



*A Study of Selected Information Technology  
Systems on Potential Business Units within  
Departments in the M L Sultan Campus of the  
Durban Institute of Technology (DIT)*

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## DECLARATION

The work described in this thesis was carried out by the author in the Department of Economics and Quantitative Methods, Faculty of Commerce, Durban Institute of Technology, from January 2002 to January 2003 under the supervision of Professor A. Bhattacharya and Professor R.P. Chetty.

These studies represent original work by the author and have not been submitted in any form to another Tertiary Institution. Where use is made of the work of others, it has been duly acknowledged in the text.

*In Loving Memory of*

*My Beloved Parents*

MR & MRS RAMDEYAL ORI

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## ABSTRACT

Over the last decade computer technology has impacted tremendously on the survival and productivity of organisations. In today's technologically advanced business environment, much emphasis is being placed on obtaining a competitive advantage through the use of computers – a commodity that has become available to almost everyone in an organisation. Increasing global competition and pressing social needs have impacted with such vigour that even tertiary institutions are now facing major financial constraints, thus forcing them to investigate alternative sources of income to maintain sustainability.

Through the use of computer technology – searching, retrieving, sorting, producing and organising data efficiently and accurately – the belief is that many departments at the M L Sultan Campus of the Durban Institute of Technology can be converted into income-generating units that can be self-sustaining. There are many departments at the M L Sultan Campus with the relevant infrastructure and person-power to establish business units. These departments vary in the services that they provide, thus relevant information systems need to be aligned to future business units within these departments.

This study focuses on

- a) investigating the impact of information technology and its systems on businesses;
- b) ensuring that information technology and its systems is looked at as a cost effective resource for maintaining a competitive edge and promoting business value. The interaction of business processes, people and technology will ensure successful planning and implementation of strategies within the potential business units; and
- c) recommending to selected departments the expected findings whereby they could choose to adopt these recommendations to transform themselves into business units in order to maintain a competitive edge for financial sustainability.

The research was envisaged to produce results that will allow the institution to make informed decisions on the adoption of proper information systems, thereby achieving productivity at a reasonable rate, whilst enhancing profit-making schemes.

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## CHAPTER 1

### INTRODUCTION

#### 1. The Focus of this Study

This research project focuses on the use of selected information technology (hereafter referred to as IT) systems in potential business units in the M L Sultan Campus of the Durban Institute of Technology (hereafter referred to as DIT).

The project is two-fold - initially it has attempted to indicate that information technologies/information systems should be viewed as a tool for strengthening an organisation's competitive position, as well as increasing individual productivity and functional efficiency and secondly, it ascertains that if proper technology systems are adopted, existing departments at M L Sultan Campus of DIT can be transformed into self-sustaining business units.

Apteker and Ord (1999:10) state the following on IT:

“Challenge the current paradigms, challenge the way you do business, and accept – fortunately or unfortunately – that IT is here to stay.”

Bearing this in mind, it is fitting to ~~(reiterate)~~ that the new millennium has pounced upon us and with it the need to use technology and its tools to maintain a competitive edge for financial sustainability. Technology and its systems have now become tools for innovative organisations to re-engineer their business operations and enhance business strategies. Information technology/information systems are no longer a technical issue but a business necessity. The focus of the identified departments is not to detour totally from the services they provide, but to also use their skill, expertise and existing and future infrastructure to maintain themselves financially.

The envisaged project, if adopted, can ensure that entrepreneurship is fostered in these departments, using proper information systems and technology resulting in intrapreneurship and self-sustainable units.



## **2. The Role of Tabeisa in this Research Project**

Tabeisa, the Technical and Business Education Initiative in South Africa, consists of a consortium of 4 South African institutions (Durban Institute of Technology [DIT], Peninsula Technikon, Eastern Cape Technikon and Technikon Northern Gauteng) and 2 British Universities (Coventry University and Greenwich University). One of the Tabeisa projects is the offering of a Master's Programme in Entrepreneurship. The overall objective of the programme is to build capacity within the higher education sector and this will, in turn, provide increased opportunities for economic and social development within the disadvantaged groups in South Africa. 11 staff (8 academic and 3 administrative) from DIT are enrolled in this programme.

The Master's qualification would ensure that staff can imbed entrepreneurship principles into existing curricula resulting in further job creation by students becoming employers (own their own businesses) rather than employees. Entrepreneurship education will provide individuals with the concepts and skills to recognise opportunities and to gain insight, self-esteem and knowledge in business management, business planning, capital development marketing and cash flow analysis.

With this type of programme being available at DIT, it is my belief that these acquired skills could be used 'closer to home' as well. Apart from transferring this knowledge to students, why not let this type of knowledge infiltrate into departments which have the potential to transform themselves into self-sustaining business units? In sync with this belief, Petrin (1991:23) states that although it is believed that entrepreneurs are born and not made, evidence indicates that entrepreneurship can be filtered through educational institutions. Entrepreneurial talent within the organisation can be supported by proper training-cum-development programmes.

## **3. Definition of Terms**

### ***(a) Information Systems (IS)***

Zwass (1998:5) describes an *information system* as 'an organised set of components for collecting, transmitting, storing and processing data in order to deliver information

for action.' Zwass also states that most information systems in today's organisations are built around the information technologies of computers and technologies – they are computer-based information systems.

#### **(b) Information Technology (IT)**

*Information Technology* is the enabling mechanism that facilitates the processing and flow of this information as well as the technologies used in the physical processing to produce a product or provide a service (Peppard 1994:5). IT represents the technical perspective linked to information systems.

#### **(c) Entrepreneurship**

Steyn (1998:1) defines *entrepreneurship* as the creation of something with value that will satisfy a real need in the market by achieving better results than other individuals with less input. Existing market opportunities are used creatively, irrespective of the resources available to the individual. The South African GEM (Global Entrepreneurship Monitor) looks at *entrepreneurship* as being the 'capabilities of people to combine scarce resources in new ways to respond to opportunities or provide solutions to problems' (2001:2). The GEM also states that entrepreneurial behaviour occurs in large corporations, NGOs (non-governmental organisations), the public sector and all institutions – it is not necessarily limited to small business or new business creation.

#### **(d) Entrepreneur**

The *entrepreneur* is the individual who lies at the heart of the entrepreneurial process, involving himself/herself with the innovative activities of entrepreneurship. Although *entrepreneurs* act singly, in many cases entrepreneurial teams exist, therefore, taking on different roles and sharing responsibilities. The South African GEM (2001:7) states that *entrepreneurs* have individual mindsets incorporating 'passion, self-confidence, persistence, passion, the desire to achieve, adaptability and the ability to take risks.' Many entrepreneurs are not born with these characteristics, however, these can be achieved through life experience or even through the entrepreneurial process.

#### ***\*(e) Intrapreneurship***

Du Preez (1998:19) defines *intrapreneurship* (or, *corporate entrepreneurship*) as the development of a new idea, product or service within a business/organisation.

#### ***(f) Intrapreneur***

An *intrapreneur* is an individual who is personally responsible for innovation within a business (Du Preez 1998:15). *Intrapreneurs* are involved in entrepreneurship activities in departments within large organizations.

### **4. Purpose of this Study**

Unlike in the private sector, where the need to compete for income and become innovative is a result of rivalry, educational institutions, like the DIT, have other pressing reasons to become competitive in order to sustain itself financially.

The White Paper on Higher Education (1997:45) addresses issues of expansion, cost and resources and places major emphasis on the fact that South Africa's present level of public expenditure on higher education is increasing rapidly compared to other international countries. 'It is unlikely that the recent trend of public expenditure growth rates can be sustained over the next decade, given other pressing social needs.' In addition, the New Funding Framework (2001:7) for higher education reiterates the idea of 'Block Grant Funding'. This mechanism will ensure that institutions' teaching output subsidies are based on their planned enrolment which is linked to the institution's Three Year Rolling plans. Furthermore, teaching output subsidies will be calculated based on the total number of graduates produced rather than the number of individual subjects passed by students.

Apart from swallowing the bitter pill on 'Block Grant Funding', the White Paper on Higher Education (1997:46) also states that, in addition to Government funding, institutions have to resort to obtaining funds on their own through, for example, various forms of employer contributions, bequests and donations, better management of institutional investments, contracts and consultancies, and an expansion of properly-regulated private higher education programmes. The New Funding

Framework coupled with the White Paper thus adds pressure on institutions to not only enrol quality students but also to improve throughput rates.

Another threat to higher education institutions to maintain financial sustainability comes from the rapid emergence of private colleges that are offering internationally recognised programmes. Students prefer attending these private institutions as they offer better facilities and the activities are not impacted on by political agendas e.g. strikes and mass action.

This study has focused on ensuring that IT and its systems are portrayed as an essential productivity tool that can be used for promoting entrepreneurship within the identified departments, thus making them self-sustainable. Cutbacks in funding will not be looked at as being as crucial as it is now. These departments are already equipped with the relevant person power and infrastructure. The technology available can therefore be used to the full capacity thus ensuring effective use of the systems. Returns from the available technology can be analysed in approximately one year to determine further investments in technology.

In accordance with Peppard's writings (1994:1), the objectives of adopting IT can enhance entrepreneurship by promoting the following:

- gaining competitive advantage;
- improving productivity and performance;
- facilitating new ways of managing and organising; and
- developing new businesses.

IT and its systems could lead to a fruitful and innovative future for the M L Sultan Campus. Even with cutbacks in funding from the government and other threats, the institution will still be able to maintain itself financially to a certain limit by promoting entrepreneurship within departments.

## • 5. Envisaged Outputs of this Project

Potential applications of the research end products: The results of this study will allow the Technikon to make informed decisions on the adoption of proper information

systems and create a relevant management system for potential business units, thereby achieving productivity at a reasonable rate and enhancing profit-making schemes.

## **6. The Hypothesis**

Information technology/systems have evolved and developed from being mere operational supports to enablers of any organisation's productivity, survival and value. Departments at the M L Sultan Campus can become financially self-sustaining business units and profit making entities for graphic designing, printing, strategic planning etc. if they adopt proper technologies and systems and an appropriate administrative framework to enhance the services they provide.

## **7. Limitations of the Study**

This study was limited to 3 departments at the M L Sultan Campus of DIT i.e. Graphic Design, Strategic Planning and Printing.

The research targeted businesses engaged in graphic designing, printing and strategic planning in Durban. Respondents were randomly selected.

## **8. Layout of the Report**

The report revolves around the hypothesis and the question *should departments transform into self-sustaining business units?* This provides two main areas for investigation: *the ability of information technology and its systems for business success* and *the idea of business units as perceived by departments at the institution.*

Relevant literature is then reviewed in Chapter 2 to provide a theoretical framework emphasising the role of information technology in organisations; entrepreneurship in public enterprises; and intrapreneurship and innovation within organisations.

A detailed description of the research methodology in Chapter 3 outlines the procedures adopted for the sample selection, data collection and analysis, and the problems experienced.

Thereafter, the findings are presented and analysed in Chapter 4. Finally Chapter 5 includes the researcher's conclusions and recommendations of the study are drawn up.

## CHAPTER 2

### LITERATURE REVIEW

#### 1. Introduction

The previous chapter highlighted the background and the reasons for undertaking this study. This chapter provides an investigation into existing literature pertaining to the impact that information technology has had on business and approaches to becoming entrepreneurially focused. The objective to this literature review is two-fold, i.e. it takes into cognizance the following two aspects:

1. the role that information technology has played in organizations becoming competitive by using IT, a tool that was once considered essentially a commodity;  
and
2. the role that entrepreneurship has played in organizations becoming innovative, independent and competitive.

Although each is different in its nature, it can be said that the partnership between information technology and entrepreneurship can create successful, competitive organizations that can reap the benefits of aligning IT and entrepreneurship.

This literature review hopes to outline the value of Information Technology (IT) and create an awareness of the highly competitive nature of IT and its systems – an awareness that indicates IT as a truly competitive force; an information weapon – used for portraying new ways of doing things better, faster and cheaper – an awareness (if taken seriously and practised rigorously) that can be adopted by some departments at the M L Sultan Campus of the Durban Institute of Technology to transform the departments into successful business units.

In order to provide a theoretical framework for my research, adequate literature on the interaction between Information Technology and businesses have been obtained through Internet searches, newspaper articles and relevant texts.



## 2. Information Technology

### 2.1. The History of Information Technology in Business

From a gawky box to a sophisticated tool, the computer has evolved from being a mere word processor to a productivity tool which is fundamental to an organisation's survival and growth. The first commercial computer struck its way into the storm of the electronics revolution in 1951 (Gremillion and Pyburn 1988:3). No group has felt the impact of the computer age more than business managers.

Mr Colin Eastabrook, a 36 year IBM (International Business Machine) veteran has nothing but words of praise for the personal computer, also very easily referred to as the PC. Eastabrook considered the PC in 1981, a 'great little toy' because 'it could do things dumb terminals couldn't'. In 2001, Eastabrook could not see any downside to 'this great toy' (Barton 2001:7).

Gordon and Gordon (2000:7) state that in order to deal with the volatile business environment, companies have introduced innovative organisational structures and many have discovered that the interaction between IT and business units is the key to success. Further results of an empirical investigation conducted by Bharadwaj (2000:169) on IT and performance in firms, indicate that firms with high IT capability tend to outperform a control sample of firms on a variety of profit and cost-based performance measures.

On the contrary, Ivo Vegter in his Internet article *Productivity Myths and Mysteries* (2002) states that too many organisations have spent too much emphasis and funding on technology and that technology has basked too much in the credit for unusual acceleration in productivity growth. However, Engardio and Smith (2001:137-139) have maintained that IT has remarkable capabilities. They state that Hewlett-Packard, in its quest to spawn profitable businesses in impoverished countries such as Costa Rica, Senegal and the Dominican Republic, have provided technological resources for the creation of new markets and businesses. Locals of these areas are queuing for their training in simple IT devices. IT is being used to create jobs for people. Managers at Hewlett-Packard hope that spreading IT throughout the Third World will result in new businesses.

Supporting the value of IT is research that has been conducted by Tallon et al. (2000:151). Results have shown the difference between firms that are not 'operations-focused' in terms of IT and those that are. 'Operations-focused' firms are using IT to reduce operating costs and enhance overall effectiveness of business operations by focusing on quality, speed, flexibility and time to market.

Not so long ago, IT was called 'the glass house' – controlled by technicians and isolated from the workforce. This made it easy to distinguish between the IT section and the rest of the business. Departments at the M L Sultan Campus of DIT are not totally divorced from IT, but IT is still seen as a technical function. However, it has to be remembered that IT permeates all spheres of business, even non-technical companies are becoming technical. In profit making business entities, IT professionals are no longer separated from customers – but work face-to-face with customers and colleagues in business units – a direction that should be followed.

Internet research has produced results that sway in the same direction in terms of technology and business strategy. Results of this research have shown how technology and information systems have become more involved in business processes.

Way back in 1987, Nolan spoke about technology and the transition into an information service based economy, which runs parallel to the quickening business tempo.

The rates of change have increased dramatically, and with them, the expected rate of return. Successful companies are developing and implementing business strategies that are yielding more than the traditional target of 10% ROI (return on investment): some of these companies are exceeding tenfold returns (100%) on their investments. (1987:183)

While many factors are involved in these companies' business strategies, they all include a featured role for the computer. It is an integral part of their business strategy. In contrast, the computer is conspicuously absent from the business strategy of less successful companies. Bearing this in mind, Nolan (1987:186) also maintains that:

...while subtleness is involved, it is clear that the executives of these companies are missing the obvious point: the computer must be an element of business strategy in order to survive industry competition...



For companies to re-engineer into successful and efficient productivity, information technology and computers have to be viewed as the 'essential enabler'. As far back as 1975 O'Brien (1988:31) spoke about 'computer technology being the icing on a cake baked by industry and business'. Today, business and industry consider the computer and technology as 'heavy armament' in a war against paper, inefficiency, and falling productivity.

## **2.2. Information Systems/Information Technologies and their Business Impact**

The impact of information systems on business and production has been phenomenal. Apart from invading virtually all aspects of management, from strategic planning in the boardroom to scheduling on the shop floor, computer-based systems can actually continue with all night production at a Mitsubishi's engine assembly plant with only one or two people to supervise the operation (Gremillion and Pyburn 1988:1).

Beaver (2002:18) confirms that business success in the recent years has shown that the factors listed below have been instrumental in determining efficient production as well as business start up success i.e.:

- owner's goals;
- operational; management and strategic abilities;
- financial; personnel and business resources; and
- information technology and systems capabilities.

Once again it can be seen that information technology and its systems is a critical success factor in business.

Peppard (1993:1) states that information systems/information technologies offer new management and business opportunities and can be applied strategically in at least four different ways:

- to gain competitive advantage;
- to improve productivity and performance;
- to facilitate new ways of managing and organizing; and
- to develop new businesses.

Synnott (1987 : 5) also acknowledges the importance of IT in business by stating:

Today, IT is not just a productivity tool designed to do accounting or record-keeping chores faster or more accurately. It's an 'information weapon' that has creative impact on every phase of business, from conceptualisation, design and production to marketing, distribution and support. To win in today's business world, you need to integrate fully this 'information weapon' into your corporate battle plan.

Synnott (1987:vii) highlights the change that is occurring in the business world today by emphasizing the competitive power of computers and technology – tools which were previously hidden in the back office as a cost cutting productivity item. He stresses that the business community has now discovered technology as an 'exciting untapped potential' for competitiveness in the market place. Information resources are being used to gain significant competitive advantage by companies such as American Airlines, American Express, Sears Roebuck, and many other leading organisations.

Julien (1998 : 302) states:

An organisation's ability to evolve in an increasingly complex environment is heavily dependent on the characteristics of the information it consumes, stores and distributes. These are the functions assumed by information systems and their technological tools, which have become vital elements for organisations large and small, private and public, whether in the manufacturing, commercial or service sector.

Bearing in mind Julien's thoughts on IT, it is profoundly clear that IT and its systems impact on the everyday life of multiple organizations globally. IT is deployed as an innovative method in multinational corporations to generate competitive advantage globally. Technology is being used to mount challenges posed by existing competitive forces by increasing efficiency and effectiveness of existing operations.

### **2.3. The Type of IT required for a Business** ✓

#### **2.3.1. Re-engineering Processes**

For the purpose of this study, it would be fitting to state that departments targeted as potential business units will have to change the way they view information technology so that they can

re-engineer their processes, taking cognisance of the business aspect attached to a business unit. Hammer and Champy (1995:83) believe that 'a company that cannot change the way it thinks about information technology' or 'a company that has problems first and then seeks technology solutions for them cannot re-engineer.'

Although Hammer and Champy (1995:83) state that information technology plays a crucial role in any re-engineering effort, they also believe that throwing computers at existing problems or misusing technology can be a stumbling block in re-engineering for improvement of production and efficiency. Barnes (1995:23) states that when creating a new environment (as would be the case, should departments transform into business units), the IT functions can be fulfilled by the institution's IT department i.e. users who are computer-literate, support from a central IT department or an external consultant. The IT department will be able to contribute to the technical issues which will become prevalent in terms of computer and communications hardware, software, understanding of current systems and implementation issues.

Before determining the type of IT required for a business, it is imperative to consider issues like determining the planning horizon for information systems and technology as well as evaluating the risks associated with such an exercise.

### ***2.3.2. Planning for Information Systems and Technology***

Nickerson (2001:440) says that planning for information systems and technology involves varying amounts of time in the future. Thus planning horizons assist in determining the type of planning necessary for technology implementation e.g.:-

- operational planning involves a planning horizon of a few weeks to a few months i.e. planning what system modification will be done in the next three months;
- tactical planning : the planning horizon is several months to a few years i.e. planning what new systems will be developed and what technology will be used with those systems in the next two years; and
- strategic planning : involves planning for many years i.e. planning the use of global information systems in five years.

Since information technology is ever changing, it is difficult to plan for specific technology more than a few years into the future. Although some companies may have legacy systems, they update their information technology to suit the needs of current business situations

(Nickerson 2001:441). The potential business units at the campus can therefore plan to use their old computers and install updated technology, thereby reducing costs of acquiring new equipment and becoming competitive as well.

When investing in information technology and its systems, it is crucial to understand the implications of such investments. It is therefore important to take cognisance of the type of IT investment necessary for business units. Targeted business units will have to look at the following as propounded by Ward and Griffiths (2000:2):

- the capabilities of the technology;
- the economics of using the technology;
- the applications that are feasible;
- the skills and abilities available to develop and use the applications;
- the pressures on the particular organisation or its industry to improve performance;
- and
- the ability of the organisation to make appropriate judgements about the deployment of IS/IT and the associated resources.

### **2.3.3. *IT for a Multi-Business Unit Organisation*** ✓

Once the planning phase of technology implementation is over, departments will have to focus on the type of information technology needed. Basically the focus will revolve around the IT infrastructure. This infrastructure, consisting of a broad assortment of products and services, will be deployed to reflect the current technology architecture.

According to Ward and Griffiths (2000:490-495), the components of the type of IT required for a multi-business unit organisation like the DIT are summed up in Table 1.

**Table 1**

1.	Computer hardware	Mainframe, desktop machines, multimedia printer, input/output devices, storage devices, disk, tape, distributed computing and client/server architectures.
2.	Systems software	Operating systems (multi-user and desktop), teleprocessing monitors, database management systems and language compilers.
3.	Communications and networking systems	Hardware, software and services
4.	Development tools	CASE (Computer Aided Software Engineering), rapid application development tools and prototyping
5.	Office Systems and Desktop environments	
6.	Application software	Bought-in products that are used as delivered, such as general purpose packages for e-mail or electronic conferencing; bought-in products that are configured and possibly tailored, such as major application packages; bought-in parts, stored for assembly into application, e.g. classes of objects and in-house developed parts for common usage.
7.	Special Purpose Tools	Electronic commerce (EDI); artificial intelligence (expert systems, neural systems, knowledge based systems and recognition technology); computer aided design and manufacturing systems; executive support systems, executive information systems (EIS), management information systems, and decision support systems (DSS); information retrieval, electronic publishing and document management; and workforce management tools.

Ward and Griffiths state that the above hardware and software can be bought 'off the shelf'. In terms of the IT required for business units, it can be ascertained that priority would be given to *development tools*, *special purpose tools* and *application software*. IT systems within departments have already been developed to some extent – a revision *only* of existing systems should be conducted to determine the type of IT that will be required for transformation into business units.

#### **2.4. Interaction between IT and Business Units as the Focal Point**

To deal with the volatile business environment, companies have introduced innovative organisational structures and many have discovered that the interaction between IT and business units is the key to success (Gordon and Gordon 2000:7). At the M L Sultan Campus of DIT, the interaction between business units and IT calls for the Department of IT to play a pivotal role in the establishment of business units i.e. supporting the infrastructure

and operational needs. The departments' quest to transform into business units can be driven by actually developing their own vision of what they want and driving the process to deliver on that vision (Gordon and Gordon 2000:11). Aligning proper information technologies/information systems in departments will incur costs, mostly computer-related expenses. However, it must be remembered that the institution has an existing IT department which services the institution, thus business units at the M L Sultan Campus of DIT could ensure that technical knowledge of IT staff is optimally utilized to achieve their strategic objectives (Gordon and Gordon 2000:12).

It is also important to bear in mind that when aligning IT to business units, it is imperative that one needs to focus on effectiveness and efficiency. Efficiency is achieved by using IT to reduce operating costs or to improve productivity, while effectiveness comes from using IT to foster greater flexibility and responsiveness to changing market needs. However, it should also be remembered that although the Department of IT will have to play a vital role in establishing business units at the M L Sultan Campus of DIT, the responsibility for IT operations should eventually shift from the Department of IT to the business units themselves.

## **2.5. Aligning Business Strategy to Information Strategy**

The electronics revolution has had a choking effect on organisations. Organisations have to change from IT resources that were once considered valuable, but are now rendered obsolete. To abolish competitive disadvantage, legacy systems should not be preserved and there should be non-resistance to organisational change (Bharadwaj 2000:180). Although many departments at the M L Sultan Campus of DIT have computer systems in place, the leverage of IT capability for competitive advantage is contingent on the sustenance and enhancement investments that departments have to make (Bharadwaj 2000:179). Requests for new technology have to be subjected to rigorous examination to determine the business value that will eventually support the development of competitive benefits for the DIT.

Departments should, before embarking on the upgrades of their information technologies/information systems, take cognisance of:-

- their current situation, analysing the information systems it already possesses with its value for money and the ability to contribute to business; and

- their expectations and objectives of their IT/information system process – this needs to be aligned to a business strategy. Lack of expectations and objectives lead to failure, therefore, business basics need to be established at the beginning to ensure good business outcomes (Garret 1994 : 81-82).

In agreement with Garret's view regarding the alignment of information strategy to business strategy, Synnot (1987:60) states that business units adopting proper information strategies is not sufficient – information strategies *have to be* aligned to business strategies. Each business unit will be unique in terms of what it will offer to the market. Synnot identifies three business strategies and the corresponding information strategies for business units:

- 1) Cost Leadership – focuses on being a low cost producer and having the lowest price potential which will make it difficult for competitors to match costs. Given reasonable quality and service, such a strategy can result in strong competitive advantage. The information strategy used will focus on efficiency of operations, or productivity, to drive costs and prices down. ✓
- 2) Differentiation – a superior quality product/service provided by the business units will provide for differentiation in the market place. The information strategy to support differentiation would be to create a uniqueness in the product/ service through technological innovation.
- 3) Focus – business units need to focus on identifying a niche in a narrow market place in order to compete favourably. This could be a product, customer segment or geographic niche. The strategies mentioned above could be used in a niche market (Synnot 1987:60).

Schulte (2000:92) provides information pertaining to the impact of technology on business as perceived by managers globally in Table 2.

**Table 2**

Technology is considered to be the most significant driver of business; other important drivers included globalization, competition and increasingly demanding customers.
82% of the managers agreed that information will be the main strategic weapon of the next decade.
88% of the managers believe that up-to-date technology is important for their business competitiveness.
61% of global managers recognize the significant impact the Internet will have on the way they do business.
62% of the managers believe that electronic commerce will be a threat to many traditional businesses.
64% managers believe that small organizations can compete with large ones through the innovative use of technology.

Considering global perceptions, Apteker and Ord (1999:184) provide the following advice for business success:

Future entrepreneurs – be wise, invest in IT solutions so that you can free up time to focus on your core purpose. The IT industry is a melting pot of creativity and colour and, as long as you have imagination, you will continue to find new ways to save time, and enhance your lives by applying technology – IT means nothing unless it is tightly woven with intense imagination.

Supporting this advice, Schulte (2000:93) states that firms can enhance competitive advantage and financial performance by aligning their information technology strategies to their business strategies.

### **3. ENTREPRENEURSHIP IN THE PUBLIC ENTERPRISE**

Most international companies are now subdividing into specialised business units, not only to improve customer services in a rapid and personalised manner, but also to transform their reporting hierarchy. The never-ending 'executive-chain' is a long and exhausting process.



Smaller, independent units create better reporting structures, thus improving productivity, morale and overall business operations. With the emergence of business units at the M L Sultan Campus of DIT, the belief is that this will create an exciting tempo to become innovative, competitive and independent.

### 3.1. Business Units and Profit Making within the Public Sector

Prokopenko and Pavlin (1991:2) emphasise that if a public enterprise cannot compare better with a private sector in terms of its work, then privatization should be considered. However, they also state that no country in the world is entirely without public enterprises. In developed countries, 20%-40% of investment and labour is absorbed by the public sector in terms of strategically important industries viz. mining, transport, communication etc.

Therefore the crucial aspect to be considered here is to question how public enterprise efficiency can be improved to reduce the burden on the public and on the state budget.

The options provided by Prokopenko and Pavlin (1991:2) are divided into two major groups i.e.

- (1) small improvements and rationalizations, the introduction of new technology, the improvement of skills' etc.; and
- (2) introduction of entrepreneurial management styles and methods into public enterprise activities, and greater autonomy from central government control.

Prokopenko and Pavlin have researched industries and discovered that even without the legal disengagement of the state, the entrepreneurial approach to management not only saved an enterprise from bankruptcy, but it was able to lead it to recovery and new development and to place it in a competitive position (1991:3).

Petrin (1991:14-15) maintains that the transformation of a public enterprise towards business orientation should be the result of a gradual process opening up entrepreneurial opportunities to the employees of an organization. Entrepreneurial restructuring of such enterprises would have numerous desirable outcomes:

- (a) newly created units would provide new employment opportunities for redundant employees in an organization;

- (b) the industrial structure of an organization would become competitive resulting in cost minimization and innovation; and
- (c) several profitable opportunities which have not in the past been exploited because of a lack of flexibility and innovation due to management restrictions, would now be exploited resulting in high income and growth opportunities.

Prokopenko and Pavlin emphasize Petrin's thought by stating:

.....entrepreneurship and intrapreneurship offer great scope for the effective functioning of public enterprises than if they remain in a purely bureaucratic centralized environment. (1991:3)

According to Petrin (1991:20), the development of entrepreneurship within the public sector will have to take 2 forms:

- the establishment of new enterprises; and
- intrapreneurship i.e. entrepreneurship within the public enterprise.

Depending upon the degree of entrepreneurial activity, Petrin (1991:19) consolidates the different types of entrepreneurship that can exist within organizations. These are:

- (a) Administrative entrepreneurship: the development of new products, processes and techniques, or the improvement of existing ones are given high priority and its attempted as a joint venture between scientific-technical personnel and managers/administrators. Management secures resources and facilities and technicians are rewarded for trying out new ideas. The culture values innovation rather than bureaucratic status. The administration shows faith and offers sanctions, support and involvement;
- (b) Acquisitive entrepreneurship: entrepreneurship is conducted through acquiring technical capabilities through collaboration, contracts and consultancy, so as to gain access to innovative technological developments;
- (c) Opportunistic entrepreneurship: here, internal and external innovative technological development is scanned and surveyed;
- (d) Incubative entrepreneurship: this requires creation and semi-autonomous units within existing enterprises to think up, initiate and nurture new ventures. As an incubator for

innovative high-risk business endeavours, semi-autonomous units strengthen internal entrepreneurship; and

- (e) Initiative entrepreneurship: here the innovation is limited to imitation and to simple modification e.g. in packaging and design.

Taking into cognisance the different types of entrepreneurship, it is my considered opinion that the departments specified in this study can adopt incubative as well as administrative entrepreneurship to foster the idea of transformation into business units.

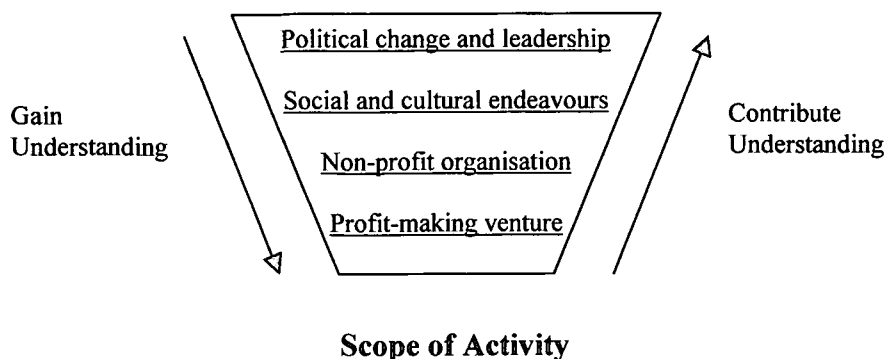
This transformation may be easier said than done, therefore, new ventures will also have to learn entrepreneurial management if they have to survive. With the development of intrapreneurship and entrepreneurial management within public enterprises, opportunities and inventions could be achieved. This new venture could lead to a competitive environment, thus stimulating better performance in existing public enterprises and providing competition for private enterprises (Petrin 1991:20).

The word *entrepreneurship* is often associated with profit making and business. However, entrepreneurship can also assist to transform non-profit activities into successful activities. Wickham (2001:42) perceives entrepreneurship as 'a style of management'. He also maintains that entrepreneurs are not only motivated by money, but desire to create a new and better world by pursuing opportunities and creating change while using entrepreneurship as a social and economic activity. Entrepreneurial skills like effective communication and leadership can be developed in non-profit organizations such as the DIT to achieve overall success. Although entrepreneurship focuses on money in profit making ventures, insights from the entrepreneurial activity can be used to help achieve success in non-profit organizations.

As Wickham (2001:43) illustrates in his hierarchy of entrepreneurship (Figure 1 on Page 21) in its wider social context, he re-iterates that entrepreneurship is just as important in non-profit organizations as it is in profit making businesses i.e. many non-profit organizations are involved in managing money e.g. charities have to attract finances to distribute to their clients while political parties must attract money from supporters in order to function.

**Figure 1**

**The Hierarchy of Entrepreneurship in its wider Social Context**



It is through entrepreneurship that management disciplines such as human resources and marketing comes to the fore – money is just a means to the end for the entrepreneur.

### **3.2. Intrapreneurship: Corporate Entrepreneurship**

Pinchot and Pellman (1999:2) state that intrapreneurs are primarily responsible for innovation in large organizations. Unless organisations use the skills and intrapreneurial energy of their people, effective innovation cannot exist – this would be a waste of intrapreneurial energy – the best ideas would be rejected.

Although the core function of the DIT is the provision of higher education, the institution also houses service departments like printing, planning, audio visual and graphic design, IT, etc. Although these departments exist (as their description states) to service the academic departments, they also have the potential to attract income to the institution. These departments are skilled in their function and have the ability to outsource such skills to attract external business. By promoting entrepreneurship within these departments i.e. intrapreneurship, these departments could become self-sustaining business units.

While the focus of this study leans towards the recommendation that departments transform into self-sustaining business units, Harvey and Evans as cited in Pinchot and Pellman (1999:345) elaborate on the advantages and disadvantages of the entry mode into such entrepreneurial ventures. Their analysis looks at the entry mode of start-up, part-time,

franchises, acquisition and intrapreneurial ventures. For the purpose of this study only the pros and cons of the entry mode of the intrapreneurial venture are underpinned in Table 3.

**Table 3**

<b>Pros And Cons Of The Entry Mode Of An Intrapreneurial Venture</b>	
<b>ADVANTAGES</b>	<b>DISADVANTAGES</b>
Test personal skills essential to entrepreneurial ventures	Risk to owners if venture is unsuccessful
Develop skills that are deficient	Behavior may not be rewarded by corporation
Low monetary risk	Considered 'outsider'/ unconventional by peers
Means to differentiate from other corporate managers	If venture is successful, become disenfranchised with 'normal' corporate decision-making and incentives

### **3.3. The Importance of Innovation in Intrapreneurship and Entrepreneurship**

Before focusing on the type of innovation necessary for business units, it is important to identify the real meaning of the word *innovation*. Both lay people and academics have sought to define innovation and it is apparent that 'innovation' becomes a 'mindmix' of 'creativity', 'invention', 'entrepreneurship' and 'intrapreneurship'. Innovation would also include the idea of invention and discovery – however, one does not have to be an expert to be innovative. (Smith and Ainsworth 1989)



Smith and Ainsworth (1989:15) consider the innovation process as one that enjoys a diverse mix of people as listed below:

- The creative person has ideas that become his or her output;
- The innovator transforms these ideas into reality, resulting in tangible products or services; (The inventor could be a combination of the creative person and the innovator)
- The entrepreneur through his/her business foresight develops the product or service into a money making proposition, resulting in a successful product or service;
- The intrapreneur is one who pursues entrepreneurial type innovation, but within the framework of a large organization;
- The champion picks up an idea, not necessarily his or her own, and through tenacity, belief and commitment works it through the organization to a successful outcome; and
- The sponsor is often a senior manager who believes in the idea and the team, thus influencing key people to ensure that the idea passes through various stages of organizational scrutiny.

Beaver (2002:194) estimates that over 60% of economic growth is brought about by innovation and technological advance. Thus innovation has become essential in economic progress especially in competition of private enterprises and national states. Beaver (2002:194) states that reports such as the *White Paper on Science and Technology* encourage innovation and technological advancement for entrepreneurs in order for commercial and economic benefits to be realized.

While Beaver (2002:194) talks about innovation for economic development, Wickham (2001:224) talks about 'innovation breakout' i.e. he views innovation as entrepreneurial innovation (driven by vision and the desire to create a new world) and corporate innovation (strategy driven). Wickham (2001:224) looks at entrepreneurial innovation as an activity that will impact on performance (whether it is successful or not). Innovation within a large business is more often compartmentalized (encouraging intrapreneurship). In order for an educational institution like the DIT to become innovative, both Beaver's and Wickham's views need to be considered seriously as innovation for the Institution could be a mixed bag of both views.

The next chapter outlines the research methodology used in the study, it highlights the methods adopted to undertake data collection as well as the process in structuring the research instrument.

## CHAPTER 3

### RESEARCH METHODOLOGY

#### 1. Introduction

*use as an example structure*

The previous chapter highlighted the literature reviewed for this study and outlined the values and benefits of adopting information technology not only in business, but also, in daily activities. This chapter focuses on the design adopted for the data collection, taking into cognisance the literature reviewed. The study adopted the use of a combination of qualitative and quantitative research strategies. Structured questionnaires and in-depth structured interviews were the main strategies for data collection. A sample of the questionnaire is included in Appendix 1. The interview schedule is included in Appendix 2.

This chapter describes the development of the research questionnaire as well as the selection of the sample population. It also looks at the method in which the questionnaires were presented to the respondent sample. The development of questions for the interviews with targeted potential business units is also described. Thereafter the information gathering and analysis methods are discussed.

#### 2. Designing the Questionnaire

For the purpose of this study, the questionnaire was developed and based on the literature reviewed. According to Remenyi (1998:150), the main purpose of questionnaire research is to obtain information that is not already available either in computerised or written forms. This type of instrument seemed more viable as questionnaires are not as time consuming as interviews. When designing the questionnaire, I had to take into cognisance the following factors i.e.:

- Ensuring that the questionnaire measured the theoretical concepts adequately;
- Ensuring that the sample of respondents answer the questions adequately; and
- Ensuring that the questionnaire was relevant to the study goal.

I had to therefore ensure that questionnaires were accompanied by a covering letter, printed on the institution's (Durban Institute of Technology) letterhead. The goals of the study had to be clarified, justified and explained to the respondent. Individuals are more willing to participate in projects when they feel that they are worthwhile and



have scientific value. I also had to be careful that the questionnaire was not too long as this would have discouraged the respondents, since time is of such a great essence with most respondents.

Guidelines listed below were adhered to in the construction of the questionnaire. (Leedy and Ormrod, 2001: 202-204) and Cooper and Schindler, 1998:332-352)

***a) Questionnaires should be kept short and solicit only the information essential for the research project***

Questions asked were therefore only linked to the impact of information technology and its systems on productivity, profit making and efficiency.

***b) Language used should be simple, clear and unambiguous***

Cooper and Schindler (1998:332) emphasise that proper question wording is crucial as people become frustrated when there is a lack of shared vocabulary. The following criteria were adhered to when I drew up the questionnaire i.e.:

- a. Does each item contain vocabulary with a single meaning?
- b. Does the item contain unsupported or misleading assumptions?
- c. Is the item stated in terms of a shared vocabulary?
- d. Does the item contain biased wording?

Cooper and Schindler (1998:333) also state that simple language allows communication with persons of limited education. The definitions of *information systems* and *information technology* were outlined at the beginning of the questionnaire to alleviate any misconceptions about these terms.

***c) Questions should be kept simple and not warrant assumptions***

***d) Questions posed should not hint about the desired response***

Difficulty did arise when I had to be objective when preparing the questions, However, by rewording questions (without changing the focus), I found that the clues to desired responses could be eliminated.

***e) The respondent's task needs to be kept simple***

I realised that time is important and means 'money' for businesses, therefore, my questions were mainly dichotomous and Likert scale questions. Apart from using this type of structured questioning for the respondents' convenience, it was convenient for me to administer, process and analyse as well as do a comparison with the responses.

***f) Clear instructions have to be provided***

This was imperative especially when focusing on the Likert scale questions since not all people are familiar with Likert scales. The instruction therefore stated that higher ratings were to be awarded to issues most important to them and vice-versa.

***g) The questionnaire should be attractive and professional looking.***

The physical design of a questionnaire is very important. A negative response rate is the result of badly typed, poorly reproduced questionnaires. The questionnaire must be attractive and respondent friendly. Although no colours were added to the questionnaire, it donned clear lines and crystal clear typing giving it a professional look and yielding a 100% response rate.

***h) Pre-testing the questionnaire or conducting a pilot test is considered important***

Pre-testing the questionnaire is an important part of the questionnaire development process. It assists the researcher in determining whether the instrument has been properly designed. Leedy and Ormrod (2001:204) suggest piloting the questionnaire with friends or colleagues to determine whether there is any difficulty in understanding the items. The responses received will indicate whether the researcher will receive responses from the sample that will be of sufficient quality to answer the research question. I sought the expertise of two professionals to determine whether the questions asked were feasible to achieve the goal of the study. (These professionals (Manager: Administrative Computing Services: DIT and a Business Analyst: Ithala Finance Corporation) provided feedback on the structure of the questionnaire as well as the language and content. The questionnaire was then

pre-tested with colleagues in the Information Technology Department to ensure that the instrument was suitable to be handed out to the sample.

### **3. Administering the Questionnaire and Maximising the Rate of Return**

Respondents were telephoned initially to be informed of the rationale for the research and also to establish their willingness to co-operate. After achieving the co-operation from the target sample, some questionnaires were hand delivered to respondents and then fetched after a week, while others were e-mailed. This gave respondent's ample time to complete the questionnaire. The day before pick-up, respondents were telephoned as a follow up reminder. This process ensured that *some* of the questionnaires were received during the stipulated time.

In return for the investment of their time, I offered to send to the respondents a copy of the final results of the research.

### **4. Questionnaire Layout**

The questionnaire was divided into 2 sections.

#### **4.1. Section 1 of the Questionnaire**

The first part of this section followed a Funnel Approach where general questions were posed and then questions were more specific relating to the study. This section focused firstly on the type of business targeted i.e. respondents had to indicate whether they specialised in graphic design, strategic planning or printing. Questions also related to the age of the business, the number of staff currently employed and whether staff numbers increased or decreased. These questions, apart from providing a general description of the company, indicated the strength of their specialist activities by indicating their length of existence and their staff turnover. Remenyi (1998:154) states that background questions are necessary to provide demographic and socio-economic information on individuals or a firm. The latter part of this section included mainly dichotomous type of questions. I believe that this type of structured questioning would be appropriate for busy business people to answer, therefore, the questions were drawn up with only two options i.e. 'Yes' and 'No'. If there were an intermediate choice of answers e.g. 'uncertain' or 'don't know', then respondents would have looked at this as being an easy alternative, thus not being

forced to commit themselves. Questions evolved around the impact that information technology has had on business in terms of investment in technology (including web-site investment), profit making, advertising and the ability of technology in achieving the mission of the companies.

#### 4.2. Section 2 of the Questionnaire

Questions in Section 2 were formulated by taking into cognisance IT issues pertaining to business as investigated in the literature review. These issues were rated using the Likert Scale and items had to be rated as being either most important (rating of 5) or least important (rating of 1). Critical areas covering the review, approval and monitoring of systems were covered. The flexibility of IT infrastructure to adapt to the volatile business and technological environment and the development of staff skills to adapt to changes also required rating. Respondents were then required to focus on whether IT was viewed as an asset or an expense and also on the innovation and strategic use of IT as a competitive tool in business. Lastly, respondents were given the opportunity to provide general comments.

#### 5. Validity and Reliability ✓

In order for a research instrument to measure and produce accurate results, it has to be valid and reliable. Validity and reliability encompass different forms which are dependent on the nature of the research problem, the methodology used to address the problem and the nature of the data collected. However, how does the researcher determine what are the characteristics of a good measurement tool? Cooper and Schindler (1998:166) state that an intuitive answer to this question is that 'the tool should be an accurate counter or indicator of what the researcher is interested in measuring.'

Leedy and Ormrod (2001:31) state the following about *validity* and *reliability*

The validity and reliability of your measurement instruments influence the extent to which you can learn something about the phenomenon you are studying, the probability that you will obtain statistical significance in your data analysis, and the extent to which you can draw meaningful conclusions from your data.

Apart from ensuring validity and reliability, the measuring instrument also has to be easy and efficient to use.

## 5.1. Validity ✓

Validity is the extent to which a test measures what the researcher actually wishes to measure. The following aspects were considered to ensure the validity of the questionnaire:

- The wording of the questionnaire was simple and was clearly understood;
- There was the inclusion of relevant questions, items and categories; and
- Respondents interpreted the questions as required by the researcher.

There are various types of validity to ensure that an instrument actually measures what it is supposed to measure e.g. face validity, criterion validity, content validity, construct validity, internal validity and external validity. For the purposes of this study, I emphasised the use of the combination of face validity and content validity.

Face validity helped me to ensure that my instrument measured what it was supposed to measure. i.e., the impact of information technology systems on business was measured. Face validity, considered not to be a detailed form of validity, also relies basically on the subjective judgement of the researcher. This type of validity also focuses on whether the sample being measured is adequate to be representative of the behaviour or trait being measured.

Content validity, on the other hand, focuses on the accuracy with which an instrument measures the factors or situations under study. It looks at how well the questions being asked elicit the information being sought. The pre-testing of a questionnaire is the best method to ensure the validity of a questionnaire. Guideline (h) on Page 26 emphasises the importance of conducting pre-tests of the questionnaire thereby ensuring validity of the instrument used.

## 5.2. Reliability ✓

Reliability is about replication – it is the consistency with which the researcher gets the same results when the experiment is repeated. Reliability is therefore considered as ‘the consistency with which a measuring instrument yields a certain result when the entity measured hasn’t changed’ (Leedy and Ormrod 2001:31-32). Accuracy is the chief essence of reliability.

The reliability of an instrument could be determined by the following methods:-

1. Test-retest reliability – refers to the consistency of scores on a test when the same person takes the same test twice;
2. Equivalent forms reliability – refers to the consistency between scores when the same person takes two versions of the same test; and
3. Split-half reliability – refers to the consistency within a test and is calculated by comparing scores on half of a test with scores on the other half of the test.

While there are different perspectives linked to reliability such as equivalence, internal consistency, practicality, economy, interpretability, the perspective that was most likely to affect the reliability in my instrument was convenience. When determining the reliability of the questionnaire in this study, it had to pass the convenience test i.e. it had to be easy to administer. Although it had many technical details, it had clear instructions. Close attention was also given to its design and layout. Compacting material together, poor illustrations and reproductions as well as carryover of items from one page to the next make completion of an instrument difficult.

Reliability is a necessary but insufficient condition for validity - we can measure something accurately only when we can also measure it consistently. However, measuring something consistently does not always mean measuring it accurately (Leedy and Ormrod 2001:32). Cooper and Schindler (1998:171) complement this by stating that reliability is necessary and is a contributor to validity, however it is not a sufficient condition for validity.

Finally, I realised that the questionnaire had to be developed keeping in mind three basic but crucial objectives i.e.

- It had to meet the aims that I had in mind;
- It had to reflect accurate information on my topic under investigation; and
- It had to be practicable, given the available time and resources.

Leedy and Ormrod (2001:204) also emphasise similar thoughts by stating that it is imperative for the researcher to ensure that every question is essential to address the research problem.

## 6. Data Collection ✓

Data can be defined as the facts presented to the researcher from the study's environment. Data is also characterised by their abstractness, elusiveness, verifiability and closeness to the phenomenon--(Cooper and Schindler 1998:77). Data collection applicable to this research was two-fold i.e. primary data and secondary data.

### 6.1. Primary Data Collection using the Survey Method ✓

Surveys consist of asking questions of representative samples and are currently being used by businesses, politicians, students and consumer groups etc. to gather information and make decisions based on these data.

Primary data was collected not only from the external companies sampled, but also from targeted internal institutional departments. Leedy and Ormrod (2001:95) state that

The researcher's only perceptions of Truth are various layers of truth-revealing fact. In the layer closest to the Truth are **primary data** – these are often the most valid, the most illuminating, the most truth-manifesting.

This is complemented by Cooper and Schindler's (1998:78) view that primary data are sought for their proximity to the truth and control over error.

#### 6.1.1. Data Collection from Industry ✓

The sources of my primary data collection in industry were a sample of 3 strategic planning, 3 graphic design and 3 printing organisations in the Durban area.

#### 6.1.2. The Sampling Technique ✓

A variety of sampling techniques exist, however, if the results of a survey are to be interpreted accurately, the sample of respondents must adequately represent the population under investigation.

SAMPLES ARE

The advantages of using a survey method are numerous.

1. Surveys are used to investigate problems in a realistic setting.
2. A huge amount of data can be achieved easily from various people.
3. In comparison with the amount of data gathered, the cost of surveys are reasonable.
4. This technique allows the researcher to examine a large number of variables which can be analysed using multivariate statistics.

The Yellow Pages Directory of the Durban area was used as a sampling frame. Lists of 10 companies in the graphic design and printing industries were drawn up respectively. Three companies were chosen randomly from the list i.e. a simple random sampling technique was adopted. Leedy and Ormrod (2001:214) state that simple random sampling is easy when the population is small and *will not* be practical for large populations. This method, which emanates from the descriptive survey method proved to be simple, systematic and orderly.

Obtaining samples for the graphic design and printing industry was not a difficult task, however, difficulty arose when strategic planning companies could not be identified. After much investigation, numerous telephone calls and web searches, it was realised that units *within* large consultancies normally undertake strategic planning activities. Due to the limited number of consultancies in the Durban area (majority of consultancies are based in the Johannesburg area, which is outside the area of the study), the first three consultancies (with units specialising in strategic planning) were chosen purposively within the Durban region. Leedy and Ormrod (2001:219) state that purposive sampling, a type of non-probability sampling, as the name suggests is for a particular *purpose*. They suggest that purposive sampling is very appropriate for certain research situations as is the case with the strategic planning industry sample.

#### **6.1.3. Data Collection from Internal Institutional Departments**

Data was gathered via personal interviews with heads of the planning and printing departments as well as with the Graphic Designer of the Audio Visual Centre at M L Sultan Campus of DIT. This information was necessary to clarify roles within these departments, the existing infrastructure and regulations presently governing these



departments. Gathering this information proved important to determine attitudes, beliefs and viability should the project be adopted to transform departments into business units.

Prior to the personal interviews with the above respondents, I had to telephone the interviewees to gain their co-operation and also to establish suitable times for the interviews. Since heads of departments were busy with finalising merger discussions, it was difficult for them to adhere to fixed interview times (The Durban Institute of Technology arises out of the merger of M L Sultan Technikon and Technikon Natal). Interviews were continuously postponed which made data collection difficult.

The interview schedule was drawn up with a list of topics to guide the interview i.e. it focused on:-

- Impact of computers/it/is on work production;
- New technologies/software;
- Impact of new technologies;
- Training brought about by new technologies;
- Personal thoughts on business units at the institution;
- Business unit failure; and
- Impact of institutional policies on business units.

In qualitative research studies, interviews are more often open-ended, however in survey research, interviews are more structured. This exercise entailed structured questions where only issues pertaining to the above topics were researched. The duration of the interviews was approximately one hour.

Cooper and Schindler (1998:291) state that personal interviews prove to be really advantageous as the greatest value lies in the depth of information and detail that can be achieved. The personal interview exceeds the information secured from telephonic and self-administered surveys. Apart from being able to clarify ambiguous answers and seek follow-up information, the researcher can also do additional things to improve the quality of information received unlike with other methods.

The responses eventually received were then analysed to determine the willingness of these departments to transform into business units and the implications that

institutional and departmental policies and procedures will have on such transformation.

Data was also collected telephonically on the existing Architecture and Design Studies business units within DIT to ascertain issues pertaining to the establishment/transformation of these units into business units and the role of IT within these departments. This was done on an informal basis. When interviewees were telephoned to ascertain times for the interview, they asked to be interviewed at that particular time. Gaining access to the information was not difficult. Details of these interviews are provided in the next chapter.

## 6.2. Secondary Data

Secondary data was obtained by consulting journals, corporate reports, books and research reports. This section examined data within related literature from a comprehensive perspective of the study to more specific detail associated with the research. Cooper and Schindler (1998:257) maintain that there are three main reasons why researchers use secondary data in conducting research i.e.:

1. It fills a need for a specific reference or citation in an area to demonstrate why the proposed research fills a void in the knowledge base. Data from secondary sources can assist in deciding future research needs as well as being a good source of hypotheses;
2. Secondary data plays a crucial role in a larger research study where bypassing the costs and benefits of conducting primary research needs to be justified; and
3. Secondary data can be the sole basis for a research study, since in many studies one cannot conduct primary research due to physical, legal or cost influences.

Apart from the reasons as to why secondary data is used in research situations, Cooper and Schindler (1998:257) state that there are many advantages to this type of investigation i.e.:

1. Secondary data can be found more quickly and cheaply while primary data can be time-consuming and costly. This research study involved primary data and it was time consuming, as well as costly as respondents sometimes did not keep to appointments which meant travelling in vain; and

2. Conclusions from research on past events can also be drawn up from secondary data.

Although secondary data has its advantages, the realisation within this research is that information collected does not always meet the researcher's specific needs. Collecting secondary data is also time consuming and there were times when the data retrieved was not useful for the study.

## **7. Problems Encountered in Collecting Data** ✓

'Time is money' is usually the saying that goes with any business. Getting the 'buy-in' from people to assist in the research project was indeed a difficult task, however once I explained to them that I would drop off and fetch the questionnaire after a week it became much easier to achieve their cooperation.

The difficulty arose when some two companies in the sample had still not completed their questionnaires after a week. It took a lot of encouragement and correspondence to get the questionnaires completed. After a three week time lapse, the questionnaires were finally ready for pick-up.

The strategic planning industry is not one that can be accessed easily in Durban. After numerous phone calls, web searching and asking around, I successfully gained the 'buy-in' of one consultancy who was kind enough to pass the message on to another. The third consultant, after spending some time in Russia (during my data collection phase), finally completed the questionnaire, thus completing my data collection.

Difficulty also arose when I attempted to gain financial information pertaining to the private services offered by the printing and graphic design departments. This had to be done in order to determine whether their current services are viable in accruing income for the department. This information is however captured and managed by the Finance Department. Requests had to be made to the Ledgers Section to access information. After many phone calls, I managed to pool together some of the required information.

## 8. Conclusion ✓

This chapter has provided in detail the rationale for adopting the appropriate methodology, the instruments used and the sampling strategy. It has also stressed the importance of achieving reliability and validity with the instrument used. With a 100% return rate of the questionnaires, the exciting task of analysing the data begins. The next chapter provides an indepth analysis of the data gathered from the respective respondents.

## CHAPTER 4

### ANALYSIS OF DATA

#### 1. Introduction

The previous chapter discussed and justified the research methodology and methods that were selected to study the questions in this research study. This chapter details the findings of the investigation of information technology and its systems as perceived by the graphic design, printing and strategic planning industries as indicated in the questionnaires. It also focuses on the information gathered via structured interviews from the potential business units within the campus as well as data collected via the telephonic interviews conducted with the existing internal Design studies and Architecture business units.

Based on the sample size, the analysis of data was done using basic statistical methods available on Microsoft Excel for Windows 2000. The raw data was collated and gleaned and scanned by the researcher.

#### 2. Primary Data

##### 2.1. Existing Business Units

Interviews were conducted with the existing Design Studies and Architecture business units focusing on whether information technology proved beneficial for effective productivity and work performance of these units.

##### 2.1.1. Graphic Design

The Design Studies department, housed in the Faculty of Arts, began their business unit with the emphasis on capacity building for the students involved in the production of arts and crafts. Students are provided with the materials and once a product is sold, the student receives 60% of the takings while the remaining 40% is incorporated into the department. Technology does not play a major role in the production of goods as production of goods involves mainly handwork. However, the department emphasizes that technology should be brought into effect by creating a website for the products and giving potential clients a view of the items on sale. This will encourage marketability of their products. In this way technology is most welcomed.

### **2.1.2. Architecture**

The services provided by the business unit in this department are offered on a small scale. The department attributes the lack of technology for provision of services on a big scale to insufficient funding. However, it is believed that architectural software and programs such as *Archicad* and *Autocad* can facilitate the efficiency of work. *Autocad* provides for two dimensional platforms while *Archicad* uses an integrated two dimensional and 3 dimensional platform with photo realistic graphic presentation. The programs allow clients to view their designs on screen without having a plan drawn up, thus facilitating easy changes. If the department could invest in this type of technology, then productivity and the volume of work could increase, thus generating more income.

### **2.2. Targeted Business Units**

To ascertain the type of departments that are being targeted as potential business units, meetings were scheduled with the Graphic Design section, Printing and Strategic Planning departments at the M L Sultan Campus of DIT in order to clarify roles, existing infrastructures and regulations pertinent to them. The attempt to gather primary data from the departments was difficult due to the emphasis and priority on merger issues. The meetings between the departments (targeted business units) and the researcher tried to achieve responses on the impact of information technology/information systems on productivity and the general perception of whether it would be feasible for departments to be transformed into business units. The departments listed below were contacted and an initial general description of their role, structures and policies is discussed. Responses regarding the use of IT and its systems within these departments are listed below.

#### **2.2.1. Graphic Design**

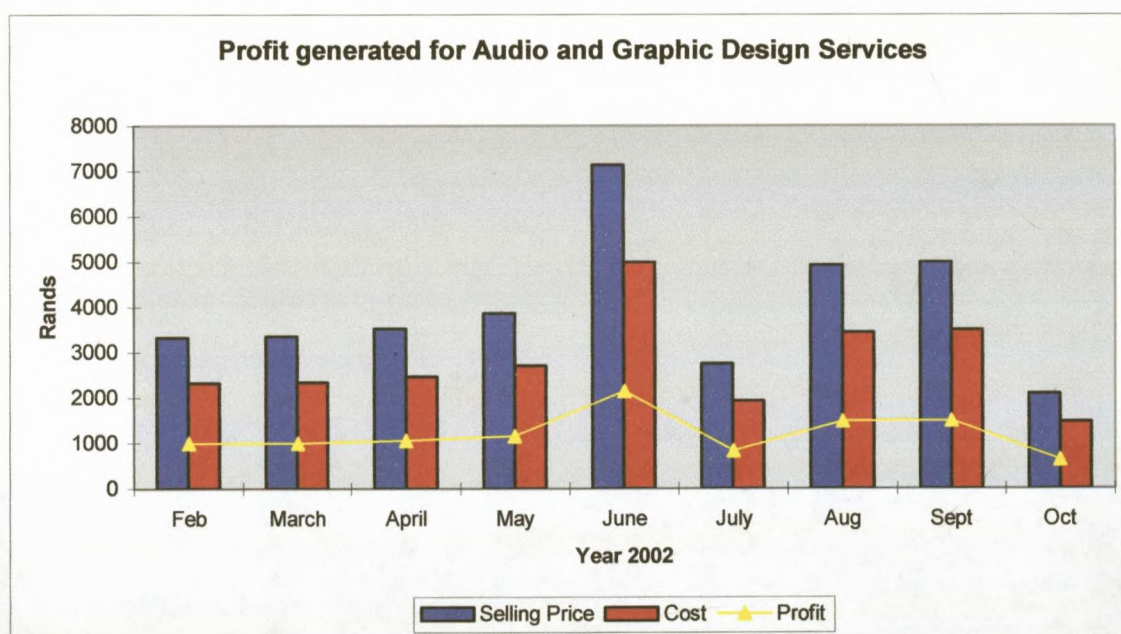
The Graphic Design service of the M L Sultan Campus is housed in the Audio-Visual Centre. A meeting was conducted with the Graphic Designer – the Head of Department was not available for a meeting. The Graphic Designer is the only staff member within the Graphic Design section and is sometimes assisted by an administrative assistant who services both the Audio Visual and Graphic Design sections. His section is currently equipped with an A2 Printer, a laminating machine and a scanner. Pictures, charts and diagrams ranging from credit card type pouches, A5, A4, A3, A2 up to A1 can be laminated. This section also provides for scanning, a variety of colour transparencies and text and colour printing. The layout and design of handbills, brochures, business cards etc. is also done here. The



department has already embarked on providing their services, both audio visual and graphic design to individual staff members who require 'private work' done. Prices of graphic design products are shown in Table 4 on Page 41. This is the initial stage in developing intrapreneurship within the institution. The financial status of the department's activities is monitored by the institution's finance department. Monies brought in through the sales of products and services are monitored through the use of proper procedures as propounded by the Department of Finance.

Figure 2 indicates the selling price of products/services, the expenses incurred and the profit gained. These figures indicate only the services that are offered to internal patrons i.e. staff members. The sources consulted provided information from February 2002 to October 2002.

**Figure 2**



Source: Detail Cost Centre Report of Media and Training – M L Sultan Campus

Records show that graphic design products are marketed at a 30% mark up to departments within the institution. Should external parties require graphic design products, the mark up is set at 90%. The department has accumulated funds of R15 000 from the sale of graphic design and audio-visual products, providing a generous profit margin in relation to the cost of products. It has to be borne in mind that these profits have been generated from undertaking very basic private activities.

**Table 4**

<b>GRAPHIC DESIGN PRODUCTS</b>	<b>SIZE</b>	<b>UNIT PRICES</b>
<b><i>THERMIL DIRECT</i></b>	A2	R8.00
	A1	R16.00
<b><i>LAMINATIONS</i></b>	A4	R5.00
	A3	R10.00
	A2	R15.00
	A1	R30.00
	A0	R30.00
<b><i>POSTERS</i></b>	A1	R15.00
	A2	R7.50
	A3	R3.00
<b><i>BANNERS</i></b>	1m	R15.00
	2m	R50.00
	3m	R75.00
<b><i>FLIPCHART PAPER</i></b>		R30.00
<b><i>TRANSPARENCIES</i></b>	INKJET TRANSPARENCY	R5.00
	THERMAL TRANSPARENCY	R2.00

### 2.2.2. Planning

The Department of Information Technology and Planning houses the Management Information Services (MIS) section and the Planning section. Management information reports are compiled using ITS, i.e. Integrated Tertiary Software. This software specializes in the provision and maintenance of an integrated enterprise set of software systems to support the administrative needs of educational institutions. It provides links with student information, space, fixed assets, finance and human resources. It meets all requests in terms of information requested. Through its partnership with MIS and information provided, the Planning section produces Strategic plans, 3 Year Rolling Plans and 10 Year Core Institutional plans.

The Manager (Planning) has under his wing a Management Information Officer, a Planning Officer, a Management Information clerk and a Planning clerk. This section falls within the ambit of the Director: Information Technology and Planning. The Director, together with his Executive Assistant, the institution's Training and Development Officer and the Planning section, underwent a period (18 months) of strategic planning training under the auspices of



AUSAID and Kangan Batman TAFE of Australia. This team graduated with skills in Quality Strategic Planning and the ability to facilitate workshops. With the correct infrastructure and policies in place, the team will be able to outsource these planning skills to external organizations.

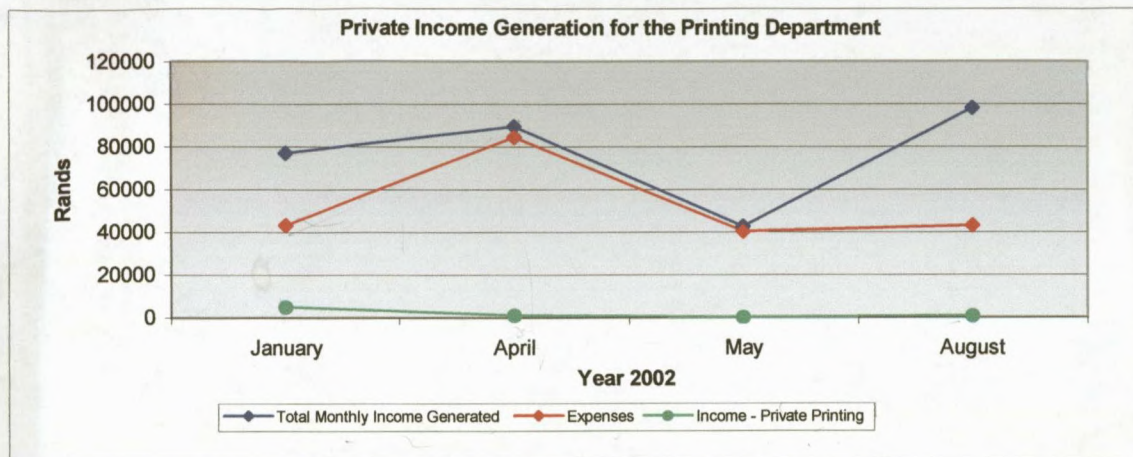
### **2.2.3. Printing Services**

The Printing Department at the M L Sultan Campus has a staff complement of seven. The department houses several machines that vary in sizes – printing products from business cards to booklets and examination papers. All machines are worked by skilled operators. Unfortunately, none of the machines are linked to computer systems, which could enable tasks to be carried out much easily.

A few years ago the department attempted to outsource its services as a business unit in order to begin sustaining itself independently because there always seemed to be a lack of funding. The Head of Department was adamant in stating that this project would have worked well had the department been well equipped with suitable machinery and manpower. Due to the lack of these resources, the department had to concentrate only on work allocated by the institution. It is a firm belief of this department that it could (and it would like to) become self-sustaining as a business unit since the prospects of attracting business was excellent at that time. The department is still approached by many prospective clients, however, they have to be turned down due to the lack of resources.

Figure 3 on Page 43 indicates current trends of the department offering services on a private basis. The graph depicts the total income generated (i.e. income generated from institutional work as well as work done on a private basis), income generated from private printing and the expenses incurred in production. The graph emphasises only the months when private work was undertaken.

**Figure 3**



Source : Monthly Financial Reports of Printing Department, M L Sultan Campus

Income that is generated from services offered privately is relatively low compared to the total monthly income generated. The trend indicates that of the total income generated in January, private work undertaken contributed 6,7% of income. However, the trend indicates that income generated from private services was low ranging from 1,5% in April to 0,6% in May with a steady increase of 0,8 % in August. Should this department be equipped with the proper technology and infrastructure, it is my considered opinion that these figures would improve.

### **3. Responses from Targeted Business Units**

The following are responses that were received during the structured interviews with the internal departments that are targeted as potential business units.

#### **3.1. How has the computer/IT and its systems assisted in work production?**

##### **Graphic Design**

*This section would not be able to function without a computer. The design packages are equipped to design any layout requested. Production requests are well achieved.*

##### **Planning**

*The institution is dependent on management information for many of its tasks and had it not been for suitable systems, then productivity would not be achieved in terms of meeting all relevant requests. IT has also been very useful in the*

*compilation of plans and reports submitted to the Department of Education, allowing for subsidies etc. to be awarded.*

### **Printing**

*Unfortunately, the department is not technologically advanced in terms of linking its equipment to computer systems. The department's counterpart at Steve Biko Campus (former Natal Technikon) has one machine linked to a computer system where operations require only a 'touch of a button'. It is a strong belief that if equipment is linked to a computerized information system, then production would be more efficient.*

It is evident from the data received that IT and its systems have contributed tremendously to the current functions of the graphic design and the planning departments. These two departments attribute the achievement of tasks undertaken to the use of technology in their functions. Unfortunately, it can be seen that the printing department lacks proper technology to provide services effectively and efficiently.

### ***3.2. How does the department keep up with new trends in IT?***

#### ***Magazines/Supplier contact/Market scan?***

### **Graphic Design**

*Markets are scanned every 6-8 months for new or revised graphic programmes.*

### **Planning**

*If there are new programmes/software for management information purposes, then it is advertised through news in the higher education sector.*

### **Printing**

*Printing conglomerates provide information and demonstrations to the department when new software or equipment come into existence.*

It can be noted that each department has varying methods to accumulate information about new technology and trends that come into existence. Receiving updated information about these new trends will assist departments in determining the technology necessary for improvement of services provided.

### **3.3. Are there too many training sessions/ workshops to attend?**

The response from both the Graphic Design section and the Planning department is similar i.e.

*Training sessions/ Workshops are attended as and when needed.*

#### **Printing**

*These do not affect the department at the moment, however, should there be an investment in technology, then training would be welcomed.*

From the information gathered, it can be concluded that training does not pose a problem for the departments concerned. Departments within the campus possess a budget for training purposes. Should training be a requirement for new technology that arises, then the Human Resources department, in collaboration with the departments concerned, will assist in liaising with the consultants or training companies concerned.

### **3.4. Are computer programmes/packages changing too often?**

#### **Graphic Design**

*Programmes do not change often – it is just the version of the package that is updated. Basic functions of the package are already in use, so it is just a matter of becoming familiar with the additional functions.*

#### **Planning**

*Packages are normally updated and that is about as far as changes would go. If there is something totally new, then training is conducted by the relevant parties.*

#### **Printing**

*Changes are not heard of too often.*

It is normally said that computers and technology are ever changing, therefore, it is difficult to keep up with technology. However responses received from departments have indicated that *it is possible for them to keep abreast of technology as and when the need arises.*

**3.5. What are your thoughts about transforming this department into a self-sustaining business unit?**

**Graphic Design**

*It is a very interesting idea and becoming self-sustainable would be excellent. This would certainly improve the morale of those involved, to own and work towards achieving productivity. The section would require more equipment and manpower.*

**Planning**

*Staff are equipped with the relevant skills, so it will be worthwhile if these skills are outsourced to bring extra monetary resources into the institution – it is a good idea.*

**Printing**

*Should this department be transformed into a business unit with sufficient equipment and manpower, then it can be said that funding for the department and the institution itself would not pose a problem again.*

Suggestions about transforming departments into self-sustaining business units have been well received. However, departments need to plan carefully and be well equipped before embarking on such a journey.

**3.6. Are there any reasons as to why transformation of this department into a business unit might not work?**

**Graphic Design**

*Transformation should work very well – it is a step forward into the future. The section already seems to be incorporating lots of sales with a few items being sold internally.*

**Planning**

*If the department is able to cope with the regular workload as well as additional functions, then it should not be a problem.*

### **Printing**

*Transformation of the department would be an excellent idea – it worked well on trial before, so there is no reason as to why it would not do well. Students and staff alone provide for a huge clientele base.*

Departments cannot see any reasons given as to why transformation of departments into business units will not work. Departments seem quite excited at the idea of becoming self-sustainable as can be seen in the responses from the Graphic Design section and the Printing Department.

### **3.7. Do you think that institutional policies would be an obstacle to this transformation of the department?**

#### **Graphic Design**

*However the transformation occurs, it should be incorporated into the institution's policies and procedures. Business units should be looked at as good innovations and advantage should be taken over such an opportunity.*

#### **Planning**

*The transformation will have to eventually fit into the institution's regulations and policies.*

#### **Printing**

*If there is a way for departments to become self-sustainable, then the institution's policies and procedures should allow it to be moulded according to the crucial needs (monetary) of the institution and society itself – society is always on the look-out for reliable services.*

Departments do not perceive institutional policies and procedures as being stumbling blocks in the transformation of departments into business units. Their belief is that policies and procedures should be flexible to allow this type of transformation.

### **4. Responses from Industry**

This section will report on the responses to the questionnaires distributed to external companies that formed part of the sample. The general details like the name, address and



type of business, are not discussed in detail as the critical issues pertaining to information technology is regarded as imperative in this study.

The graphs detailed below will indicate the Funnel Approach of Section 1 of the questionnaire where general questions were posed to respondents. This section focused firstly on the type of business targeted i.e. respondents had to indicate whether they specialised in graphic design, strategic planning or printing. Questions also related to the age of the business, the number of staff currently employed and whether staff numbers increased or decreased. These questions, apart from providing a general description of the company, indicated the strength of their specialist activities by indicating their duration of existence and the staff turnover. As stated by Remenyi (1998:154) it is evident that background questions are necessary to provide demographic and socio-economic information on individuals or a firm.

#### 4.1. Duration of Business

Figure 4

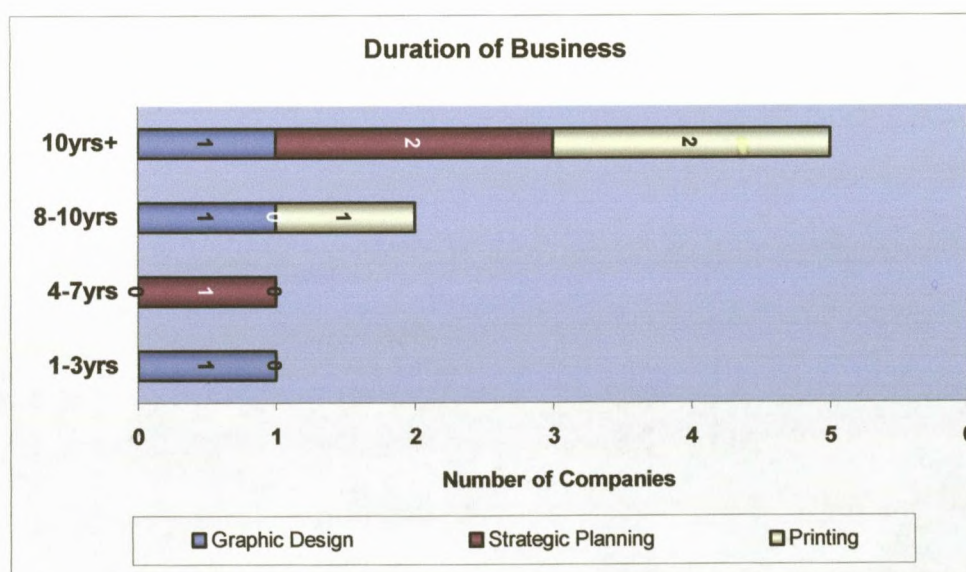


Figure 4 above indicates that 56% of the companies sampled have an age span of over 10 years, 22% of the companies aged between 8-10 years while 22% of the remainder companies are in existence for less than 10 years.

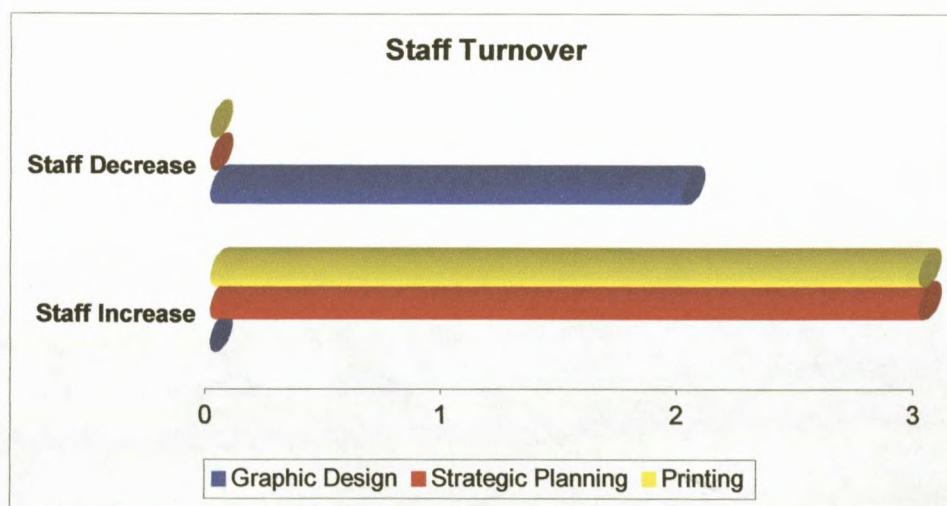


## 4.2. Staff Turnover

Figure 5 provides a general description of the staff turnover at the organizations that form part of the sample. The instrument used attempted to ascertain whether information technology and its systems impacted on staff turnover. As can be seen, there have been increases in staff numbers in the printing and strategic planning industries. Analysis conducted has indicated that increases in staff numbers is attributed to the increase in volume of work, business expansion and increased service provision. Responses indicated that strategic planning, especially in conjunction with IT has become extremely important to organizations. It is evident that staff numbers have increased in order to support business objectives using IT and its systems.

Roepke (2000:327) envisages similar thoughts by stating that business leaders are increasingly demanding that IT play the role of business partner and strategic enabler together with human capital. Transformation of IT from a back-office support to a strategic business partner requires new roles and competencies for staff.

**Figure 5**



Data collected from 2 graphic design companies have shown that there has been a decrease in staff numbers while one graphic design company experienced no staffing changes. Although one graphic design company indicated that staff numbers decreased due to trying economic times and saturation of the market, the other stated that IT reduced staff numbers. Although productivity increased, less staff were needed due to additional disciplines (multimedia) brought about by the introduction of IT in business in 1994. Staffing numbers may have



decreased in this organization, but, it is clear that IT has been used as a competitive weapon. Almost two decades ago Burch and Grudnitski (1986:14) considered IT and its systems as the primary weapon to help management, product and service, and productivity penetrate the competitive environment. They had also foreseen that ‘computers and other technology would support organizations to reach goals of winning managers, superior products and services, and greater productivity and eventually success.’

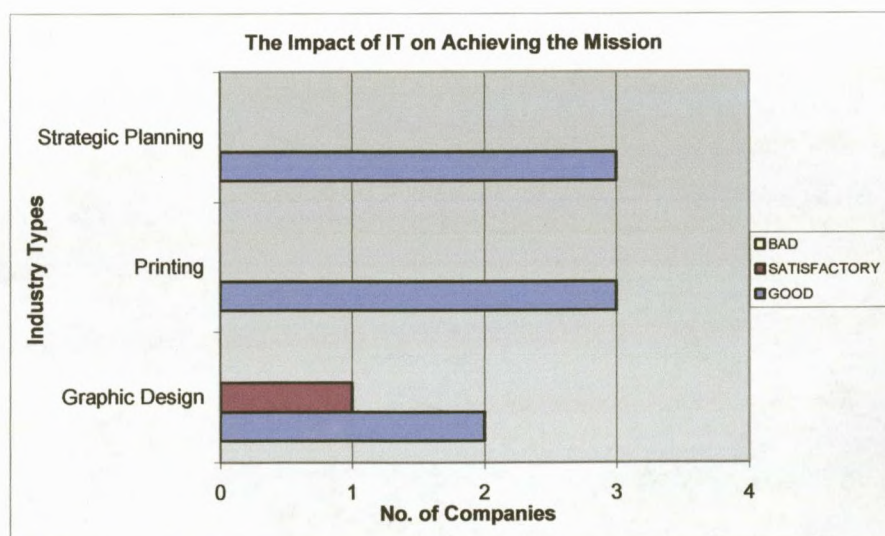
However, I believe that little or no attention is attributed to the importance of proper staffing aspects. The key element in the journey of IT adoption to improve business should also focus on the development of business-aligned, entrepreneurial skills and competencies among the staff (Roepke 2000:327). The misconception that *the computer’s main job is to replace human beings* is rife. Many years ago Grindley and Humble (1973:15) stated that

Unless we can find a human being who is behaving completely as an automaton, we cannot replace him with a machine.

It has to be borne in mind that the computer is essentially complementary to humans, not a replacement for people – it merely releases the worker to undertake more important discretionary control.

### 4.3. Achieving the Mission

Figure 6



Respondents were questioned about whether or not they had a clear and understandable corporate mission and how they rated the contribution of IT to achieving the mission. 89% of



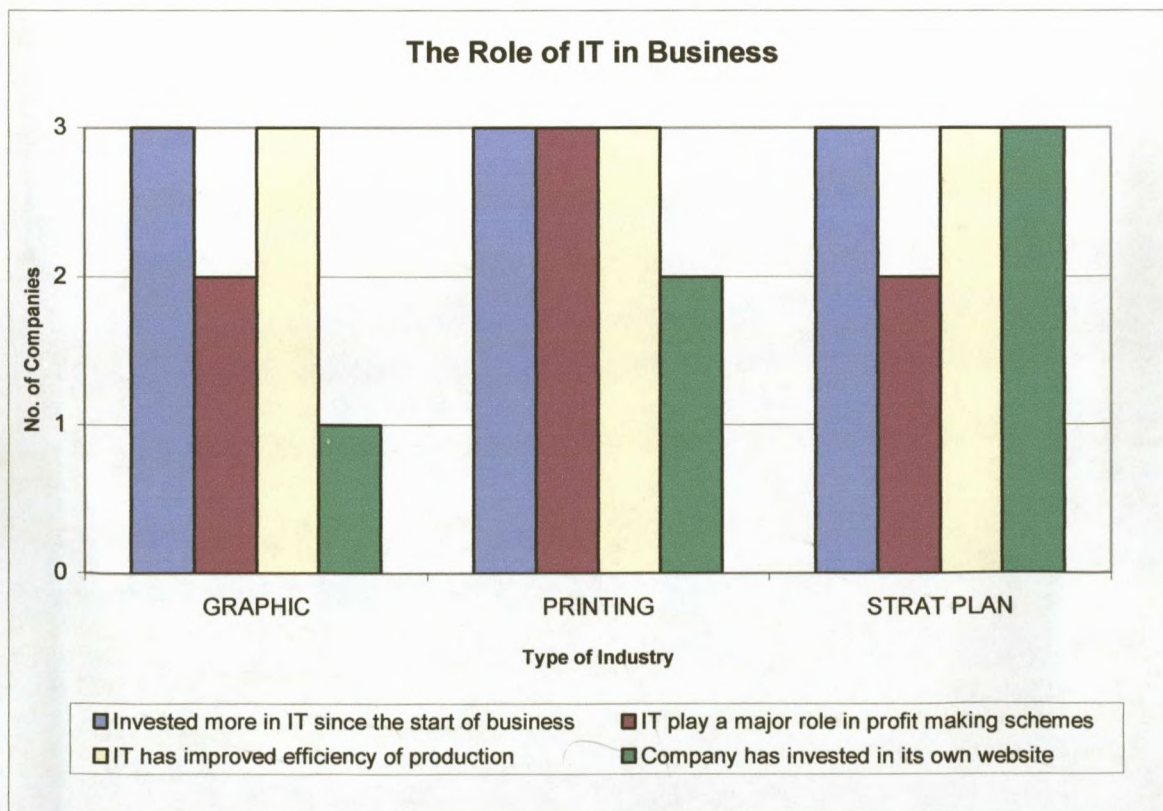
the respondents confirmed the positive impact that IT has had on achieving their mission – they rated the contribution made by IT as being ‘good’. Only one company perceived the contribution of IT on achieving its mission as being merely ‘satisfactory.’ Strategic planning for any type of organization encompasses focusing on the vision, mission and goals of the organization. Numerous authors in the literature review have indicated that in order for organizations to realize their competitive edge through their vision, mission and goals, they (the organizations) have to seriously consider adopting IT to re-engineer their business processes. IT is now playing a pivotal role in determining the success of business ventures.

#### 4.4. The Role of IT in Business

Numerous authors in the literature reviewed have emphasized the positive impact that IT and its systems have had on business. Apart from gaining competitive advantage, productivity and performance have improved i.e. IT has actually improved the efficiency of production.

Figure 7 below depicts the role that IT plays in the various companies sampled.

**Figure 7**



#### **4.4.1. Investments in IT and the Efficiency of Production**

100% of companies sampled have indicated that they have invested more in IT since the start of business. Each company sampled also indicated that IT has improved the efficiency of production.

Responses from the graphic design industry have indicated that the industry has now found itself in a different era. With the rapid advancement of technology, the industry has to brace itself in order to learn and adapt to survive, thus investing more in IT. This industry has proclaimed that IT and its systems are integral to the efficient functioning of companies. Companies have also indicated that IT provides specialized tools (e.g. Applemac) which are essential to the core functioning of the business. IT is used as the medium required for production.

The printing industry attributes its success to technology and computerized systems. Technology has actually made provision for documents to be printed, guillotined and perforated simultaneously. Efficiency in colour printing has become so technologically advanced that only four colours are required to produce a colourful picture. The computerized technology has the ability to mix colours to perfection. The printing industry has also indicated that apart from efficient production, technology has played a major role in accruing income to the business.

Strategic planning companies have indicated that IT and its systems have revolutionized the way in which they operate. In order to compile strategic plans, inferences need to be drawn up from the data received. Technology assists in analyzing and representing figures and facts. Computerised packages such as Microsoft Excel plays a major role in determining calculations etc. accurately. Increased investments in technology and appropriate software have created great advantages for strategic planning initiatives.

Although all the companies sampled have indicated that IT has improved the efficiency of their production and services, only 66% of the graphic design and strategic planning industries have indicated that IT plays a major role in profit making schemes. The printing companies that were part of the sample have all indicated that profit making can be attributed to the role that IT plays in production processes.

#### **4.4.2. Web-site Investments**

Three of the strategic planning and two of the printing companies that were sampled have invested in their own website while only one graphic design company thought it necessary to invest in a website. In response to whether a website investment proved beneficial to the company, the strategic planning companies indicated that clients often accessed the site thereby making use of the useful information contained. Apart from useful information being accessed, companies are marketed through customers accessing the website.

The graphic design companies who currently do not possess a website believe that investing in a website would prove beneficial to the business.

The printing companies that have invested in their own websites have seen business growth through clients accessing their websites in order to view items and their variations, price, special promotions and contact details. Business users have become accustomed to the capabilities of website advertising and have learned to capitalize on them commercially. It can therefore be said that website connectivity has had a riveting effect on electronic commerce, thus increasing sales and improving advertising.

#### **4.5. Rating of IT in Business**

Respondents were asked to rate the value of IT and its systems as it has impacted on product manufacturing and service provision. Figures 8-12 indicate the way in which IT is perceived in the various companies that were sampled – ratings of IT are evaluated as being either very important to the extreme of IT being perceived as least important.

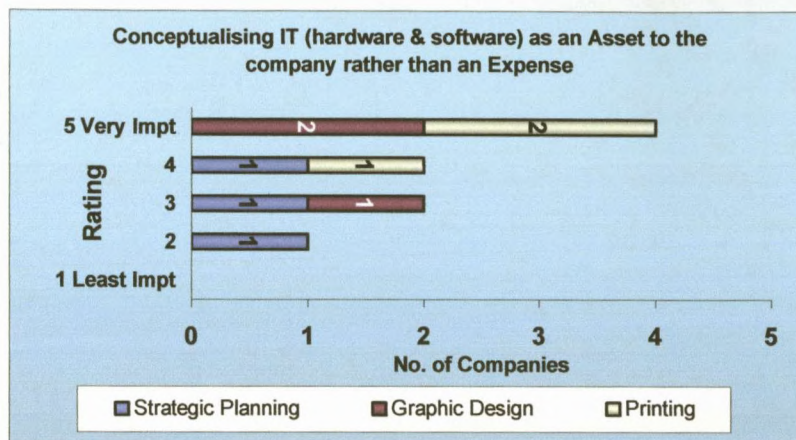
##### **4.5.1. IT: Asset or Expense**

Respondents were asked to indicate whether they conceptualized information technology (including hardware and software) as an asset to the company rather than an expense. 67% of the sampled companies consider IT as being a crucial asset with 22% of the companies considering the importance of owning IT as being moderate. These companies view the tools of IT i.e. computerized software (tools to replace old techniques of production) as being highly essential to the business rather than placing too much emphasis on the latest hardware that is available. If existing technology can incorporate new software to improve production then not much emphasis is placed on acquiring totally new technology. 11% (one strategic planning company) placed little emphasis on the importance of IT. This company stated that



IT has provided some obvious advantages in its appropriate software, however, it does not perceive IT as being the panacea as it is often seen to be by other industries. It can be concluded from Figure 8 that IT and its systems does play a major role in business, especially when services are provided by the graphic design and printing industries.

**Figure 8**



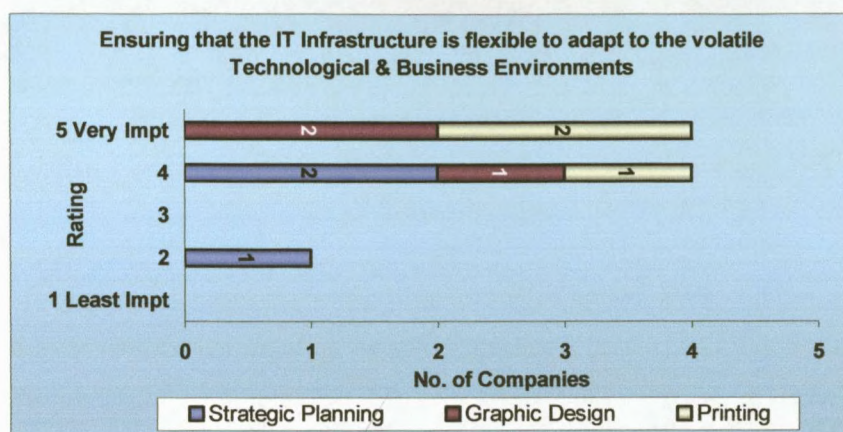
In appreciation of IT and its systems, Willcocks et al (1997:6-7) have discovered in their research that IT is perceived as an asset by many business executives. These executives envision IT as playing an important role in the transformation of the business.

#### 4.5.2. Flexibility of IT Infrastructure

Figure 9 on Page 55 indicates that 89% of the companies that were sampled strongly believe that it is crucial to ensure that the company's IT infrastructure is flexible to adapt to the volatile technological and business environment. Willcocks et al (1997:457) believe that the business life cycle of IT in companies seems to average years rather than decades. The challenge is compounded by the need for IT infrastructure to remain open to change in the demands of business. A business which cannot assess the role of IT and the appropriate architecture and infrastructure within a turbulent context will be severely handicapped – strategically and economically. It is therefore interesting to note that the sampled companies focus on their IT infrastructure with such great impetus.



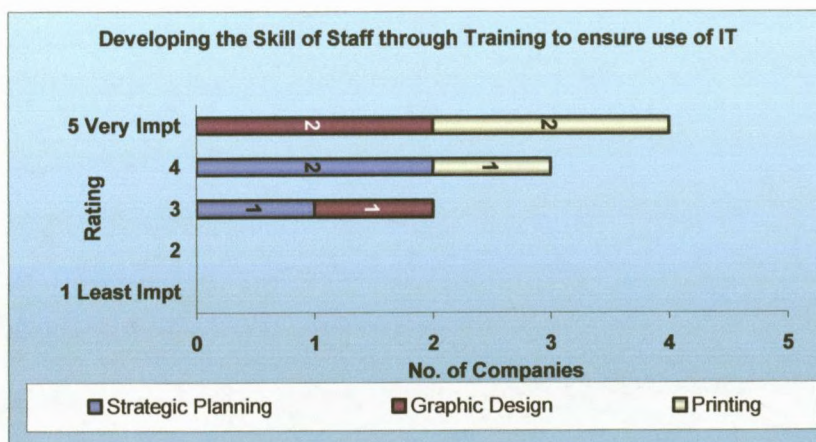
**Figure 9**



#### 4.5.3 Development of Skills

It was encouraging to note that 78% of the companies that form part of the sample believe in ensuring that staff skills are developed through training in order to ensure proper use of IT systems. Figure 10 below depicts only 22% of the companies as displaying moderate emphasis on the development of staff skill in relation to the ability to ensure the use of IT.

**Figure 10**



The Harvard Business Review (1999:48) emphasizes that there have to be more effective operational and management processes in this increasingly competitive world. Companies need to be proficient in various key areas, reduced cycle time, faster development of new products, improved customer service, increased knowledge sharing and learning – this is only possible through increasing empowerment of individuals through technology, a critical



resource for accomplishing goals. It can therefore be concluded that developing staff skill is crucial to ensure accomplishment of strategic company goals. Companies invest sufficiently in IT resources to achieve IT advantages, however, companies gain IT related advantages by merging IT with complementary resources, particularly human resources.

#### 4.5.4. Systems Development and Operations

Figure 11

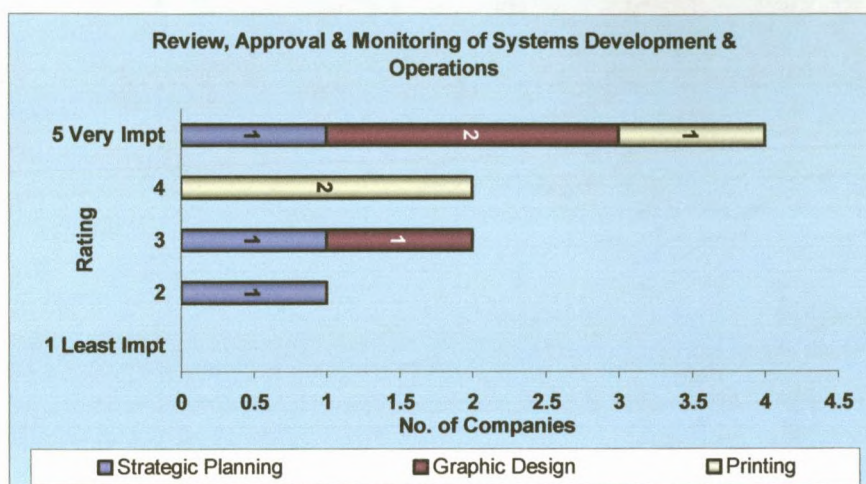


Figure 11 above indicates that 56% of the companies that form part of the sample consider the review, approval and monitoring of systems development and operations as being fairly crucial to the company's goals and mission. 22% of the companies have envisaged systems development and operations as being moderately important while 12% (one strategic planning company) does not consider this issue as being really important to the company's business achievements. Once again, the review and monitoring of IT and its systems are not perceived as being ultimately important in profit making by this strategic planning company. It has been indicated again that IT has provided obvious advantages to work performance but it is not given sole credit for services and production. However, from the complete analysis of systems development and operations, it is my considered opinion that the review, approval and monitoring of systems development and operations should take precedence when aligning business objectives within an organization. In order for any business to effectively succeed within the volatile economic environment, companies need to constantly prepare their competitive weapons, thus placing emphasis on systems development and operations.



#### 4.5.5. IT/IS as Tools for Competitive Advantage

Figure 12

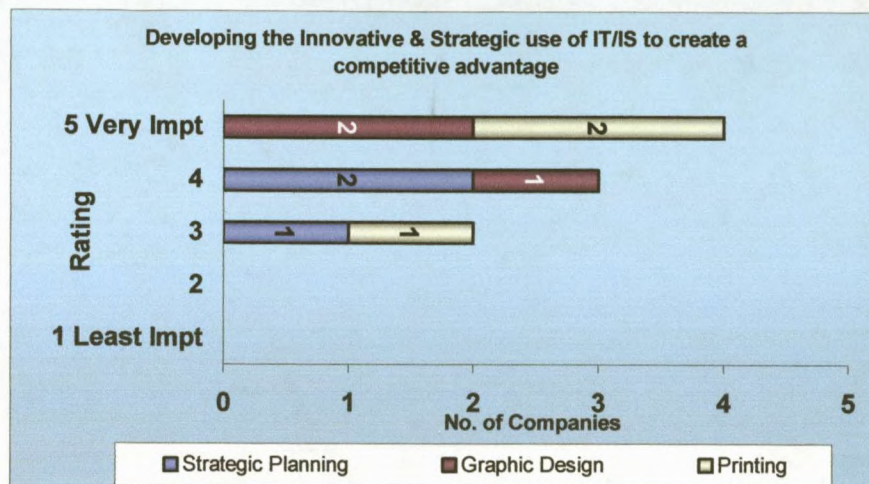


Figure 12 above details the views of the companies in the sample regarding the development of IT/IS as a tool for creating competitive advantage. It has to be realized that what was once considered to be a commodity can now be effectively used by business managers as a tool for gaining competitive advantage. 78% of the companies in the sample have indicated the importance of ensuring a flexible IT platform that reflects the technical strategy of the company that is aligned to the corporate strategy. 22% of the companies consider the development of innovative and strategic use of IT to create a competitive advantage as being moderately important. However, it is important to bear in mind that building a flexible IT platform can be advantageous when being innovative in using IT as the technical strategy that is aligned to a company's corporate strategy.

#### 5. Conclusion

From the data gathered and the analysis conducted, it can be concluded that departments at the M L Sultan Campus are excited at the prospect of transforming into financially self-sustaining business units and profit making entities for graphic designing, printing and strategic planning, thereby encouraging a spirit of intrapreneurship.

The analysis conducted through the data received from the external companies in the sample have indicated that information technology/systems have evolved and developed from being mere operational supports to enablers of any organisation's productivity, survival and value.



The next chapter provides recommendations necessary for successful transformation of departments into business units and also posits concluding remarks on the study.

## CHAPTER 5

### CONCLUSIONS AND RECOMMENDATIONS

The analysis of the data in the previous chapter provided insight into the role of IT in business as perceived by the companies that formed part of the sample. Perceptions of the Graphic Design, Printing and Planning departments in the data gathered focused on instilling entrepreneurial activity within these departments by encompassing IT as the enabler of such activities. This chapter concludes the research study, taking into consideration the findings produced by the analysis as well as recommendations posited by the researcher.

This concluding chapter emphasises information technology, on the one hand, and entrepreneurship on the other.

#### 1. Information Technology

##### 1.1. Impact of IT on Business

From the analysis of the data gathered regarding the impact of technology on business processes, it can be concluded that IT and its systems are cost effective resources which are essential for maintaining a competitive edge and promoting business value. The computer is now ubiquitous in the daily lives of many businesses and people around the globe – it is difficult to think of any field that does not involve or that is not affected by computers.

The findings of this study support the view that IT and its systems be viewed as a tool for strengthening the departments' competitive positions as well as increasing individual productivity and functional efficiency. Senn reiterates this view by stating that 'information technology's great usefulness is an aid in solving problems, unlocking creativity, and making people more effective than they would be if they didn't apply IT to their activities' (1998:21).

In order to enhance entrepreneurial activity by considering the objectives of adopting IT i.e. to gain competitive advantage, improve productivity and performance,

facilitate new ways of managing and organising and developing new businesses, targeted departments need to be wary of the consequences of such strategies.

## **1.2. Recommendations on IT Implementation**

The recommendations provided below are crucial when any organisation steps towards investment opportunities to enhance entrepreneurial goals.

When an organisation invests in IT implementation and strategies, it is only wise to evaluate the effectiveness and efficiency and the costs and the benefits of such investments. Should the targeted departments decide on transformation into business units through implementation of IT systems, then proper evaluation of these systems should be conducted to assess the IT/IS performance. Research results show that the main weakness when examining the feasibility of IT/IS investment is the over-reliance and/or misuse of traditional, finance-based cost-benefit analysis (Willcocks et al 1997:78).

Willcocks et al (1997:79) state that evaluation needs to be conducted in a linked manner across systems development and into systems implementation and operational use (See Table 5 on Page 61). Evaluation cannot be based only or mainly on technical efficiency criteria – one also needs to look at cost avoidance impacts of IT/IS implementation.

Keen (as cited in Willcocks et al 1997:79) says that evaluation is best measured in terms of increasing volume of work compared to the number of employees. He assumes that business volume can increase without increasing personnel. However, it has to be remembered that since the targeted departments at the M L Sultan Campus service the institution's needs, employee numbers *may need to increase slightly* if external production requests increase. Another strategy would be to track employee IT/IS performance over time in terms of business performance per employee i.e. revenue per employee or profit per employee.

**Table 5**

Type of Investment	Business Benefit	Main formal aids to investment evaluation	Importance of management judgment	Main aspects of management judgement
Mandatory investments as a result of:				
Organisational requirements	Facilitate business operations	Analysis of costs	Low	Fitness of the system for the purpose. Best option for variable organisational requirements.
Competitive Pressure	Keep up with the competition	Analysis of costs to achieve parity with the competition. Marginal cost to differentiate from the competition, providing the opportunity for competitive advantage.	Crucial	Competitive need to reintroduce the system at all. Effect of introducing the system into the marketplace. Commercial risk. Ability to sustain competitive advantage.
Investments to improve performance	Reduce costs	Cost/benefit analyses	Medium	Validity of the assumptions behind the case
	Increase revenues	Cost/benefit analyses. Assessment of hard-to-quantify benefits. Pilots for high-risk investment	High	Validity of the assumptions behind the case. Real value of hard-to-quantify benefits. Risk involved
Investments to achieve competitive advantage	Achieve a competitive leap	Analysis of costs and risks	Crucial	Competitive aim of the system. Impact on the market and the organisation. Risk involved
Infrastructure investment	Enable the benefits of other applications to be realised	Setting of performance standards. Analysis of costs	Crucial	Corporate need and benefit both short and long term

Willcocks et al (1997:80-81)

Willcocks et al. (1997:79) also state that recent research has shown the need for six sets of measures when evaluating IT/IS implementation strategy i.e.:

1. corporate financial perspective (e.g. profit per employee);
2. the systems project (e.g. time, quality, cost);
3. business process (e.g. purchase invoices per employee);
4. the customer/user perspective (e.g. on-time delivery rate);

5. an innovation/learning perspective (e.g. rate of cost reduction for IT services);  
and
6. a technical perspective (e.g. development efficiency, capacity, utilization).

Departments need to take cognisance of these factors that are critical in assessing their IT/IS implementation plans. For each set of measures the business objectives for IT/IS would be set.

Way back in 1985 McFarlan spoke about information systems technology and corporate strategy as being interlinked. McFarlan stated that

Information technology is being used more and more to develop new channels of distribution to customers, to provide the bases of new products, and to afford the opportunity for major changes in operations.

(1985: 5)

However, he also stated that there has been no work done on 'increasing the use of information technology to enable innovative differentiation strategies'. His main criticism was that 'the fields of business policy and information systems have politely coexisted in most academic institutions with scarcely any impact on each other.'

Mason (1985:298) states that every unique strategy entails risk. In terms of this study we need to focus on information technology and its systems risk assessment. The central managerial question would be whether the likelihood of securing benefits warrants the degree of risk undertaken. Mason stresses that there are several factors that intensify an organisation's risk position e.g. the project size, resource commitments, newness of technology, organisation's prior experience, the degree of consensus among the parties and the ambiguity of the project and its proposed outcomes.

An integral part of strategic planning must be undertaken to determine the assessment of risk and return involved in undertaking or not undertaking an information technology project. Mason (1985:299) advises that although stakes can be high, the pay-offs can be even higher. By commitment and careful management, organisations can make projects succeed and in the process gain competitive advantage. The next step for the departments identified in the study would be to undertake an evaluation

exercise to determine the feasibility of transforming themselves into business units, thus making them entrepreneurially focused.

## **2. Entrepreneurship in the Institution**

The hypothesis of this study states that departments at the M L Sultan Campus can become financially self-sustaining business units and profit making entities for graphic designing, printing, strategic planning etc. if they adopt proper technologies and systems and an appropriate administrative framework to enhance the services they provide. However, becoming entrepreneurially focused is difficult when entrepreneurship is attempted in an organisation lacking in entrepreneurial processes, strategies and structures.

However, the data gathered from the potential business units indicate the enthusiasm and exhilaration with which the idea of generating profits is perceived. Some departments like the graphic design and printing departments have already engaged in profit making exercises and are eager to welcome additional resources to produce on larger scales to wider markets.

Organisations, including educational institutions, fall victim to the highly volatile and fast-changing world. Entrepreneurial organisations are much better equipped to compete than traditional organisations. Cornwall and Perlman (1990:29) state that the most important outcome of institutional entrepreneurship is long term: the institution that is better able to adapt and survive. They look at institutions coping with changes in the environment – changes that arise from competitors, customers, new technologies, governmental and political bodies as well as societies as a whole.

Changes impacting on departments at the M L Sultan Campus can be attributed to factors like new technologies, existing and potential customers, funding, governmental and political agendas as well as the community. However, apart from overcoming the challenges of these factors and reaping the long-term benefits of being able to adapt and survive, there are more immediate benefits from fostering a spirit of entrepreneurship within the targeted departments of the institution e.g.:

- a) Relationships with students and stakeholders on the whole can be improved – more attention will be paid to their needs, concerns and ideas;
- b) The institution will become a more challenging work place. It will be more stimulating and rewarding. This will help improve morale and relationships among the institution's employees. Employees will also pay more attention to the *process* of their work; and
- c) Institutional entrepreneurship will help to improve the relationship with outsiders, which will eventually result in a more socially responsible institution.

### **2.1. Bureaucracy in Public Service Institutions**

When questioned about the impact of institutional policies and procedures on incorporating entrepreneurial activities within departments, respondents from departments indicated that policies and procedures should be altered to incorporate the idea of profit generation by departments.

Drucker (1985:177) emphasises that public service institutions such as churches, higher education institutions, schools, hospitals etc. need to be as entrepreneurial and innovative as any business does. Supporting the view of Cornwall and Perlman (1990:29) on the rapid changes in society and economy, Drucker states that these changes can be simultaneously a threat as well as an opportunity for institutions to consider entrepreneurship.

The Durban Institute of Technology, like any other public service institution should focus on growth as being a criterion of success. However, it must be remembered that this institution's funding formula is based on a subsidy and is funded by the government, taxpayers, donors and the community as a whole. Getting a larger budget rather than obtaining results defines success in a public service institution. However, with the cutback in funding the question of 'success' becomes an issue if there isn't a larger budget. The institution therefore has to refocus and adopt a change in mindset regarding success and improve income received through adopting innovative ideas.

Drucker (1985:177) also states that public service institutions find it far more difficult to innovate than even the most 'bureaucratic' company. By stopping what has *always been done* and doing *something new* is extremely painful to such institutions. The existing view is that public service institutions like to *maximise* rather than *optimise*.

However, a change in bureaucratic mindsets is necessary in order to eradicate the challenges posed by cuts in the budget by the Department of Education as well as the threats posed by the existence of private higher education institutions. The transformation of departments into business units and profit making entities is not only a challenge to the institution, but an opportunity to exploit creativity and innovation within the departments.

## **2.2. Innovation within DIT**

The purpose of this study is concomitant with the requirements of the White Paper on Higher Education (1997:46), which has clearly stated that higher education institutions need to embark on obtaining funds on their own.

Skills, potential and ability of targeted departments need to be exploited in order to foster entrepreneurship in departments. Departments can embark on strategy driven corporate innovation. Apart from departments becoming innovative for economic development, innovation can also lead to a new desired vision for departments thus improving working relationships, morale and improved performance and production processes.

## **2.3. Adoption of a Proper Administrative Framework**

The focus of the study was to portray IT as a fundamental tool in business. However, this study will not appear to be complete if it does not also touch on a few recommendations on the incubation of business units at the institution. One of the crucial factors is the adoption of an appropriate administrative framework. Although this study does not provide all the solutions to the recommended strategy of business units, some recommendations are provided if the implementation of such a strategy does occur.



In the transformation of departments into business units, there will obviously be staff fears and frustrations as the change occurs. Therefore, there needs to be proper policies and procedures in place with support from senior administrators involved in this institutional effort. Successful change will require active participation by those with authority over budgets, personnel and institutional priorities.

Apart from the stringent policies and procedures that govern higher education institutions, flexibility within these policies and procedures should be incorporated within the administrative framework e.g. income received is normally routed through proper financial procedures into the institutional budget. Business units could still follow this route, however, provision could also be made for departments to incorporate their profits into their own departmental budgets. Provision could also be made for profit sharing among employees thus improving morale and creating an exciting work environment. Production and performance could improve tremendously with such motivation.

The institution could also focus on implementing a feedback system. This will indicate to staff their performance levels against set targets and benchmarks. Feedback is a powerful motivating tool. If feedback is delivered in the correct manner, frequently and against defined outputs, then there is scope for improved motivation and better performance. The feedback system should consist of the routine outputs of the business units. The feedback system will determine outputs and performance measures and determine and prioritise targets. When performance is measured, performance improves. When performance is measured and reported back, the rate of improvement accelerates.

Apart from profit-sharing and a reliable feedback system, there are many more paradigms within an appropriate administrative framework for the business units. The employees within the business units must also take precedence. It must also be remembered that successful institutions do not rely on a single approach or make a change or transformation initiative solely the responsibility of one person. Rather, they recognise that the initiative is substantive enough to create multiple opportunities for various groups to work as partners.

### 3. Revisiting the Hypothesis

Bearing in mind the literature reviewed and the responses received from industry regarding IT and the impact it has had on business, we can certainly reiterate the hypothesis that *Information technology/systems have evolved and developed from being mere operational supports to both inhibitors and enablers of any organisation's productivity, survival and value.*

By taking into account the responses of the targeted departments and the literature reviewed it can be stated that *Departments at the M L Sultan Campus can become financially self-sustaining business units and profit making entities for graphic designing, printing, strategic planning etc. if they adopt proper technologies and systems and an appropriate administrative framework to enhance the services they provide.*

### Conclusion

The literature reviewed and the analysis and findings of the research undertaken have indicated that organisations of varying sizes and staff complement can improve business through the adoption of information technology and proper systems. The study has proven that IT can be used to gain competitive advantage and improve productivity and performance. Information obtained in this study has also indicated that entrepreneurship *is possible* in public enterprises. Although the traditional belief that is accepted globally states that 'entrepreneurs are born and not made', Richard Firth, CEO of MIP Holdings states that

Some people are born leaders, but entrepreneurs are born from corners.

Tight corners force people to take risks.

Finally, it is my considered opinion that the adoption of the results of this study *will* allow the institution to make informed decisions on the adoption of proper systems for potential business units to achieve productivity at a reasonable rate and enhance profit-making schemes.

## BIBLIOGRAPHY

Apteker, R & Ord, J. 1999. *Do You Love IT in the Mornings: The Progress Paradox*. Cape Town: Media Africa and The Publishing Partner.

Barnes, R. 1995. *Good Buys in IT: A Manager's Guide to Effective Spending*. England: McGraw-Hill Book Company

Barton, C. 2001. Happy 20<sup>th</sup> Birthday PC: Tracing the birth of the personal computing age and how it has affected us. *The Independent on Saturday*, 18 August:7.

Beaver, G. 2002. *Small Business, Entrepreneurship and Enterprise Development*. England: Pearson Education Ltd.

Bharadwaj, A.S. 2000. A Resource Based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation. *MIS Quarterly*, Volume (24), March:169-180.

Burch, J. and Grudnitski, G. 1986. *Information Systems: Theory and Practice*. Canada: John Wiley and Sons, Inc.

Cooper, D.R. and Schindler, P.S. 1998. *Business Research Methods*. 6<sup>th</sup> Edition. Singapore: McGraw-Hill Book Co.

Cornwall, J.R. and Perlman, B. 1990. *Organizational Entrepreneurship*. United States of America: Richard D. Irwin. Inc.

Drucker, P.F. 1985. *Innovation and Entrepreneurship: Practice and Principles*. New York: Harper and Row, Publishers, Inc.

DuPreez, G.J. 1998. The Nature of Entrepreneurship. In Kroon, J. (ed.) *Entrepreneurship: Start Your Own Business*. Pretoria: Kagiso Publishers

Engardio, P. and Smith, G. 2001. Hewlett-Packard. *Business Week*, Issue 3746, August:137-139.

Garret, H. 1994. Strategic IS/IT Planning. In Peppard, J. (ed.) *I.T. Strategy for Business*. London: Pitman Publishing.

Gordon, J. R. and Gordon, S R. 2000. Structuring the interaction between IT and Business Units. *Information Systems Management*, Volume (17), Winter:7-17.

Gremillion, L.L. and Pyburn, P.J. 1988. *Computers and Information Systems in Business: An Introduction*. United States of America: McGraw-Hill, Inc.

Griffiths, P.M. 1987. *Information Management in Competitive Success*. Maidenhead: Pergamon Infotech.

Grindley, K. and Humble, J. 1973. *The Effective Computer: A Management by Objectives Approach*. United Kingdom: McGraw-Hill Book Company.

Hammer, M. and Champy, J. 1995. *Reengineering the Corporation: A Manifesto for Business Revolution*. London: Nicholas Brealy Publishing Limited.

Harvard Business Review. 1999. The End of Delegation? Information Technology and the CEO. *Harvard Business Review: The Business Value of IT*. United States of America: Harvard Business School Press.

Harvey, B. and Evans, J. 1999. Intrapreneurship for Enterprise Development. In Pinchot, G. and Pellman, R. *Intrapreneuring in Action*. San Fransisco: Berret-Koehler

Julien, P. 1998. *The State of the Art in Small Business and Entrepreneurship*. Ashgate: Aldershot Hants.

Keen, P. 1991. Assessing IT Productivity. In Willcocks, L., Feeny, D., and Gerd, I. 1997. *Managing IT as a Strategic Resource*. United Kingdom : McGraw-Hill Publishing Company

Kroon, J. 1998. *Entrepreneurship: Start Your Own Business*. Pretoria: Kagiso Publishers

Leedy, P.D. and Ormrod, J.E. 2001. *Practical Research: Planning and Design*. 6<sup>th</sup> Edition. New Jersey: Prentice Hall, Inc.

Mason, R.O. 1985. Information Systems Technology and Corporate Strategy. In McFarlan, F.W. (ed). *The Information Systems Research Challenge – Proceedings*. United States of America: Harvard Business School Press.

McFarlan, F.W. 1985. Introduction. In McFarlan, F. (ed.) *The Information Systems Research Challenge – Proceedings*. United States of America : Harvard Business School Press.

Nickerson, R.C. 2001. *Business and Information Systems*. 2<sup>nd</sup> edition. United States of America: Prentice Hall.

Nolan, R.L. 1987. Information Revolution. In Griffiths, P.M. (ed.) *Information Management in Competitive Success*. Maidenhead: Pergamon Infotech.

O'Brien, J.A. 1988. *Information Systems in Business Management (with Software and BASIC Tutorials)*. United States of America: Richard D. Irwin, Inc.

Peppard, J. 1994. Information, Technology and Strategy. In Peppard, J. (ed.) *I.T. Strategy for Business*. London: Pitman Publishing.

Peppard, J. 1994. *I.T. Strategy for Business*. London: Pitman Publishing.

Petrin, T. 1991. Is Entrepreneurship possible in Public Enterprises? In Prokopenko, J. and Pavlin, I. (ed.) *Entrepreneurship Development in Public Enterprises*. Geneva: International Labour Office and International Centre for Public Enterprises in Developing Countries.

Pinchot, G. and Pellman, R. 1999. *Intrapreneuring in Action*. San Fransisco: Berret-Koehler

Prokopenko, J. and Pavlin, I. 1991. *Entrepreneurship Development in Public Enterprises*. Geneva: International Labour Office and International Centre for Public Enterprises in Developing Countries.

Remenyi, D., Williams, B., Money, A. and Swart, E. 1998. *Doing Research in Business and Management : An Introduction to Process and Method*. London: Sage Publications Ltd.

Roepke, R. 2000. Aligning the IT Human Resource with Business Vision: The Leadership Initiative. *MIS Quarterly*, Volume (24), Issue 2:327-354.

Roche, E.M. and Blaine, M.J. 2000. *Information Technology in Multinational Enterprises*. USA: Edward Elgar Publishing Limited.

*South African Global Entrepreneurship Monitor*. 2001. Cape Town: Graduate School of Business, University of Cape Town

Schulte Jr., W.D. 1997. Information Technology and Global Competitive Advantage. In Roche, E.M. and Blaine, M.J. (ed.). 2000. *Information Technology in Multinational Enterprises*. United States of America: Edward Elgar Publishing Limited.

Senn, J.A. 1998 *Information Technology in Business: Principles, Practices and Opportunities*. New Jersey: Prentice-Hall Inc.

Smith, N.I. and Aintsworth, M. 1989. *Managing for Innovation: The Mindmix Guide to Organisational Creativity*. London: Mercury Books Division of W.H. Allen & Co. Plc.

South Africa. 1997. *Education White Paper 3*. Pretoria: Government Printer.

South Africa. 2001. *Funding of Public Higher Education: A New Framework*. Pretoria: Government Printer

Steyn, T.F.J. 1998. The Nature of Entrepreneurship. In Kroon, J. (ed.) *Entrepreneurship: Start Your Own Business*. Pretoria: Kagiso Publishers

Schindler 2000

Douglas - 202  
Dun 204

Synnot, W.R. 1987. *The Information Weapon: Winning Customers and Markets with Technology*. New York: Wiley Publishers

Tallon, P. P., Kraemer, K. L. and Gurbaxani, V. 2000. Executives' Perceptions of the Business Value of Information Technology: A Process-Oriented Approach. *Journal of Management Information Systems*, Volume (16), Spring:145-174.

Vegter, I. 2002. Productivity Myths and Mysteries. <http://www.itweb.co.za/sections/features>

Ward, J and Griffiths, P. 2000. *Strategic Planning for Information Systems*. 2<sup>nd</sup> edition. England: John Wiley & Sons Ltd.

Wickham, A.P. 2001. *Strategic Entrepreneurship: A Decision-making Approach to New Venture Creation and Management*. 2<sup>nd</sup> Edition. England: Pearson Education Ltd.

Willcocks, L., Feeny, D., and Gerd, I. 1997. *Managing IT as a Strategic Resource*. United Kingdom : McGraw-Hill Publishing Company

Zwass, V. 1998. *Foundations of Information Systems*. International Editions 1998. Singapore: McGraw-Hill, Inc.

**Questionnaire : Sampled Companies**

This questionnaire has been designed to ascertain the impact that Information Technology (IT) and its systems (IS) has on your company. To alleviate any misconceptions about IT and IS, the definitions of these terms are provided.

**INFORMATION SYSTEMS**

Zwass (1998:5), describes an *information system* is "an organised set of components for collecting, transmitting, storing and processing data in order to deliver information for action.

Zwass also states that most information systems in today's organisations are built around the information technologies of computers and technologies – they are computer-based information systems.

**INFORMATION TECHNOLOGY**

Information Technology is the enabling mechanism that facilitates the processing and flow of this information as well as the technologies used in the physical processing to produce a product or provide a service (Peppard 1993:5). IT represents the technical perspective linked to information systems.

**SECTION 1****COMPANY DETAILS**

- 1 Name of Company: \_\_\_\_\_
- 2 Address of Company: \_\_\_\_\_

Please indicate your answer by marking the appropriate block:

- 3 Type of Industry (X)

Printing		Strategic Planning		Graphic Designing	
----------	--	--------------------	--	-------------------	--

- 4 Number of years in existence (X)

1-3YRS		4-7YRS		8-10YRS		10YRS+	
--------	--	--------	--	---------	--	--------	--

- 5 Number of staff currently employed (X)

1-5 staff		6-10 staff		11-20 staff		20 staff +	
-----------	--	------------	--	-------------	--	------------	--

- 6 Has the number of staff increased/decreased since the start of business? Why?

Increased		Decreased	
-----------	--	-----------	--

Please state reason.

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- 7 Has the company invested more in IT since the start of business?

YES		NO	
-----	--	----	--

- 8 Does IT play a major role in profit making schemes?

YES		NO	
-----	--	----	--

Continued on Page 2



Section 1 continued

9 Has IT improved efficiency of production?

YES		NO	
-----	--	----	--

10 How does the company keep up with the latest trends in the development of IT/IS?

Journals/ Literature		Suppliers		Attending workshops/ conferences		Other	
-------------------------	--	-----------	--	--	--	-------	--

11 Does your company have a clear and understandable corporate mission?

YES		NO	
-----	--	----	--

12 How effective do you feel IT/IS has been in satisfying the mission of the company?

GOOD		SATISFACTORY		BAD	
------	--	--------------	--	-----	--

13 Has the company invested in its own website?

YES		NO	
-----	--	----	--

14 If YES to 13, have the returns from such an investment been beneficial to the company?


15 If NO to 13, do you think investing in a website would prove beneficial to the company?


Section 2 continued on Page 3

SECTION 2

The questions listed below require you to allocate ratings with the most important issues receiving the higher rating and vice-versa.

LEAST IMPORTANT > MOST IMPORTANT  
1            2            3            4            5

1 Review, approval and monitoring of systems development and operations.

1	2	3	4	5
---	---	---	---	---

2 Developing the skill of staff (through training programmes) to ensure maximum utilisation of technology provided.

1	2	3	4	5
---	---	---	---	---

3 Ensuring that the IT infrastructure is flexible in order to adapt to the volatile technological and business environments.

1	2	3	4	5
---	---	---	---	---

4 Developing the innovative and strategic use of IT/IS to create a competitive advantage for the organisation.

1	2	3	4	5
---	---	---	---	---

5 Conceptualising IT (hardware and software) as an asset to the company rather than an expense.

1	2	3	4	5
---	---	---	---	---

6 General Comments

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\*\*\*\*\* THANK YOU FOR YOUR KIND ASSISTANCE - IT IS MUCH APPRECIATED \*\*\*\*\*

**STRUCTURED INTERVIEW SCHEDULE: DEPARTMENTS: PRINTING,  
STRATEGIC PLANNING AND GRAPHIC DESIGN**

**QUESTIONS**

Does IT

1. How has the computer/IT and its systems assisted in work production?
2. How does the department keep up with new trends in IT?  
Magazines/Supplier contact/Market scan?
3. Are there too many training sessions/ workshops to attend?
4. Are computer programmes/packages changing too often?
5. What are your thoughts about transforming this department into a self-sustaining business unit?
6. Are there any reasons as to why transformation of this department into a business unit might not work?
7. Do you think that institutional policies would be an obstacle to this transformation of the department?