1	1		1	1	1	6			1		1
4	Utilized the examples because it relates to specific request	1	1	1	1	1	1	1	7	1	1	1		3
	Total	3	4	3	2	4	3	4	23	3	2	3	2	10

1.2.7   A7 – The need for list of benefit variable

| | Concepts | Participants | | | | | | | | | | | | |
| | | Academic | | | | | | | | Non Academic | | | | |
		Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	The business output examples are used; they are picked from the business process examples	1	1	1		1	1	1	6					0
2	The examples make it easier to recognize the affected process	1	1	1	1	1	1	1	7					0
3	The examples are utilized because they exactly describe the business process affected	1	1	1		1	1	1	6					0
4	Difficult to specify without the examples	1	1	1	1	1		1	6	1	1	1	1	4
5	Easier to match the examples of business process with the examples of expected improvement		1	1		1	1		4					0
	TOTAL	4	5	5	2	5	4	4	29	1	1	1	1	4

1.2.8 A8 – Intangible are not seen as credible claims for justification

	Concepts	Participants												
		Academic								Non Academic				
		Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	Intangibles were considered for justifying IT initiative			1					1		1		1	2
2	Intangibles not considered because it is not important for justification/ no need for it	1	1		1	1	1	1	6	1		1		2
3	Intangibles won't be considered because fear of rejection; selection committee would not buy it		1		1	1	1	1	5	1				1
4	Intangible won't be considered because it is a wish list and secondary reason, indirect		1		1	1	1	1	5	1		1		2
5	We might consider in the future now we know	1	1						2	1	1	1	1	4
	TOTAL	2	4	1	3	3	3	3	19	3	1	2	1	7

1.2.9 A9 – Quality of Information as a business benefits

	Concepts	Participants												
		Academic								Non Academic				
		Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	Having information is IT benefit								0				1	1
2	Access to Information is IT benefit								0		1			1
3	Having integrated information is IT benefit								0	1				1
4	Improved information availability is IT benefit								0		1			1
	TOTAL	0	0	0	0	0	0	0	0	1	2	0	1	4

2. Content category B: Measurement of the business benefits of IT

2.1 Summary of themes including frequencies of individual participants (content category B)

	Themes	Participant 1	Participant 2	Respondent 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic	Total
B1	The measurement method does not provide proportionate figure	1	3	2	3	2	3	1	15	4	3	1	1	9	24
B2	The measurement is a judgment, not calculation	1	4	1	4	2	4	2	18	1	3	2	1	7	25
B3	Measurement unit to describe change	0	0	0	0	0	0	1	1	0	1	1	0	2	3
B4	Intentional overestimation	0	0	0	0	0	1	0	1	0	2	1	0	3	4
B5	Difficult to predict in justification stage	1	2	1	2	2	2	2	12	1	2	2	1	6	18
B6	Cost-benefit to provide proportionate percentage rate	0	0	0	0	0	0	0	0	0	0	0	1	1	1
	Total	3	9	4	9	6	10	6	47	6	11	7	4	28	75

2.1.1 B1 - The measurement method does not provide proportionate figure

	Concepts	Participant 1	Participant 2	Respondent 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	The *direct percentage increase calculation* is done			1		1			2	1				1
2	The benefits are not made measurable and predicted in physical terms / Steps of quantification not followed	1	1	1	1	1	1	1	7	1	1	1	1	4
3	Evaluators do not put effort or have experience to measure it		1		1		1		3	1	1			2
4	Ambiguity of how to measure		1		1		1		3	1	1			2
	TOTAL	1	3	2	3	2	3	1	15	4	3	1	1	9

2.1.2 B2 - The measurement is judgment not calculation

	Concepts	Participant 1	Participant 2	Respondent 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	The percentages are assigned based on the non-numeric scale value	1	1		1		1	1	5		1			1
2	The direct payback output requires only qualitative description		1		1	1	1		4	1	1	1		3
2	IT solution is needed and it is significant, thus 50% is assigned		1		1		1		3					0

	Concept	Participant 1	Participant 2	Respondent 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
3	Not sure if the figure reflects the improvement/benefit level			1	1	1			3		1	1	1	3
4	There is no need to calculate, the instruction leads to put 50%, there are few options		1				1	1	3					0
	TOTAL	1	4	1	4	2	4	2	18	1	3	2	1	7

2.1.3 B3 - The measurement unit is used to describe change

	Concept	Participant 1	Participant 2	Respondent 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	The measurement unit is used to show change of the way we operate in different method, not necessary improvement (transformation)							1	1		1	1		2
	TOTAL	0	0	0	0	0	0	1	1	0	1	1	0	2

2.1.4 B4 - Intentional overestimation

	Concepts	Participant 1	Participant 2	Respondent 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	Anybody can put any figure											1		1
2	Putting impressive (not actual) figure to get approved										1			1
3	Cannot put zero, it cannot pass to be approved, we put at least 50%						1		1		1			1
	TOTAL	0	0	0	0	0	1	0	1	0	2	1	0	3

2.1.5 B5 - Difficult to predict at ex-ante justification stage

	Concept	Participant 1	Participant 2	Respondent 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	Difficult to predict at this stage/ Thumb suck		1		1	1	1	1	5		1	1		2
2	There is no outcome indicators or metrics	1	1	1	1	1	1	1	7	1	1	1	1	4
	TOTAL	1	2	1	2	2	2	2	12	1	2	2	1	6

2.1.6 B6 - Cost-benefit analysis (CBA) to provide proportionate percentage rate

	Concept	Participant 1	Participant 2	Respondent 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	It can be clearly interpretable in cost and benefit relationship to the emphasis and attention that the IT request should deserve								0				1	1
	TOTAL	0	0	0	0	0	0	0	0	0	0	0	1	1

3. Content category C: Communication between IT management and business.

3.1 Summary of themes including frequencies of individual participant (content category C)

	Themes	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic	Total
C1	IT is not involved in justification	5	5	4	4	5	3	5	31	2	3	3	3	11	42
C2	There is no IT benefits orientation	2	0	2	1	1	1	1	8	2	2	0	0	4	12
C3	Need of IT personnel to identify benefits	2	5	4	4	4	2	2	23	1	4	0	0	5	28
C4	Lack of formal feedback	1	6	1	0	5	1	4	18	0	4	5	2	11	29
C5	Low expectation of Approval	1	2	1	2	2	3	3	14	1	2	3	1	7	21
	Total	11	18	12	11	17	10	15	94	6	15	11	6	38	132

3.1.1 C1 - IT management participation is limited

	Concepts	Participant 1	Participant 2	Respondent 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	IT management are not consulted during business justification/ They cannot know each business	1	1	1	1	1	1	1	7	1	1	1	1	4
2	IT management hosted presentations about how to justify, and participant attended	1	1	1	1	1	1	1	7	1	1	1	1	4
3	The information is not made known and cascaded to the rest of business unit	1	1	1	1	1		1	6		1		1	2
4	Few individuals from the business	1	1	1	1	1	1	1	7			1		1

		Participant 1	Participant 2	Respondent 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
	unit attend such presentations													
5	Time and schedule conflicts are the reasons for not attending presentation	1	1			1		1	4					0
	TOTAL	5	5	4	4	5	3	5	31	2	3	3	3	11

3.1.2   C2 - There is no IT benefits orientation

	Concepts	Participant 1	Participant 2	Respondent 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	"IT Benefits" or the need for IT benefits to be identified were not mentioned in the presentation	1		1			1		3	1	1			2
2	The instruction was not explained in detail	1		1	1	1		1	5	1	1			2
	TOTAL	2	0	2	1	1	1	1	8	2	2	0	0	4

3.1.3   C3 - The need for IT personnel to participate

	Concepts	Participant 1	Participant 2	Respondent 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	To acquire knowledge of technology, to harness opportunities			1	1			1	3					0
2	To understand the IT resources in the organization so that we can request viable initiative that can be selectable		1	1		1			3					0
3	To improve the quality of justification document	1	1	1	1	1	1		6		1			1
4	Unrecognized output (benefit) will be visible		1		1	1		1	4		1			1
5	To validate the claims; to reduce overstatement								0		1			1
6	To be agent of feedback; to inform whether the project is approved or not approved.		1						1					0
7	To understand our problem and needs, IT management might not know clearly the actual specific business context	1	1	1	1	1	1		6	1	1			2
	TOTAL	2	5	4	4	4	2	2	23	1	4	0	0	5

3.1.4 C4 - Lack of formal feedback

	Concepts	Participant 1	Participant 2	Respondent 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	There is no formal feedback on IT request because they are deferred or attended at latter stage								0		1		1	2
2	There is no formal feedback, because the project are turned down		1					1	2			1		1
3	There is a need to know the status of our requests					1			1		1			1
4	The lack of feedback reduced a will to justify		1			1		1	3			1		1
5	There is a need to know even they are rejected so that we learn for next time		1			1		1	3		1	1	1	3
6	There is a need for feedback to understand the limitation of ITSD capacity and capital			1					1					0
7	There is a need to know the selection process, which IT initiatives are selected and why (Transparency)	1	1			1			3					0
8	Feedback is associated also with rejection		1				1	1	3			1		1
9	The received feedback is once in a year at the presentation but it is not satisfactory (formal and detailed)		1			1			2		1	1		2
	TOTAL	1	6	1	0	5	1	4	18	0	4	5	2	11

3.1.5 C5 - Low expectation of approval

	Concepts	Participant 1	Participant 2	Respondent 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic
1	Our project will be delayed to be attended or deferred because of ITSD busy deploying systems in other units	1		1					2	1	1		1	3
2	Project will be turned down looking from our past experience		1		1	1	1	1	5					0
3	ITSD has budget constraints						1		1		1	1		2
4	There is no need to submit IT requests because it will be turned down		1		1	1		1	4			1		1
5	There is no need to justify in this form instead direct contact to executive committee to get approval						1	1	2			1		1
	TOTAL	1	2	1	2	2	3	3	14	1	2	3	1	7

Addendum B

Quantitative figures from Data Document

Content category A: Identifying IT benefits

1.1 Table Showing number of IT request describing the *business objective*.

		Business Units													
		Academic								Non Academic					
		Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic	Total
A	The business plan or objective specified in justification.		1	1		1		1	4	1		2	1	4	8
B	*Total Number of IT requests*	2	1	1		2	1	2	9	1	3	7	1	12	21

1.2 Table showing the number of IT request that specified *area of impact* as individual or business process.

	Area of Impact	Number of IT requests													
		Academic								Non Academic					
		Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic	
A	Area of impact as individual						1		1	1		4		5	6
B	Area of Impact as business process	2	1	1		2		2	7		3	3	1	7	14
	TOTAL *Number of Requests with area of impact specified*	2	1	1		2	1	2	9	1	3	7	1	12	21

1.3 Table showing repetitive use of area of impact example

	Concepts	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic	Total
					Academic						Non Academic				
1	Utilization of the exact area of impact examples *Number of requests*	1	1	1		2	1	2	8			4	1	5	13
2	New business specific and self-described area of impact *Number of requests*									1	3	3		7	7
3	Left blank	1							1						1
	TOTAL *Number of Requests*	2	1	1		2	1	2	9	1	3	7	1	12	21

1.4 Table showing use of Benefit variable examples

		Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic	Total
A	Utilization of exact benefit variables examples *Number of benefits variables*	3	2	4		4		5	18			2		2	20
B	Total benefits variables expressed *Number of benefits variables*	3	2	4		4	1	5	19	1	3	7	1	12	31
	Total Number of Request														

1.5 Table showing association between area of impact with benefit variables

		Participants													
		Academic								Non Academic					
		Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Academic	Participant 8	Participant 9	Participant 10	Participant 11	Non Academic	Total
A	There is no direct association between the area of impact and the process output		1						1	1	3	4		8	9
B	Left blank	1				2			3			2		2	5
	Total								4					10	14
C	The area of impact links with the process output, *Number of direct association*	3	1	4		4	1	5	18			3	1	4	22
	Total output expected								22					14	36

Content Category B: IT benefits measurement

2.1 Table showing distribution of percentage rate assigned

Percentage	Participants Business Unit													
	Academic								Non Academic					
	Business Unit 1	Business Unit 2	Business Unit 3	Business Unit 4	Business Unit 5	Business Unit 6	Business Unit 7	Academic	Business Unit 8	Business Unit 9	Business Unit 10	Business Unit 11	Non Academic	Total
10% - 19%			1					1						1
20% - 29%			1					1						1
30% - 39%			1					1						1
40% - 49%														0
50% - 59%	2	2				1	2	7			6		6	13
60% - 69%			1					1						1
70% - 79%					2			2			2		2	4
80% - 89%														0
90% - 99%					2			2						2
100%							3	3	1	3	1	1	6	9
Total benefit variables	2	2	4	0	4	1	5	18	1	3	9	1	14	32

Addendum C

IT Projects Justification Instrument.

Specific IT Needs 2010

Description of the proposed project namely IT-systems, IT-projects, IT-infrastructure, IT computer labs, etc.

A. Short description and objectives

Name of need/project	Contact Person	Priority No. (force-ranked in order of priority – there can only be one number 1,one number 2 etc)
Description/objectives		

B. Strategic alignment

List and motivate the strategic thrusts (1 to 8) that will be supported by this system project.		
1. Excellence in support service	2. Academic excellence	3. People-centred University
4. Excellence in core functions	5. Sustainability	6. Interfaces
7. Transformation	8. Local impact	

Number	Motivation

C. Institutional Risks (See Attachment 1)

Risk number	Motivation/justification

D. Business/Work Process Improvement

Process. Please list the major institutional / business processes that will benefit from the proposed project (e.g. "Undergraduate Student Teaching and Learning", "Graduate Student Teaching and Learning", "Perform Research", "'Engage with the community", "Manage Projects", etc.)	Process Outputs. associated with the processes in the previous column, (e.g. "Improved Student Pass Rate", "Improved Graduation Rates", "Increased Research Outputs", "Improved tracking of Community Engagement Projects", "Improve project quality and reduce costs" etc.)	Expected Improvement. Indicate the expected business process improvement impact, as a percentage. (0=Zero, 50%=significant, 100%= total transformational)	Motivation/ justification

E. Direct Payback

Will the system/project lead to any direct cost saving, productivity improvement or cost avoidance? Indicate the type of payback: A, B and/or C, and motivate: (A= direct cost savings, B= productivity improvement and C= Cost avoidance)	
A	
B	
C	