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IDENTIFYING AND BENCHMARKING INFORMATION TECHNOLOGY COST WITHIN A MULTINATIONAL

by

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Abstract

Faced by ever increasing expenditure on Information Technology (IT), organisations are turning to what can be perceived as measures of world-class performance such as benchmarking to identify weaknesses in their practices.

The objectives of this research were two-fold: Firstly, to explore in what way an organisation identifies its Information Technology costs, and secondly, to determine what IT cost benchmarking takes place within an organisation and to determine its value and relevance to the organisation. The research was conducted as a qualitative two phase snapshot case study across five regions within GoodsCo. Data collection comprised of unstructured face-to-face interviews and five semi-structured telephonic interviews. Content analysis was then used to identify the key patterns or themes which emerged.

The research established that Information Technology costs within GoodsCo consists of primarily direct costs components, and that most indirect cost components and contextual elements are not accounted for. Finally it was established that limited and infrequent benchmarking occurs within these regions, and that GoodsCo derives limited value and relevance from their current benchmarking practices.

Declaration

I declare that this research project is my work. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration at the Gordon Institute of Business Science, University of Pretoria. It has not been submitted before for any degree or examination in any other University.

..... Date: .....

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Chapter 1: Introduction to the research problem

1.1 Introduction

This chapter serves as an overall introduction to the research report and will allow the reader to gain an understanding of the background and focus of the research as well as how the research is structured.

Firstly, this chapter will introduce the background against which the research was conducted and then clarify the motivation for the research. Finally, this chapter will conclude with presenting the structure of the report.

1.2 Background to the research

Although Information Technology (IT) is an important tool in attaining the desired growth, productivity and competitiveness within companies (The World Bank, 2006), it also constitutes a major portion of an organisation's annual capital investment (Alshawi, Irani and Baldwin, 2003). Average IT spending among the InformationWeek 500 companies for 2005 was US$ 293 million which equates to between 2.8 % and 3% of revenue (Cuneo, 2005), and IT spending in the US economy has increased by more than 2 orders of magnitude since 1970 (Mistry, 2006). Within this context of increasing spend on IT, Epstein and Rejc (2005) also demonstrated the causal relationship between IT and

revenue growth or cost reduction, thereby indicating the IT impact on earnings or growth within the bigger company. Within this context the understanding, management and measurement of IT costs has become critical for organisations striving to achieve world-class performance.

Benchmarking is one of a few elements that can be considered as measures of world-class performance (Tobin, 2006) and currently shares the title of the management concept with the greatest influence over the 1,000 points that can be awarded in a Baldridge assessment with competitive comparisons (APQC, 1997). Rigby (2007) states that the importance of benchmarking is due to its ability to improve organisational performance, clarify the organisation's relative cost position, identify opportunities for improvement within the organisation, assist organisations to focus on capabilities critical to building strategic advantage and due to its ability to foster a culture of organisational learning. These abilities enable benchmarking to create a substantial payback on investment, with a study by APQC's International Clearinghouse reporting an average of $76 million income and/or lower costs across thirty highly successful benchmarking projects performed by different organisations within the first year. Among the most experienced benchmarking organisations this return increased to $189 million (APQC, 1997).

More than 70 percent of the Fortune 500 companies now use benchmarking on a regular basis, including companies such as Ford Motor Company, IBM and AT&T (Greengard, 1995).

1.3 The research motivation

Since the 1980's a lot of research has been done on the IT area, spurred by general management being more computer literate and as a result asking more questions about the effectiveness of their organisation's Information Technology investment (Lubbe, 2003). Regardless of all the newfound attention to IT, very little research has been done on what costs to identify and how to go about identifying these costs. Gartner (undated, online) Total Cost of Ownership (TCO) identifies costs as being made up of two major cost components, direct and indirect, but while most organisations can account for their direct costs, indirect costs, which can be up to sixty percent of total IT cost, are more elusive to measure and rationalise. As such, Gartner (undated, online) states that some organisations dismiss the impact of indirect costs completely. Love, Ghoneim and Irani (2004) heeded these shortcomings and requested further research on identifying cost elements and establishing new taxonomies on this topic.

Comparing IT organisations to various benchmarks is a rather common phenomenon, but with limited results as these benchmarks typically poorly factor in firm-specific context thus fails to highlight the operational model which may drive the IT spend, and secondly, because benchmarking often suggests opportunities but fails to explain how to pursue them (Cullen, Symons, Cameron, Warren, Orlov and Belanger, 2007). Although there are various academic research papers on benchmarking in the IT field they mainly focused on e-commerce (McGaughey, 2002), small firms (Cragg, 2002) and benchmarking

benefit extraction (Alshawi *et al*, 2003). As such Yasin (2002) and Wainwright, Green, Mitchell, and Yarrow, (2005) states that the field of IT benchmarking has no distinctive theory to guide its advancement and that additional research is recommended.

1.4 The research problem

This research consists of two main research problems the first of which relates to the identification of IT costs, and the second which relates to benchmarking within IT.

Gartner (undated, online) and Love *et al* (2004) indicated the shortcomings of IT cost identification within organisations and as such the first research objective is to explore the topic of IT cost identification within an organisation.

Although Tobin (2006), Rigby (2007) and the APQC (undated, online) emphasise the importance of benchmarking within organisations, Yasin (2002), Wainwright *et al* (2005) and Cullen *et al* (2007) notes the difficulties encountered with benchmarking within the Information Technology. The second research objective is thus to identify what IT cost benchmarking takes place within an organisation and what the value and relevance of this benchmarking is.

1.5 Research scope

The scope of the research is limited to exploring in what way regions in one multinational organisation are currently identifying their Information Technology costs, and what benchmarking is currently occurring within their IT environment within these regions, and what the value and relevance of this benchmarking is.

1.6 Structure of the report

Chapter 2 presents a non-empirical investigation into the identification of costs as well as benchmarking, with a particular focus on the Information Technology industry.

Chapter 3 highlights the two research problems identified to address the aim of this research.

Chapter 4 explores the possible alternatives and indicates the preferred research methodology that was used to conduct the research. This chapter consists of three sections, being the research approach, philosophy and research design.

Chapter 5 consists of three sections presenting the empirical data gathered for the research project. The first section serves as an introduction to the case study organisation, GoodsCo. The following two sections present the predominantly qualitative data gathered during the empirical research as gathered via semi-structured interviews, according to the research question.

Chapter 6 analyses the data presented in Chapter 5 with reference to the non-empirical research covered in Chapter 4.

The final chapter in this research report, Chapter 7, presents recommendations and identifies potential areas for future research based on findings during the research which would require more in-depth analysis and additional research.

Chapter 2: Literature Review

2.1 Introduction

Advances in technology and globalisation have changed the competitive landscape for organisations thereby forcing them to discover new and improved ways of competing on the global marketplace. This has forced organisations to reconsider historic practices and minimise costs to maximise earnings in an effort to become world-class, a term described by Voss, Blackmon, Chase, Rose and Roth (1998) as cited by Tobin (2006), as organisations with both leading management practices as well as performance equal to the world's best.

Within this competitive context and with the average IT spending among the InformationWeek 500 companies for 2005 equating between 2.8 % and 3% of revenue (Cuneo, 2005), the role of identifying and benchmarking Information Technology costs becomes a critical issue.

As mentioned in Chapter 1, Epstein and Rejc's (2005) proposed IT Balanced Scorecard depicted the impact that IT costs have on either Revenue Growth or Cost Reduction, thereby changing Earnings or Growth within the bigger company. But as per Smith (2005), cost investigation should not necessarily be about the cost of acquiring more technology. Instead, organisations are looking to best use the technology they already own.

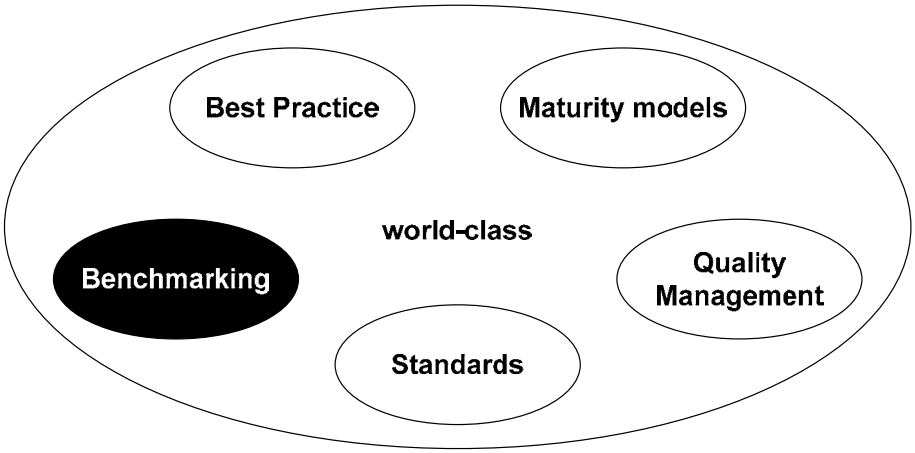
Cost reduction within IT also makes more funds available to introduce new IT products and services that will lead to acquiring new customers, satisfying the

existing ones and consequently, increasing sales and profits (Hurley and Schaumann, 1997). As such, a good understanding of the costs and components involved is critical for organisations to be competitive or even world-class.

But how do organisations identify and target their weaknesses in these areas to ensure world-class performance? Kouzmin, Löffler, Klages and Korac-Kakabadse (1999) state that benchmarking was specifically created to identify competitive targets which, through comparison, would identify the weak points within an organisation and discover ways to improve them.

Tobin (2006) also recognised the role of benchmarking alongside best practice, quality management, standards and capability maturity as an element of what might be considered as measures of world-class performance. Figure 1 summarises their world-class performance framework and indicates the role that benchmarking plays within it.

Figure 2-1. Proposed world-class performance measures



Adapted from Tobin (2006)

As such, the role of benchmarking is not only to measure the best performance but also to identify and exploit its cause, being best practices. As per the American Productivity and Quality Centre (APQC) (1999) this study of best practices is the key to gaining a strategic, operational and financial advantage.

In order to address the aim of the research, the theory and literature review addresses the classification of IT components and the different taxonomies that are available. The role, types and process of benchmarking is discussed in more detail, with a focus on its relevance to Information Technology. Finally, in order to assist companies to classify and benchmark their IT costs, a possible tool to assist them is proposed.

2.2 Information Technology costs

2.2.1 A Brief look at Costs

As cost is the most widely understood performance criterion and the most finite as well as most competed-for resource, it is perceived by organisations as the most important (Tichacek, 2006). Gordon and Loeb (2001) state that cost management is an important aspect of running a corporation successfully, as is assigning these costs correctly, because of its key role in determining the reported profitability of an organisation. Cost allocation also affects product and

pricing hence identifying them correctly is imperative to the sustained profitability of the organisation.

As per Solloway (1996) costs can be classified as follows:

- Direct costs: Costs can be traced to the cost objective and assigned to the cost objective in a clear-cut manner.
- Indirect costs: Costs that can not easily be traced to the cost objective but rely on some sort of allocation scheme and are necessary for the organisation's existence. As these costs are shared by multiple departments they are also seen as shared costs and synonymously with general administrative and overhead costs.

Classifying costs as direct and indirect is a way to measure the full expenditure for an organisation.

2.2.2 Information Technology Cost

While IT is characterised by cost declines and dramatic performance improvements over time (Demirhan, Jacob and Raghunathan, 2006), 56% of the *InformationWeek* 500 companies said that during 2005 they would increase year on year IT spending, with only 25% of the top 100 companies looking to reduce their IT costs (Cuneo, 2005).

Based on a survey of 77 US senior IT executives, Kanakamedala, Krishnakanthan and David (2006) forecasted a three percent annual increase on an accrual basis across industries. This increase masks the reductions in overall IT operating costs from process improvements, such as offshoring and

new technologies, which cumulatively will allow capital expenses to increase by 13 percent. Of those surveyed, 53 percent of respondents confirmed their investment in IT infrastructure as their key category, with investments in Servers (38%), Voice over Internet Protocol (VoIP) (27%), data integration (24%) and mobile solutions (19%) being the specific areas of investment within the category. The second key category for investment is Enterprise Resource Planning (ERP) systems with 47 percent and lastly security, regulations, and reliability at 46 percent (Kanakamedala *et al*, 2006).

World Information Technology and Services Alliance's (WITSA) upward trend on Information Technology spending continues with worldwide expected expenditure during 2006 exceeding US$3 trillion and not forecast to decline during this decade (WITSA, 2006). With IT costs amounting to nearly seven percent of the world Gross Domestic Product during 2006, it is imperative that this spending is accurately measured and controlled to ensure maximised organisational benefit from Information Technology. But how do organisations monitor and evaluate these costs?

As long ago as 1990 researchers grappled with the measurement of IT cost, with Hochstrasser's (1990, p.216) Kobler Unit study stating that "…evaluation procedures exclusively based on standard accounting methods simply do not work in today's sophisticated IT environment". Yet the situation has not changed over the last decade, with Alshawi *et al* (2003) stating that these common standard accounting methods such as return on investment, internal rate of return, net value, and payback are specifically designed to assess the bottom-line financial impact of investments and are unable to accommodate strategic benefits and indirect costs.

Not only is the measurement difficult but also costly and requires ongoing resources as well as commitment. This absence of valid measures leaves organisations without an idea whether investments in IT are providing increased efficiency, added value, or competitive advantage (Blowers, 2005).

As part of a three year study involving 60 managers from 34 British companies, Hochstrasser (1990) found that most companies tend to underestimate the total cost of IT projects, with regular differences of up to 50 percent in the costing structure. Furthermore it was found that some companies, that weren't using careful analysis, were unaware of the true costs involved in deploying IT. As a result organisations find themselves in a situation where the total cost of their IT investment is not known, and as a result, cannot be evaluated.

2.2.3 The role of Information Technology within organisations

Following on from Weill and Broadbent's (1998) earlier work and based on interviews with 147 U.S. firms, Weill and Aral (2005) found that business leaders have four different objectives or portfolio classes which motivate their organisation's investment in Information Technology:

- Transactional, which means cutting costs or increased throughput at the same cost.
- Informational, referring to the providing of information for any purpose such as account, manage, control, communicate or analyse.

- Strategic, to achieve a competitive advantage or position in the marketplace.
- Infrastructure, to either reduce costs through consolidation or provide a flexible base for future business initiatives.

Weill and Aral (2005) found that the average firm spends 54 percent of their total IT investment each year on infrastructure costs, followed by 20 percent on informational, 13 percent on strategic and 13 percent on transactional costs. But these percentages can vary significantly between organisations dependent on their IT strategy. For example an investment in the informational asset class might be due to regulatory pressures such as Sarbanes Oxley or to better analyse customer needs, while an increased investment in the asset class may aim to reduce costs and increase productivity.

2.2.4 Information Technology Components

This section briefly investigated the available literature on the different components that make up an IT environment.

Weill and Broadbent (1998) cited in Chanopas, Krairit and Khang (2006), states that IT consists of IT Infrastructure as well as Local Applications, the fast changing local business applications as well as the actual data (Boh and Yellin, 2007).

Chanopas *et al* (2006) defines IT Infrastructure as a set of shared resources which is a foundation for both communication across the organisation and the implementation of present and future business applications. They state that IT infrastructure consists of two broadly defined infrastructures being technical and human. The technical infrastructure includes all the needed hardware, software, network components and telecommunications, all applications and other tangible IT resources. The human infrastructure consists of the knowledge and skills required to manage the technical infrastructure. The top layer of IT infrastructure consists of shared and standard IT applications which change less frequently such as accounting, budgeting or human resource management.

As an example of IT components, WITSA's (2006) Digital Planet guidebook examines IT spending in four broad categories being:

- Computer Hardware spending, representing the total value of all purchased or leased hardware such as computers, storage devices and printers. This category represented 17 percent of all IT spend in 2006.
- Computer Software, including the total value of all purchased or all leased packaged software such as operating systems, utilities and applications. During 2006 computer software contributed 10 percent towards total IT cost.
- Computer Services spending includes the total value of outsourced services such as IT consulting, systems integration or office automation and accounted for 23 percent of the 2006 total IT spend.

- Communications spending consists of the total value of all voice and data communications services and equipment, and accounts for 50 percent of the total IT cost.

WITSA's (2006) classification is one of a plethora of IT classification and guidelines which add to the confusion of what Information Technology actually consists of. A lot of these guidelines are in the form of Gartner and Forester reports which are not in the public domain and therefore have been excluded from this research project. Some examples of these as mentioned by Heschl (2006) are represented in Table 2-1, indicating their main aim as well as indicating which IT resources they address namely Applications, Information, Infrastructure and People:

Table 2-1. IT guidelines

Guidance	Aim	IT components
A Guide to the Project Management Body of Knowledge (PMBOK)	The primary use of PMBOK is to identify the subset of The Project Management Body of Knowledge that is generally regarded as good practices.	Frequently addresses the People aspect, rarely discusses Applications, Information or Infrastructure
Capability Maturity Model Integration (CMMI)	Offers guidance on developing processes with the aim to create better products	Addresses Applications, Infrastructure and People but rarely discusses Information
Committee of Sponsoring Organisations of the Treadway Commission (COSO) Internal Control - Integrated Framework	Four volume report dedicated to improve quality of financial reporting and ethics through effective internal control	Applications, Information, Infrastructure, People frequently addressed
Control Objectives for Information and related Technology (COBIT)	Collection of documents classified as generally accepted best practice for IT governance	Applications, Information, Infrastructure, People frequently addressed
Federal Information Processing Standard (FIPS) Publication 200 Minimum Security Requirements for Federal and Information	Addresses the specification or minimum security requirements for US federal information and information systems	Frequently addresses Applications, Infrastructure, People, moderately addresses Information
ISO/IEC 15408:2005 Common Criteria	Standard issued to define criteria as basis for common and comparable evaluation of IT security	Applications, Information, Infrastructure, People frequently addressed
ISO/IEC 17799:2005 Code of Practice for Information Security Management	Informative as to implementing information security within an organisation. Defines 132 security controls strategies under 11 major headings	Mainly Applications, Information and People. Moderately addresses Infrastructure
ISO/IEC TR 13335 Information Technology - Guidelines for the Management of IT Security	Five part guidance report on aspects of IT security management	Applications, Information, Infrastructure, People frequently addressed
IT Baseline Protection Manual (BPM)	To identify and achieve a security level for IT that is adequate and sufficient to satisfy the requirements for protecting information and assets	Addresses Infrastructure and People. Rarely addresses Applications or Information
Projects in Controlled Environments (PRINCE2)	To define a project management method to provide a framework covering the wide variety of disciplines and activities required within a project	Frequently addresses the People aspect, rarely discusses Applications, Information or Infrastructure
The IT Infrastructure Library (ITIL)	Development of a vendor-independent approach to service management. Ethos being recognition of the role of increased dependence on IT which needs to be managed by high quality IT services	Applications, Information, Infrastructure, People frequently addressed
The Open Group Architecture Framework (TOGAF 8.1)	Detailed method and set of supporting tools for developing an enterprise architecture	Addresses Applications, Information, and Infrastructure but rarely addresses People
TickIT	Encourages software developers to address the quality intrinsic to the process of software development, achieving the quality objectives, and continuous improvement of the quality management system	Applications, Information, Infrastructure, People frequently addressed

Adapted from Heschl (2006).

Though a few of these guidelines address all four of the IT resources, closer inspection reveals their shortcomings with regards to the aim of this research:

- COBIT 4.1 offers a comprehensive framework classifying IT components as applications, information, infrastructure and people, but does not specify these IT components in detail but rather acts as a framework to tie business requirements for information and governance to the objectives of the IT services function.
- COSO only briefly mentions these IT components from an internal control perspective
- ITIL V2 is customer oriented and concerned with service support processes being incident, problem, change, configuration and release management.
- ISO/IEC TR 13335 and ISO/IEC 15408:2005 offers guidance with tasks such as implementation and security management, techniques, safeguards and communication-related issues while implementing IT security
- TickIT covers the four IT topics from a software development quality perspective.

As such, none of Heschl's (2006) mentioned guidelines are detailed enough to clarify the area of Information Technology components.

In summary, the available literature does not clarify Information Technology components - Weill and Broadbent's (1998) classification of IT is so broad as to raise more questions than answers about identifying and classifying all IT costs and, as with the WITSA categories, does not cater for indirect components.

2.2.4 Information Technology cost components

This section investigates the available literature on Information Technology, but from a cost perspective.

In a study by Love *et al* (2004) into the academic cost taxonomies for IT, they reported that the current academic taxonomies are of little use to decision-makers. Love *et al* (2004) also state that there is much need for further research to identify cost elements and possibly establish new taxonomies on this topic. One proposed reason for this gap in relevant academic literature is that academics are not aware of these costs, and/or the organisations studied for developing the taxonomies were not familiar with these costs. Table 2-2 gives a summary of Love *et al's* (2004) findings on the limited research of cost taxonomies:

Table 2-2. Cost taxonomies

Reference	Cost Taxonomies
Anandarajan and Wen (1999)	*Development/Hidden costs.* Costs related to the purchasing, installing, training, and testing the system
David *et al* (2002)	*Acquisition/Administration: control and operations costs.* This taxonomy identifies a set of cost factors that constitute the total cost of ownership (TCO) of information technology
Dier and Mooney (1994)	*Initial/Ongoing costs* . These are identified and assigned during the systems life cycle. However they tend to be retrospective, which make their consideration during *ex-ante* evaluation difficult. Yet, as legacy systems and enterprise solutions become more integrated, such taxonomies warrant closer considerations in terms of identifying their respective cost elements.
Irani and Love (2001)	*Direct/Indirect: human and organisational.* The direct cost element is assigned to the information technology component, whereas the indirect element relates to the affect of the Information system on the organisation and people.
Kuster and Renkema (1996)	*Financial/Non-Financial activities.* These costs are classified according to the activities causing them, emphasising a causal relationship. Hence, reactive in nature
Mohammed and Irani (2002)	*IS cost divisions - management, employee, finance, and maintenance* . This cost taxonomy identifies a set of cost factors on sub-systems that impact the organisation . However, the taxonomy falls short of identifying performance measures.
Remenyi *et al* (1996)	*Initial investment/Ongoing costs.* These are based around the costs relating to the development of an information system infrastructure (initial investment) and operation of the infrastructure (ongoing cost)
Ryan and Harrison (2000)	*Social subsystem costs.* The costs that reflect the changes in the social subsystem brought about by a new information technology

Adapted from Love, Ghoneim and Irani (2004)

A more in depth look into these cost taxonomies revealed certain shared factors which are indicated in Table 2-3, as well as their frequency:

Table 2-3. Cost taxonomy shared factors

Number of occurrences	Cost factor shared by two or more taxonomies
7	Training
7	Hardware
6	Package software
5	Maintenance
5	Implementation risks (covert resistance)
5	Staff related costs (changes in salaries, etc.)
4	Communication
4	Employee time
3	Development
3	Support
3	Upgrades
3	Installation and configuration
3	Business process re-engineering (BPR)
2	Operations
2	System software
2	Modifications
2	Overheads
2	Management/Staff resource
2	Management time
2	Cost of ownership: system support
2	Management effort and dedication
2	Productivity loss
2	Organisational restructuring
2	Infrastructure
2	Accommodation/travel
2	Displacement and disruption
2	Learning

Adapted from Love, Ghoneim and Irani (2004)

The three most frequently mentioned cost factors, being hardware, training and software costs, are all directly related to IT and thus easy to identify and quantify (Love *et al,* 2004).

All these cost factors can be classified as either direct or indirect costs. Gartner (undated, online) states that direct IT costs traditionally form the area that

organisations find the easiest to measure and as such receive undue and excessive focus while indirect costs are by nature more elusive to measure and rationalise therefore often dismissed by organisations. Irani, Ezingeard and Grieve (1998) noted that total direct costs are often underestimated while indirect costs, consisting of indirect human and organisational costs, might well be four times as high as the direct costs. Direct costs can be summarised as costs that can easily be attributed to the implementation and operation of IT and are indicated in Table 2-4.

Table 2-4. Direct IT costs

Direct costs associated with Information Technology	Example of direct IT cost
Communication	Telephonic or data communications
Consumables	Printer cartridges
Environmental Operating cost	Computer room and other overheads
Hardware costs	Infrastructure such as file servers
Installation and configuration costs	Installation Engineers for upgrades
Maintenance costs	Operations and support
Software costs	Operating Systems or Security software such as protection against viruses
Training costs	Vendor software familiarisation courses

(Adapted from Irani, Ezingeard and Grieve, 1998)

Management time is one of the largest indirect human costs and refers to time spent integrating new systems. Furthermore, significant employee resources will be used for investigating the potential of and experimenting with Information Technology. As such, additional costs might be incurred associated with employee pay and awards to keep employees trained and motivated, as indicated by Table 2-5:

Table 2-5. Indirect Human Costs associated with IT

Indirect human costs associated with Information Technology	Examples of indirect human costs associated with Information Technology
Employee motivation	Interest in IT reduces as time passes, salary changes and incentives
Employee training	Learning and development
Management time, effort and dedication	Devising, approving and amending IT and manufacturing strategies and exploring the potential of the system
Management/staff resources	Integrating new systems into new/revised work practices, travel, absorbing the transition to new work practices

(Adapted from Irani, Ezingeard and Grieve, 1998)

Indirect organisational projects costs encompass organisational issues caused by the move from old to new work practices based on the impact of new IT systems. Initially there might be a loss of productivity as employees go through the learning curve, and additional organisational costs might also be experienced once the basic systems are in place. These cost implications are associated with management's efforts to incorporate information flows and increase availability. Restructuring costs might also play a role as management tries to simplify and optimise the hierarchy. The indirect organisational costs are indicated in Table 2-6:

Table 2-6. Indirect Organisational Costs associated with IT

Indirect organisational costs associated with Information Technology	Examples of indirect organisational costs associated with Information Technology
Losses in organisational productivity	Developing and adapting to new systems, procedures and guidelines
Organisational restructuring	Covert resistance to change, displacement, disruption
Process re-engineering	Redesign of organisational functions, BPR
Strains on organisational resource	Maximising the potential for the new technology through integrating information flows and increasing information availability and communication

(Adapted from Irani, Ezingeard and Grieve, 1998)

Therefore, Irani *et al* (1998) stressed the importance of including all the direct costs as well as accommodating indirect human and organisational costs to ensure an accurate Information Technology cost.

As another method of determining the IT cost components, Smith David, Schuff, and Louis (2002) divide the IT Total Cost of Ownership (TCO) into two main sets of cost factors: acquisition and administration costs. Acquisition costs consist of both the hardware and software costs associated with IT, while administration costs consist of control and operational cost categories as follows:

- Control costs being the degree of centralisation and standardisation.
- Operational costs such as support, evaluation, training and installations or upgrades.

As acquisition costs are now seen as a commodity it is very difficult for organisations to try to gain a competitive advantage by controlling them, but organisations have greater control over IT expenditure directed towards the administrative functions, which consist of up to 80% of all expenditure. As such, the degree of centralisation and standardisation should be added as two complementary methods for reducing TCO (Smith David *et al,* 2002).

Prasad and Tata (2006) expanded on this theme by identifying technological complexity as a relevant structural variable when benchmarking organisations. Technological complexity refers to the diversity of platforms (single vs multiple), diversity of technology (limited vs extensive), processor location (centralised vs

distributed), database intensity (low vs high) and location (centralised vs distributed), and diversity of information sources (few vs multiple).

This section indicated the indirect and hidden nature of Information Technology cost as well as all the components that need to be taken into account. Smith David *et al*'s (2002) addition of the degree of centralisation and standardisation and Prasad and Tata's (2006) addition of complexity are both valid measures that cannot be clearly or easily measured, but their possible impact on the outcome of the study will be noted.

2.2.5 Summary

Table 2-7 summarises the cost components identified in this section as well as their relevant author which gives a clear indication as to the difficulty that different cost taxonomies experience when trying to identify all the cost components. One general observation in the academic literature is that the role of intangible measures of Information Technology cost is of value and has to be central to any serious attempt to conduct IT investment evaluation (Anandarajan and Wen, 1999).

Table 2-7. IT Cost components summary

Cost components identified	Weill and Broadbent (1998)	Chanopas et al (2006)	WITSA (2006)	Love *et al* (2004)	Smith David *et al* (2002)	Prasad and Tata (2006)
Hardware	x	x	x	x	x	
Network	x	x	x	x	x	
Telecommunications	x	x	x	x		
Software	x	x	x	x	x	
Local Applications	x	x		x		
Services			x	x	x	
Consumables				x		
Training		x		x	x	
Operating Costs				x		
Indirect Human Costs		x		x		
Indirect Organisational Costs				x		
Centralisation					x	
Standardisation					x	
Complexity						x

2.3 Benchmarking

2.3.1 Introduction

Named after the surveyor's mark for position and elevation, benchmarking has become almost mandatory for any organisation trying to better results or business processes (Camp, 1989). Since Xerox introduced benchmarking in 1979 to assist with resolving their severe quality and cost problems (Kouzmin *et al*, 1999), it has risen to become one of what might be considered as measures of world-class performance, alongside best practice, quality management, as standards and the capability maturity model (Tobin, 2006). Currently benchmarking and competitive comparisons are seen as management concepts with the single greatest influence over the 1,000 points that can be awarded in a Baldridge assessment, an assessment which helps organisations identify and, understand and manage the factors that make them successful (APQC, 1999).

2.3.2 Description of benchmarking

The American Productivity and Quality Centre (APQC) (1999, online) defines benchmarking as "…the process of improving performance by continuously identifying, understanding, and adapting outstanding practices and processes found inside and outside the organization". Spendolini, Friedel and Workman (1999, p. 58) defines it as "A continuous, systematic process for evaluating the products, services and work processes of organisations that are recognised as

representing best practices for the purposes of organizational improvement". As per McGaughey (2002) these descriptions of benchmarking infer that:

- The benchmarking process is not once off but rather continuous, to adapt to the competitive or internal landscape.
- Performance must be measured so that strategies and methods can be changed accordingly.
- Multiple aspects, such as products, services, and work processes should be benchmarked.
- Companies should identify and compare themselves to best-in-class performance wherever best practices can be found, inside or outside of the organisation.
- The purpose of the benchmarking process is organisational improvement.
- Benchmarking is about learning. It is a learning process of identifying, understanding, and adapting best practices and processes to enable organisational improvement.

As such, Zairi (1992) cited in Wainwright *et al* (2005) states that benchmarking is imperative on the Total Quality Management (TQM) journey of first raising awareness and recognising problems and opportunities and then utilising benchmarking to optimise operations and implement best practices.

While benchmarking was initially used as a problem solving technique (problem based benchmarking), the focus has recently changed to process benchmarking to extract more value by identifying and analysing the basic processes that run the organisation.

2.3.3 Why benchmark?

Camp (1989) states that in order for an organisation to energise and motivate its people, it must firstly believe there is a need for change, determine what it wants to change, and create a picture of how it wants to look after that change. Benchmarking creates this need for change by identifying the gaps between the organisation and its competition and, secondly, identifies what has to change within the organisation. Lastly benchmarking motivates an organisation's people by showing what best-ing-class organisations have achieved and creates attainable goals and strategies to drive their efforts towards surpassing these achievements.

Camp (1989) also claims that benchmarking overcomes the three basic obstacles organisations face when trying to improve business performance by searching for best practice, namely:

- Firstly, no one is ever best at everything he or she does.
- Secondly, there is a constant need for improving practices, if not best practise.
- Thirdly, that once this best practice knowledge is found, it needs to be captured, conveyed and implemented within the organisation.

Benchmarking was created to overcome these basic obstacles in a disciplined way.

Rigby (2007) confirms that benchmarking is about improving performance but adds that it also clarifies the organisation's relative cost position and identifies opportunities for improvement within the organisation. It helps organisations to focus on capabilities critical to building strategic advantage thus assisting in gaining a strategic advantage. He lastly states that benchmarking also brings new ideas into the organisation and facilitates experience sharing thereby increasing the rate of organisational learning.

Last but not least, when measuring the results of benchmarking and implementation of these opportunities, it can yield a significant return on investment. In a study conducted in 1995 by the International Benchmarking Clearinghouse from the American Productivity and Quality Centre (APQC), more than 30 organisations reported an average $76 million first year return on their most successful benchmarking project, while among the most experienced benchmarking organisations this return increased to $189 million (APQC, 1999).

As such, benchmarking is a pivotal ingredient in strategic planning and operational improvement to ensure survival within a turbulent marketplace.

2.3.4 Types of benchmarking

Camp (1989) proposed the first basic classification of best practice benchmarking types as being internal, competitive, functional or generic. Internal benchmarking refers to comparisons between divisions or departments within the same organisation. Competitive benchmarking is benchmarking

undertaken against best-in-class organisations to compare performance and results. Functional benchmarking aims to compare the technology or processes within the specific industry or technological area with the aim to become the best in that specific process or technology. Generic benchmarking compares processes against best-in-class regardless of their industry.

Khurrum and Huq (1999) expand on this framework by distinguishing between performance, process and strategic benchmarking. Performance benchmarking compares performance measures such as quality, speed, cost, flexibility or dependability relative to other organisations. Process benchmarking entails comparing processes or methods within the organisation to other organisations in an effort to improve them. Strategic benchmarking is undertaken when the organisation's strategy needs to be changed and thus measured compared to other organisation's strategies (Khurrum and Huq, 1999).

These types of benchmarking as well as their definition are presented in Table 2-8:

Table 2-8. Types of benchmarking:

Author	Benchmarking Type	Definition
Camp (1989)	Competitive	Benchmarking against best in class organisations to compare performance and results
	Functional	Compare technology pr processes within specific industry or technological area with the aim to become the best in that specific
	Generic	Compares processes against best in class orgainsations regardless of industry
	Internal	Between divisions or departments within the same organisation
Khurrum and Huq (1999)	Performance	Externally compares performance measures such as quality, speed, flexibility or dependability
	Process	Compares internal processes or methods against external organisations in an effort to improve them
	Strategic	Compares other organisation's strategies if an organisation's strategy needs to be changed

Pycraft, Singh and Phihlela (2005) identified six types of benchmarking, namely: internal, external, non-competitive, competitive, performance and practice benchmarking. Both External and Competitive benchmarking are similar to Camp's (1989) Competitive benchmarking, while Non-Competitive benchmarking is similar to Camp's (1989) Generic benchmarking. Pycraft *et al's* Practice benchmarking is also similar to Khurrum and Huq's (1999) Process benchmarking, while both Performance and Internal benchmarking are similar (Pycraft *et al*, 2005; Khurrum and Huq, 1999; and Camp, 1989). Table 2-9 also indicates the similarities between the Khurrum and Huq (1999) and Camp (1989) benchmarking types and the Pycraft *et al* (2005) benchmarking types.

Table 2-9. The benchmarking matrix

	Camp (1989)				
Khurrum and Huq (1999)		Internal	Competitive	Functional	Generic	Pycraft *et al* (2005)
	Performance					Performance
	Process					Practice
	Strategic					
		Internal	External/Competitive		Non Competitive	
	Pycraft *et al* (2005)					

Khurrum and Huq (1999) also propose that a combination of different types of benchmarking can be used to yield better results. As per Table 2-10, internal strategic benchmarking will add little or no benefit, while external competitor strategic benchmarking would provide a wealth of information and possible means for improvement.

Table 2-10. Benchmarking combinations

	Internal Benchmarking	Competitive Benchmarking	Functional Benchmarking	Generic Benchmarking
Performance Benchmarking	o	Δ	o	◊
Process Benchmarking	o	◊	Δ	Δ
Strategic Benchmarking	◊	Δ	◊	◊

Relevance/Value High Δ Medium O Low ◊

Adapted from Khurrum and Huq, 1999

Even though researchers at Northumbria University (Newcastle Business School, Centre for Business Excellence) identified more than 16 types of benchmarking reported in the literature, they concluded that on closer inspection they all conform to Camp's (1989) suggested four types (Wainwrigth *et al*, 2005).

Either internal or external benchmarking can achieve breakthrough performance but unlike external benchmarking, internal benchmarking also accommodates the knowledge or best practices already present within organisations. As such, organisations are putting as much effort into internal benchmarking for knowledge management; to identify, capture, and leverage knowledge to help the company compete (O'Dell and Grayson, 1998).

Waldron (1999) saw benchmarking as either quantitative or qualitative. Quantitative benchmarking involves the use of best practice metrics with the aim to compare these to conventional measures such as quality, time, and cost. Qualitative benchmarking seeks to compare the current manufacturing processes to leading manufacturer's practices. Spendolini *et al* (1999) ventures so far as to say that qualitative process-related information is the most useful

benchmarking information, while studies that focus entirely on quantitative information should be defined as comparative or competitive analysis, and not benchmarking. As such any research that aims to explore the types of benchmarking in use should include measurement of Waldron's (1999) quantitative or qualitative benchmarking processes, as per Table 2-11:

Table 2-11. Benchmarking framework

Author	Benchmarking Type	Waldron (1999) Qualitative	Quantitative
Camp (1989)	Competitive		
	Functional		
	Generic		
	Internal		
Khurrum and Huq (1999)	Performance		
	Process		
	Strategic		

2.3.5 The benchmarking process

Camp (1989) suggests that the following key elements be addressed to ensure that benchmarking achieves optimal benefit to the organisation:

- Critical success factors within the organisation must be identified by querying their strategic plans and focused on accordingly.
- Use known strengths and weaknesses to identify performance targets not achieved or processes with improvement potential.
- Select the processes which need improvement, and

- identify benchmarking partners keen to share their knowledge of these processes

Pulat (1994) cited in Khurrum and Huq (1999) states that benchmarking is a continuous process which follows the Plan, Do, Check and Act (PDCA) cycle, with the Plan phase including the upfront decisions, such as selection of the functions or processes to benchmark, as well as the type of benchmarking to complete. During the Do phase selected processes need to be characterised by using metrics and documenting business processes. The relevant data also need to be collected from the benchmarking partner during this phase. The Check phase refers to the need to observe if a positive or negative gap exists between the benchmarking organisation and the benchmarking partner. During the Act phase projects are launched either to close negative gaps or to maintain positive gaps.

Though companies like Xerox and Kodak typically use a ten or six step plan respectively, Khurrum and Huq (1999) reveal the five major components of benchmarking in their benchmarking wheel as follows:

- Step 1: Plan the study based on the organisation's critical success factors to ensure that benchmarked processes are aligned with the organisation's strategy.
- Step 2: Form the benchmarking team and define roles, responsibilities, milestones and a realistic completion date.
- Step 3: Identify partners that are world-class in the processes to be benchmarked and who may mutually benefit out of the benchmarking.

- Step 4: Collect and analyse data with the aim to identify the enablers of the best practice performance
- Step 5: Adapt and improve the other organisation's best practices to conform to the organisation's culture, technology, and human resources with the assistance of action planning or goal setting (Khurrum and Huq, 1999).

2.3.6 Benchmarking IT

There are numerous academic research papers on benchmarking in the IT field, mainly focused on e-commerce (McGaughey, 2002), small firms (Cragg, 2002) and benchmarking benefit extraction (Alshawi *et al*, 2003), yet the field of benchmarking has no distinctive theory to guide its advancement (Yasin, 2002; Wainwright *et al*, 2005).

Cullen *et al* (2007) states that comparing IT organisations to various benchmarks is a rather common phenomenon with limited results, as these benchmarks typically poorly factor in firm-specific context, thus fail to highlight the operational model which may drive the IT spend. Secondly, benchmarking often suggests opportunities but fails to explain how to pursue them. As such, the actual process used for comparison determines the usefulness of the results.

Cullen *et al* (2007) recommends that the organisation firstly finds firms and organisations with similar characteristics by comparing the patterns on how IT is used, instead of using an industry-specific segmentation which might be less useful due to operational differences. Next the organisation needs to compare its IT scope and structure, such as the role of IT within the organisation after

which Cullen *et al* (2007) recommends comparing budgets based on spending objectives, while separating new investments and planning from ongoing costs, and then to investigate the context behind the numbers. What might seem to be a lean operation to some CIO's might mean that users are not well served to another. Finally Cullen *et al* (2007) recommends comparing the actual management practices that drive IT value, by investigating how planning and budgeting are done, and how these budgets and resources are allocated to projects or services. Also worth investigating is how service levels and projects are managed, as well as how business satisfaction and alignment is ensured.

2.3.7 Challenges of Benchmarking

According to Khurrum and Huq (1999) the main problem with benchmarking is the focus on data instead of the processes used to acquire the data. Their proposed solution to this problem is to move away from problem-based to process-based benchmarking in an effort to understand what makes these processes work.

The American Productivity and Quality Centre (APQC) (1999) supports Khurrum and Huq's (1999) solution and stresses that senior management, inexperienced at benchmarking, often fall prey to the misconception that benchmarking is about the process of measuring best performance, and that once this best performance benchmark is identified, that organisations try to meet or beat it. As per APQC (1999, online) "This view completely misses the most valuable part of benchmarking - the part that more sophisticated

benchmarking companies leverage to gain extraordinary strategic and financial advantage. The missing piece: Benchmarking is actually the process of learning lessons about how best performance is accomplished. That is why experienced benchmarkers refer to best-in-class organizations as having "best practice" - not "best performance." True, best-in-class companies do have best performance - but best practice is the cause."

Kouzmin *et al* (1999) stress that in order for benchmarking to be beneficial to the organisation, it can also not be carried out in isolation and has to match and contribute to the overall business objectives. On internal benchmarking Kouzmin *et al* (1999) recommends defining and finding the relevant best practices before trying to transfer the knowledge. Best practices cannot merely be surgically implanted into organisations; factors such as prevailing culture and the human resource employed need to be taken into consideration. As performance targets and action plans continuously change within the organisation, benchmarking needs to be a permanent exercise to ensure relevant objects, indicators and companies are involved in the benchmarking. Lastly, Kouzmin *et al* (1999) states that the success of benchmarking is also dependent on employee understanding and learning of the results and consequences.

Khurrum and Huq (1999) noted that the perception that benchmarking is too expensive is also a misconception. Benchmarking costs, which are mainly comprised of travel expenses and indirect costs, have declined from an average $50,000 for conducting one benchmarking study in 1992 to $5,000 by 1996, due to the availability of resources and information.

On external benchmarking, the impression that benchmarking gave too much information away to competitors also concerns organisations. To avoid this

misconception Khurrum and Huq (1999) proposed that employees providing information should be smart about it and not give away the heart and soul of the organisation, and that, as a whole, distributing information and processes will help organisations to be more competitive in the global marketplace.

Just focusing on successful organisations introduces selection bias, which is relying on samples which are not representative of the whole population and any relationship inferred between management practice and success will be misleading (Denrell, 2005). As a solution Denrell (2005) proposed that both floundering and thriving companies should be used for benchmarking to discover the qualities that separate the successes from the failures.

Cullen *et al* (2007) stated that comparing an IT organisation to various benchmarks is limited in two aspects:

- Poorly factored in firm-specific context. Firm specific attributes such as the degree of centralisation and the role of technology within the organisation can be a strong driving force behind how IT operates and thus drives spend.
- May suggest opportunities, but does not clarify how to pursue them. Regardless of the benchmarking outcome CIO's need to understand how their management practices compare with known best practice as well as practices that are feasible for firms such as theirs.

As such Cullen *et al* (2007) stresses that the process used for comparison determines the usefulness of the results.

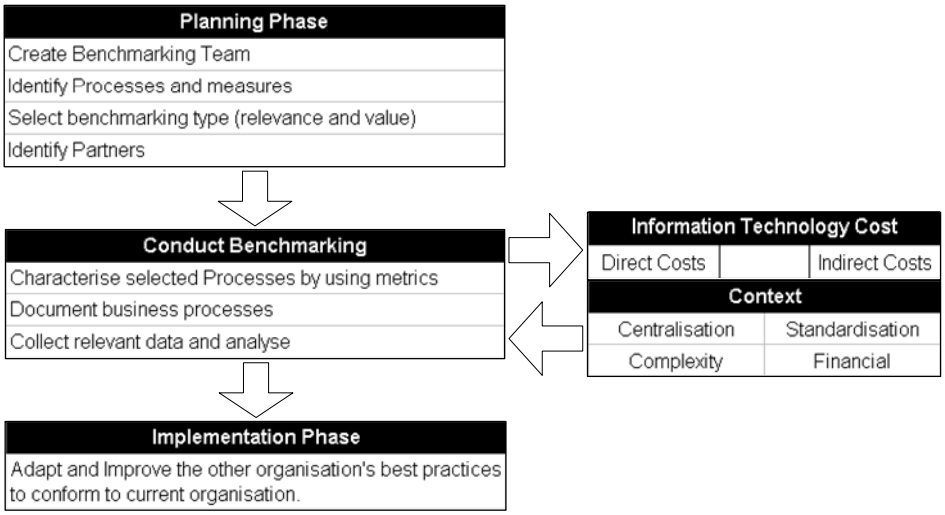
The American Productivity and Quality Centre (APQC) (1999) also mentions the final flaw that inexperienced benchmarking organisations commit - not doing enough follow-up measurements after the implementation to measure the

project's operational effects and financial cost and benefit. Such follow-up would indicate the financial value and relative importance of benchmarking in meeting the organisation's strategic objectives to senior management, and can act as a catalyst to promote the newly implemented practices throughout the enterprise and motivate greater utilisation of the benchmarking process itself.

2.3.8 Summary

The previous section indicated that benchmarking is a systematic discipline of planning and identifying, conducting and studying, analysing, and adapting best practices and implementing the results. When benchmarking is used in the IT environment it was shown that it cannot be performed in isolation, but the organisation's context is also of great importance. This process is indicated by Figure 2-2.

Figure 2-2. Benchmarking IT



For the purpose of this research it was decided that the prevalence of Khurrum and Huq's (1999) three types of benchmarking as well as Camp's (1989) four types of benchmarking will be investigated. Khurrum and Huq's (1999) benchmarking has been simplified as per Table 2-12 for noting the occurrence of benchmarking within the organisation:

Table 2-12. Benchmarking summary

	Internal Benchmarking	Competitive Benchmarking	Functional Benchmarking	Generic Benchmarking
Performance Benchmarking				
Process Benchmarking				
Strategic Benchmarking				

But, as mentioned previously in section 2.2, Spendolini *et al* (1999) emphasised the importance of both Waldron's (1999) qualitative and quantitative types of benchmarking. Their occurrence will also be included within the research. Table 2-13 summarises the benchmarking tool which will be used to better understand what benchmarking measures are used and how organisations go about the practice of benchmarking.

Table 2-13. Summarised framework for benchmarking IT components

Cost components identified	Cost Identified (Y/N)	Performance Benchmarking	Process Benchmarking	Strategic Benchmarking	Internal Benchmarking	Competitive Benchmarking	Functional Benchmarking	Generic Benchmarking
Hardware								
Network								
Telecommunications								
Software								
Local Applications								
Services								
Consumables								
Training								
Operating Costs								
Indirect Human Costs								
Indirect Organisational Costs								

2.4 Literature Conclusion

In line with the overall research problems, this chapter explored the nature of Information Technology costs and benchmarking through a non-empirical review of the available literature.

The literature review highlighted a lack of clarity in the field of IT component and cost identification, the need for a more structured approach towards identifying and benchmarking Information Technology cost, and confirmed several important issues for the research project as a whole. Firstly, that identification of IT cost components is a general concern for academia and organisations and, secondly, that benchmarking is an accepted, yet troubled practice, within the Information Technology sector.

A review of the relevant literature revealed fourteen IT cost components of which three (centralisation, standardisation and complexity) are to be used for researching the context of the organisation's Information Technology. The non-empirical review also identified the seven types of benchmarking as well as the importance of qualitative and quantitative approaches to benchmarking.

Based on the non-empirical review, the next chapter will clarify and state the research questions for this research project.

Chapter 3: Research Questions

The non empirical review highlights the importance of both cost identification and benchmarking within the Information Technology area. As a result research questions were developed to determine how an organisation may go about these two activities.

3.1 Information Technology cost identification:

Costs directly related to the operation and implementation of Information Technology are generally easy to identify and quantify but a review of the relevant literature recognised the ease with which intangible costs are excluded from Information Technology cost. These intangible costs are mostly of an indirect nature and can contribute substantially to the overall IT cost within an organisation so will form an integral part of this research. Even though contextual costs such as centralisation, standardisation and complexity are difficult to measure they create the foundation of IT cost measurement supporting the direct and indirect cost components. As such any serious attempt to conduct IT investment evaluation should include an exploration into the contextual elements. This research project will aim to investigate which of these IT cost components are identified within an organisation as forming part of their Information Technology cost and is explicitly stated as:

3.1.1 Research Question 1: In what way does an organisation identify its Infrastructure Technology costs?

3.2 Information Technology benchmarking

As evident from the non-empirical review Information Technology benchmarking is an often misunderstood systematic discipline of planning and identifying, conducting and studying, analyzing and adapting best practices, implementing the results and then finally measuring the success of the exercise. When benchmarking is used in the IT environment it was shown that it can not be performed in isolation but that the organisation's context is also of great importance as is both the quantitative and qualitative measures used to conduct the benchmarking. Therefore systematic attention to all these factors determines the value and relevance of the results attained through the benchmarking process. This section gives rise to the second research question:

3.2.1 Research question 2: What IT cost benchmarking takes place within an organisation and what is the value and relevance of this benchmarking?

The next chapter will look in detail at the research methodology to be used in the empirical phase of the research project.

Chapter 4: Research Methodology

4.1 Introduction

This chapter presents the approach, research philosophy and methods used to address the research problems as outlined previously, as well as the limitations to the research methodology. It will indicate that, as per the terms defined by Myer (1997), this research sought to clarify through predominantly qualitative methods using deductive reasoning based on existing taxonomies and theories, the identification and benchmarking of Information Technology cost within a multinational. This is according to the research problems as identified in Chapter 1.

The contents of this chapter is arranged in three sections, namely the research approach, philosophy and research design, which will explain the reason for selecting the specific methodology for this research project.

4.2 Research approach

4.2.1 Non-empirical / empirical research

Tobin (2006) states that one of the primary considerations to be faced in any research is the pre-existing body of knowledge, referred to as non-empirical

research, which should be used as a reference for previous research material pertaining to the selected subject area.

Data gathered based on observation or experience is referred to as empirical research. The nature of the problem for which the data is gathered will determine if the research will be exploratory, descriptive, or causal (Zikmund, 2003). Research is exploratory in nature if the general problem has been discovered, but more research needs to be undertaken to gain better understanding of the dimensions of the problem. Descriptive research aims to describe the characteristics of a population or a phenomenon, while causal research identifies cause-and-effect relationships among variables within a narrowly defined problem.

This research project took into account both a non-empirical (more commonly referred to as literature) review as well as an empirical approach. The literature review was used to structure and carry out the empirical research activities. The research is exploratory in nature as the general problem has been discovered but the extent or dimensions of the problem are not known.

4.2.2 Quantitative / qualitative approach

Meyer (1997) states that research methods can be classified in various ways, of which the most common distinction can be found between quantitative and qualitative research methods. With its foundation in natural sciences to study natural phenomena, quantitative research methods usually take the form of, for example, laboratory experiments and mathematical modelling. In stark contrast,

and with its origins in the social sciences, qualitative research methods were developed to enable researchers to study social and cultural phenomena. As such, quantitative methods were only used for part of the empirical study to assist in identifying the most frequent cost components, while qualitative methods were used to piece together all of the information as gathered from the participants.

4.2.3 Deductive / Inductive

Zikmund (2003) states that theories are either generated through deductive or inductive reasoning. Deductive reasoning is the process of deriving a conclusion about a specific instance based on a known general premise, while inductive reasoning is the process of establishing a general proposition on the basis of observation of particular facts.

Due to the nature of this case study being generalisation about an organisation based on the occurrence of IT cost identification and benchmarking, a mainly deductive approach has been used.

4.2.4 Subjective / objective

The degree to which the researcher is involved, or has an influence on the research outcome, is another significant choice in the research paradigm (Tobin, 2006). As indicated below in the research philosophy, the phenomenological

research paradigm is by definition subjective. As such, the researcher will be involved and will be able to influence the outcome of this research. This was recognised within the research and the necessary attention was paid to this aspect.

4.3 Research philosophy

Underlying assumptions about validity and appropriate research methods forms the foundation of all research. Therefore it is important to know what these assumptions are. Meyer (1997) states that qualitative research can be positivist, interpretive or critical. Positivist research assumes that reality is objectively presented and can be described by observer-independent, measurable properties and, as such, generally attempt to test the theory in an attempt to increase the predictive understanding of phenomena. Interpretive research assumes that access to reality is only through social creations such as language and shared meanings. These studies typically attempt to understand phenomena through the meanings that people assign to them or other interpretive methods of research. Critical research starts out with the assumption that social reality is historically represented and produced and reproduced by people. As such the main task of critical research is described by Myer (1997, online) as offering social critique, thereby focusing on "…the oppositions, conflicts and contradictions in contemporary society, and seeks to be emancipatory i.e. it should help to eliminate the causes of alienation and domination."

Easterby-Smith, Thorp and Lowe (1991), cited in Tobin (2006), offer two primary philosophical alternatives - positivist and phenomenological. The positivist paradigm corresponds with Myer's (1997) positivist philosophy, but the phenomenological paradigm believes that the observer is part of what is observed, that the world is socially constructed and subjective, and that science is driven by human interests. Researchers should thus focus on meanings, try to understand what is happening, look at the totality of each situation and develop ideas through induction from data. Preferred methods of the phenomenological paradigm include using multiple methods to establish different views of phenomena and using small samples investigated in depth or over time.

Due to the in depth nature of the case study the researcher decided to use the phenomenological paradigm.

4.4 Research method

Myer (1997, online) states that the research method is "…a strategy of inquiry which moves from the underlying philosophical assumptions to research design and data collection." The choice of research method influences the way in which data is collected, and will also imply different assumptions, skills and research practices. Meyer (1997) proposes four different research methods - action research, case study research, ethnography and grounded theory. Action research is concerned with increasing the supply of knowledge of the social science community and to contribute to the practical concerns of people in an

immediate challenging situation (Meyer, 1997). According to Yin (1981, p. 59) "…*the distinguishing characteristic of the case study is that it attempts to examine:* (a) a contemporary phenomenon in its real-life context, especially when (b) the boundaries between phenomenon and context are not clearly evident." This is different from experiments, which intentionally divorce a phenomenon from its context, and histories, which limit phenomena to the past. With its roots in the discipline of social and cultural anthropology, ethnography involves spending a lot of time doing research in the field and then tries to place the phenomena studied in their social and cultural perspective. The last research method, grounded theory, seeks to develop theory on the basis of data systematically gathered and analysed.

The case study method was primarily used as it enabled Information Technology to be examined in a holistic manner within a real life organisation, GoodsCo. A more detailed exploration of this research paradigm follows in the next section.

4.4.1 Case study research overview

Abercrombie, Hill and Turner (1984) described a case study as a single example of class phenomena which therefore can not provide reliable information about the broader, but can be useful in the preliminary stages of an investigation for providing a hypothesis which can later be tested with a larger group of cases.

As stated by Jensen and Rodgers (2001), though the case study might address several questions, examine several processes, or survey a large sample of

individuals or sub units, the sample size of a case study is always equal to one. Even though the results of a case may be difficult to generalise, each case study possesses what Jensen and Rogers (2001) refer to as “intellectual gold” that is absent from larger sample studies. To some extent this does mean that case studies trade detail for generalisations, but this criticism vanishes while the richness of details is preserved (Jensen and Rogers, 2001).

Case study types

Jensen and Rodgers (2001) identified five types of case studies - snapshot, longitudinal, pre-post, patchwork case studies and comparative studies of cases. The snapshot case study describes a single organisation or entity at a single point of time, and is often formally tested with a between-case design. A longitudinal case study is a time-ordered analysis of events during the entity’s history, with time being the organising device and the dynamics of change the primary focus. In pre-post case studies the outcome of a particular program, policy or decision is assessed, while patchwork case studies integrate several case studies that have evaluated a particular entity as snapshot, longitudinal or pre-post designs. Comparative studies also integrate different findings from several case studies, but in a cross-unit comparison instead of within the same unit in an effort to find underlying commonality reflecting a policy, process, program or decision.

To achieve the objectives of this research it was decided to conduct a snap-shot case study within one organisation.

4.4.2 Case study organisation selection

Yin (1994) cited in Tobin (2006) suggested that there are four main factors which relate to the selection of the case study organisation - relevance, feasibility, access and application.

Relevance

Relevance refers to the extent to which the organisation selected for the case study suits the purpose of the research. As the researcher had been involved with the selected company for five years, it was clear that the organisation suited the purpose of the study.

Feasibility

Feasibility refers to the researcher's ability to conceptualise, plan, execute and report back on the research project to the selected organisation. For this case study the practical aspects determined were that the company should be easily accessible to the researcher and that managerial support should be given to the researcher to ensure the successful completion of the project. The identified company consented to these feasibility criteria.

Access

Yin (1994), as cited in Tobin (2006), also stated that the assistance of the organisation should be secured for the extent of the research. The practical aspect determined that the case study organisation should be willing to participate, share information and access to resources. Given the constraints of the research project in terms of time and cost, the selected company, GoodsCo, met all these criteria.

Application

Application refers to the extent to which the case study method can be applied in a particular situation. In the context of the research objectives this indicated that the selected organisation would need to have a sizeable, strategic Information Technology investment, accessible regions as well as experts in the field of IT cost identification and benchmarking. GoodsCo satisfied all these criteria.

4.4.3 Research Process

The research project took the form of a two-phase qualitative study:

- **Phase 1:** During this phase in-depth exploratory interviews were conducted with the IT manager and business unit controller, the experts in the field of Information Technology cost within the pre-test region. The aim of this research phase was to determine the views of these experts regarding their current Information Technology cost which assisted in developing more specific propositions to inform and pre-test the interview questionnaire to be used in sampled regions. These experts were also consulted as to the availability of key informants within the case study company.

- **Phase 2:** The second phase consisted of semi-structured in-depth interviews with the five key informants in regions within the identified case study organisation, as identified in Phase 1. Phase 2 was conducted with the assistance of a framework as identified in Chapter 2, but also included the prompts identified during Phase 1 to delve deeper into the relevant subjects during these interviews.

4.4.4 Proposed Population and Unit of Analysis

The population was all the regions within the identified case study organisation, GoodsCo. The sampling frame was all regions within GoodsCo with key informants and thus experienced individuals with an expert opinion, as identified in Phase 1 of the proposed research process. The unit of analysis was a region within GoodsCo with a key informant.

4.4.5 Data sampling

Given the nature of the research problem outlined in Chapter 1 it was evident that probability sampling would not be appropriate for this study. Therefore non-probability sampling, a sampling technique in which sample units are selected based on personal judgement or convenience (Zikmund, 2003), was selected.

Non-probability sampling methods

Zikmund (2003) identified four types of non-probability sampling: convenience (or accidental), judgement (or purposive), quota and snowball sampling. Convenience sampling refers to sampling units or people most conveniently available, while judgemental sampling is a technique whereby an experienced individual selects the sample based on some appropriate characteristic. Quota

sampling ensures that certain characteristics of a population sample will be represented to the exact extent that the researcher desires. Snowball sampling refers to a technique whereby initial respondents are selected by probability methods and additional respondents are obtained from information obtained from the initial respondents (Zikmund, 2003).

Considering the nature of the research, judgemental sampling was undertaken as the sample units were selected on the basis of predefined characteristics specified by the researcher, namely that they must be key informants and thus experienced individuals with an expert opinion.

The sample was five regions that were drawn from the population of relevance based on the availability of key informants, experienced individuals with an expert opinion on Information Technology cost components as well as benchmarking.

4.4.6 Data Collection and Management process

As per Tobin (2006) case studies allow for a wide variety of possible data collection methods such as questionnaires, interviews, observation and gathering of documentation or artefacts.

Unstructured face-to-face interviews were used during phase 1 of the research process to give the experts the opportunity to express their opinion without

being limited by specific questions. During phase 2 telephonic semi-structured interviews assisted, by questionnaires, were conducted. This was necessary as certain financial and technical information needed to be gathered during the structured part of the interview, as well as more in-depth analytical discussions during the unstructured part, as per questionnaire in Appendix 1

As this case study involved multiple regions, uniformity of recording was essential to facilitate comparisons which allowed similarities and differences to be highlighted. As per Lubbe (2003), it is vital to institute this uniformity in a multiple region case study in order to recognise similarities, or the usefulness and scientific value of findings may be eliminated. All interviews were digitally recorded for later transcription and filed per region per respondent. All written notes and schematics were digitally scanned and added to the respective regional respondent folder, as well as MSN Messenger questions and answers and digital questionnaires.

4.4.7 Data Analysis

LeCompte (2000) compared working with qualitative data to assembling a jigsaw puzzle. As qualitative data have no initial intrinsic organisational structure or meaning, the researcher was tasked with creating a structure and imposing it on the data. The first step, as outlined by LeCompte (2000), was to tidy up, a process of structuring, filing, labelling and comparing data to the questionnaire

to fill in any gaps by returning to the field if needed. This step permitted the researcher to make an initial assessment of the data set.

During the second step, finding items, data was sifted to reveal items relevant to the research questions indicated by frequency, omission and declaration.

In step three, creating stable sets of items, these items were compared, contrasted, mixed and matched to organise them into groups or categories. The purpose of this step was to group similar items together.

In the fourth step LeCompte (2000) proposed that patterns need to be identified. Using the jigsaw example, stage four is comparable to grouping all the pieces of sky with the birds together, while assembling van Gogh's "Crows Over a Wheatfield"

In the final step, assembling structures, groups of patterns were assembled into structures which resembled an overall description of the problem being studied.

4.4.8 Data Validity and Reliability

LeCompte (2000) stated that unless the data analysis is meticulously done, based on clearly articulated theories and yielding meaningful results in an understandable language, results can not be used to solve the problem for which they were created. This, as well as the perceived accuracy and reasonability of the findings, impacts on the validity and reliability of the findings. Therefore the researcher needed to continually ask him or herself whether he or

she really understood and described what was being studied in the same way the people who live it would.

LeCompte (2000) also specified that researchers should get input from key people as to the validity of their recognised relationships and patterns, which will avoid researcher bias to a certain degree. Lubbe (2003) stated that it is naïve to declare that any research or even human activity in general is without some sort of bias, as the researcher's bias would be manifested in the subject or experiment chosen as well as how the research or experiment is performed. Therefore it is impossible to totally eliminate bias, but it should be recognised and the implications acknowledge and accepted. As per Lubbe (2003) it should be the principal role of the researcher to try to minimise the bias level in which he or she is working. The following three common obstacles in obtaining unbiased testimonials from observers were addressed:

- Respondents not remembering accurately
- Inhibitions of respondents to disclose important opinions or feelings
- Respondents not willing to reveal information that might reflect poorly on them, their superiors or regions.

By using multiple sources the validity and reliability of the research has been substantially improved (Lubbe, 2003). From the outset it was also clarified with all respondents that their responses were confidential, and that additional comments or accurate responses could be sent to the researcher at a later stage.

4.5 Potential Research Limitations

The following aspects were limitations to this study:

- The research was conducted in a single organisation.
- The strong technical bias of the researcher had the potential to influence the data interpretation.
- As per Abercrombie *et al.* (1984) the outcome of a case study might not provide reliable information about the broader class, but can be useful in the preliminary stages of an investigation by providing a hypothesis which can later be tested with a larger group of cases. On these limitations Amaratunga and Baldry (2001, p. 100) stated that "…like all experimental observations, case study results can be generalised to theoretical propositions (analytical generalisation) but not to populations or universes (statistical generalisation). Thus the aim of case studies cannot be to infer global findings from a sample to a population, but rather to understand and articulate patterns and linkages of theoretical importance". Ultimately the reader wil decide whether these patterns and linkages are relevant to their requirements.
- As highlighted by the data analysis considerations, qualitative data, unlike quantitative data, have no intrinsic structure or meaning. Thus the researcher is tasked with creating the structure and imposing it on the data, which determines the usefulness to other organisations.

4.6 Summary

In this chapter a number of alternative methods were evaluated for the research approach, philosophy as well as the method used to address the research problem.

The overall methodology is based on phenomenological philosophy and combines both the non-empirical and empirical approaches in a subjective rather than objective fashion. Furthermore, the methodology is exploratory in nature, deductive regarding theory testing and dependent on mostly qualitative methods. Given the research objectives and constraints under which the research was conducted, the researcher decided to use the snapshot case study method and to execute the case study through a combination of face-to-face interviews and telephonic conversations.

The results of the research are shown in the next chapter.

Chapter 5: Results

5.1 Introduction

This chapter presents the data gathered during the empirical phase of the case study and starts with a brief introduction to the selected case study organisation, GoodsCo. The role of Information Technology within GoodsCo is also explained to create a context for the following section, reporting of the data findings of the investigation into IT cost components within GoodsCo. In the next section, the data findings regarding the occurrence of benchmarking will be reported, after which a brief summary will conclude the chapter and serve as an introduction to the data analysis chapter.

5.2 Company information

5.1.1 General information

GoodsCo is a well-established multinational enterprise ranked within the fifty biggest Fast Moving Consumer Goods (FMCG) companies worldwide and with an annual turnover exceeding $1 billion. This organisation has representation in most countries globally, and employs more than 30,000 staff worldwide.

5.1.2 The role of Information Technology within GoodsCo

Since the implementation of standardisation and centralisation, the role of IT within GoodsCo has moved from a purely support tool on the McFarlan grid to the Strategic quadrant, with the organisation reliant on IT for the performance of day-to-day operations and as a competitive advantage (McFarlan, 1984) or position in the marketplace (Weill and Aral, 2005).

The aim of this standardised and centralised approach was to leverage the global size of GoodsCo, align and unify the organisation to be globally more competitive and focus on alternative customer channels and consumers by tapping into the e-business phenomenon. As such, regions within GoodsCo access centralised databases via a Wide Area Network (WAN) provided by a single Service Provider while using a standardised hardware and software platform.

5.3 Regional Demographics

A total of five Information Technology Managers from different regions within the GoodsCo were interviewed. The following information regarding demographics for their respective region was requested:

- Number of countries: Referring to the number of actual geographic countries within their region.

- Number of sites: This total includes all head offices, factories and distribution centres within the region.
- Number of Sales/Home offices: Includes all smaller sites within the region, usually consisting of fifteen users or less.
- Co-packers: Includes all third party sites connected to the organisation's network with the aim of assisting with the manufacturing of the organisation's products.
- Number of IT users: This total includes all regular users of the organisation's Information Technology within the region.

A summary of this information is displayed in Table 5-1.

Table 5-1. Regional demographics

Region	Number of countries	Number of sites	Sales/Home offices	Co-packers	Number of IT users
Region A	2	9	17		2,000
Region B	1	11			1,200
Region C	1	9	15		3,000
Region D	1	12		8	2,000
Region E	1	30	200		2,500

5.4 Question 1 findings

To what extend is the case study organisation identifying their Infrastructure Technology costs?

5.4.1 Region A

IT Components

Region A took the following components into consideration regarding their IT cost:

Hardware, networking components, telecommunications, software, local applications, Service, and Indirect Human costs.

Only UPS costs were included in Operating costs, the other components such as air-conditioning were paid for by a different department, Office Solutions. Consumables were not measured by IT and rather sourced by the relevant department requiring it and Training was handled by the regional Training department. Table 5-2 summarises these findings:

Table 5-2. Region A cost components

Cost Component	Cost Identfied?
Hardware	Yes
Network	Yes
Telecommunications	Yes
Software	Yes
Local Applications	Yes
Services	Yes
Consumables	No
Training	No
Operating Costs	Yes
Indirect Human Costs	Yes
Indirect Organisational Costs	No

Contextual information

Region A houses a regional helpdesk with four full-time GoodsCo employees. Local site administrators are dual role site administrators paid for by their relevant site. On the topic of complexity, all sites within this region supply wireless access for users and handheld product scanning, while all the sites within the region also use IP Telephony with Voice over IP. On the financial side Region A depreciates all equipment over a 3 year period, while only responsibility for UPS costs and maintenance are accounted for by the IT department. Region A's IT supply chain consists of purchases of their HP and Dell equipment through a direct channel, while all other IT expenditure is via a distributor with a predetermined upliftment fee. On the software side Microsoft and legacy software is bought within the region, with the remainder recharged from the central IT office. Table 5-3 represents these contextual findings in a summarised format.

Table 5-3. Region A contextual data

Context component	Measure	Finding
Centralisation	Regional Help Desk	4 full time employees
	Local site administrator	Non-IT
Complexity	Wireless networking	All sites users data and product scanning
	IP Telephony	Yes, with VoIP
Financial	Depreciation period	3 years all equipment
Responsibility	Operating cost	Only UPS
	Consumables	Non-IT
Supply Chain	Software purchasing channel	Microsoft and legacy local, others recharged
	Hardware purchasing channel	Dell and HP direct, others through distributor

5.4.2 Region B

IT Components

In Region B all Hardware, Networking components, Telecommunications, Software, Local Applications, Services and Training were accounted for in IT cost. Consumables were only included and measured for the Head Office, while Operating costs, Indirect Human and Organisational costs were not accounted for in IT cost, as summarised in Table 5-4:

Table 5-4. Region B cost components

Cost Component	Cost Identfied?
Hardware	Yes
Network	Yes
Telecommunications	Yes
Software	Yes
Local Applications	Yes
Services	Yes
Consumables	Yes
Training	Yes
Operating Costs	No
Indirect Human Costs	No
Indirect Organisational Costs	No

Contextual information

In the centralisation cost context, Region B has a regional Helpdesk with three full time GoodsCo employees, while local site administrators were present at all sites but their costs were not included in the IT cost as their relevant sites paid for their contractor fees. Complexity-wise Region B uses wireless connectivity

primarily for telephones and handheld scanning devices, with their telephone system based on IP PBX using VoIP between their sites. On the financial side, their equipment is depreciated over different time periods being Desktop and Notebook computers over three years and the rest of the Information Technology equipment over 5 years. As far as responsibility goes, consumables were only included and measured for the Head Office, while Operating costs were excluded from the IT costing as a different department paid for it.

Region B acquires all their hardware and networking equipment via an indirect distributor. They purchase all Microsoft and legacy software within the region while the other software is recharged from the central office based on licence usage. These findings are summarised in Table 5-5.

Table 5-5. Regional B contextual data

Context component	Measure	Finding
Centralisation	Regional Help Desk	3 full time employees
	Local site administrator	Non-IT
Complexity	Wireless networking	Telephones and product scanning
	IP Telephony	No, but PBX VoIP
Financial	Depreciation period	PC's 3 years, but all other for 5 years
Responsibility	Operating cost	Non-IT
	Consumables	Yes, Head Office only
Supply Chain	Software purchasing channel	Microsoft and legacy local, others recharged
	Hardware purchasing channel	All through distributor

5.4.3 Region C

IT components

Region C accounted for Hardware, Networking components, Telecommunications, Software, Local Applications, Services, Training and Indirect Human costs within their IT costs.

The cost of business process re-engineering was included as an Indirect Organisational cost, which was later recharged to the respective departments.

All Consumables as well as Operating Costs were excluded from IT cost and accounted for by the Administration or Building Services departments respectively.

These findings are presented in Table 5-6:

Table 5-6. Region C cost components

Cost Component	Cost Identfied?
Hardware	Yes
Network	Yes
Telecommunications	Yes
Software	Yes
Local Applications	Yes
Services	Yes
Consumables	No
Training	Yes
Operating Costs	No
Indirect Human Costs	Yes
Indirect Organisational Costs	Yes

Contextual information

The regional helpdesk consists of eight contractors paid for by a different department and onsite support is conducted by local administrators, also not paid for by IT. Complexity wise, Region C provides wireless coverage for head office users as well as for product scanning at all sites, while the whole region has implemented IP Telephony as well as Voice over IP. On the financial front, Region C depreciates servers over five years and all other IT equipment over four years. IT does not take responsibility for either operating or consumable costs within Region C, while their IT supply chain consists of software which is recharged from the central office with only a few legacy applications purchased within the region, only HP hardware is purchased directly and all other IT equipment is supplied via a distributor. These findings are summarised in Table 5-7.

Table 5-7. Regional C contextual data

Context component	Measure	Finding
Centralisation	Regional Help Desk	Non-IT (8 contractors)
	Local site administrator	Non-IT
Complexity	Wireless networking	Head Office user data, other product scanning
	IP Telephony	Yes, with VoIP
Financial	Depreciation period	Servers 5 years, all other 4 years
Responsibility	Operating cost	Non-IT
	Consumables	Non-IT
Supply Chain	Software purchasing channel	All recharged
	Hardware purchasing channel	HP direct, others through distributor

5.4.4 Region D

IT components

Region D accounted for Hardware, Networking equipment, Telecommunications, Software, Local Applications, Services and Training as part of their Information technology cost.

All Consumables as well as Operating, Indirect Human and Indirect Organisational costs were excluded IT cost components, as per Table 5-8:

Table 5-8. Region D cost components:

Cost Component	Cost Identfied?
Hardware	Yes
Network	Yes
Telecommunications	Yes
Software	Yes
Local Applications	Yes
Services	Yes
Consumables	No
Training	Yes
Operating Costs	No
Indirect Human Costs	No
Indirect Organisational Costs	No

Contextual information

As a measure of centralisation Region D's helpdesk consists of one full-time employee and four contractors, all paid for by IT. The cost of local site administrators is recharged to the respective site but still seen as an IT cost. As

far as complexity goes Region D supplies wireless for users at some sites and at all sites for product scanning and has implemented IP Telephony as well as Voice over IP. Financially Region D depreciates their notebooks and PC's over three years, servers over four years, and the rest of their IT equipment over five years. The IT department is not responsible for Consumables nor operations, while all software except for legacy applications are recharged from the central office and only desktops and servers are purchased directly. This information is summarised on Table 5-9 below.

Table 5-9. Regional D contextual data

Context component	Measure	Finding
Centralisation	Regional Help Desk	1 full time employee and 4 contractors
	Local site administrator	IT cost, recharged
Complexity	Wireless networking	Some sites user data, all sites product scanning
	IP Telephony	Yes, with VoIP
Financial	Depreciation period	3 years notebook and PC, 4 years server, 5 years for rest
Responsibility	Operating cost	Non-IT
	Consumables	Non-IT
Supply Chain	Software purchasing channel	Legacy local, others recharged
	Hardware purchasing channel	Dell and HP direct, others through distributor

5.4.5 Region E

This region included all Hardware, Networking components, Telecommunications, Software, Local Applications, Services, Training and Operating costs.

Consumables, Indirect Human as well as Indirect Organisational costs, were excluded from IT costs, as per Table 5-10: Region E Cost Components:

Table 5-10. Region E cost components:

Cost Component	Cost Identfied?
Hardware	Yes
Network	Yes
Telecommunications	Yes
Software	Yes
Local Applications	Yes
Services	Yes
Consumables	No
Training	Yes
Operating Costs	Yes
Indirect Human Costs	No
Indirect Organisational Costs	No

Contextual information

Region E's regional helpdesk consists of one full-time GoodsCo employee, while all on-site support is done by dual-role engineers employed by the respective sites with no cost to IT. Region E uses wireless exclusively for product scanning, while no IP Telephony is installed. On the financial side all equipment is depreciated over a five-year period. IT takes full responsibility for all operating costs within the region, but not for any consumables. Their software supply chain supplies both Microsoft and legacy software locally, with the balance recharged from head office. All hardware within Region E is supplied via a direct supply chain. These findings are presented in Table 5-11.

Table 5-11. Regional D contextual data

Context component	Measure	Finding
Centralisation	Regional Help Desk	1 full time employee
	Local site administrator	Non-IT
Complexity	Wireless networking	Product scanning only
	IP Telephony	None
Financial	Depreciation period	5 years all equipment
Responsibility	Operating cost	All IT
	Consumables	Non-IT
Supply Chain	Software purchasing channel	Microsoft and legacy local, others recharged
	Hardware purchasing channel	All direct

5.4.6 Summary

Table 5-12 summarises the frequency of the various IT Cost Components within the five regions, while Table 5-13 summarises the contextual information as collected.

Table 5-12. IT cost component occurrence

Cost Component	Occurrence
Hardware	5
Network	5
Telecommunications	5
Software	5
Local Applications	5
Services	5
Consumables	2
Training	4
Operating Costs	2
Indirect Human Costs	2
Indirect Organisational Costs	1

Table 5-13. Contextual data						
Context component	**Measure**	**Region A**	**Region B**	**Region C**	**Region D**	**Region E**
Centralisation	Regional Help Desk	4 full time employees	3 full time employees	Non-IT (8 contractors)	1 full time, 4 contractors	1 full time
	Local site administrator	Non-IT	Non-IT	Non-IT	IT cost	Non-IT
Complexity	Wireless networking	All sites users data and product scanning	Telephones and product scanning	Head Office user data, all other sites product scanning	Some sites user data, all sites product scanning	None
	IP Telephony	Yes, with VoIP	No, but PBX VoIP	Yes, with VoIP	Yes, with VoIP	None
Financial	Depreciation period	3 years all equipment	3 years PC, all other 5 years	5 years servers, 4 years all other	3 years notebook and PC, 4 years server, 5 years for rest	5 years all equipment
Responsibility	Operating cost	Only UPS	Non-IT	Non-IT	Non-IT	All IT
	Consumables	Non-IT	Yes, Head Office only	Non-IT	Non-IT	Non-IT
Supply Chain	Software purchasing channel	Microsoft and legacy local, others recharged	Microsoft and legacy local, others recharged	All recharged	Legacy locally, others recharged	Microsoft and legacy local, others recharged
	Hardware purchasing channel	Dell and HP direct, others through distributor	All through distributor	HP Direct, others through distributor	Dell and HP direct, others through distributor	All direct

5.5 Question 2 findings

In this section respondents were questioned regarding the occurrence of benchmarking within their respective regions.

5.5.1 Region A

Internal Performance benchmarking occurs comparing the total IT cost as a percentage of Net Proceeds of Sales (NPS). This benchmarking is done annually by the central management team and the results shared with the regions.

On an informal basis, at seminars and conferences with peers within the region, the following benchmarking was mentioned:

- Functional Benchmarking – technology is compared with the aim to become the best in that specific process or technology
- Performance Benchmarking – Quality and cost is measured against other organisations
- Process benchmarking – Comparing processes within the organisation to other organisations in an effort to improve them

These findings are represented in Table 5-14:

Table 5-14. Region A benchmarking

	Internal Benchmarking	Competitive Benchmarking	Functional Benchmarking	Generic Benchmarking
Performance Benchmarking	1	0	1	0
Process Benchmarking	0	0	1	0
Strategic Benchmarking	0	0	0	0

At these conferences and seminars Hardware, Networking components, Telecommunications, Software, Local Applications, Services, Operating costs, Indirect Human costs as well as Indirect Organisational costs are compared.

5.5.2 Region B

Region B does Internal Performance benchmarking based on the percentage of NPS information received from the central office, as mentioned in Region A.

They also participate in an annual third party Competitive Performance benchmarking exercise within the region, with a focus on efficiency and effectiveness within respective IT departments. These findings are represented in Table 5-15:

Table 5-15. Region B benchmarking

	Internal Benchmarking	Competitive Benchmarking	Functional Benchmarking	Generic Benchmarking
Performance Benchmarking	1	1	0	0
Process Benchmarking	0	0	0	0
Strategic Benchmarking	0	0	0	0

The third party benchmarking covers Hardware, Networking components, Telecommunications, Software, Local Applications, Services, Consumables, Training and Operating costs, but mainly from a technologies deployed perspective rather than in detail.

5.5.3 Region C

Region C does Internal Performance benchmarking against other regions within the organisation based on the percentage of NPS.

Other than that, Region C also occasionally embarks on a regional Competitive Performance benchmarking process against competitors. The last such exercise was three years ago, at which time they undertook Competitive and Performance benchmarking on Hardware, Networking components, Telecommunications, Software, Local Applications as well as Services. Region C's benchmarking is summarised in Table 5-16:

Table 5-16. Region C benchmarking

	Internal Benchmarking	Competitive Benchmarking	Functional Benchmarking	Generic Benchmarking
Performance Benchmarking	1	1	0	0
Process Benchmarking	0	0	0	0
Strategic Benchmarking	0	0	0	0

5.5.4 Region D

Region D only does Internal Performance benchmarking within the organisation based on the percentage of Net Proceeds of Sales as indicated in Table 5-17.

Table 5-17. Region D benchmarking

	Internal Benchmarking	Competitive Benchmarking	Functional Benchmarking	Generic Benchmarking
Performance Benchmarking	1	0	0	0
Process Benchmarking	0	0	0	0
Strategic Benchmarking	0	0	0	0

5.5.5 Region E

Region E does not benchmark any IT cost.

5.5.6 Summary

A summary of which types of benchmarking regions within GoodsCo undertake is represented in Table 5-18:

Table 5-18. Benchmarking type occurrence

	Internal Benchmarking	Competitive Benchmarking	Functional Benchmarking	Generic Benchmarking
Performance Benchmarking	4	2	1	0
Process Benchmarking	0	0	1	0
Strategic Benchmarking	0	0	0	0

Table 5-19 displays the number of times each IT cost components occurred as part of the benchmarking process:

Table 5-19. IT Component benchmarking occurrence

Component	Occurrence
Total IT cost	4
Hardware	3
Networking components	3
Telecommunications	3
Software	3
Local Applications	3
Services (Support and Maintenance)	3
Consumables	1
Training	1
Operating costs	2
Indirect Human costs	1
Indirect Organisational costs	1

5.6 Summary

This concludes the empirical data presentation. In summary, data was gathered on the following aspects of the case study organisation:

- GoodsCo
    - General information regarding GoodsCo
    - The role of Information Technology within GoodsCo
    - Regional Demographics
- IT cost component identification within GoodsCo
    - Direct and indirect costs identified by regions within GoodsCo
    - Contextual information within GoodsCo regions
- The occurrence of benchmarking within GoodsCo
    - Types and frequency of occurrence
    - IT components benchmarked

As a result of the data gathered it is possible to create an analysis of the findings in the next chapter. This analysis will be conducted against the non-empirical research previously conducted in the field of IT cost components and benchmarking.

Chapter 6: Discussion of Results

6.1 Introduction

The objective of this chapter is to analyse the data gathered during the empirical phase of the research as presented in Chapter 5 and it will investigate each of the areas covered by the research in turn, being IT cost identification and benchmarking.

This chapter is structured in two main sections and will conclude with a summary of the analysis conducted.

6.2 IT component identification

6.2.1 In what way does an organisation identify its Infrastructure Technology costs?

The first part of the interview requested participants to state and describe the components their total IT cost consisted of. The findings of this question is summarised in Table 6-1.

Table 6-1. Cost component frequency

Cost Component	Occurrence
Hardware	5
Local Applications	5
Network	5
Services	5
Software	5
Telecommunications	5
Training	4
Consumables	2
Indirect Human Costs	2
Operating Costs	2
Indirect Organisational Costs	1

Six of the eleven cost components were identified by all five participants, namely Hardware, Local Applications, Network, Services, Software and Telecommunications. Training was identified by all but one participant, Region A, who stated that the regional Human Resources department caters for all their training needs and therefore is not included in IT cost.

The other four cost components being Consumables, Indirect Human Costs, Operating Costs and Indirect Organisational Cost, were acknowledged by less than half of the participants.

Though Irani *et al* (1998) classifies Consumables as a direct cost, it was found that different regions' IT departments have different levels of involvement with consumables. This is also the case with Operating Costs which involves all computer rooms and overheads such as rental, electricity and maintenance components (such as Uninterrupted Power Supply (UPS), air conditioning, fire detection, generator as well as monitoring costs). The different regional interpretations of these cost components are summarised in Table 6-2.

Table 6-2. Regional Consumable and Operating Cost IT responsibility

Cost Component	Region A	Region B	Region C	Region D	Region E
Consumables	Non-IT	IT - Head Office only	IT - Head Office shared printers only	Non-IT	Non-IT
Operating Costs	IT - UPS and Air conditioning costs	Non-IT	Non-IT	Non-IT	IT cost

Indirect Human costs were identified by Region A and Region C in the form of Management/Staff resources while Indirect Organisational cost was only identified by Region C and consisted of the cost for process re-engineering only, which was later recharged to the respective departments.

All seven of the most frequently occurring costs being Hardware, Local Applications, Network, Services, Software, Telecommunications and Training can be directly attributed to the operation and implementation of Information Technology. These costs are also in the top five (some cost factors shared the same frequency) of Love *et al*'s (2004) Cost Taxonomy Shared Factors as outlined previously in Chapter 2 and summarised in Table 6-3.

Table 6-3. Comparison of cost factors in taxonomies and frequency of occurrence

Cost Component	Participant Occurrence	Love, Ghoneim and Irani (2004) Cost Factor	Love *et al* (2004) Cost Taxonomy Shared Factors where 1 = most frequently mentioned
Hardware	5	Hardware	1
Local Applications	5	Software	2
Network components	5	Hardware	1
Services	5	Maintenance, Support	3 and 5
Software	5	Software	2
Telecommunications	5	Communication	4
Training	4	Training	1

The other four cost components being Consumables, Indirect Human Costs, Operating Costs and Indirect Organisational Cost, were identified less frequently due to their indirect nature (as is the case with Indirect Human and Operating Costs) or due to different responsibility and interpretation (as is the case with Consumables and Operating Costs) as summarised previously in Table 6-2.

When classified according to Irani *et al*'s (1998) direct or indirect costs, as indicated in table 6-4, the data shows that the top eight most frequent cost factors are all direct costs.

Table 6-4. Frequent cost component cost types

Cost Component	Participant Occurrence	Irani, Ezingeard and Grieve (1998) Cost type
Hardware	5	Direct
Local Applications	5	Direct
Network components	5	Direct
Services	5	Direct
Software	5	Direct
Telecommunications	5	Direct
Training	4	Direct
Consumables	2	Direct
Indirect Human Costs	2	Indirect
Operating Costs	2	Direct
Indirect Organisational Costs	1	Indirect

This supports Love *et al* (2004) and Gartner's (undated, online) suggestion that costs directly related to Information Technology are more easily identified and quantified. Direct costs are those costs that can be easily attributed to the implementation and operation of Information Technology (Irani *et al*, 1998) while indirect costs are typically shared by multiple departments and synonymous with general administrative and overhead costs (Solloway, 1996). Table 6-4 highlights the lack of recognition of indirect costs, which can be four times higher than direct costs (Irani *et al*, 1989), within these regions.

Even where these indirect costs were mentioned it did not ensure that they were fully accounted for. In both cases where Indirect Human Costs were mentioned only one of the four sub categories of Irani *et al*'s (1998) Indirect human costs associated with Information Technology being Management/Staff

resources, was included in their IT cost. Where Indirect Organisational cost was identified by Region C it included only one of Irani *et al*'s four sub categories, Process re-engineering.

From the above data it is evident that although direct costs are mostly accounted for, indirect costs are barely accounted for within GoodsCo. It also highlighted the different responsibility and interpretation within some of these cost components such as Consumables and Operating Costs.

6.2.2 Contextual findings

Smith David *et al* (2002) identified control costs as consisting of centralisation and standardisation while Prasad and Tata (2006) added complexity as another IT component impacting on the total cost of IT ownership. As these components are difficult to measure but do have an impact on the outcome of this research, they were analysed as per Table 6-5. Standardisation was not analysed as all the regions' Information Technology is standardised as mentioned in Section 5.1.2 The role of IT within GoodsCo. Table 6-5 displays how different these contextual components are between the regions.

Table 6-5. Contextual IT cost components						
Context component	**Measure**	**Region A**	**Region B**	**Region C**	**Region D**	**Region E**
Centralisation	Regional Help Desk	4 full time employees	3 full time employees	Non-IT (8 contractors)	1 full time, 4 contractors	1 full time
	Local site administrator	Non-IT	Non-IT	Non-IT	IT cost	Non-IT
Complexity	Wireless networking	All sites users data and product scanning	Telephones and product scanning	Head Office user data, all other sites product scanning	Some sites user data, all sites product scanning	None
	IP Telephony	Yes, with VoIP	No, but PBX VoIP	Yes, with VoIP	Yes, with VoIP	None
Financial	Depreciation period	3 years all equipment	3 years PC, all other 5 years	5 years servers, 4 years all other	3 years notebook and PC, 4 years server, 5 years for rest	5 years all equipment
Responsibility	Operating cost	Only UPS	Non-IT	Non-IT	Non-IT	All IT
	Consumables	Non-IT	Yes, Head Office only	Non-IT	Non-IT	Non-IT
Supply Chain	Software purchasing channel	Microsoft and legacy local, others recharged	Microsoft and legacy local, others recharged	All recharged	Legacy locally, others recharged	Microsoft and legacy local, others recharged
	Hardware purchasing channel	Dell and HP direct, others through distributor	All through distributor	HP Direct, others through distributor	Dell and HP direct, others through distributor	All direct

Through the qualitative interviews the researcher also identified three more contextual components which will impact on the total cost of IT ownership at GoodsCo as being:

- Financial: Different regions depreciate their IT equipment over a different period. This would impact on the IT cost due to the frequency of equipment rotation, the shorter the depreciation the greater the increase in IT cost.
- Responsibility: Regions are involved in operating and consumable costs to varying degrees. The result of different regional responsibility is that some regions would have a higher IT cost as they include these consumable or operating costs while other regions exclude them.
- Supply Chain: Another regional difference that was noted was the different channels for purchasing hardware and software. A region using a distributor for hardware would typically incur a handling or upliftment fee of up to fifteen percent, while direct supply would not face these fees. Regions purchasing software locally would also not incur additional exchange rate costs as those reliant on recharging from the central office would.

Though the impact of these contextual cost variables will be more relevant in the following section focusing on benchmarking, it was listed here to highlight the fundamental differences between IT in these highly standardised regions and stresses the importance of the often overlooked basic premises, such as the depreciation period, which impact on IT cost within organisations.

6.2.3 Summary

This section firstly looked at the frequency of identification of the IT cost components as identified in the non-empirical research and then looked at possible contextual influences as encountered during the research.

The research supports the views of Anandarajan and Wen (1999), Irani *et al* (1998) and Love *et al* (2004) in that indirect costs are often overlooked when investigating the cost of Information Technology. Gordon and Loeb (2001) stressed the importance of identifying costs to ensure the sustained profitability of the organisation, and Blowers (2005) also stated that the absence of valid measures leaves organisations without an idea of whether investments in IT are providing increased efficiency, added value, or competitive advantage. As such the importance of identifying costs using validly refined measures are critical to organisations such as GoodsCo who see IT as a strategic investment and thus, as per Weill and Aral (2005), as a tool to achieve competitive advantage or position in the marketplace.

In what way does an organisation identify their total Infrastructure Technology cost?

Data shows that to the answer to the research is that primarily direct costs are identified. This answer is based on the following findings from the empirical research:

- only six of the eleven cost components were identified by all the participants and they were all of a direct nature
- Indirect human cost was only acknowledged by two of the participants, and only to a limited degree
- Indirect organisation cost was only acknowledged by one of the five participants, and only to a very limited degree
- Contextual elements, such as centralisation and responsibility, were not accounted for within the IT cost in GoodsCo. As such, the total cost of IT can not be accurately determined within GoodsCo regions as other departments could possibly be paying for Information Technology cost components.

6.3 What IT cost benchmarking takes place within an organisation and what is the value and relevance of this benchmarking?

6.3.1 Regional Benchmarking Types

As per Table 6-6 it is evident that limited benchmarking occurs within the five regions of GoodsCo.

Table 6-6. Benchmarking type frequency

	Internal Benchmarking	Competitive Benchmarking	Functional Benchmarking	Generic Benchmarking
Performance Benchmarking	4	2	1	0
Process Benchmarking	0	0	1	0
Strategic Benchmarking	0	0	0	0

The most common benchmarking type in use between the participants is Internal Performance benchmarking used in all the regions except Region E. The reason for this frequency is that the central office conducts an annual benchmarking exercise based on the cost of IT as a percentage of the Net Proceeds of Sales (NPS) within each region, which is then shared with all the regions. The reason why Region E was not party to this information was not evident from the discussion.

Table 6-7 indicates what benchmarking was mentioned and by which region.

Table 6-7. Regional benchmarking within GoodsCo

	Internal Benchmarking	Competitive Benchmarking	Functional Benchmarking	Generic Benchmarking
Performance Benchmarking	Region A, B, C, D	Region B and C	Region A	None
Process Benchmarking	None	None	Region A	None
Strategic Benchmarking	None	None	None	None

It was found that informal benchmarking occurs at conferences and seminars within Region A, accounting for general Functional Performance as well as Functional Process benchmarking.

Both Region B and Region C participate in third party benchmarking exercises within their respective regions. Region B participates in an annual Competitive Performance exercise across a wide range of IT cost components while Region C occasionally embarks on a third party regional Competitive Performance benchmarking process against regional competitors, the last which was three years ago.

Also worth noting is that Region E does not benchmark any IT cost. The participant stated that “After the [centralisation and standardisation of GoodsCo], most of the IT cost, Hardware, Software and Services cannot be managed by the markets. I believe there is no meaning to compare the IT cost with other companies, because they have different IT strategies which depend on their company strategy.”

6.3.2 IT cost components

The IT cost components included in the benchmarking exercise were also noted. Table 6-8 indicates the frequency of occurrence for each respective component as well as for occurrence of benchmarking of the Total IT cost, which is used by four of the five regions.

Table 6-8. Benchmarking component frequency

Component	Occurrence
Total IT cost	4
Telecommunications	3
Software	3
Services (Support and Maintenance)	3
Networking components	3
Local Applications	3
Hardware	3
Operating costs	2
Training	1
Indirect Organisational costs	1
Indirect Human costs	1
Consumables	1

This table provides a valuable insight into frequently used benchmarking categories being that benchmarking occurs most regularly under direct IT costs as indicated previously in Table 6-4 and therefore highlights the lack of recognition towards the indirect costs associated with IT as identified by Irani *et al* (1998).

6.3.3 Frequency of benchmarking and benchmarking process

As indicated in Table 6-7, informal benchmarking occurs within Region A, and Region C also occasionally embarks on a third party benchmarking process against regional competitors, the last of which was more than three years ago.

McGaughey (2002), Spendolini *et al* (1999) and Kouzmin *et al* (1999) stress that the benchmarking process cannot be seen as a once-off process but rather as continuous, needing to adapt to the competitive and internal landscape. Khurrum and Huq (1999) also define benchmarking as a continuous process of planning, forming the benchmarking team, identifying the correct partners, collecting and analysing the data, and then adapting and improving the identified best practices.

As such, the researcher would not classify either Region A or Region C's benchmarking practices as relevant current benchmarking within GoodsCo:

- Region A on the basis of not following any specific process as outlined by Khurrum and Huq (1999) or addressing any of the key elements as identified by Camp (1989) and discussed in Chapter 2, but rather conducting brief, informal and general comparisons.
- Region C due to its infrequent benchmarking process.

Worth mentioning is that a central theme, being the exclusion of indirect IT cost components during costing as well as benchmarking, transpired during Region C's participant responding to a probing question regarding their previous benchmarking exercise three years ago: "We couldn't compare everything especially with all these costs being charged out, so we only do those where we know how much the cost is, that is the only part which we compare."

The balance of the benchmarking within the sample consisted of the annual third party benchmarking conducted within Region B as well as the four regions benchmarking IT cost based on it's percentage of Net Proceeds of Sales.

6.3.4 Value and relevance of benchmarking within GoodsCo

To establish the usefulness of these benchmarking types, the regional benchmarking types were compared to Khurrum and Huq's (1999) value and relevance table, as indicated in Table 6-9. The gray indicates the Competitive Performance benchmarking that Region B's third party covers as well as the value or relevance of the annual Internal Performance benchmarking as done by GoodsCo.

Table 6-9. Value and relevance of regional benchmarking

	Internal Benchmarking	Competitive Benchmarking	Functional Benchmarking	Generic Benchmarking
Performance Benchmarking	O	Δ	O	◊
Process Benchmarking	O	◊	Δ	Δ
Strategic Benchmarking	◊	Δ	◊	◊

Relevance/Value High Δ Medium O Low ◊

Adapted from Khurrum and Huq (1999)

Though performance is benchmarked both internally and competitively, multiple aspects such as services and work processes are not measured as per McGaughey's (2002) recommendation. As such both occurrences of benchmarking are used as a problem-solving technique of a quantitative nature and do not benefit from the additional value added by also conducting qualitative process benchmarking (Camp, 1989).

Region B's competitive performance benchmarking is indicated by Khurrum and Huq (1999) as of high relevance and value as it compares performance and results against best-in-class organisations, using measures such as quality, speed, cost, flexibility or dependability relative to other organisations within their region. The data indicates that although most IT Cost components are included to be benchmarked, both Indirect Human and Organisational costs are excluded which erodes the benefit of the exercise (Alshawi *et al*, 2003).

As per Table 6-9 Khurrum and Huq (1999) state that internal performance benchmarking will only produce medium relevance and limited value results. Combined with Hochstrasser's (1990) observation that evaluation methods based purely on accounting methods are inappropriate in today's sophisticated IT environment, evaluating IT cost as a percentage of Net Proceeds of Sales does not provide much benefit. This lack of value and relevance is also supported by Alshawi *et al* (2003) observing that standard accounting methods are specifically designed to assess the bottom-line financial impact of investments and therefore are unable to accommodate strategic benefits and indirect costs associated with IT. The fact that IT cost as a percentage of NPS is given as an absolute financial figure for all the regions, without identifying opportunities for improvement or organisational learning as specified by Rigby (2007), unquestionably limits its relevance and value as a benchmarking measure.

6.3.5 Summary

Section 2.3.5 dealt with the challenges of benchmarking, being a focus on data instead of the processes used to acquire the data (Khurrum and Huq, 1999), the need for continuous benchmarking to ensure relevance, employee understanding and learning of the results and consequences (Kouzmin *et al,* 1999), poorly factored in firm-specific context and the outcome of benchmarking suggesting opportunities without clarification as to how to pursue them (Cullen *et al*, 2007). It was found that all these challenges were present within

GoodsCo's benchmarking, even though four of the five regions relied on the outcomes of benchmarking.

What IT cost benchmarking takes place within an organisation and what is the value and relevance of this benchmarking?

It was found that only internal performance benchmarking was conducted consistently across the regions but with medium relevance and limited value.

Competitive performance benchmarking with high value and relevance was conducted by one region but only on limited IT components.

The limited value and relevance these regions derive from benchmarking stems from their inability to identify all their IT cost categories as well as well as reliance on centrally derived bottom-line financial measures that do not factor in their region-specific context or clarify how to pursue learnings.

Chapter 7: Conclusion

7.1 Introduction

This chapter revisits the research problems as outlined in Chapter 1, introduces a possible model for assisting GoodsCo with IT cost identification and benchmarking, presents a number of recommendations arising from the research and then indicates possible areas for further research identified during this research project.

7.2 Research problems summary

7.2.1 The identification of IT cost within GoodsCo

The research discovered that GoodsCo regions do not identify all their IT costs. This is due to the following most notable observations:

- Only six of the eleven cost components were identified by all the participants.
- Indirect costs such as indirect human and organisational cost is hardly acknowledged within GoodsCo. In the few regions where they were acknowledged it was only to a very limited degree.

- Contextual elements, such as centralisation and responsibility, cause other departments to carry IT costs instead of IT, such as site administrator or consumable costs. As such, the total cost of IT can not be accurately determined within GoodsCo regions.

7.2.2 IT cost benchmarking within GoodsCo, the types, value and relevance

The research project also concludes that little benchmarking occurs within GoodsCo, and that its relevance and value is also limited:

- Only one out of five regions within GoodsCo continuously partakes in high relevance and valuable benchmarking.
- Where total cost of IT is benchmarked it does so only using standard accounting methods specifically designed to assess the bottom-line financial impact of investments and therefore are unable to accommodate strategic benefits and indirect costs associated with IT.
- All IT cost components are not identified for inclusion in IT cost benchmarking. Indirect costs are frequently excluded from IT cost benchmarking exercises and, as such, would yield unreliable results.
- Contextual factors such as centralisation, complexity, supply chain, financial and responsibility are ignored in all benchmarking which would impact on the accuracy of the benchmarking exercise.

- Most of the benchmarking exercises are once-off and not continuous. Continuous benchmarking ensures relevance, employee understanding and learning of the results and consequences.

- No specific process is followed when benchmarking, and there is a clear focus on data instead of the processes used to acquire the data.

- Feedback from benchmarking exercises is only quantitative and cost related. No qualitative or process-related benchmarking occurs and no clear implementation plan for the identified discrepancies in performance is communicated. As such, there was also no follow-up on implemented changes to measure their success.

7.2 Recommendations to the organisation

The very limited value derived from benchmarking mentioned in the previous section stems from the case study organisation's inability to identify all their IT cost categories and contextual costs related to IT, reliance on centrally derived bottom-line financial measures that do not factor in their region-specific context or clarify how to pursue learnings and an infrequent and unstructured benchmarking process.

The method for GoodsCo to enhance its IT cost identification and IT benchmarking is proposed in Figure 7-1 below. Note that this tool is based on

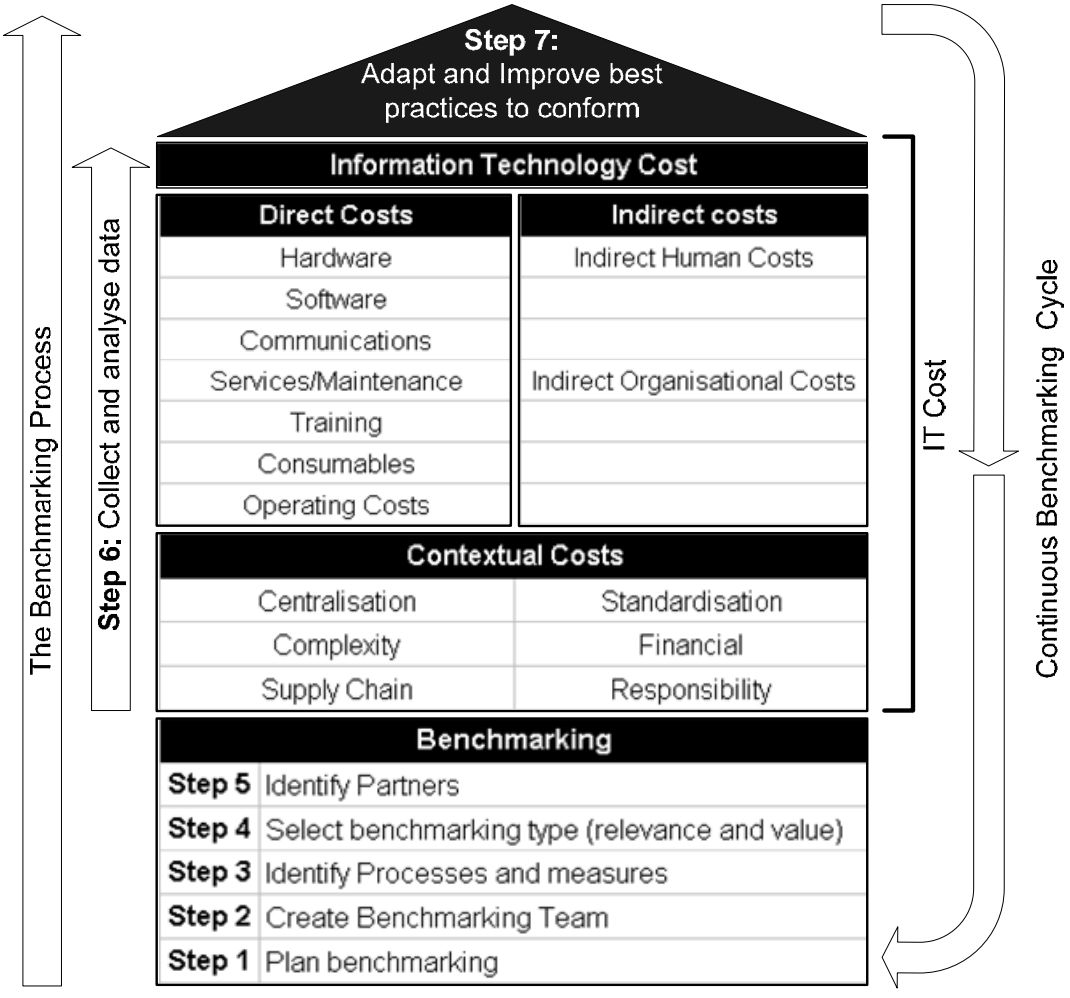
findings specific to the case study organisation and may not be appropriate for other companies.

For the purpose of IT cost identification GoodsCo should first investigate the six Contextual Costs, namely Centralisation, Standardisation, Complexity, Financial, Supply Chain and Responsibility. Standard criteria for evaluating these elements should be decided on before any calculation of IT cost is attempted. The next step for determining IT cost should be to include all nine of the Direct Costs (note that the previous cost category Network has been amalgamated into Hardware) as well as both the Indirect Costs. Giving cognisance to these three categories ensures an accurate calculation of the cost of Information Technology within GoodsCo.

For the purpose of benchmarking, GoodsCo needs to first plan the benchmarking exercise, create the benchmarking team, identify the relevant processes and measures to be benchmarked, and select the appropriate benchmarking type, depending on its relevance and value. The next step in the process is to identify the benchmarking partners, which should be done by exploring the potential partner's contextual elements to ensure that the foundations of their Information Technology is similar or comparable. During Step 6, data collection and analysis, cognisance should be taken of the Contextual Costs as well as the relevant selected Direct or Indirect Costs. If the benchmarking exercise is to include all IT costs, all Contextual, Direct as well as Indirect components should be included to get an accurate Information Technology cost. During Step 7 the identified best practices should be adapted

and improved to conform to the organisation's culture, technology and human resources with the assistance of action planning or goal setting. As per Figure 7-1 this process should also be continuous so as to ensure relevance, measure the success of any changes implemented and to foster a culture of organisational learning.

Figure 7-1. IT cost identification and benchmarking model



7.3 Future research ideas

Some of the issues raised through the research suggest that the following areas may provide additional insight into IT cost identification and benchmarking:

- **Indirect IT costs:** although a fair amount of literature is available on this topic it seems as though the authors still wrestle with the finer details of the concept within the Information Technology arena. The current literature is very vague and does not include enough information as to cost categories contained within this category or clarify how to measure these costs. This might be the reason why so many organisations struggle with identifying and accounting for indirect IT costs.

- **Contextual costs:** The relative ease with which more contextual cost elements were identified in this research project would suggest that there may be other organisation specific elements not encountered. As these elements would directly impact on the outcomes of identifying IT costs and even more so with IT benchmarking, more research into this area would be highly beneficial for organisations to ensure a holistic approach and to warrant that all levels of IT total cost of ownership is standardised and clarified.

- **The secondary impact of centralisation and standardisation:** During the empirical phase of the research it was noted that several of the respondents were indifferent about cost control and identification as well as benchmarking practices in their region due to the standardisation and centralisation within GoodsCo. As such it seemed as though regional

experts were doing the minimum required by the central IT office which could severely impact on their IT cost and efficiency. A pre-post case study to investigate the outcome of a particular centralisation and standardisation program would be beneficial to all organisations considering these strategic initiatives to ensure that they address the relevant areas.

- **The relationship between cost identification and benchmarking:** During the research it was noticed that there might be a relationship between IT cost identification and benchmarking, being that the more IT cost components are accurately identified, the more relevant and valuable the results of IT cost benchmarking would be.

7.4 Summary

The final chapter started with a problem summary, mentioned a number of recommendations to improve IT cost identification as well as to ensure relevant and valuable benchmarking, presented a possible model to act as guidance for these two areas and concluded with a number of areas for possible future research.

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Appendices

Appendix 1 – Individual Interview Questionnaire Part 1

IT Cost Identification and Benchmarking Questionnaire		
Section A: Respondent Details		
Name:		
Region:		
Section B - Regional Information		
Number of users in Region:		
Number of Sites/Countries:		
Section C: Cost Identification		
Question 1: How do you go about determining your total IT cost? In other words, what cost categories do you use to classify and monitor IT cost?		
Question 2: Which of the following are taken into consideration when looking at IT cost?		
Component	**Y/N**	**Measure used**
Hardware		
Networking components		
Telecommunications		
Software		
Local Applications		
Services (Support and Maintenance)		
Consumables		
Training		
Operating costs		
Indirect Human costs		
Indirect Organisational costs		
Indirect structural costs		
Degree of standardisation		
Question 3: Qualitative discussion on costing issues based on outcome of Question 2		
Probing questions:		
IT Depreciation period in country		
Purchasing channel for hardware (HP, Cisco, Dell, Symbol)		
Wide Area Networking (WAN) (How many sites on INFONET or on iVPN)		
Is software bought in country or recharged via GC AOA (i.e. Micrisift, SAP, legacy)		
Number of legacy applications		
Services - Is external maintenance contracts used for i.e. Cisco, Symbol, and Datamx equipment?		
Is IT responsible for purchasing consumables i.e. toner cartridges?		
What qualifications do IT staff require within IT (i.e. A+, N+,		
Operating costs (server room standards and maintenance)?		
Do you use PC Desktop engineers to support remote sites on-site? Are any contractors used? Who do they report to and carried their cost?		
Are technologies such as Wireless, IP Telephony and Voice over IP (VoIP) used? If so, in what areas (i.e. wireless in boardrooms and IPT at all sites)		
Other costs not mentioned that should be included in IT cost		
Costs that should be excluded from IT costs		

Appendix 2 – Individual Interview Questionnaire Part 2

Section D - Benchmarking		
Question 1: Which types of IT benchmarking are used within your region and by whom?		
Benchmarking Type	**Y/N**	**Example**
Internal Benchmarking		
Competitive Benchmarking		
Functional Benchmarking		
Generic Benchmarking		
Performance Benchmarking		
Process Benchmarking		
Strategic Benchmarking		
Question 2: Qualitative probing depending on answers from Question 1		
Question 3: On what IT components are these types of benchmarking applied and what is the measure used?		
Component	**Y/N**	**Measure**
Total IT cost		
Hardware		
Networking components		
Telecommunications		
Software		
Local Applications		
Services (Support and Maintenance)		
Consumables		
Training		
Operating costs		
Indirect Human costs		
Indirect Organisational costs		
Indirect structural costs		
Degree of standardisation		
Section E: Additional comments:		
IT Cost Components:		
IT Benchmarking:		