

**An Evaluation of the Staffing Levels and Organisational Structure of the
Information Technology Division of Natal University**

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DECLARATION

This research has not been previously accepted for any degree and is not being currently submitted in candidature of any degree

Signed ..  ..

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ABSTRACT

This research attempts to find the ideal ratio of IT staff to end-user at the University of Natal. It also examines the organisational structure of the Information Technology Division of Natal University.

This study first examines available literature to establish the suggested structure and ratio. Next the IT function of a small sample of universities around the world is examined.

The structure and ratio found at the University of Natal will be compared to the suggested model and to those of the other universities examined. From this study will emerge the ideal structure and ratio for the Information Technology Division of the University of Natal.

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CHAPTER 1: INTRODUCTION

INTRODUCTION

“Information technology is no longer just an add-on feature for most colleges and universities, its implementation and application are increasingly mission-critical and strategic.” (Hawkins, Rudy & Wallace 2002)

It is important to note just how necessary information technology (IT) is for all organisations in general and the part that IT plays in tertiary education institutions in particular.

In every industry, businesses need to possess certain capabilities that enable them to exist, let alone be competitive. If a business does not possess these capabilities, it will not survive. Information technology is one of those capabilities. Recent literature shows that IT does not offer long-term competitive advantage, but if it is not implemented correctly, it can have a negative strategic impact.

Computing and networking have become indispensable tools in education and research at most universities. The use of information technology and the level of assimilation into the entire user community at universities have been steadily increasing. Educational institutions have been redesigning their work processes in order to take full advantage of new technologies. From the registration of students, to redesigning courses, from dispersing of information to decision making, every part of running a university has been affected.

The IT function is normally a support function, unless the organisation is a provider of information technology services, then it is a core function. In both cases, there are clients or users whose technology needs have to be catered for. You need the necessary staff in the right places to provide this service. How many people one needs, what type and level of expertise should they have and how effectively one can deploy these people are critical questions that IT managers need to know the answers to.

This paper attempts to find the ideal user to IT staff ratio along with the ideal structure for the information technology function of an organisation and how it can apply to the Information technology division (ITD) of the University of Natal.

BACKGROUND

Located in the province of KwaZulu-Natal, the University of Natal offers prospective students the choice of four campuses on which to study. They are:

- Durban
- Pietermaritzburg
- Medical School
- Edgewood

All four campuses are within a radius of forty-five kilometres and are within forty-five minutes driving time of each other.

THE INFORMATION TECHNOLOGY DIVISION (ITD)

The internal service provider called the Information Technology Division (ITD) supports the information technology infrastructure. A Director who reports to the Deputy Vice-Chancellor of Administration, who in turn sits on the executive board, runs this department. The IT function is extremely centralised, with the Director and most of his senior management team situated on the Durban campus.

ITD provides the technological solutions and support that all four campuses rely on. All of these services rest on a core backbone and network that has been put into place and that has been designed with the capacity to take the university well into the next decade.

The user community's first point of contact is the information technology's call centre, called the Help Desk. This is a virtual call centre with call centre support staff situated in Durban and Pietermaritzburg. Calls from all four campuses are routed to this single centre. Support for staff, both academic and support is given telephonically as well as by means of consultants who will visit the user's office and

provide desktop support. All users have access to the central backbone and are connected via the network to all services and applications available on the centrally managed servers.

For the larger enterprise-wide applications, development is undertaken to customise packaged software to serve the specific needs of the university.

The computing needs of the students are met by providing numerous student local area networks (LANs), which can be found on all campuses.

The focus of this study will be on the information technology support provided for staff - both faculty and support - only.

LITERATURE REVIEW

The fundamental role of resources in an organisation is to add value. (Lynch 2000). The information technology staff is a resource of the university because it is an internal service. For this staff to add value, there needs to be the right amount of sufficiently skilled IT staff in an effective organisational structure.

No company can hope to perform the activities required for successful strategy execution without attracting capable managers and without employees that give it a suitable knowledge base and portfolio of intellectual capital. (Thompson & Strickland 2003) Acquiring and retaining staff with information technology knowledge is critical for ITD.

Many institutions continue to find that regardless of how many staff is employed in the IT office, there's never enough staff to do everything that needs to be done. IT staff are challenged by increasing demands from users for consulting, assistance and troubleshooting. (Lembke 2000)

IT funding challenges has become the number one IT-related issue in terms of its strategic importance to the institution. (EDUCAUSE Quarterly, 2003)

One of the many metrics IT managers use to evaluate their environment is the ratio of IT employees to total enterprise employees. High-level head count figures such as these are useful for planning purposes if IT managers measure the year-to-year changes, or when they compare their organisation to other similar enterprises. (Potter & Guptill 1999)

Once certain organisational members have made decisions regarding corporate strategies, they must develop the structure that will best facilitate the attainment of those goals. (Robbins and Decenzo 2001)

'Every firm's organisation chart is idiosyncratic, reflecting prior organisational patterns, varying internal circumstances, executive judgements about reporting relationships, and the politics of who gets which assignments. Moreover, every strategy is grounded in its own set of key success factors and value chain activities. So a customised organisation structure is appropriate' (Thompson & Strickland 2003). Essentially there is no right or wrong organisational structure, rather a firm needs to find a "best-fit" structure that aligns itself to the goals and objectives of the firm.

MOTIVATION

As the demand for computing support increases, so too is the demand for new technologies and resources. The increased complexity of supporting the information technology requirements of an organisation means that unless the organisation takes cognisance of this fact, there will be a deterioration of service levels. Quality of service can only be maintained if the IT function keeps up with the technologies it is supposed to be supporting.

At the university more and more staff are using computers to do their work. This means the number of new computer users is increasing. At the same time the workforce is getting more computer-literate and are beginning to use their computers for more complex tasks. The number of power users is increasing as new technologies are making it easier for users to develop "mini" solutions and systems to satisfy their needs.

The motivation to find the ideal support staff to computer user ratio is driven by the need to use limited available resources effectively and efficiently. In finding the ideal organisational structure, ITD can ensure that this same staff is effectively deployed.

VALUE TO THE DEPARTMENT

Generally, when it comes to IT or the IT departments within a company, they are perceived to have a poor service delivery. One of the reasons is that the demand for computing support outstrips the supply of resources, especially human.

To provide the university community with a high level of service, the IT department also needs to have an organisational structure that enables it to align itself with the goals and objectives of the university. The structure also needs to ensure that effective use is made of the available skills of its information technology staff.

Within the organisational structure, the information technology department needs to ensure that there are enough people to support their user community. This study will attempt to establish the ideal user to IT staff ratio. The value of this study is to have an ideal ratio to work towards and the closer that you are to this ratio, the better the service delivery.

The outcome of this study can be used to justify adding more staff, when necessary, in times when upper management demands that spending be curtailed.

PROBLEM STATEMENT

Is there enough sufficiently skilled information technology staff effectively deployed at the University Of Natal to adequately support the number of computer users?

OBJECTIVES OF THE STUDY

1. To establish the current ratio of IT support staff to Computer Users ratio

2. To determine the ideal organisational structure for the Information technology division of the University of Natal
3. To determine the ideal IT supports staff to Computer User ratio.

RESEARCH METHODOLOGY

This paper is a qualitative case study of the Information Technology Division of the University of Natal. In order to find the ideal IT staff to end-user staff and the ideal organisational structure for the department, a comparison will be made with what is prescribed and also to what is actually in place at universities around the world.

This paper will investigate the organisational structures of the IT function of these universities and establish why they are structured the way they are. The number of IT staff in these organisations will also be examined and it will establish how many users are being supported and by how many information technology staff.

From this study, it will be found what user to IT staff ratios exist at other universities around the world and how they overcome some of the difficulties of supporting an academic institution. The paper will also examine some universities in South Africa.

The Information Technology Division of Natal University will be examined closely to establish what user to IT staff ratio exists and to establish how their staff is deployed.

The IT function of the University of Natal will then be compared to the international universities, as well as the South African universities. A comparison will be made of the organisational structure and the user to IT staff ratio.

Based on these comparisons, recommendations will be offered.

DATA COLLECTION

The sampling method used is convenience sampling. A limited number of tertiary education institutions from around the world, were selected. This study required information from at least two universities from each of the United States of America, United Kingdom, Australia and South Africa. Many universities were initially considered but were eliminated if there was insufficient information available on their web site.

Certain websites were quite restrictive and required a login and password to certain pages, while other sites were packed full of information of the university and their information technology service.

LIMITATIONS OF THE STUDY

This study is limited to the support given to staff only. Because the study attempts to compare the internal Information Technology Division to corporate organisations, the support required for staff is similar as opposed to the requirements needed by students. The support staff to student ratio can be higher due to the fact that information technology services are provided in a LAN environment and the hardware and software is totally standardised and is also located in one place.

The fact that the university is in the process of merging with another is mentioned but not studied in detail. Essentially this fact is ignored due to the time constraints of this study and the fact that the process is still at a sensitive stage.

The recommended organisational structure should be adaptable and able to incorporate the merging of two universities. As the far as the recommendation for the ideal user to IT staff ratio, the increase in the user community should also result in proportionate increase in IT staff.

This report also limits itself to universities that have sufficient information on their web sites.

STRUCTURE OF THE STUDY

Chapter two is a literature review on information technology and how it can be sufficiently and effectively supported in order for an organization to gain maximum benefit from its information technology investment. In this chapter, the importance of IT to organisations is discussed with particular mention of its importance to tertiary education institutions.

For information technology to be effective it has to be effectively managed. Management issues are discussed briefly.

The organisational structure is examined with respect to whether IT units should be hierarchical or flat, centralised or decentralised, should it be an internal service outsourced or an external service and also the function and the strategic placement of the leadership. From this one can get some guidelines on how to structure the IT function of the organisation.

Finally the importance and calculations of the IT unit's ideal IT support staff to end-user ratio is discussed. At the end of chapter two an IT model of the organisational structure and staff levels for tertiary education institutions will emerge.

The next chapter, chapter three, investigates the organisational structure of universities around the world, as well as their IT support staff to user staff ratio. This chapter will give one an insight into how some universities' IT units are structured and what is the actual ratio of IT support staff to end-user is in practice in tertiary educational institutions.

Chapter four closely examines the Information Technology Division (ITD) of the University of Natal. ITD's structure and staff levels will be analysed.

The last chapter will compare ITD's structure and staff levels to the other universities. ITD will also be measured against the suggested model devised in chapter two. From these observations, recommendations will be put forward.

CHAPTER 2: THEORY

INTRODUCTION TO INFORMATION TECHNOLOGY: THE SERVICE

As computers and their associated technologies become increasingly integrated into businesses, most organisations have a group of individuals that provide Information Technology (IT) resources and services. In some organisations they are referred to as “Computer Services”, evidence of the initial adoption of computing functionality. This also suggests that support is limited to the desktop computer. It does not encompass the underlying technology that links the desktop computers of an organisations or the back office equipment and human resources that manage the information technology of the business.

A more precise title that is also used is “IT Function”. The most common names for this group of individuals are Information Technology Department (ITD) or Information Technology Services (ITS). The latter is more relevant because it can be interpreted that a service is being provided by a group of people to another group or clientele.

It is essentially a service department, i.e., a support function in an organisation. It is a core function if the organisation provides information technology services to another organisation.

The IT function in any given organisation could provide some or all of the following functionality:

- Voice and data communication
- Application development
- IT Training
- Desktop support
- Networking
- IT Helpdesk
- IT Planning and Collaboration

McNurlin and Sprague's (2002) model of the IS function has four major components:

1. The technology, which provides the electronic and information infrastructure for the enterprise
2. Information workers in organisations, who use IT to accomplish their work goals
3. The system development and delivery function, to bring the technology and users together
4. The management of the IS function, with the overall responsibility to harness IT to improve the performance of the people and the organisation

According to Brown et al (2003), the information technology infrastructure consist of the hardware, operating systems, networks and services that support IT systems. This implies that the people that work in the IT department along with the physical and logical components of the department are part of the infrastructure. Without the people there is no infrastructure.

THE IMPORTANCE OF INFORMATION TECHNOLOGY TO ALL ORGANISATIONS

McNurlin and Sprague (2002) see the mission for information technology service organisations to be: To improve the performance of people in the organisations through the use of information technology.

Information technology can be used just to automate the tedious processes of people. This type of assimilation means that IT fits into the organisation and offers a lower return on investment. At the other end of the scale, organisations have totally restructured the way they work and even introduced new products, in order to take full advantage of what new technologies have to offer.

The benefits a firm actually realises from its infrastructure investments depend on its objectives for the infrastructure (McNurlin & Sprague 2002). IT infrastructure provides the capability for reliable services and sharing, and it includes both the

technical and managerial expertise required to provide these services. If a company views its infrastructure as a utility it treats it as an administrative expense and expects mainly cost saving benefits.

A business that is dependent on the information technology infrastructure for specific business programs will treat it as a business expense and its value is measured by short-term business benefits. A firm, however, that develops and continually modifies its infrastructure in “co-alignment” with its business strategy views infrastructure costs as a business investments and hopes to gain long-term benefits from its investments.

According to Castelluccio (2003), IT has become a common business expense that offers no special advantage. Carr (2003) concurs by stating that the core functions of information technology are becoming costs of doing business that must be paid by all but provide distinction to none. Carr (2003) further states, like the railroad and the electric generator, IT for a brief period in time, as it was adopted into the infrastructure of commerce, opened opportunities for forward-looking companies to gain real advantages. But as its availability increases – as it becomes ubiquitous – it becomes a commodity input. From a strategic standpoint, it becomes invisible.

The rapidly increasing affordability of IT functionality has not only democratised the computer revolution, it has destroyed one of the most important potential barriers to competitors. Even the most cutting edge IT capabilities quickly become available to all. (Carr 2003) According to Carr (2003) the opportunities for gaining IT-based advantages are already dwindling.

When a resource becomes essential to competition but inconsequential to strategy, the risks it creates become more important than the advantages it provides. To avoid IT becoming a disadvantage Carr (2003) suggests that you spend less on IT, follow - don't lead, and focus on vulnerabilities, not opportunities.

The McKinsey Global Institute (MGI) spent two years investigating the relationship between IT and productivity and found that the former most effectively stimulates the growth of the latter by helping companies to innovate (Farrell, Terwilliger & Webb

2003). Even though IT improves productivity, it is important to note that “value is created by business change and true business change cannot be led by the IT side; it must spring from the business side” (McNurlin and Sprague 2002).

Although Farrell et al (2003) seems to contradict Carr (2003) it should be noted that Carr talks about strategic value, whereas Farrell et al speak about importance. There are very few organisations that do not have any IT functionality. Even a business owned and run by a single person makes extensive use of information technology in the form of a desktop or laptop computer, dial-up to an Internet Service Provider (ISP) or Personal Digital Assistant (PDA). Carr (2003) states that today, an IT disruption can paralyse a company’s ability to make its products, deliver its services and connect with its customers, not to mention foul its reputation.

Even though IT does not give an organisation long-term strategic advantage over its competitors, it is strategically important to ensure that the implementation of information technologies within the organisation works towards the same objectives of those of the organisation. It is also of strategic importance that the IT function fits in with the organisational culture. Unless top-level management buy-in to the necessity of the correct investment into IT, information technology will be nothing more than a huge business expense that does not add value.

IMPORTANCE OF IT TO EDUCATIONAL INSTITUTIONS

Information technology is no longer just an add-on feature for most colleges and universities; its implementation and application are increasingly mission-critical and strategic. (Hawkins, Rudy & Wallace)

Indiana University has long recognised the importance of information technology to its overall teaching and learning, research, and service mission. As information technology has become such a pervasive part of these functions, support of it has been viewed as extremely critical to their success. (Voss 2001)

Thomas (1998) states that information technology organisations at colleges and universities are beleaguered by the increasing demand for desktop client support. In the past five to ten years the “computer centre” migrated from an “end-of-the-line” support unit into the forefront of the organisational communications infrastructure, adding thousands of clients to institutional campus networks.

Higher education institutions need to understand that technology is an expensive, perpetual need and therefore must be efficiently managed annually at an institution level. (Saxena 2002) Universities cannot ignore the importance of their information technology investments.

MANAGING IT

The process of managing technology in organisations is getting more complex as it becomes more important (McNurlin & Sprague 2002). Historically, managing IT has been the job of technical managers, but it is increasingly becoming an important part of the responsibilities of top executives, line managers and employees at all levels of an organisation. This begs the question of whether IT is truly centralised in a formal centralised structure.

The assimilation of IT has reached the stage where IT makes pervasive changes in the structure and the operation of work, business practices, organisations, industries and the global economy (McNurlin & Sprague 2002). This statement assumes that organisations have realised that in order to fully benefit from the use of information technology, they need to rethink the way they work and the way they deploy these technologies and the responsibility for them. Companies also need to realise that technology is advancing continuously and that the way technology is used needs to change as well. Information technology and organisational structure evolve together, with either one influencing the other.

Today, many companies are strapped for resources, and they need to be extremely selective about the technologies they fund, deploying new information technologies in ways that are most relevant to their businesses and strategic objectives (Andal-

Ancion, 2003). According to Andal-Ancion et al (2003), different drivers determine the competitive advantage that can be derived from IT. They are different from the critical success factors that affect the implementation of information technology which are specific to a company, as opposed to an industry.

Most companies under invest in technology at their peril – even in lean times. New technology, deployed intelligently, can help organisations make dramatic leaps in productivity and redefine competition within whole sectors (Farrell, Terwilliger & Webb 2003).

According to Peppard (2001), the importance of a strong IS-business relationship cannot be underestimated. The search for IT-base sources of sustainable competitive advantage suggests that organisations must focus less on technology and more on the process of organising and managing IT within the organisation.

It has become increasingly clear that choices of which IT investments will be needed for strategic agility can significantly enable or impede business initiatives. Managers must anticipate future strategic moves and make often-complex assessments about how the IT infrastructure must adapt to support the enterprise (Weill 2002).

In most surveys of IT executives, aligning IT with company business goals is always a top priority (Bowers 2003). How closely you align IT with the business goals of the company depends on how the company invests in information technology in the first place.

“Weill and Broadbent categorize IT investments into four types” (McNurlin and Sprague 2003). These four investment types are:

- Strategic investments that aim to change the way a firm competes, the products or services it offers, or how it intends to increase revenues.
- Informational investments provide the information employees need to manage and control the enterprise. These systems include executive information

systems; support planning, accounting, management control, and communications.

- Transactional investments support operational management. They are intended to cut operating costs by substituting capital for labour so that higher volumes can be handled without requisite increases in people.
- Infrastructure investments provide the base foundation of IT capability in a firm. The infrastructure does not run applications it simply supports them.

ORGANISATIONAL STRUCTURE

THE INFORMATION TECHNOLOGY LEADERSHIP

“Changes required to support emerging organisational structures require a significant amount of well coordinated business and IT executive leadership. The IT leadership comes from a “chief information officer” CIO who must be high enough in an organisation to influence organisational goals, and have enough credibility to lead the harnessing of the technology to pursue those goals (McNurlin and Sprague 2002).

Traditionally, most of the functionality to use and support information technology was concentrated in the finance division, purely because this was the first part of the organisation to make use of computers and have their work automated. This led to the situation where the information technology department was found in the finance division and the head of IT reported to the finance executive, who in turn sat on the executive board. As IT becomes more a part of doing business, its strategic importance is becoming more apparent to management.

McNurlin and Sprague (2002) believe that the major role of the CIO is to bridge the gap between the business and technology, and to have the enabling technology in place to deliver what the business requires, although the business might not yet realise what it requires. If the CIO is successful in bridging this gap, the results will be an information technology investment that “fits” the organisational culture and an investment that helps the business achieve its goals and objectives.

By having the leader of the information services division on the executive, the executive is forced to be more participative and to understand the importance of information technology in their business. At the same time the IT executive is fully aware of the company's goals and objectives and is able to align the objectives of the IT strategy with those of the company.

HIERARCHY VS. FLAT STRUCTURE

In a hierarchical structure, control is high, but decision-making is slow. The procedures and policies in this structure along with the very definite lines of reporting ensure that the organisation is tightly controlled. High-level managers make the strategic decisions while line managers concentrate on the day-to-day operations. The problem with this structure is that the decision-makers are far removed from the environment in which the business operates. If an opportunity or a threat is identified, the decision on how to react is made only after the reporting procedure has followed the duly required path up the bureaucratic hierarchy.

This is not an ideal situation in an extremely dynamic environment. Industries are changing all the time and the era of stable business environments is essentially over. Businesses find that in order to survive they need to be more responsive to the changing environment. The adage "adapt or die" is becoming a mantra for all businesses.

A flat organisational structure is fast, flexible and focussed on areas of core competencies. In the flat, entrepreneurial structure, decisions can be made quickly, enabling the organisation to react faster in the ever-changing environment of today's business world. This structure tended to favour the small entrepreneurial company that focussed more on innovation and adaptability rather than on control of resources.

Larger companies that thrived in a hierarchical structure can no longer be unresponsive to the environment and more importantly, the needs of their customers. The manager's dilemma is that they cannot sacrifice efficiency for speed. They cannot abandon formal control systems as they empower employees to make

decisions addressing real-time customer needs (Applegate, McFarlan & McKenney 1999).

Applegate et al (1999) introduces the concept of the “Information Age Organization” that combines the control of the hierarchical structure and the flexibility of the flat structure for large complex organisations that operate in a dynamic environment. This collaborative structure means that employees in the lower levels need to be empowered and control is maintained through the flow of information from operations to management and vice versa.

The organisation and information technology design challenge today is to find a structure that has proper procedures and processes in place to ensure control is maintained while at the same time is responsive enough to operate in a dynamic environment.

CENTRALISED VS. DECENTRALISED STRUCTURE

When the IT functionality is centralised, it means that a central IT unit is responsible for most computing activities. When a user department identifies a requirement for a new or enhanced information system they have to apply for it through the centralised IS department (Boddy, Boonstra & Kennedy 2002). Furthermore, all IT resources including support staff belong to the IS department. Support requests are routed to the central IS department, normally via call centres.

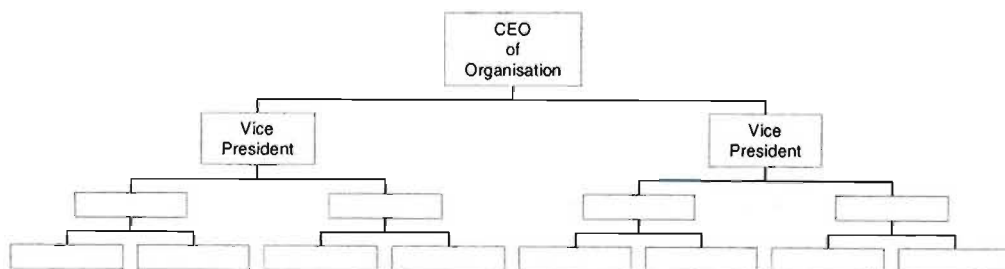


Figure 2.1: Hierarchical Organisational Structure

When the IT service is decentralised, the organisational units become responsible for their systems – including development, acquisition, operations and maintenance. IT

staff is dispersed over the various business units. Decision-making responsibilities are being pushed down and out in organisations, with local sites and teams being given more autonomy and responsibility for the resources they use. One such resource is IT.

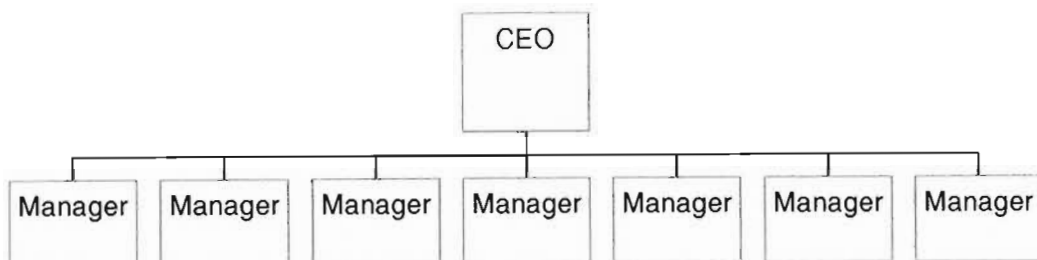


Figure 2.2: Flat Organisational Structure

It would appear at first glance that centralised or decentralised IT functionality is not as big an issue for corporate firms as it is for universities. Most corporate organisations have a centralised IT function with a few first-level support staff closer (geographically and functionally) to the people they support. However, at large educational institutions like universities and colleges, the debate is highly contested between the IT provider who wants to maintain control and their clients who want the IT resources to be specialised to support them correctly.

For universities, Voss (2001) states that moving responsibility for the information technology infrastructure away from the central IT organisation to the institution's financial responsibility centres (schools and departments) has shown that such ad hoc funding approaches thwart the long-range planning and modernisation efforts that are vital to the successful integration of IT into the fabric of the university. The problem with centralised IT is that many IT professionals lack the discipline-specific knowledge needed to help faculty in the development of instructional applications at universities. In business IT staff may place too much emphasis on the technical excellence of their information systems, rather than business value.

On the other hand, it can be argued that a centralised IT function is far more reliable. Systems integration, accessibility and concentrated expertise are major advantages of a centralised IT function (Boddy, Boonstra & Kennedy 2002). Companies, who have

always been driven to minimise cost and maximise profits, are well aware of the fact that there is a definite cost saving advantage in centralising the IT function.

“Professor James Wetherbe suggested asking the following three business questions before distributing information systems functions and the responsibilities that go with them” (McNurlin & Sprague 2002). According to him systems responsibilities can be distributed unless the following are true:

- Are the operations interdependent? If the one operation or business unit needs to know what another is doing, they need to be centrally coordinated to synchronise their operation
- Are the businesses really homogeneous? Even if business units do not need to know what another is doing, but they are homogenous and have a lot in common, it makes sense to keep the planning, software development and hardware selection centralised in order to keep processing costs down and to more easily migrate to new systems, while distributing processing
- Does the corporate culture support decentralisation? Corporate culture might dictate that some functions be centralised. Many companies choose to centralise the human resource, finance and system development functions.

A third option suggested by Boddy et al (2002), called the federal model, is a combination of centralised and decentralised functionality. A centralised department has to determine the information strategy of the organisation as a whole, and administer the corporate system and the database of the organisation. The decentralised departments develop and manage their information systems within those corporate guidelines. The organisation needs to decide which functions will be more effective centralised and which will be more relevant decentralised or localised.

The greatest challenge for an organisation is it corporate or otherwise is to find a balance between the efficiency and reliability of a centralised information technology function and the effectiveness and flexibility of a locally controlled function.

INTERNAL VS. EXTERNAL SERVICE

ITD can be an internal service or an external service. Internal services are most simply defined as the services a firm requires to operate but for which there is no direct tie to revenue. In other words, internal services are not directly billable and therefore only subtract from the firm's net income or bottom line. Outsourcing is the movement of an internal service outside the firm and the establishment of a business relationship with another company to provide the service. (Piede 1996)

The trend toward focusing on core business and core competencies that started with large firms is being adopted by smaller firms and educational institutions as well. Some educational institutions are also following the outsourcing trend, in order to focus on their core competency and core service. These institutions are usually outsourcing in the areas of internal computing and network infrastructure or Internet access. Some institutions have even outsourced their entire IT department. (Hawkins, Rudy & Wallace 2002)

According to Boddy et al (2002), outsourcing allows companies with fluctuating IS needs to pay only for what they use. Other reasons are to keep up with technological changes and to overcome the problems of hiring good IS staff.

Internal service providers – from IS organisations to human resources departments – face challenges to their competitive positions and credibility. They can shape their destinies by functioning more like the external service providers they compete with. (Young 2003)

OUTSOURCING

“Managers too often spend inordinate amounts of time, psychic energy, and resources wrestling with functional support groups and other internal bureaucracies, which diverts their attention from the company's strategy-critical activities. One way to reduce such distractions is to cut the number of internal staff support activities and, instead, source more support functions and non-critical value chain activities from outside vendors.” (Thompson & Strickland 2003)

“Outsourcing means turning over a firm’s computer operations, network operations, or other IT function to a vendor for a specified time” (McNurlin and Sprague 2002). Focus and value are two drivers that are leading companies to restructure and consider outsourcing as an option. If the company does not add value by running its own information technology department, then it is better to outsource this function so that it can concentrate on its core functions, which do add value.

For IT managers who need to manage outsourcing, they need to remember that it is a joint effort between two parties that may not have the same goal. Companies need to keep in mind that when they sign an outsourcing contract with a vendor, the relationship needs to be formally managed. The person managing this relationship is referred to as a relationship manager. The relationship manager will ensure that the company is receiving the services for which it is paying and that the outsourcing service provider complies with the terms of the contract.

A major governance item in the contract is the service level agreements (SLAs) because they are used to gauge supplier performance (McNurlin & Sprague 2002).

McNurlin and Sprague (2002) further recommend that outsourcing executives:

- Manage expectations, not staff
- Realise that informal ways of working may disappear
- Loss of informal ways of working can add rigour
- Communication is essential for day-to-day management of outsourcing

When to Outsource?

According to Applegate et al (1999) one of the factors that influence the decision to outsource, the company's position on the strategic grid, is based on two broad issues:

- The organisation's current dependence on information
- The importance of sustained, innovative information resource development.

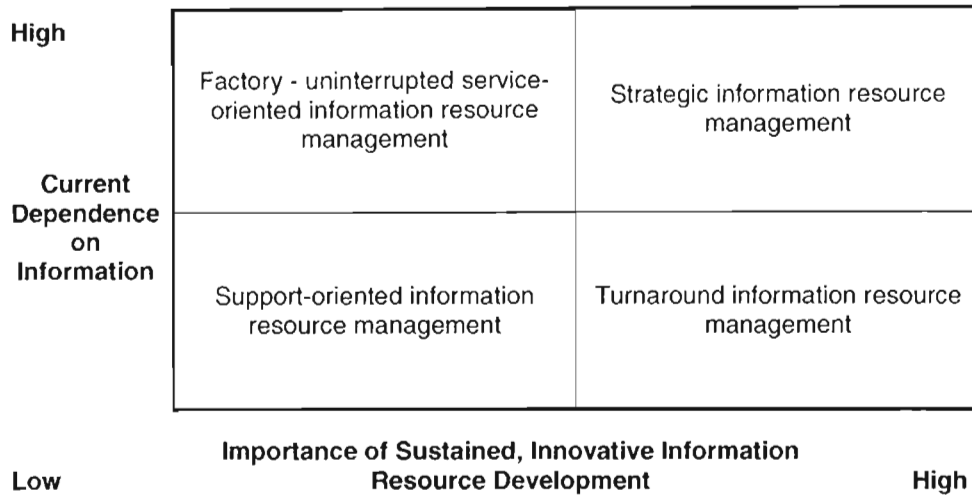


Figure 2.3: Strategic Grid for Information Resource Management

For companies in the support quadrant, the outsourcing presumption is yes, particularly for the large firms. For companies in the factory quadrant the presumption is yes, unless they are huge and perceived as exceptionally well managed. For firms in the turnaround quadrant, the presumption is mixed; it may represent an unnecessary, unacceptable delegation of competitiveness, although conversely, it may be the only way to get these skills. For companies in the strategic quadrant, the presumption is also mixed; not facing a crisis of IT competence, some companies in the strategic quadrant have found it hard to justify outsourcing; others have found it indispensable in gaining access to otherwise unavailable skills. Another factor that influences the outsourcing decision is the current structure of the IT function. If it is segregated and protocols are well developed it is easier to outsource because the control mechanisms are already in place. If the IT function is highly integrated different divisions and functions, it is more complex to outsource.

The fourth factor to consider is that if the company has failed to keep abreast of information technology developments, the more useful it is to outsource the IT function in order to bridge the gap. Another factor is if the corporate culture of the

organisation is adverse to change. The outsourcing decision represents a major organisation transformation and if the culture of the organisation is such that it is used to constant change then outsourcing just becomes another change and it is quickly and easily accepted as another step in the life of the organisation.

RATIO OF IT STAFF TO END-USER CALCULATION

'Having too many – or worse, too few – workers costs money and opportunities for growth' (Agrawal, Berryman & Richards 2003).

In most companies the largest fixed operating expense is staff salaries and wages. When companies are experiencing difficulties, especially during an economic downturn, cost cutting becomes necessary. The obvious place to start is where your greatest expense is, i.e., staff. Managers need to bear in mind that while reducing the number of staff, they still need to maintain their level of service.

Both internal and external service providers need to maintain a certain level of service that will justify their existence. Internal information technology service providers generally do not have a good reputation. The perception is that the service is not up to standard and response times are too slow.

For the end-user, the smaller the ratio of qualified IT staff to total number of staff supported the better. This means they do not have to wait too long for an IT staff member to attend to their problem and they can continue with their own functions with minimal disruption. Because organisations are in business to make a profit, the more service they can get with as little expense as possible, the better.

For managers, this corporate attitude presents a constant battle to employ and retain quality staff. "Managers must be given the physical and staff resources to achieve their goals. Industry sources suggest that even amid the peaks and valleys of turbulent IT business cycles, there is a chronic shortage of top-quality IT managers in North America and that this situation will persist well into the foreseeable future." (Longenecker & Scazzero 2003).

The ITAA annual survey placed the size of the U.S. IT workforce at 10.3 million, with hiring and terminations amounting to less than one percent growth during first quarter of 2003, with the IT workforce growing by 86,000. While this is good news, it is below fourth quarter 2002 growth, which added 97,000 jobs, the slowest quarterly growth in 2002. As the heading of the press release indicates, demand for IT workers in the U.S. is at a historic low, with more positions to be outsourced overseas. The study shows that the information technology job outlook will remain soft in 2003.

In the United Kingdom, the outlook seems much worse. McCue (2003) states that the immediate outlook for IT staff in the UK is bleak with redundancies rising, salaries falling and less training going on. He goes on to say that as a result of IT cutbacks by many businesses the overall number of ICT staff made redundant in the UK rose to 10,000 for the quarter with unemployment rates for IT staff climbing to 4.6 percent.

South Africa is experiencing the opposite effect in that there seems to be a shortage of IT skills. This shortage is a problem to the extent that the Minister of Trade and Industry, Alec Erwin, included the information technology profession as one of those in which the country is experiencing a skills shortage and is considering rescinding the race quota for the IT profession. "Erwin confirmed that shortages were being experienced in certain professions such as the financial sector, engineering, information technology, researchers, scientists and technical specialists" (Joubert 2003)

This phenomenon is reiterated in the Map of the Information and Telecommunications Technology in South Africa 2003 (MITT SA) which reported that one of the findings is that skills are still in short supply and skills development has become a priority. South Africa is also fast becoming the Information and Communications Technology (ICT) gateway to Africa, says MITT SA, released by World Wide Worx. (Burrows 2003)

In times of shortage, the cost of the commodity is high. Because there is an extremely small pool of specialised qualified information technology professionals it can be extremely costly for an organisation to recruit and retain the necessary staff required to provide high-level IT services. These professionals can demand salaries that exceed market value.

The lower the ratio of IT staff to the number of staff supported, one could assume that it would be easier to provide a high level of service. But it is not only about numbers. What needs to be seriously considered is the expertise of the IT staff. It is much better to have a few highly qualified and experienced staff members than a lot of inexperienced unqualified IT staff members. The level of service will be much higher, even with the higher ratio.

The key objective for information technology departments is to provide their clients or users with what they want and not what the IT department thinks they want or need. A good starting point is to have the right staff available with the necessary skills.

Human capital – the skills and knowledge of employees – too often remains an untapped performance lever. Deploying employees more effectively is only the start. A manager who wants the best people to do their best work must anticipate the company's workforce requirements; provide training tailored to individual goals, and reward employees for hard-to-measure contribution (Agrawal, Berryman & Richards 2003).

Calculating required staffing ratios is necessary and is a good place to start when trying to establish the staffing resources required to provide an IT service. But having the “right” ratio does not necessarily mean that your service will be up to standard, or even that you will be providing a useful and necessary service. It must be remembered that the ideal ratio of IT staff to number of staff supported differs from organisation to organisation. This ratio depends amongst other things, on the complexity of services offered and the industry in which the organisation operates. It can be hampered by the importance on which the organisation places on IT and how much it is prepared to spend on its IT functionality.

“There is no single ‘right ratio’ according to Gartner analyst Robert Mack, it will vary by organisation and is affected by such factors as number of technologies present, environmental complexity, geographic spread of IT infrastructure, physical distribution of support staff, user sophistication/training, and the extent that outsourcing is used.” (*Developing the right end-user/IT support staff ratio* 2001)

“Gartner is recommending a ratio for companies based on their business or IT goals. The range of ratios accounts for how much remote control and self-support tools are deployed by companies versus higher ratios for those companies not using automated tools.” (*Developing the right end-user/IT support staff ratio* 2001)

Help desk support ratios based on business/IT goals	
Type of company	Recommended ratio
Companies competing at the cutting edge of innovation	25:1 or 50:1
Companies who compete on full service and overall value	60:1 or 100:1
Companies competing on a thin cost margin and scalability	125:1 or 200:1

Figure 2.4: Help Desk Support Ratios Based on Business/IT goals

Potter and Guptill (1999) presented a research note that examined the ratio of IT employees to total employees. According to the 1998 GartnerGroup IT spending and staffing survey, results indicate that the average IT employee to enterprise employee ratio is 6.58 percent, with a median of 4.67 percent. In other words, for every hundred employees there is on average 6.58 IT employees, which gives a ratio of 1:15.20 IT employees to total enterprise employees. For higher education, colleges and universities, the average is 3.12 percent with a median of 2.50. The average for this sector is 1: 32.05 IT staff to total enterprise staff, with a median of 1:40.

It is quite clear that the best ratio will differ from organisation to organisation. The best ratio is also not the ideal ratio. An ideal ratio is one that gets as close to the best ratio as is economically possible for a business that is in existence to make a profit. You might have enough IT staff to support the rest of the organisation, but if you are not making a profit, this number becomes irrelevant.

AN IT MODEL

From this section a model will emerge that serves as a guideline for the structure and staff levels for the information technology function of tertiary education institutions.

ORGANISATION

Leadership

All business units require some form of leadership. McNurlin and Sprague (2002) believe that the leadership of the IT function should come from a Chief Information Officer (CIO). The major role of the CIO is to bridge the gap between business and technology and ensure that the IT investment fits the organisational culture and helps the business achieve its goals and objectives. All information technology functions require a CIO, or the equivalent, who is an executive member of the institution's governing body.

Hierarchy vs. Flat Structure

The traditional hierarchy provides a set of detailed guidelines for designing large organisations that could cope efficiently with the complexity of doing business on a broad scale (Applegate, McFarlan & McKenney 1999). The hierarchy requires the elimination of uncertainty based on the principles of simplification, routine and control. In a dynamic environment however, uncertainty is high. Entrepreneurial organisations, on the other hand thrive in dynamic environments because they are able to be fast, focussed and flexible due to their small size and relatively simply context.

Large and Complex Size of Organisation	Hierarchy	Collaboration
	Flat	Flat
Small and Simple	Stable	Dynamic
	Environment	

Figure 2.5: Hierarchy vs. Flat Structure

If the organisation is large and operates in a stable environment, then the IT function should be hierarchical. If it is small and operates in either a stable or dynamic environment, then the IT function should be flat and simple. If the organisation is large and complex and operates in a dynamic environment then the information age or collaborative structure is advised.

Information Technology by its very nature is extremely dynamic. Because universities and the environments in which they operate depend more and more on IT, it is safe to assume that institutions of higher education find themselves in environments that are not stable. The degree of dynamism needs to be established in order to fit the university into this model. Unless there is a clear indication of how dynamic the environment is, this paper will assume that universities fall in the middle in terms of the stability versus dynamic nature of the environment

Centralised vs. Decentralised Structure

“Professor James Wetherbe suggested asking the following three business questions before distributing information systems functions and the responsibilities that go with them” (McNurlin & Sprague 2002). According to him systems responsibilities can be distributed unless the following are true:

- Are the operations interdependent? If the one operation or business unit needs to know what another is doing, they need to be centrally coordinated to synchronise their operation
- Are the businesses really homogeneous? Even if business units do not need to know what another is doing, but they are homogenous and have a lot in common, it makes sense to keep the planning, software development and hardware selection centralised in order to keep processing costs down and to more easily migrate to new systems, while distributing processing
- Does the corporate culture support decentralisation? Corporate culture might dictate that some functions be centralised. Many companies choose to centralise the human resource, finance and system development functions.

	Centralise	Decentralise
The units are interdependent	Yes	No
The units are homogeneous	Yes	No
The university culture is centralised	Yes	No

Figure 2.6: Centralised vs. Decentralised Structure

Internal vs. External Service

The internal information technology service unit belongs to and is controlled by the organisation and is geared specifically to support its goals and objectives. An external service or outsourcing as it is commonly known, means that an organisation contracts with another organisation to provide the IT function. The organisation is then able to concentrate on its core function that in the case of tertiary education institutions is teaching and research.

The decision to outsource is based on, amongst other things, the company's position on the strategic grid. The strategic grid evaluates the company's dependence on information technology and the importance placed on sustained and innovative information resource development.

High Current Dependence on Information	Outsource	Internal Service Unless there is a need to *rescue an out-of-control internal IT unit* tap source of cash*facilitate cost flexibility*facilitate management of divestiture
	Outsource	Internal Service unless *the internal IT unit is not capable in required technologies*the internal unit is not capable in required project management skills
Low	Importance of Sustained, Innovative Information Resource Development	
	Low	High

Figure 2.7: Internal vs. External Service – The Strategic Grid

For companies in the bottom left quadrant, the outsourcing presumption is yes, particularly for the large firms. For companies in the top left quadrant the presumption is yes, unless they are huge and perceived as exceptionally well managed. For firms in the bottom right quadrant, the presumption is mixed; it may represent an unnecessary, unacceptable delegation of competitiveness, although

conversely, it may be the only way to get these skills. For companies in the top right quadrant, the presumption is also mixed; not facing a crisis of IT competence, some companies in the strategic quadrant have found it hard to justify outsourcing; others have found it indispensable in gaining access to otherwise unavailable skills. For universities it has been shown that the IT function is becoming increasingly important and therefore the importance of sustained, innovative information resource development is medium to high. This means that the universities that will be examined fall into either of the two right-hand quadrants, i.e., outsourcing is not recommended unless the listed criteria is true.

Other factors that influence the decision to outsource is the level of IT integration within the business units. The more integrated IT is, the more difficult it is to outsource. If the company has not kept up to date with the latest technology it is easier and more cost effective to outsource the task of bringing the company up to date rather than attempting the task internally. It is also easier to outsource if the organisation is constantly changing and its people are able to adapt because then outsourcing becomes just another change.

Therefore, together with the organisations position on the grid, the following criteria also need to be considered.

	Internal	Outsource
IT is integrated in the units	Yes	No
Up to date with technology	Yes	No
Organisation is not use to change	Yes	No

Figure 2.8: Internal vs. External Service

IT STAFF TO END-USER RATIO

Developing the right end-user/IT support staff ratio (2001) recommends a ratio based on the company's business or IT goals. The more cutting edge the organisation is the more IT support staff is required the lower is the IT support staff to end-user ratio. If the organisation places more importance on cost effectiveness and scalability, then the

service from the information technology function will be basic and the need for support staff will be lower. It is critical to note that this ratio is for IT support staff and not total IT staff. The recommendation is as follows in figure 2.9

IT/Business Goals	Recommended ratio
Companies competing at the cutting edge of innovation	1:50
Companies who compete on full service and overall value	1:100
Companies competing on a thin cost margin and scalability	1:200

Figure 2.9: Recommended IT Support Staff to End-User Ratio Based on IT Goals

According to the 1998 GartnerGroup IT spending and staffing survey, results indicate that the average IT employee to enterprise employee ratio for higher education, colleges and universities is 3.12 percent, i.e., 1 IT employee to every 32 enterprise staff (Potter & Gupta 1999). Therefore the recommended ratio in this model is 32 end-users for every IT staff, i.e., 1:32.

CHAPTER 3: INFORMATION TECHNOLOGY FUNCTIONS OF VARIOUS UNIVERSITIES AROUND THE WORLD

INTRODUCTION

In this chapter the information technology units of various universities will be examined. From the United Kingdom, the study will include the London School of Economics and the world-renowned Oxford University. Monash University, based in Australia, is the most internationalised university with campuses and offices around the world. The other two Australian universities included are the University of South Australia and the University of Sydney.

The American universities are Yale and Indiana. Both universities are remarkable in the complexity of their IT units.

Finally, the two South African universities chosen are the University of Cape Town and the University of Orange Free State. UOFS is interesting in its size and simple structure, as well as the fact that it is officially a bilingual university.

LONDON SCHOOL OF ECONOMICS (LSE)

The London School of Economics and Political Science (LSE) is a social science institution for teaching and research. The school is located in London and covers an area with a radius of approximately 250 metres. The campus is small and compact. The School's academic profile spans a wide range of disciplines, from Economics, International Relations, Government and Law, to Sociology, Information Systems, and Accounting and Finance. Teaching and research are conducted through 18 departments and more than 30 Research Centres and Institutes. LSE has nearly 7,000 students and 1,300 staff.

	2001/02 (Dec. 2001)			
	Full Time	Part Time	TOTAL	% Of Total
Undergraduate	3541	61	3602	48%
Postgraduate	3183	759	3942	52%
TOTAL	6724	820	7544	
% Of Total	89%	11%		

Figure 3.1: LSE Student Headcount

The coordination and strategic planning behind the school is the Directorate – senior academics who help shape new ideas and initiatives. The School's Director is Professor Anthony Giddens. Three deputy directors, who each have defined areas of activity, assist the Director.

It is difficult to establish which of the three deputy directors the Information Services department reports to.

INFORMATION SERVICES

Information Technology Services supports all IT related activities for members of the School, including students, academic, research and administrative staff.

ITS offers a wide range of services, from the provision of high-quality PCs and industry-standard software, through training to help and advice in the use of IT in academic work. Behind the scenes, ITS also manages the School network and server infrastructure and the connection to the Internet.

Mission

The role of ITS is to provide:

- A first class network infrastructure that is secure, reliable, flexible and responsive to the changing needs of the School
- A standard desktop and server environment that is focused on the core needs of the School
- Centralised support services for taught students that enable them to make optimum use of IT in their academic studies

- Support services to staff and research students, where feasible at the point of use, to enable them to achieve optimal use of the standard infrastructure in both research and teaching and learning
- Training for staff and students to develop their IT skills.

And to ensure that:

- All services are and remain at high quality and are continually informed by and responsive to the changing needs of the School through explicit feedback from and dialogue with users
- ITS works with the Library, MIS and Website Services teams and other service providers to ensure synergy of effort, interoperability and user focus at all times (www.lse.ac.uk/itservices/introduction.htm).

Cluster Teams

There are six academic IT cluster support teams consisting of one IT Support Specialist, and at least one IT Support Officer. They provide IT support to groups of academic departments and research centres, which tend to have similar IT requirements.

The cluster teams provide both first and second line support, specialist advice and assistance in the use of subject-specific software used in teaching and research, assistance and leadership as required with the development of IT strategy in departments, and advice on IT purchasing. The Library and central administration manage their own cluster teams (www.lse.ac.uk/itservices/help/clusters/contacts).

There are 8 cluster teams including the library and central admin clusters. There are a total of 27 staff members providing IT support within these clusters.

This eliminates the need for a helpdesk facility for faculty and staff. There is however a helpdesk for students.

To maintain a central IT strategy, each academic department and research unit has an IT representative. This person could be either an academic or administrative member

of staff, and has the responsibility of coordinating IT related issues in their department. Each term they attend the IT Cluster Steering Group meeting with other IT Reps in their cluster and their IT cluster team, where they discuss the latest IT support issues, departmental IT strategies and any current problems. They are also responsible for coordinating their department's IT budget.

ITS Structure

Jean Sykes - Librarian and Director of Information Services - has overall responsibility for all Library and IT Services staff and services, and for the strategic development of Library and IT Services.

The Technical Infrastructure Manager is the senior manager of the network services teams and has overall responsibility for the development, support and maintenance of the network and server infrastructure throughout the School. The Network Manager, who reports to the Technical Infrastructure Manager, manages the Network Team and is responsible for the design, development and support of the School's data communications network. There are three Network Specialists who together are responsible for the installation of network cables, for operational aspects of the network infrastructure, for the design, development and support of the network infrastructure, for IT security matters, for first line network support on campus.

Departmental support is managed by the User Services Manager through the IT cluster teams, student support through the IT Helpdesk and remote support service. The User Services Manager also jointly manages the School's Learning and Teaching Technology Group. There are altogether twelve IT support staff that can be found in the cluster teams. There is one Academic Support manager, seven IT Support Officers and four IT Support Specialists

A Remote Support Officer supports the student laptop plug-in scheme, and runs the laptop 'surgery' for students assisting them with laptop problems related to connection to the School's network, while a Remote Support Supervisor manages the remote support service for students, including the laptop 'surgery' for off-site access problems.

The Centre for Learning Technology (CLT) helps teaching staff to develop online courses and integrate these into the teaching and learning activities of academic departments. The management of the server and programming technologies that support the online courses using WebCT is the responsibility of the Technical Administrator. There are two IT Support Specialists that provide the support for teaching staff in the development and integration of online courses.

A Learning Technologies Training Specialist develops and delivers an integrated training programme for WebCT and related learning technologies, in support of course developers and end-users. The Assistant Librarian (Centre for Learning Technology) is responsible for copyright and licensing issues and also helps teaching staff to develop online courses and integrate these into the teaching and learning activities of academic departments.

The Office Manager is responsible for the staff and work of the IT Services Administration office, including software licensing queries, publications, financial queries and the IT services web pages. A Departmental Administrator and a Purchasing and Finance Officer report to the Office Manager.

The system team reports to the system manager who is also responsible for the design, development and support of the Exchange system. Three Systems Specialists together provide Unix system support for the School corporate database computers; support for the Legato enterprise backup systems; systems support for ITS registration services; for the development of utilities and systems to enhance the services delivered; for the design, development and deployment of the School standard desk top environment on PCs.

The training and documentation team is managed by the IT Training Manager, who also researches and acquires new training materials, delivers training to School staff on core software, and develops training courses. The IT Training Administration Assistant deals with IT Training email enquiries, schedules classes and processes course bookings, administers the ECDL at LSE initiative, and updates content on the IT Training website. A Specialist Applications Consultant provides training for staff and research students on the use of core software in the School, develops

documentation and Web pages, provides second line support for cluster teams on certain software packages, and produces in-house courseware.

The IT Help Desk Manager runs the IT Help Desk service for students, which provides advice and assistance to students with IT problems and the IT Help Desk Officer works as the full time professional member of staff on the IT helpdesk in the Library, which provides advice and assistance to students with IT problems.

The PC Support Team is managed by the PC Support Team Leader who is responsible for the support of the School's open access PCs. A Staff PC Installation Officer is responsible for the installation of new PCs for academic staff and two PC Support Officer are responsible for the support of the School's open access PCs.

LONDON SCHOOL OF ECONOMICS AND THE IT MODEL

Leadership: The Information Technology Services of the London School of Economics is bundled with the library services. A person with the title “Librarian and Director of Information Services” heads this department. It is interesting to note that there is no executive representation for ITS in the Directorate of LSE.

Hierarchy vs. Flat Structure: The London School of Economics is small and simple and has a single campus spread over a relatively small area. The ITS structure is relatively flat with only the network services section that has two levels of management. This is in line with the recommendations of the model developed in chapter two.

Central vs. Decentralised Structure: The services are extremely centralised, even the cluster teams who are allocated to departments are managed via a central User Services Manager. Departments are not responsible for any IT staff, equipment or IT planning. The central IT function provides all the IT services campus-wide. Because LSE focuses on Human Sciences study, the departments are probably homogeneous in their IT requirements and the culture of the university is one of centralisation. According to the model, the IT function should be centralised, which it is.

Internal vs. External Service: LSE’s current dependence on IT appears to be medium to low because it is bundled with the library services and it does not have a

leader dedicated to information technology. IT does not seem to be integrated into the departments because the departments' support staff do not have offices in the departments itself but rather with the rest of the ITS staff. It is difficult to establish if LSE has kept up to date with technology, but the rest of the factors favour an outsourcing solution. LSE, however, maintains its own internal service.

IT/Business Goals: The mission of ITS indicates that it falls between a full service provider and a unit that is competing on a thin cost margin and scalability. This falls between the recommended ratios of 1:100 IT support staff to end-user and 1:200. With a total of 27 support staff supporting 1,300 university staff – a ratio of 1:48, ITS far exceeds the recommendations. A total number of 37 IT staff gives a ratio of 1:35 for total IT staff to end-user. This is close to the recommendation of 1:32.

The Information Technology Services of the London School of Business operates within the recommendations of the model of chapter two on all counts except that it has no CIO and it is an internal service when the model suggests that it should be outsourced.

OXFORD UNIVERSITY

Oxford University is the oldest University in the English-speaking world. Today there are 39 colleges and six permanent private halls. The University and its colleges are spread over an area that extends over two miles from north to south and 1.5 miles from east to west.

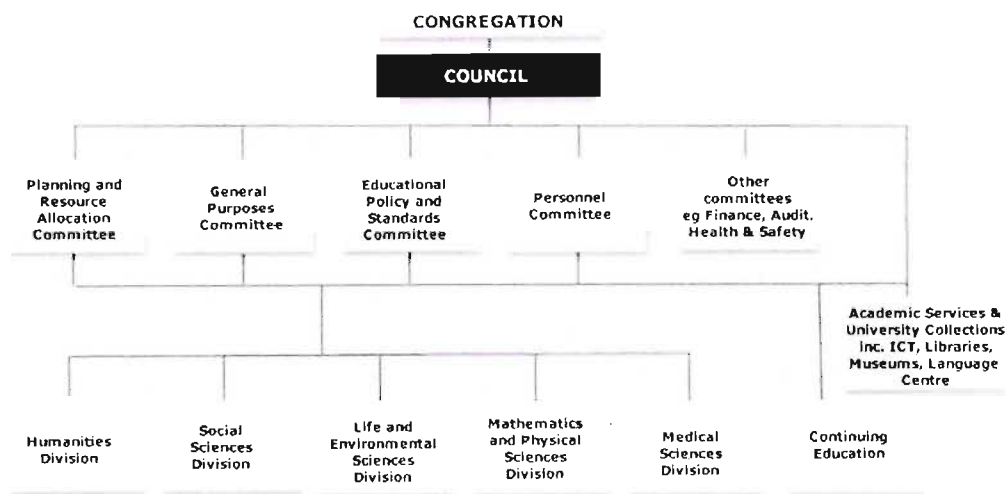


Figure 3.2: Structure of the Governance of Oxford University

The Vice-Chancellor is, in effect, the Chief Executive of the University. He or she has overall responsibility for the executive management of the institution and for its day-to-day direction, and is accountable to the Council for the exercise of these responsibilities. He or she is designated as the principal officer of the institution.

Four **Pro-Vice-Chancellors** have been appointed, with specific responsibilities for Academic Matters, Academic Services and University Collections, Planning and Resource Allocation, and Development.

Colleges and Halls:

- select and admit undergraduate students, and select graduate students after they are admitted by the University
- provide accommodation, meals, common rooms, libraries, sports and social facilities and pastoral care for those students
- are responsible for students' tutorial teaching and welfare.

The University:

- determines the content of the courses within which college teaching takes place
- organises lectures and seminars
- provides a wide range of resources for teaching and learning in the form of libraries, laboratories, museums, computing facilities, etc
- admits and supervises graduate students, examines theses
- sets and marks examinations
- awards degrees.

(www.ox.ac.uk/aboutoxford/unicol.shtml)

Oxford University has five academic divisions plus a unit for Continuing Education. Staff is also employed in the 21 administrative departments and 28 service departments.

The University of Oxford's total student population numbers over 16,500. The University employs over 7,300 staff, including some 3,700 academic staff.

OXFORD UNIVERSITY COMPUTING SERVICES

Mission

The Mission Statement of OUCS is: -

- To provide high-quality and cost-effective IT services that meet the needs of the University and its members;
- to contribute to the University's wide range of IT training and relevant training resources;
- to foster and support excellence, innovation, best practice, and value for money in the use of IT in teaching, learning, and research across the University;
- to promote effective communication throughout the University IT community.

OUCS will fulfil its Mission:

- By operating, developing and supporting the University's primary computing infrastructure and services including facilities such as the network backbone and its external connections; central email, web, news, and backup servers; and other core university-wide support services including security and anti-virus support;
- by fostering the effective use of IT in all disciplines through the provision and development of training and courses, learning and teaching resources, and by such activities as negotiating advantageous arrangements for the supply and maintenance of hardware and software etc.;
- by actively supporting the work of, and collaborating closely with, IT Support Staff within the University;
- by developing centres of expertise in relevant areas relating to the application of IT;
- by promoting and demonstrating good practice.

(www.oucs.ac.uk/about/mission.xml)

IT Strategic Framework: 2000

Responsibility for implementation of the overall strategy is divided between the IT Committee, the Computing Services (OUCS), Management Information Services (MIS), the library service and a number of other bodies.

The IT Committee is currently responsible for general policy, for providing strategic direction to OUCS, for monitoring the IT strategies of individual departments, faculties, and central services, and for advising the central bodies on the distribution and use of resources for information technology. OUCS manages the University's IT infrastructure, provides core services, including some central servers, and provide the support for the distributed environment. MIS is responsible for advising on the development of administrative and management information services. The Library Services are responsible for selecting, delivering and supporting information services in support of the teaching, learning, research and administrative activities of the University, and of the wider scholarly community.

Effective exploitation of IT use is dependent on the IT infrastructure. These include departmental and college networks as well as the facilities provided by OUCS as part of its core services. The extent and design of networks in individual departments and colleges is not determined centrally, although OUCS provides technical advice. The University expects those responsible for existing and new buildings to provide for the installation and maintenance of local networks.

The overall IT strategy is based on a distributed model, in which equipment and support are provided in the most appropriate location. It is the responsibility of the IT Committee to keep under review the balance between local and central provision. In general, its preference is for local provision unless it is clear that it would be more effective for Oxford as a whole to make central provision.

(www.ox.ac.uk/it/strategy/2000/index.html)

Oxford University Computer Services Structure

OUCS is responsible for the key items of University-wide infrastructure, in particular for:

- the University Backbone network
- connection of the University network to Janet
- certain network services, for example, domain name service, email relay service, dial-up service, Dynamic Host Configuration service, various authentication services
- certain major systems centrally installed and available, for example, the Hierarchical File Storage, general-purpose servers, special printers

(www.oucs.ox.ac.uk)

The central Oxford University Computer Services is made up of three main services:

- The Learning Technologies Group (LTG)
- Research Technologies Service (RTS)
- Technical Services

The Learning Technologies Group: The Learning Technologies Group was established by the Oxford University Computing Services in response to a growing demand for advice and support related to the use of Computers and Information Technology (C&IT) in traditional teaching, learning and research in all disciplines.

Research Technologies Service: The Research Technologies Service (RTS) brings together staff with a remit to promote and support the very latest research tools and techniques. Working in close collaboration to serve the entire University, the projects and services within the RTS offer advice upon new research technologies and ensure the effective dissemination of best practice.

Technical Services: Technical services provide a Computing Services Shop, Network Services Management, Media Services and Mirrored Servers services.

THE IT SUPPORT STAFF OF THE MATHEMATICAL SCIENCES DEPARTMENT

To determine the IT support staff to user ratio, this paper examines the staff composition of the Mathematical Sciences unit in the Mathematical and Physical Sciences Division. This unit consists of the Computing Laboratory, Mathematics and Statistics.

The Computing Laboratory supports an academic staff of 30. In addition there are 25 members of the research staff and 25 support staff. IT support staff consists of a Computer Operations Manager, a Computer Manager and three Computing Officers.

The department of statistics offers a Statistical Advisory service and comprises a total of 55 staff. Three computing staff, a Computing Manager and two Computing Officers, provides IT support.

The Mathematical Institute is the centre for mathematical activity at the University of Oxford. Its active members total 292 and they are supported by three system administrators that provide the necessary IT support.

OXFORD UNIVERSITY AND THE IT MODEL

Leadership: Oxford University Computing Services does not have a Chief Information Officer or any other kind of representation at executive level at the university as recommended by the model. According to the Strategic Framework responsibility for implementation of the overall strategy is divided between the IT Committee, the Computing Services (OUCS), Management Information Services (MIS), the library service and a number of other bodies.

Hierarchy vs. Flat Structure: With over 16,000 students Oxford is a medium-sized university with an extremely complex structure. The university provides the infrastructure for teaching and research and the colleges and halls are responsible for the specific needs of the student. Looking at figure 2.5 it is difficult to place Oxford University in any of the quadrants because it is small yet complex and according to the assumption in chapter two the environment is neither stable nor completely dynamic and thus there is no clear indication of what structure would best suit the IT function of Oxford University. Oxford's OUCS is a small flat structure with three divisions along functional lines.

Centralised vs. Decentralised Structure: The different units or departments at Oxford are neither interdependent nor are they homogeneous. Each college or hall has its own culture and contributes to the decentralised organisational culture of the university. The recommendation is a decentralised IT structure.

Oxford University Computing Services provides central support on services that affect the whole University. Their prime function is to provide a central information technology strategy and to provide services that benefit the whole University. In essence, the only function that is centralised is IT strategy and policy formulation. The rest of the IT function is completely decentralised as is recommended by the model. Departments or divisions are completely responsible for the hardware, software and support of their information technologies.

Internal vs. External Service: The current dependence on information technology is medium to high, judging by the mission statement that states its objective to provide

high quality and cost-effective IT services that meet the needs of the University and its members. Together with the assumption that the importance of sustained, innovative information resource management is medium to high, puts Oxford in the quadrant where outsourcing is not advised unless the IT unit is incapable of supporting the technology or managing projects. OUCS is in line with the model in that it is an internal service. Furthermore, the local support is integrated into each unit, even though the central IT functions is not which suggests that the central IT function be outsourced while the local functions remain internal, which they are. The central IT service is, however also internal.

IT/Business Goals: In the mission statement cost efficiency is stated as being one of the objectives of OUCS. In this instance the recommended ratio is 1:200 IT support staff to end-user. It is difficult to establish if the entire IT function falls into this ratio, but the individual unit that was examined had a total IT staff to end-user ratio of 1:39 which is marginally higher than the recommended ratio of 1:32.

The Oxford University Computing Services unit together with the structure of the university did not fall into any clear-cut framework and made it difficult to apply the model to it. Essentially the model of chapter two failed on all counts except for the centralisation/decentralisation factor.

MONASH UNIVERSITY

Monash is Australia's most internationalised university. It has eight campuses including one in Malaysia and one in South Africa, and centres in London, UK and Prato, Italy. Monash University has 75 research centres and is involved with 17 Co-operative Research Centres. (www.monash.edu.au)

ITS MISSION STATEMENT

The Mission of the Division of Information Technology Services is to provide quality information technology services for all activities within its purview, and to provide innovative assistance and leadership in IT matters to all parts of the University in the achievement of their goals and objectives.

The Division of IT Services will address its Mission via:

- wide consultation with its clients;
- the development and realisation of information technology policies, procedures and standards;
- the promotion of appropriate access to, and use of, information technology facilities for all members of the University community, in accordance with the University's policies including those concerned with the confidentiality of data;
- a customer-oriented concentration on client service;
- the adoption of quality practices in all of its operational activities; and
- the development of service level policies, which include specifics of service availability, integrity, security and performance.

ITS GOALS AND OBJECTIVES

The focus of the Information Technology Services Division will be to:

- provide, support and manage the University information technology infrastructure according with agreed principles;
- provide, support and manage information technology infrastructure services; and

- develop detailed proposals for policy, procedures and guidelines relating to information technology.

Monash University has approximately 200 staff in all IT facets (i.e. network engineers, system engineers, software developers, etc) and they support a total of over 5300 staff, academic and support.

INFORMATION TECHNOLOGY SERVICES DIVISION

Headed by an Executive Director, the Division has six organisational units with approximately 200 staff. The six units are:

- Administrative Services
 - establishes and manages the business, financial and human resources functions for the Division.
- Applications Services
 - provides systems development, integration, implementation, and support services for the University's information systems, and applications development, implementation, and support.
- Client Services
 - manages the interface between the Division and its clients.
- Global Operations
 - is a special office of the ITS Division responsible for fulfilling, for the Monash overseas campuses, the Monash objective to establish IT services to the worldwide Monash community.
- Infrastructure Services
 - provides and manages the University's shared IT infrastructure facilities
- Project Office
 - its objective is to generate and maintain a productive and efficient IT project development environment.

(www.its.monash.edu.au/aboutits/its/index.html)

The Information Technology Services (ITS) division is the central information technology and communications group of Monash University. ITS is responsible for much of the University's IT infrastructure including network and Internet connections, workgroup and central host servers, corporate databases, lecture theatre support, helpdesk and information services, which keep Monash at the leading edge of innovation in its core activities of teaching, learning and research.

IT planning is centred on the IT Strategic Plan, which describes a framework for the application and usage of IT within Monash University. Its aim is to ensure that University-wide IT initiatives are directly aligned to the overall mission, strategies and operational needs of the University (www.monash.edu.au/about/itsp).

ITS has developed a Services Catalogue as part of a Service Management initiative outlined in the Monash University Support Services Strategic Plan. The Services Catalogue identifies the major services and service outcomes currently provided to the Monash community. The services catalogue is good in that it also shows outcomes. User perception of what service is to be provided and what services ITS is providing often differ. It is also good in that there is a list of services available and to whom. Users know what services the ITS department provides which reduces user dissatisfaction because they will not be expecting more than what is on offer.

Staff Services

A wide range of IT services, information and resources are made available for staff at Monash. Support staff within each Faculty or work unit is responsible for their own IT resources. Initial requests for IT assistance are made to the local IT support and if necessary they will escalate problems to ITS. Technology support professionals are local IT support staff employed by Faculties and other organisational units. At Monash they are known as "the TWP" (Technical Working Party).

MONASH SOUTH AFRICA INFORMATION TECHNOLOGY SERVICES

The Information Technology Services (ITS) Division is the central information technology and communications group of Monash South Africa. ITS is responsible for much of the Monash South Africa IT infrastructure including network and internet connections, workgroup and central host servers, corporate databases, lecture theatre support, helpdesk and information services, which keep Monash at the leading edge of innovation in its core activities of teaching, learning and research

ITS Staff – South Africa

ITS in South Africa is small in comparison to the other campuses. They support 180 staff and 300 students. The support functions are as follows:

Function	People Responsible
Help Desk	Chris, Lavina, Lucas
Senior Technician	Lucas
Client Services	Lavina
Manager	Ross

Figure 3.3: ITS Staff of Monash, South Africa

MONASH UNIVERSITY AND THE IT MODEL

Leadership: Monash's Information Technology Services has an executive director, which is in line with the recommendations of the model.

Hierarchy vs. Flat Structure: Monash University is relatively large and complex and the environment in which it operates is more dynamic than stable. The model of chapter two indicates a collaborative structure. Monash IT, essentially has a hierarchical structure with elements of collaboration. The project office's objectives are to generate and maintain a productive and efficient IT project development

environment. To be able to do this there will be collaboration across all functional divisions.

Centralised vs. Decentralised Structure: The units at Monash are not interdependent nor are they homogeneous. This is due to the fact that Monash has campuses and offices all over the world and this also means that the organisational culture of the university is one of decentralisation. The recommendation is for a decentralised structure. ITS Monash, however is largely centralised with some decentralisation at the departmental level.

Internal vs. External Service: Being at the leading edge of technology is important to Monash's ITS as stated in its mission statement. Its dependence on information technology is high to medium. The model recommends that IT be an internal service, which it is.

IT/Business Goals: Service delivery is important as can be seen in the fact that Monash ITS has compiled a service catalogue. The mission statement also shows that being at the leading edge of technology is important as well. The business goals of ITS falls between being a leading edge unit and providing full service and overall value. The ratio of IT support staff to end-user should fall between 1:50 and 1:100. The South African campus operates with three support staff for 180 end-users, which give a ratio of 1: 60, which is within the recommendation of the model. The total IT staff to end-user ratio for Monash University is 1:27, which is safely within the recommended ratio of 1:32.

UNIVERSITY OF SOUTH AUSTRALIA (UniSA)

UniSA was founded on 1 January 1991 through the amalgamation of the South Australian Institute of Technology and the Magill, Salisbury and Underdale campuses of the South Australian College of Advanced Education (<http://www.unisa.edu.au/about/intro/default.asp>)

Number of students	27,263
Number of staff	2,048
Number of Information Technology Services Staff	89
Number of campuses	6
Number of divisions	4
Number of schools	28
Number of research institutes/centres/groups	120

Figure 3.4: Facts and Figures for UniSA

The six campuses are:

- City West Campus
- City East Campus
- Magill Campus
- Mawson Lake Campus
- Underdale Campus
- Whyalla Campus

Both City West and City East campuses are found in the South Australian city of Adelaide. Magill Campus is eight kilometres east of Adelaide. Twenty minutes north of the city is the Mawson Lake campus. Located in the western suburbs, Underdale campus is the focus for education, nursing and visual arts. The most distant campus is Whyalla, which is four hundred kilometres northwest of Adelaide.

INFORMATION STRATEGY AND TECHNOLOGY SERVICES (ISTS)

The ISTS services group provides:

Technology Management Services

- management of core information technology services such as data networks, telephone systems, e-mail and access to the internet
- computing access points for students in the form of computer pools, barns and walk ups
- a range of “help” services to assist students and staff to make best use of the University’s IT environment
- policies, procedures and guidelines for the use of information technology within the university
- development and implementation of appropriate information systems security and disaster recovery plans

Management Information Services

- provision of timely and relevant information to support management decision making and to meet statutory requirements
- technical management of the computer systems which facilitate the University’s core administrative processes, including the student information system, the human resource system and the finance system

IT SUPPORT

IT support within the University is devolved and individual cost centres have responsibility for funding and staffing the acquisition, management and support of the information technology facilities and services which are within their own boundaries and under the direct control.

In undertaking these responsibilities, cost centres are required to act in accordance with the approved information technology policies, procedures and guidelines applying at the time.

To establish an IT support staff to user ratio, this paper will closely examine one of the departments, namely the Arts and Education Department.

IT SUPPORT IN THE DIVISION OF EDUCATION, ARTS AND SOCIAL SCIENCES

The Division is a large organisation, with eight schools, each with a Head of School and five University-funded research centres. The division has in excess of 250 academic staff and 100 general staff and approximately 9,500 enrolled students. These students are spread over four of the six campuses of the University, Magill, Underdale, City West and City East. (www.unisa.edu.au/eas/about/default.htm)

IT Support Services – Division of Education, Arts and Social Sciences

The Information Technology support team provides a range of computing services to staff and students within the Division of Education, Arts and Social Sciences including....

- Desktop support to Schools, Centres and Units.
- Special purpose computer pools support.
- Server administration.
- IT equipment and software purchasing.
- Inventory and asset control.
- Liaison with Central Units.
- IT project work.
- Advice and reporting.

(<http://www.easit.unisa.edu.au/about.htm>)

The team consists of several IT staff based at each Campus where the Division has a significant presence. As a group, the IT staff are responsible for supporting the IT needs of some 8 Schools and approximately 26 research centres within the University. Their mission is to achieve ongoing improvements to the efficiency and effectiveness of IT support arrangements throughout the Division, and thus contribute to the development of the University's teaching, research and learning environment.

This team is headed by an IT Coordinator. The rest of the team is made up of two Information Technologists and five IT Support Officers.

(<http://www.easit.unisa.edu.au/contacts.htm>)

UNIVERSITY OF SOUTH AUSTRALIA AND THE IT MODEL

Leadership: At the University of South Australia the leadership and direction of information technology comes from the Information Strategy and Technology Services group, which is neither at executive level nor is it just one person or CIO.

Hierarchy vs. Flat Structure: UniSA is a large complex university in an environment, which is neither stable nor completely dynamic as per the assumption made in chapter two. The model suggests either a hierarchy or collaboration. It is difficult to establish the hierarchy of the Information Strategy and Technology Services group, but the divisional IT support groups are teams working within a flat structure.

Centralised vs. Decentralised Structure: The units are not interdependent and they are not homogeneous. The culture of the university is not centralised due partly to its geographical spread and due partly to the fact that it is an amalgamation of various institutions. Decentralisation is recommended and at UniSA the IT function is devolved.

Internal vs. External Service: The current dependence on information is medium and judging from the goals and objectives of ISTS the importance of sustained, innovative information resource development is medium to low. It is difficult to establish if the technology is up-to-date and the last big change the university experienced was the merging of several institutions more than ten years ago. The position on the strategic grid advises outsourcing but the fact that IT is integrated into the divisions and the university's ability to absorb change advises against outsourcing. ISTS and the divisional IT support units remain internal to the university.

IT/Business Goals: On close examination of the division of Education, Arts and Social Sciences, IT support is a basic service that needs to be cost-effective. There is

no mission statement to prove that the service provided is more than just a utility. The recommended ratio is one IT support staff for every 200 end-user. The ratio of 1:44 is totally off the mark, in that there are too many IT support staff. The total IT staff to end-user ratio, at 1:23 falls well within the industry standard of 1:32.

UNIVERSITY OF SYDNEY

The University has nine different teaching campuses spread throughout the Sydney area, as well as a rural campus at Orange. Orange Campus is located about 3.5 hours drive from Sydney in the Central Tablelands of New South Wales.

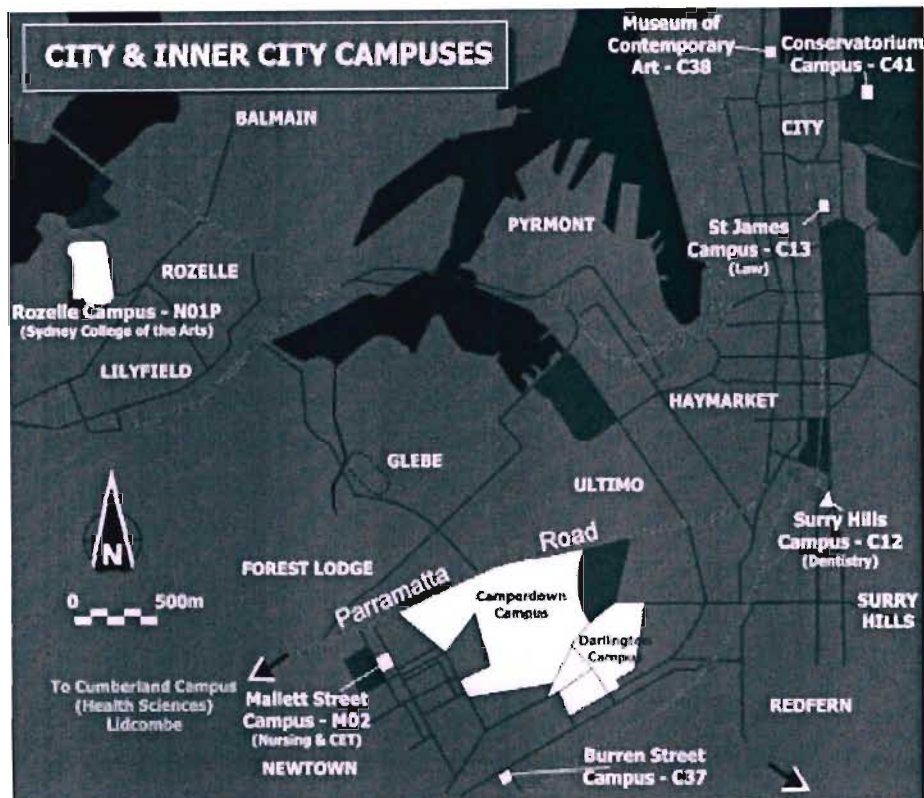


Figure 3.5: University of Sydney – Map of Inner City Campuses

The Camperdown and Darlington campuses – together referred to as the main campus - are a short distance from the CBD of Sydney, while Cumberland Campus, 16 kilometres west of the main campus is at Lidcombe. The Australian Graduate School of Management is located in the University of New South Wales at Kensington, in the southern suburbs. The St James campus is in the heart of Sydney's legal district - just near the Supreme Court in Phillip Street - this campus is the home of Australia's first and most prestigious law school. The Mallet street campus is one block from the main campus and houses the Faculty of Nursing. The Sydney Conservatorium of Music is one of the world's finest music schools and is set in the Royal Botanic Gardens near the Opera House. The Sydney College of the Arts historic sandstone buildings are set in beautiful and spacious grounds on the edge of the harbour at

Rozelle. The Surry Hill campus is excellently located - right next to Central Station in the heart of the city. Agriculture and veterinary science students use the extensive farms and research units at the Camden campus – 65 km southwest of Sydney. Burren Street campus is located a short distance south of the main campus.

University of Sydney Summary Statistics 2002	
Student Enrolments	42,420
Student Load	32,926.00
Graduations Since Foundation	218,347
Total Staff	5,819.10
Student Staff Ratio	15.9

Figure 3.6: University of Sydney Summary Statistics 2002

INFORMATION TECHNOLOGY SERVICES

Mission Statement: Our mission is to facilitate research, teaching, and administrative excellence through the provision of world-class information technology and services. (www.sydney.edu.au/is/about.html)

The department of Information Technology Services is charged with the responsibility of providing and supporting University wide Communication, Infrastructure and Administrative Information Systems and effectively supporting staff of the University who use these systems. The Director of ITS, Mr Ian Trevena, has responsibility for the functional groups listed below that comprise ITS. Although each group has its own goals, all areas reflect Department Goals:

- To assist the University meet its goals in Teaching, Research and Administration by providing high quality services in Communications and Information Technology.
- To assist in determining the strategic direction of the University in the key areas of Communication and Information Technology.
- To focus on quality improvement in every function and activity to ensure excellent results.

The functional groups that comprise ITS are:

- Administration
- Communication Systems
- Client Support Services

The three functional groups offer the following services:

ITS GROUPS		
Communication Systems	Client Support Services	Application Production Support
Networks and Sydnnet	Help Desk	Design of Admin Computer Systems
PABX	Internet Account Support	Programming of Admin Computer Systems
Internet Services and Network Security	Desktop Systems Support	Maintenance of Admin Computer Systems
Maintenance and Operation of Admin Systems	Software Distribution	
	Network Cabling Support	

Figure 3.7: Services offered by each ITS Group of the University of Sydney

(<http://www.sydney.edu.au/is>)

**THE ORGANISATIONAL STRUCTURE OF THE INFORMATION
TECHNOLOGY SERVICES OF THE UNIVERSITY OF SYDNEY**

Directors Office		Client Support Services	
Name	Position	Name	Position
Ian Trevena	Director	Madeleine Petit	Client Support Manager
Jude Hore	Executive Assistant to Director	<u>James Phoon</u>	Central IT Services Coordinator
Administration and Finance		Helpdesk	
Name	Position	Tristram Ryvers-Ellicott	Support Coordinator
Angela Cheung	Finance Manager	Brett Hamilton	Senior Help Desk Officer
Irma Torres	Finance Officer	Peter Northcott	Help Desk Officer
David Marrett	Senior Administrator	Marina Lobastov	Help Desk Officer
Clara Horvath	Admin Assistant	Aleksandr Yap	Help Desk Officer
John Rogic	Assistant Accountant	Desktop Systems	
Application Production Support		Greg Baker-Moss	Desktop Support Team Leader
Name	Position	Annie Zhang	Computer Systems Consultant
Doug Vail	Application Production Support Manager	Colin Mackintosh	Computer Systems Consultant
People Soft Support		Gavin Tung	Computer Systems Consultant
Steve Owen-Wall	Team Leader	Ashley Scott	Computer Systems Consultant
Maggie Huang	Snr. Analyst Programmer	Tommy Chan	Computer Systems Consultant
Paul Dunda	Analyst Programmer	Adam Jenkins	Computer Systems Consultant
Linda Vinski	Analyst Programmer	Access Centres	
Lou Porillo	Analyst Programmer	Matthew Etherden	Computer Access Centre Sup.
Elizabeth (Bess) Tan	Analyst Programmer	Tancred Fergus	Computer Systems Officer
Student Administration		Network Support	
Leo Goorevich	Team Leader	Victor Fang	Senior Engineer
Abdur Rauf	Business Analyst	David Leal	Network Engineer
Johnny Lau	Analyst Programmer	Keith Ross	Network Engineer
Austin Kim	Analyst Programmer	Reception	
Mohammad Bintahir	Analyst Programmer	Noelene Darcy	PABX Operator/Receptionist
Dmitri Ivailovski	Analyst Programmer	PABX Operators	
Adam Sen	Analyst Programmer	Ben Drysdale	PABX Operator
Operations		Julie Ioane	PABX Operator
Sharon Jones	Senior Operator	Catherine McManus	PABX Operator
Emanuel Antoniou	Operator	Margaret Christoffersen	PABX Operator
		Communication Systems	
		Name	Position
		Russell Cook	Communications Manager and Deputy

			Director
		Rafik Razzouk	Video Conferencing Manager
		Bob Olde	Telecommunications Manager
Data Entry		Data Network Unit	
May Moore	Data Entry Supervisor	<u>Stephen Tolhurst</u>	Data Network Manager
Arthur Sakley	Data Entry Operator	<u>Bob West</u>	Senior Network Analyst
		<u>Jennifer Sayers</u>	Senior Network Analyst
Minor Systems		<u>James Ding</u>	Senior Professional Officer
Andrew Mountford	Team Leader	Network Services Unit	
Andrew McCallum	Analyst Programmer	<u>John McQueen</u>	Network Services Team Leader
Tuyet Nguyen	Analyst Programmer	Tim Nicholson	Network Support Officer
		Jie Gao	Network Support Officer
Technical Support		Jo Chee	Network Support Officer
Doug Richardson	Team Leader	Michael Tran	Network Support Officer
Evelyn Romero	Snr. Database Administrator	Mat Loftus	Network Support Officer
Lila Yassini	Snr. Database Administrator	Rudolphe Pereira	Network Support Officer
Gerhard Ruhl	Snr. Database Administrator	Network Security and Privacy	
Maria Dang	Database Administrator	Nicole Haywood	Network Security Officer
Nadia Banna	Database Consultant	Enterprise Systems Unit	
Grace Lee	Technical Support Officer	Craig Hamilton	Team Leader Enterprise Systems
Olympia Xiros	Technical Support Officer	Greg Rudd	Unix Administrator
		Didier Debuf	Unix Administrator
		Jonathan Huang	Senior NT/Citrix Systems Administrator
		Alan Woo	Senior NT/Citrix Systems Administrator
		<u>Tony Calanni</u>	Systems Programmer / Unix Administrator
		Eric Cipollone	Systems Programmer / Unix Administrator

Figure 3.8: ITS Structure of the University of Sydney

UNIVERSITY OF SYDNEY AND THE IT MODEL

Leadership: The Information Technology Services of the University of Sydney is headed by a director who is not an executive, contrary to the recommendations of the model of chapter two.

Hierarchy vs. Flat Structure: ITS is hierarchical and is divided along functional lines. Sydney University is extremely large with over 42,000 students and just under

6,000 staff and complex in that it has nine campuses spread over a large city. The environment in which it operates is more dynamic than stable and according to the model should really be collaborative which it is not.

Centralised vs. Decentralised Structure: The different units at the university are not homogeneous and they are not interdependent because they are on separate campuses. By the same token the structure of the university tends to favour a decentralised culture. The model advises a decentralised structure, but ITS is completely centralised.

Internal vs. External Service: The current dependence on Information and the importance of sustained, innovative information resource development is medium to high. Provision of world-class information technology services is part of ITS's mission. In this situation the model suggests an internal IT service. However, the fact that IT is not tightly integrated into the divisions or units of the university means that it could quite easily outsource the IT function. The university has an internal IT unit, which is in line with the model.

IT/Business Goals: The service provided by ITS falls between a full service provider and a cost-effective scalable function. The mission statement makes mention of only what the responsibility of ITS is and the fact that it needs to be effective in providing a world-class information technology service and does not mention being at the leading edge. Furthermore, there is no mention of the existence of a service catalogue. The suggested ratio of IT support staff to end-user is between 1:100 and 1:200. Sydney University has a ratio of 1:208, which falls just outside the recommended ratio. The 1:72 ratio of total IT staff to end-user is way above the industry standard of 1:32. On both counts, Sydney University fails according to the model.

YALE UNIVERSITY

Yale University is a large research university with a wide array of programs, departments, schools, centres, museums, and affiliated organizations. Yale University is located on a 300-acre campus in New Haven, Connecticut.

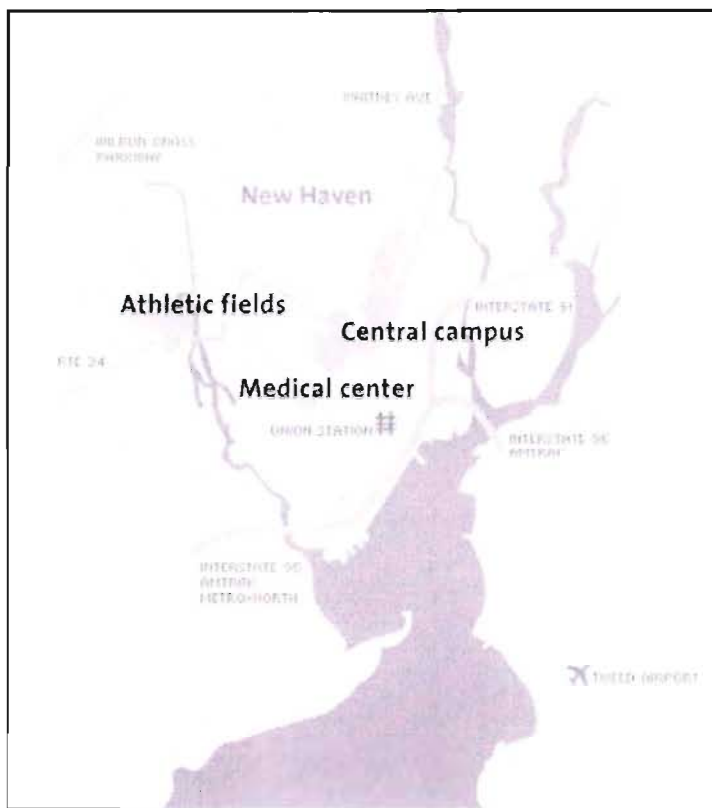


Figure 3.9: Yale Campus Map

The Yale Campus Map is comprised of three major campus areas in the city of New Haven, the Central Campus, the Yale Medical Center including the Yale-New Haven Hospital and the Yale Athletic Fields.

Schools of Yale University

- Yale College (undergraduate programs)
- Graduate School of Arts and Sciences
- 10 Professional schools

University Staff Counts (Headcounts) Fall, 2002

Managerial & Professional	3,590
Clerical & Technical	3,127
Service & Maintenance	1,175
Total	7,892

Figure 3.10: Yale University Staff Count

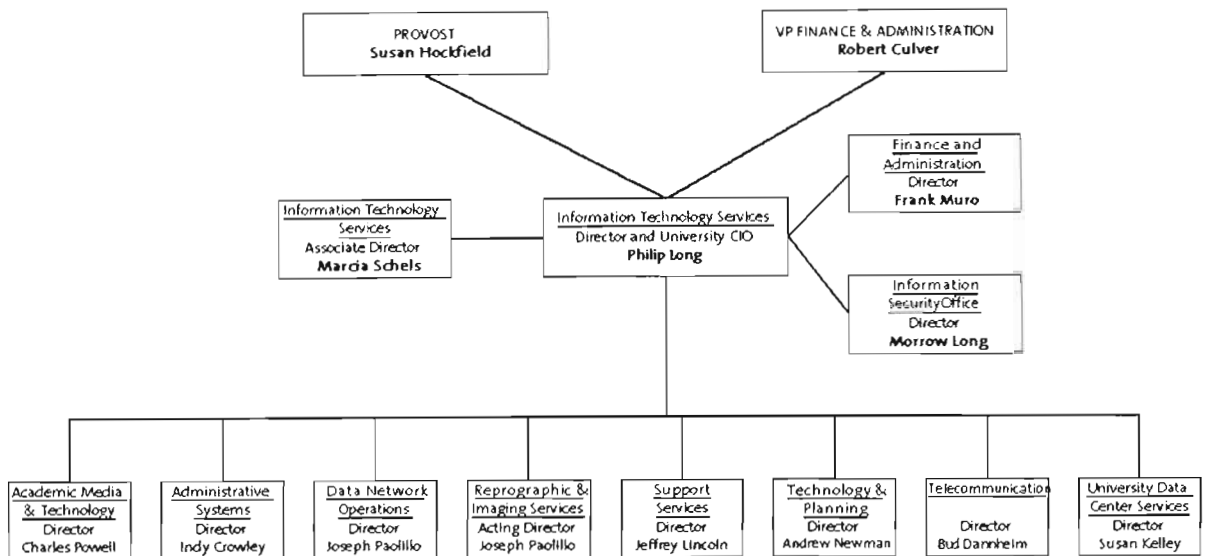
Fall 2002 Enrolment

Division	Male	Female	Total
Yale College:	2,650	2,624	5,274
Special (Degree & Non-Degree)	28	37	65
Graduate School of Arts & Sciences:	1,261	1,111	2,372
Professional Schools:			
Architecture	114	71	185
Art	50	68	118
Divinity	190	182	372
Drama	87	110	197
Forestry & Environmental Studies	117	155	272
Institute of Sacred Music	40	19	59
Law	349	300	649
Management	324	141	465
Medicine -- M.D.	255	228	483
E.P.H.	72	158	230
P.A.	18	53	71
Music	97	87	184
Nursing	16	258	274
Professional Schools Total	1,729	1,830	3,559
Total University	5,668	5,602	11,270

Figure 3.11: Yale University Student Count
(www.yale.edu/oir/factsheet.html#Fall%201995%20Enrollment)

INFORMATION TECHNOLOGY SERVICES (ITS)

Yale University Information Technology Services Organization



April 1, 2003

Figure 3.12 Organogram of ITS at Yale University

ITS Departments

Academic Media and Technology supports faculty and students in their use of technologies in teaching, learning and research.

The Instructional Technology Group provides easy access to course web and related services through the instructional web server, individual consulting and group workshops for instructors, and software development services to Yale faculty engaged in technology-enhanced teaching. This group is headed by a director and has three instructional technical specialists and three students providing support. The Student Computing Services group, with a staff of 67 undergraduate and graduate Computing Assistants and two full-time staff, supports Arts and Sciences student computing on personal machines in college residences and in the campus computing clusters and lab.

The Yale Film Study Center is home to a substantial collection of film, video, laserdisc, DVD and related materials for local use and checkout supported by a director, two staff and fourteen student assistants.

Media Services provides traditional photography services (shoot, print, enlarge, duplicate, etc.) as well as an increasing number of digital image services supported by 24 staff and 20 student assistants.

The Faculty Support Program has a director, three staff and 20 students.

Workstation and Server Support provides "tier 2" support for technical workstations (Unix and NT) within the FAS IT Support program and via contract for research systems, with 21 staff and five students.

The Webteam, consists of three staff and two student assistants, and supports web pages and related services used throughout Academic Media & Technology.

A director and six staff make up the Centre for Media Initiatives.

The AM&T Library Systems Group works in partnership with the University Library's Systems Office to provide deep technical support for major Library systems supported by six staff.

The Social Science Research Services offers a range of technical support from consultation on data management strategies to highly customized projects involving data collection, analysis, design, and publication solutions with the help of a director, two staff and thirteen graduate students.

Administrative Systems implements, enhances, and supports the University's financial, human resources/payroll, student, facilities, alumni/development and other central administrative systems. The director is assisted by a Senior Information Technology Manager of Custom Projects & ITS Business Systems and his staff of eight; Senior Information Technology Manager of Data Warehousing and her staff of eight; Associate Director of Finance & Administration Application and his staff of 23; Manager of Change Management and his staff of one; Technical Manager of Student Financial and Admin Systems and his staff of eight; Senior Technical Manager of the Office of Development and his staff of four; Technical Manager for Enterprise Web Development and his staff of eight; Senior Technical Manager of University Health Systems.

Data Network Operations designs, installs, and operates the campus backbone data network; installs and supports departmental and individual network connections; and maintains Yale's links to the Internet and Internet 2. The director along with his administrative assistant, oversees eight operations staff and two engineering staff.

Information Security Office provides consulting, information, and investigative services in support of systems and network security and data integrity as well as increasing information security awareness.

Reprographic & Imaging Services provides a wide range of design, printing, mailing, and related publications services and consists of 67 staff.

Support Services include the Help Desk, Internet Information Center, User Accounts, Desktop Services, Desktop Technologies, Email and Network Services, ITS Communications and Distributed Support. The manager of Desktop Technologies has a team of five staff. Desktop Services has a manager and 18 staff. The User Services Manager has a team of 54 staff which is distributed over central IT, Law School IT, School of Management IT and Medical School IT.

Technology and Planning with a staff of five researches and evaluates new technology and helps implement them into Yale's environment.

Telecommunications manages Yale's Telephone, Long Distance, Voice Mail, Cable TV, and Operator Services together with all related cable and transmission facilities on Central Campus and in the Medical Center. Telecommunications consist of four sections:

- Support with thirteen staff
- Finance and Administration with five staff
- Customer Service with five staff
- Project Management with five staff

University Data Center Services operates and manages ITS data centers. The Systems group installs and maintains server operating system software and related products, and the Administration group installs and maintains database software and vendor supplied application products (www.yale.edu/its/depts).

YALE UNIVERSITY AND THE IT MODEL

Leadership: The leadership of information technology Services at Yale University is a director and CIO, which is in line with the model of chapter two.

Hierarchy vs. Flat Structure: The structure of ITS at Yale University is hierarchical and divisions have been constructed along functionality. Each unit is in control of the services it renders and how it renders it. Yale is a small university with respect to the number of students and staff it has and it is simple in structure with essentially two campuses and only twelve divisions. The IT model, however, recommends a flat structure for this type of organisation.

Centralised vs. Decentralised Structure: It is difficult to establish if the units are interdependent and homogeneous in their IT requirements. The culture of the university seems to be one of centralisation, especially since it is compact in its geographical spread. In this instance the model suggests a centralised structure. . The Support Services division of Yale's Information Technology Services is centralised with elements of decentralization in that some support is distributed over three schools as well as centrally

Internal vs. External Service: According to the assumption made in chapter two the importance of sustained, innovative resource management is medium to high. The current dependence on information is high and can be seen in the number of service units in ITS as well as the range of services they offer. The model suggests and internal service, which it is at Yale University.

IT/Business Goals: The range of information technology services available to the Yale end-users suggests that ITS is a full service provider and therefore requires an IT support staff to end-user ratio of 1:100. The ratio of 1:105 is close. The total IT staff to end-user ratio of 1:24 falls within the recommendation of the model.

INDIANA UNIVERSITY

Indiana University is a multi-campus university spread across the state of Indiana in the United States. It has eight campuses, which together have over 15,000 staff and 86,000 students. Two of the campuses, those at Fort Wayne and Indianapolis, are joint campuses shared with Purdue. The main campus is at Bloomington, which has about 37% of the enrolled students (32,400).

Student Enrolment at Indiana University at non-joint campuses	
<i>"Major world universities and colleges." Britannica 2002 Standard Edition CD-ROM. Copyright © 1994-2002 Britannica.com Inc.</i>	
Bloomington, Ind.	32400
Gary, Ind. (Northwest)	5600
Kokomo, Ind.	2700
New Albany, Ind. (Southeast)	5100
South Bend, Ind.	5400
Richmond, Ind. (East)	2400

Figure 3.13: Student Enrolment at Indiana University

This then, briefly, is the background to the environment in which Indiana University's University Information Technology Services operates. It is a highly distributed environment requiring service delivery to all campuses.

DEPARTMENTAL STRUCTURE OF THE UNIVERSITY INFORMATION TECHNOLOGY SERVICES

The Office of the Vice President for Information Technology oversees the University Information Technology Services (UITS). The vice president is also the institutions Chief Information Officer. The role of this office is described thus in the UITS Services Directory (2001): “The IU Office of the Vice President for Information Technology and Chief Information Officer (OVPIT) provides leadership for the continued development of a modern information technology environment throughout the university. The primary responsibility of this office is the development and use of information technology in support of the university’s vision for excellence in research, teaching, outreach and lifelong learning.”

Each of the five regional campuses has it’s own CIO who liases with the chancellors of their campus of responsibility.

The department is divided into the following sections:

- Teaching and Learning Information Technologies, which provides support to staff via a call centre and on-site support and student computing facilities. This department offers all the IT staff desktop services as well as Digital Media and Web Development, Data Management Support and an award winning knowledge base for the solution of computing problems which enables end-users to solve problems themselves without having to rely on the services of someone at the call centre or on on-site support. The number of staff falling under TLIT is 213.

- Telecommunications provides networking services, infrastructure services and also includes the telephone service of the institution. The total number of staff in this department is 94 people.
- University Information Systems are responsible for the development and maintenance of the student systems, fiscal systems and e-commerce systems as well as operations and database administration. The staff complement is 120.
- Research and academic computing has a staff complement of 58. They support and aid academic staff in developing and integrating online courses.
- The Administrative Section comprises several parts, which are Finance (29 staff), Communications and Planning Office (16 staff), Human Resources (4 staff), the office of the IT Security and Policy Office (19 staff), and various other posts. It would seem that being granted independence from the institutional structures to the extent that UITS seems to have been, should probably enhance the overall function. For example, the HR component could specialize in I.T. staff, thereby ensuring better staff and better I.R.
- The Communication and Planning Office deals with internal and external communication for the vice president and UITS as a whole and provides planning and support for related campus events as well as keeping the university, media and other external groups informed about services, activities and accomplishments of UITS.

Reading through the UITS services directory, one can see that the University Information and Technology Services department seems to embrace the computing efforts of the University rather than attempt to prescribe to them and thereby limit its

efforts. Rather than limit the number of services, they seem to make their service all encompassing.

Indiana University has in the region of 630 appointed staff members with a ratio of one UITs staff member for every 24 end-users. In User Support, IU sports a ratio of one UITs support staff member per 108 University staff members. UITs makes use of students in their Student Technology Centers (Directory Services, 2001) and there is reference elsewhere to FTE's. This then means that their effective staffing levels are higher than the 630 mentioned.

INDIANA UNIVERSITY AND THE IT MODEL

Leadership: The Office of the Vice President for Information Technology and Chief Information Officer provides leadership for the IT function of Indiana University and complies with the recommendations of the model in chapter two.

Hierarchy vs. Flat Structure: Indiana University is extremely large and complex with 53,600 students, approximately 15,000 staff and six campuses located across the state of Indiana. This along with the assumption that the environment is neither stable nor completely dynamic, suggests that UITs should be either hierarchical or collaborative in structure. UITs is hierarchical and sectioned along functional lines.

Centralised vs. Decentralised Structure: It cannot be established if the units at Indiana University are interdependent or homogeneous, but the culture of the university is decentralised to the extent that each campus has its own CIO. The Human Resources and Finance divisions of the university are also decentralised.

There are eight campuses spread across Indiana State, which also adds to the culture of decentralisation. In this case the model recommends a decentralised structure, but the UITS is a centralised structure.

Internal vs. External Service: Information technology is essential to the entire Indiana University community (*UITS Services Directory* 2001), which makes its dependence on information high. UITS, according to its Services directory is committed to the continued development of a modern information technology environment, which indicates that the importance of sustained and innovative information resource management is high. The model strongly recommends an internal service for Indiana University, which UITS is.

IT/Business Goals: The goal for information technology at UI is to rise to a position of absolute leadership among institutions of public higher education in the creative use and application of information technology (www.indiana.edu/~ovpit/strategic/d_.html). UITS wants to be at the cutting edge of technology and provide a full service that adds value to the university. The recommended ratio is one IT support staff for every 50 to 100 end-user. Indiana University's ratio is 1:70 and complies with the model's recommendations. It is also in line with the industry standard with a ratio of 1:27 total IT staff to end-user.

UNIVERSITY OF CAPE TOWN

The University of Cape Town (UCT) is South Africa's oldest university, and is one of Africa's leading teaching and research institutions (www.uct.ac.za).

Mission Statement

"... is to be an outstanding teaching and research university, educating for life and addressing the challenges facing our society.

Educating for life means that our educational process must provide:

- a foundation of skills, knowledge and versatility that will last a life-time, despite a changing environment;
- research-based teaching and learning;
- critical enquiry in the form of the search for new knowledge and better understanding; and
- an active developmental role in our cultural, economic, political, scientific and social environment

UCT employs 4 500 people, 52% of whom are administrative and support staff, 48% are academic staff and research staff. UCT's student intake is 18 985 students for 2002. This is an increase of 5.8 percent on the 17 878 students at UCT in 2001.

The University of Cape Town consists of the following faculties:

- Commerce
- Engineering & Built Environment
- Health Sciences
- Humanities
- Law
- Science
- Centre for Higher Education Development

UCT also includes the Graduate School of Business as well as the Graduate School in Humanities.

THE EXECUTIVE STRUCTURE

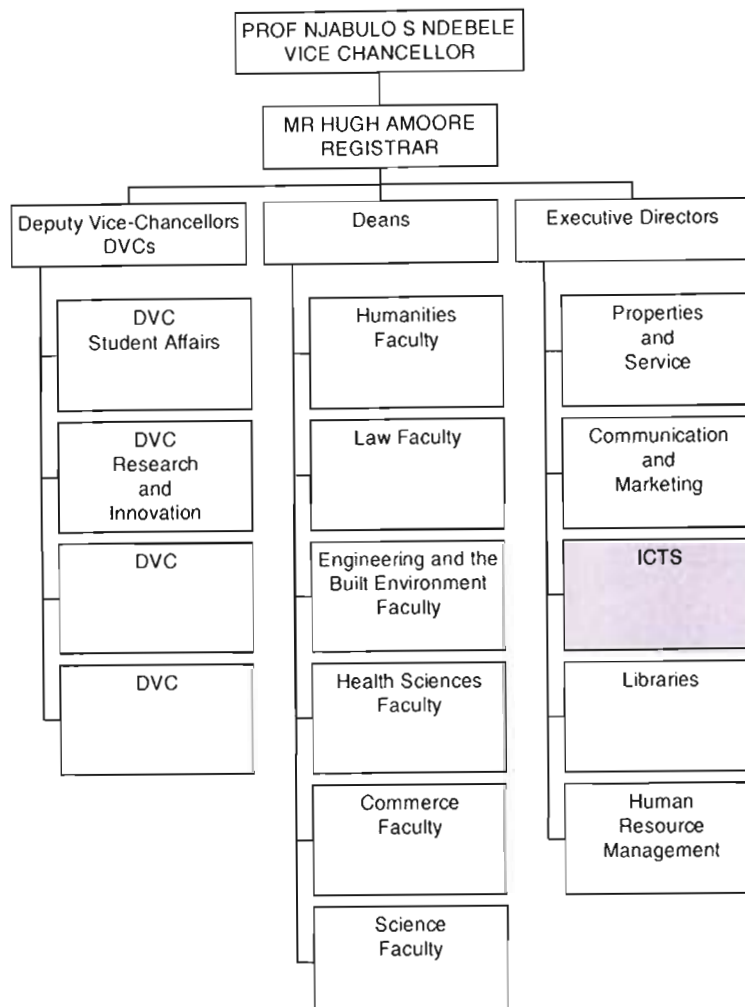


Figure 3.14: Executive Structure of University of Cape Town

INFORMATION COMMUNICATION TECHNOLOGY SERVICES (ICTS)

ICTS is a support organisation that exists to enable and assist Faculties, Departments and Research Units, the University Libraries, the Administration and individual members of staff and students of the University of Cape Town to adopt and exploit information technologies to enhance their work.

ICTS is guided by facilitative standards and policies approved by the University Information & Communication Technology Committee. (UICTC)

The ICTS organisational chart, Appendix A, is quite extensive, but does not include all IT support staff. The Commerce faculty has its own I.T. Department that serves the entire Faculty of Commerce, i.e. Academic and support staff in the Departments of Information Systems, Accounting, Management Studies and Economics. This department supports approximately 280 staff machines, as well as plus minus 3700 students who register for a commerce degree, plus approximately another 1000 that register for courses offered in the Commerce Faculty, but are registered for other degrees, and who work in the Commerce Computer Labs.

Commerce I.T. is made up of an I.T. Manager, two Technical Support Administrators, one I.T. Server Administrator, two Technical Assistants and one Microlab Assistant. Temporary Staff consists of a team of Help Desk Tutors to give support in the labs and three Web Assistants who do support on the Commerce Faculty Web Site.

UNIVERSITY OF CAPE TOWN AND THE IT MODEL

Leadership: It can be seen from the organogram of ICTS of the University of Cape Town that it fits into the model by being headed by an executive director.

Hierarchy vs. Flat Structure: UCT is a small simple university with a single campus and seven faculties. The environment is neither stable nor completely dynamic as per the assumption in chapter two. The suggested organisational structure for ICTS is flat. However, ICTS in contradiction to the model has a hierarchical structure.

Centralised vs. Decentralised: The commerce faculty is different from the other six units in that it has its own IT support function. The rest of the university receives their IT support from a centralised IT function.

It is difficult to establish if the other units are interdependent or homogenous, but the single compact campus indicates a centralised organisational culture. The model in this case recommends a centralised IT function for UCT.

Internal vs. External Service: There is no clear indication of the University of Cape Town's dependence on Information, but judging by the lack of a mission statement for ICTS it must be medium to low. It also shows that the importance of sustained, innovative resource management also medium to low. The recommendation for UCT is thus to outsource its IT function, but it remains an internal service.

IT/Business Goals: ICTS exists to enable and assist the university community to adopt and exploit information technologies to enhance their work. From this statement one can conclude that ICTS operates as more than a basic service provider, but not quite as a full service provider that adds value to UCT. The suggested ratio of IT support staff to end-user is between 1:100 and 1:200 and with a ratio of 1:145, ICTS is within the recommendations of the model. However, with a ratio of IT staff to end-user of 1:60 it fails to meet the industry standard.

UNIVERSITY OF ORANGE FREE STATE

The University of the Free State is one of South Africa's oldest universities, and will celebrate its centenary in 2004. The UFS is an important research centre. The six faculties offer a full range of under- and postgraduate programmes to more than 20 000 students.

The University is a multicultural and multi-lingual institution with parallel-medium instruction (English and Afrikaans). (www.uovs.ac.za)

The University consists of the following faculties:

- Economic and Management Sciences (which includes a School of Management)
- The Humanities (which includes a School of Education and a School of Sport, Biokinetics and Leisure Sciences)
- Health Sciences (which consists of the School of Medicine, the School of Nursing and the School of Allied Health Professions)
- Natural and Agricultural Sciences
- Law
- Theology

Student Numbers:	
Total student body (2001)	12,083

Staff Members:	
Academic (permanent):	539
Academic (temporary):	364
Non-academic (permanent):	1,072
Non-academic (temporary):	1,366

Figure 3.15: Statistics of the University of Orange Free State

COMPUTER SERVICES

Computer Services are responsible for the co-ordination and distribution of computer apparatus, programmes, networks and systems. The installation base comprises about 3 000 microcomputers and printers.

Full Time Staff Member Name	Position
ALTONA, ET (Mr)	Director Computer Services
ALTONA, T (Mr)	Computer Technician
BESTER, D (Mr)	Director User Support
BESTER, MM (Mrs)	Analyst/Programmer
BOTHA, JA (Mr)	Project Leader
BOTHA, WN (Mr)	Advisor
BRAND, CJC (Mr)	Advisor
BUCHNER, I (Mrs)	Project Leader
DE LANGE, GF (Mr)	Project Manager
DIEDERICKS, CD (Mr)	Senior Computer Technician
DU TOIT, LT (Mr)	Project Leader
ERASMUS, LDJ (Mr)	Computer Technician
FOURIE, PJ (Mr)	Project Manager
HISCOCK, RD (Mr)	Project Manager
JACOBS, JSH (Mrs)	Senior Data Typist
JACOBS, RF (Mr)	Operator
JANSE VAN RENSBURG, E (Mrs)	Senior Data Typist
JOUBERT, H (Mr)	Manager Operating Systems
JOUBERT, MC (Miss)	Advisor
KILIAN, A (Mr)	Advisor
KOTZE, GDP (Mr)	Operator
LOUW, AA (Mr)	Advisor
MARAIS, F (Mr)	Advisor
MARAIS, LCDV (Mrs)	Controller
MARAIS, LF (Mr)	Programmer
MASONDO, CK (MR)	Technician
NAGEL, WJ (Mr)	Operations Manager
PIENAAR, AR (Mr)	Programmer
POTTAS, JJ (Mr)	Analyst/Programmer
SAIDOVA, N (MS)	Advisor
SCHWELLA, IC (Miss)	Junior Shift Leader
SETAJ, MJ (MR)	Advisor
SMIT, KA (Mrs)	Manager Academic Systems
SONNEKUS, RJ (Mr)	Advisor

STEVENS, BG (Mrs)	Secretary
VAN VUUREN, MJ (Mr)	Manager Personal Computers
VAN ZADELHOFF, CJ (MR)	Director: CIT
Part Time Staff Member Name	Position
DU PLESSIS, R (Mr)	Student Assistant
LUBBE, AJ (Mr)	Computer Technician
VAN ECK, A (Mr)	Student Assistant

Figure 3.16: Computer Services Staff of the University of Orange Free State

UNIVERSITY OF ORANGE FREE STATE AND THE IT MODEL

Leadership: Computer Services of the University of Orange Free State does not have an executive leader as recommended by the model. Instead it has a director.

Hierarchy vs. Flat Structure: UOFS is a medium-sized university with a single campus in an environment that is neither stable nor is it completely dynamic. The structure of Computing Services is flat which is in line with the recommendations of the model.

Centralised vs. Decentralised Structure: The university has six faculties on a single campus which points to a culture of centralisation. Based on this fact the recommendation is for a centralised IT function, which Computer Services is.

Internal vs. External Service: There is no indication of a forward-looking IT strategy of UOFS and there is no indication of a high dependence on information. Computer Services is responsible for the co-ordination and distribution of computer apparatus, programmes, networks and systems. There is no indication of sophistication of information technology at the university. These factors together with the fact that IT is not integrated into the units of the university indicate a need to outsource the IT function. Computer Services does not fit into the model because it is an internal service of the university.

IT/Business Goals: Computer Services is responsible for the co-ordination and distribution of computer apparatus, programmes, networks and systems. This statement indicates that cost-effectiveness and scalability are more important than

being a full service provider. The IT support staff to end-user ratio for UOFS is 1:244 which is higher than the recommended 1:200. UOFS with one IT staff for every 122 end-user also far exceeds the industry standard ratio of 1:30.

CHAPTER 4: THE INFORMATION TECHNOLOGY DIVISION OF NATAL UNIVERSITY

INTRODUCTION

Mission: The University of Natal strives to serve all sections of its community through excellence in scholarship, teaching, learning, research and development.



This chapter will examine how the Information Technology Division of the University is structured and if it adds value to the university in order for the university to achieve the goals and objectives stated in the mission statement.

UNIVERSITY OF NATAL – GEOGRAPHICAL SETUP

Located in KwaZulu-Natal Province's two main centres, the University of Natal offers prospective students the choice of four campuses, each with its own distinctive character. Durban is situated on the east coast of KwaZulu-Natal, while Pietermaritzburg is located approximately eighty kilometres inland from Durban. Westville lies between these two major centres, on the outskirts of Durban.

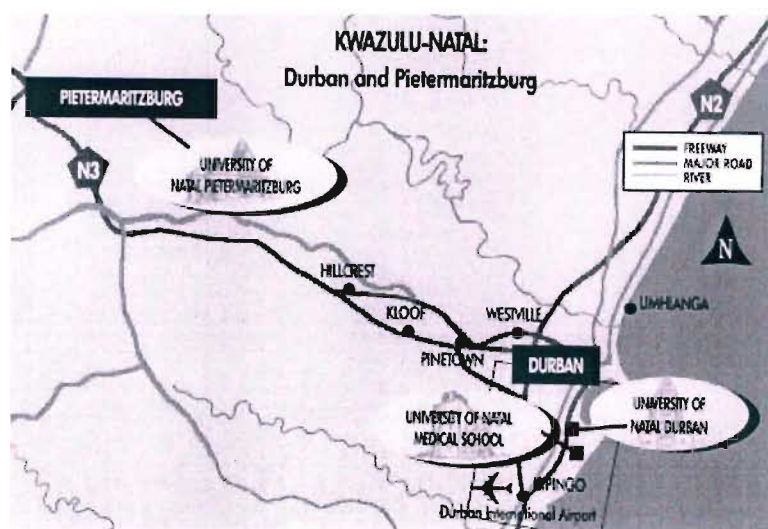


Figure 4:1: Geographical Layout of the University of Natal

While there is considerable overlap in the subjects offered at Durban and Pietermaritzburg, there are some important differences: Architecture, Medicine, Music, Social Work and Nursing are only offered in Durban, while Agriculture, Theology and Fine Art are only offered in Pietermaritzburg. Edgewood originally a teacher's training college, offers subjects in Education and its allied disciplines only. The Nelson Mandela School of Medicine is known as the Medical School and offers subjects in the field of medicine.

Altogether the University Of Natal comprises the following campuses and their associated satellite sites.

- Main Campus - Durban
- Pietermaritzburg
- Medical School - Durban
- Edgewood – Pinetown

There are altogether 24,236 students enrolled in the ten faculties of the university. The ten faculties of Natal University are located on one or more of these campuses. Each faculty has one or more schools. These various campuses also hosts over fifty research centres and institutes.

The University Of Natal is currently in the process of merging with the University of Durban-Westville. This will add another campus. For the sake of this paper, the study will be limited to the current structure of four campuses.

The University has a worldwide reputation for academic excellence in teaching and research and all degrees awarded are internationally recognised. The University has formal links, exchange programmes and collaborative teaching and research programmes with many other universities around the globe. A large number of agreements and Memoranda of Understanding have been signed with various institutions in Asia, Europe, USA and other parts of Africa.

INFORMATION TECHNOLOGY DIVISION (ITD)

MISSION

“ . . .to enable and facilitate the integration of information technology into the University’s processes, through capacity building, active partnership with the University Community, and excellence in service, to create, maintain and enhance competitive advantage in and through the use of IT.”

It is important that IT specialists in higher education cease to be passive service providers and become active partners, enablers, facilitators, and capacity builders. The IT Division’s mission is to achieve levels of service based precisely upon such a partnership with the University Community.

STRATEGIC PLANNING

In order to achieve these goals, three sub-plans are in the process of formulation: an academic plan, an information systems plan and a telecommunications plan. All three plans fall outside the scope of the Information Technology Division. The ITD Director is only one of the members of these committees. Academics and other support departments are also represented.

Where Does ITD Fit into the University Organogram

University of Natal Executive and Senior Staff

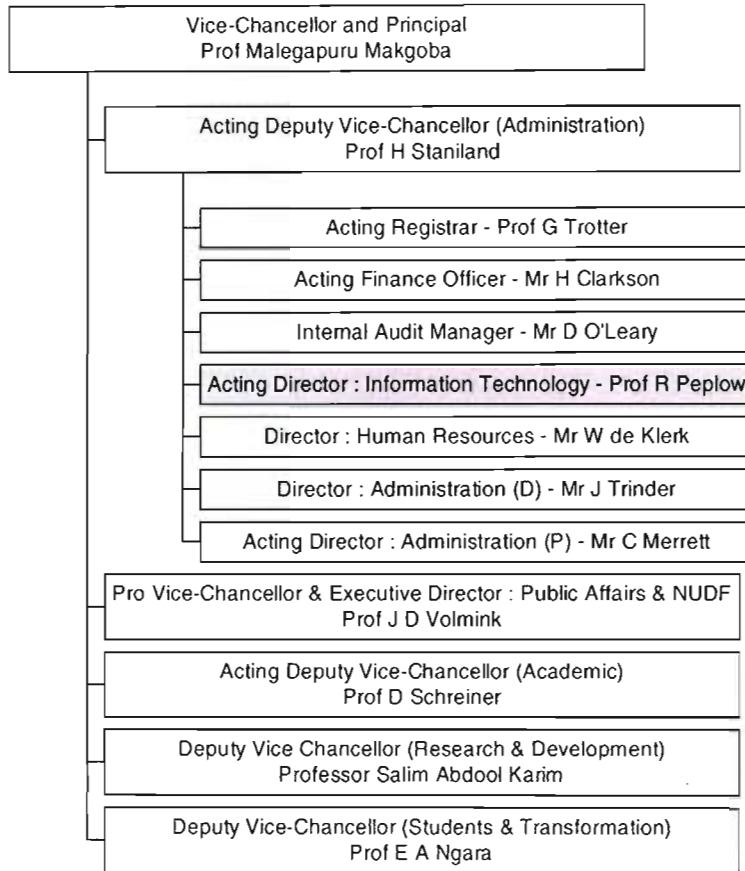


Figure 4:2: University Of Natal Executive and Senior Staff

ITD ORGANOGRAM

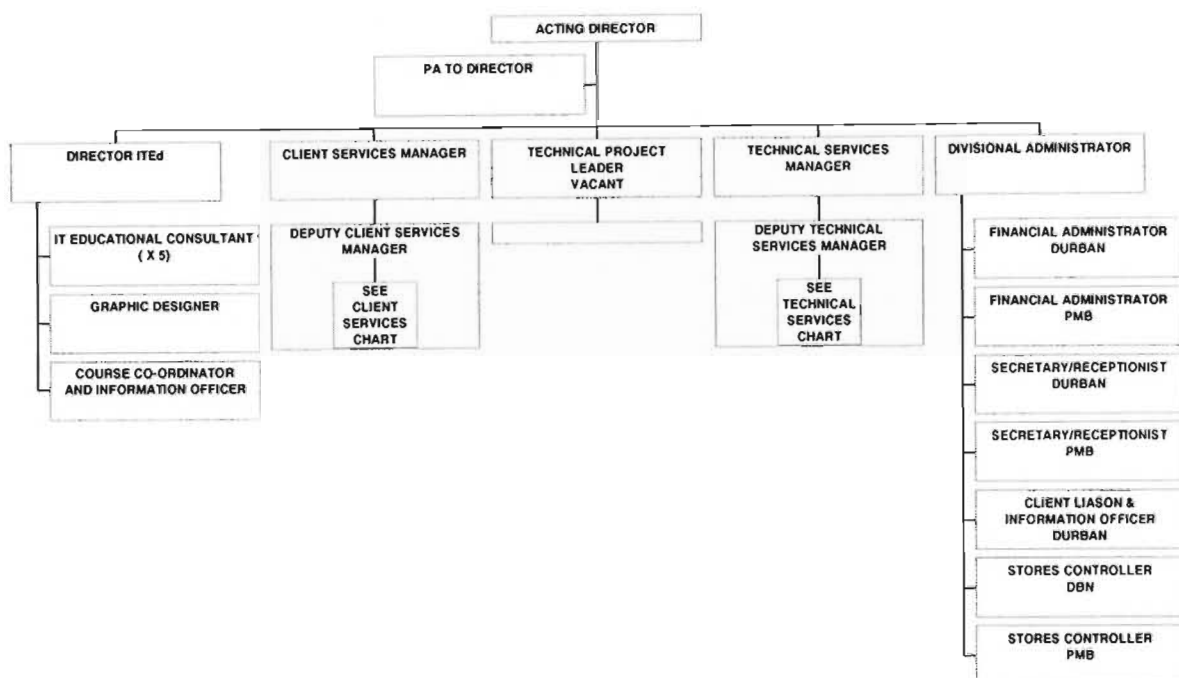


Figure 4.3: ITD Organogram

ITD PLANNING

The Information Technology Division consists of a number of closely integrated components that collectively provide and manage all the services required by a modern organisation for creation, management, delivery and communication of all digital documents and services.

The functional units within the IT Division report to the office of the director. This office is also responsible for strategic planning, policy formulation, and quality control.

IT planning cannot be disconnected from wider University strategic planning processes. An IT strategic plan is a subset of a wider plan, and has meaning and purpose only if it is built upon a synergy of planning that encompasses all the

constituencies that are affected by, or have an interest in, IT planning.

Foundational principle (1): A ubiquitous, reliable, scalable network.

Foundational principle (2): A PC on the desk of every knowledge worker, in a standard configuration and with standardised software, immune from the pressures of politically driven budgeting, and connected to the network.

Foundational principle (3): Basic tools of the trade for every knowledge worker: Groupware, Internet access, and office productivity software.

Foundational principle (4): an average ratio of 10 students per common access PC, in labs configured in multiple ways: ITD managed, Faculty managed, and school managed.

Foundational principle (5): every knowledge worker and student is trained in using the hardware, software, network and information resources to which he or she has access.

IT in education: IT is used not simply to enhance existing teaching and learning processes. IT is regarded rather as both a driver of a paradigm shift and a means to exploit that shift.

IT in research: Rich information resources and appropriate equipment are available to all who have a responsibility for research.

IT in administration: IT is used to streamline business processes, eliminate latency and duplication, and promote efficiency and effectiveness in the University's administration.

Information systems (1): Every knowledge worker has access to the corporate knowledge, data and information that he or she requires.

Information systems (2): Systems are planned, designed and procured to secure maximum integration.

Information systems (3): Corporate data is immune from tampering, exposure or other attack.

Resource management: IT management focuses on reliability, cost-effectiveness, accountability, benchmarking and reporting, and TCO.

Relationship management: The IT Division conceives of its role to be both that of service provider and of partner, enabler and capacity builder.

TECHNICAL SERVICES

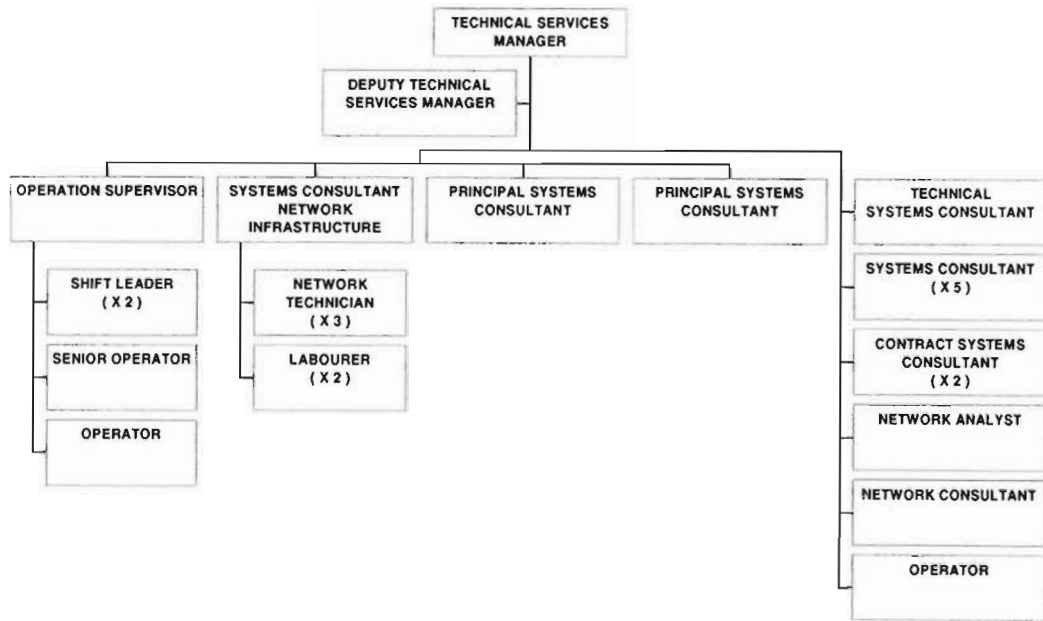


Figure 4.4: Organogram - Technical Services of ITD, Natal University

The Technical Services division within ITD at the University Of Natal provides support to the university's core infrastructure, server's, data communications as well as various other systems. Technical Services provides for the needs and services for campuses in Durban, Pietermaritzburg, Edgewood and Medical School.

The technical services team provides the following services:

- **Intranet Facility**
 - The university's intranet, running off a Windows NT server, is used to disseminate information pertinent to the university itself. It enables secure access to various types of information including on-line access to student photographs, session dates and student marks.
- **Backup services**
 - Technical Services maintains backups of all systems. Copies of all backups are stored off-site.
- **Consultancy**
 - ITD can provide consultancy where a department is wishing to cable or re-cable a building or area.
- **CDs Online**
 - Technical Services provides, on behalf of the library and other departments, the infrastructure for a range of online CD-based information systems. These include Ovid, Jutastat, MethSci, Institute for Scientific Information Citation Indexes, Library of Congress Catalogue, Medline, the Oxford English Dictionary, and MSDS.
- **Cabling**
 - Installation of backbone cabling to buildings from the network centre(s) on campus. This is usually fibre optic cabling. Connected to the backbone cabling inside the building are hub(s) to which the users PCs are connected. The cost of this cabling is usually covered within the ITD budget but recovered over time by incorporating it into the LAN connection charge. There is currently approximately 70 kilometres of fibre-optic cable, with built-in redundancy in place, over the three campuses.
- **Dial-In Facilities**
 - A dial-in facility is available to users.
- **E-Mail**
 - Groupwise is the university's e-mail system, in part because of its extensive functionality. The Technical Service section also maintains the mail gateways that give users access to Internet mail.

- **LAN connections**
 - The Technical Services section is responsible for the installation of UTP cabling and LAN points from offices to the networking hub.
- **Servers**
 - The networking section supports and services 50 Novell file servers, a number of NT as well as some Unix servers. These are connected via a Wide-Area Network (WAN) using ISDN lines, Radio and Infra Red Links between the Howard College campus, Medical School, Pietermaritzburg, Wentworth Hospital and the Campbell Collections.
- **Unix Systems**
 - Technical Services provides and maintains DNS, DHCP, HTTP, FTP, NNTP and firewall services on Unix machines. In addition to this a number of machines exist purely for academic purposes, both teaching and research.

CLIENT SERVICES

The objective of Client Services is to provide efficient, effective and high-quality information technology support, ensuring our users receive the appropriate training and are informed of developments within the IT world and within our Campuses.

To facilitate the provision of an extensive range of services provided to a very large user base with varying IT skill levels, Client Services is divided into four functional areas consisting of User Support, Student LANs, Staff Training and Project Management.

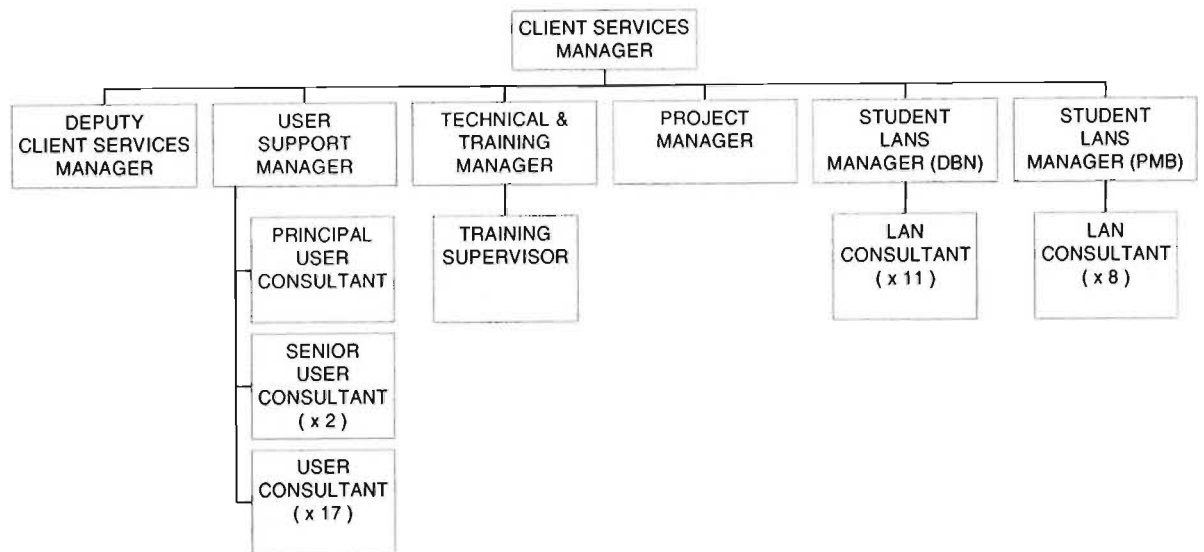


Figure 4.5: Organogram - Client Services of ITD, Natal University

Overview of the Functional Areas of Client Services

User Support: User Support is the first point of contact between the Information Technology Division and the University community. They provide a consultancy and support service to all users of computer equipment. This incorporates hardware, software and first line networking.

Student LANS: This Team is responsible for maintaining the Computer Laboratories and providing guidance and support to students and staff utilising these facilities. The University has a number of Computer Laboratories operating 24/7, ensuring that all its students become 'computer literate' during the course of their studies.

Training: The primary focus of the Training is to provide computer courses for the University Staff. Students and members of the public can also attend these courses for a nominal fee.

Projects: The project office is responsible for the planning and monitoring of projects undertaken by Client Services.

INFORMATION SYSTEMS

This Information Systems section of ITD provides a comprehensive support and service of the Administrative Systems of the University. The core of our work covers areas of investigation, documentation, design, development, maintenance and training of mainly the primary application systems viz. ITS.

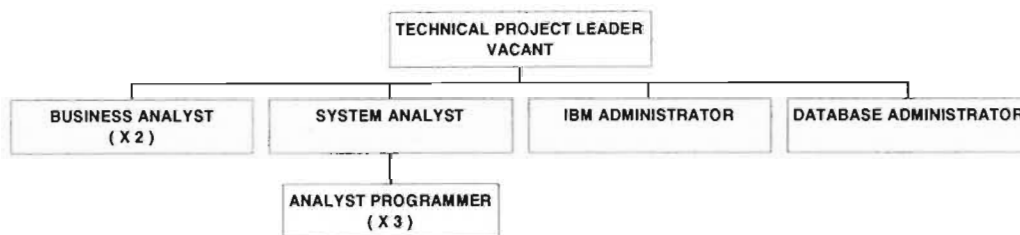


Figure 4.6: Organogram – Information Systems of ITD, Natal University

The functions performed within the section include operating systems administration, database management and application (e.g. ITS) programs development, implementation, training and support of systems acquired from third party vendors or our 'home-grown systems' or (application) modules. Currently, the ITS integrated database system is the primary application used for University administrative functions.

EXTERNAL PRESSURE (OPPORTUNITIES AND THREATS)

Government is combining universities in a move to consolidate. To make the tertiary education sector more efficient. Universities are being made more accountable and need to justify their existence.

Because of the gradual removal of government funding, universities need to generate more income to make up for government spending less and less per student at a tertiary institution. Each department needs to have a good financial plan and be stricter with budgeting. Need to do more with less.

In the new economy, intangible assets, such as intellectual capital and knowledge have become scarce and desirable. At the same time companies in South Africa and universities in particular are forced to abide by the employment equity act. Natal University's employment equity plan is to ensure that each department has a representative number of each of the four race groups in KwaZulu-Natal. Each department including the IT function needs to comply.

The process of hiring the right person for the job is difficult in itself. The university is competing for limited available skilled people with organisations who are in a better position to offer market – related salaries or better. The people with the right skills for the job do not always fall into the correct race group to meet the requirements of the employment equity plan, and therein lays the dilemma. One option is to identify potential candidates from the desired race group and train them into the jobs. This means spending time and money in developing people, who will probably be snatched by the corporate world eventually.

Outsourcing is a constant threat. There are users on campus who believe that they would get a better service if the whole of ITD were outsourced.

INTERNAL ENVIRONMENT (STRENGTHS AND WEAKNESSES)

Up until four years ago the information technology units of Durban and Pietermaritzburg campuses operated as two separate divisions, each with its own director. A decision was made to merge the two divisions and it is now a highly centralised unit. The Medical School campus now also falls under the same umbrella. When Edgewood Teacher's College of Education became a part of the University of Natal, it was easy to extend the services of ITD to the newly incorporated staff. The centralised ITD structure is more cost efficient, requiring only one Director and the internal administration of the department has been consolidated.

An internal weakness in the Information Technology Division is that there is a lack of communication between sections within the department. This leads to unnecessary delays in resolving user requests and user problems. This leads to the situation that service level agreements are not met.

Another weakness is that there is no clarity on what services are offered, either to support staff, or to the user community. This leads to unfair expectations from users and lack of accountability on the part of the IT support staff. For this reason there is a perception on the part of the user community that the internal Information Technology Division is inefficient and ineffective.

ITD STAFF TO END-USER RATIO CALCULATION

UNIVERSITY OF NATAL STAFF HEAD COUNT 2003				
CAMPUS	APPOINTMENT TYPE	MALE	FEMALE	TOTAL
DURBAN				
	ACADEMIC FIXED	85	88	173
	ACADEMIC PERMENANT	275	163	438
	SUPPORT FIXED	75	155	230
	SUPPORT PERMANENT	396	400	796
	EXECUTIVE	5	0	5
	CAMPUS TOTAL	836	806	1642
PIETERMARITZBURG				
	ACADEMIC FIXED	12	29	41
	ACADEMIC PERMENANT	223	133	356
	SUPPORT FIXED	46	114	160
	SUPPORT PERMANENT	267	266	533
	CAMPUS TOTAL	548	542	1090
MEDICAL SCHOOL				
	ACADEMIC FIXED	16	23	39
	ACADEMIC PERMENANT	56	28	84
	SUPPORT FIXED	23	122	144
	SUPPORT PERMANENT	35	103	138
	CAMPUS TOTAL	130	276	405
EDGEWOOD				
	ACADEMIC FIXED	4	11	15
	ACADEMIC PERMENANT	20	25	45
	SUPPORT FIXED	6	5	11
	SUPPORT PERMANENT	6	17	23
	CAMPUS TOTAL	36	58	94
GRAND TOTAL		1817	1949	3498

Figure 4.7: Total Number of Staff Employed at the University Of Natal

There is a total of 99 staff employed in the Information Technology Division. Twenty-one of which provide support for students in the student LANs. Three additional posts are vacant, which implies that there is a need and they will be filled eventually. Effectively there is 78 ITD staff supporting 3,489 university staff computer users. The ITD staff to staff user ratio for the Information Technology Division of the University of Natal is 1:44.7

Developing the right end-user/IT support staff ratio (2001) is concerned with support staff numbers and does not include administrative staff of the information technology function. At ITD the support staff is part of the Client Services section. There is one principal consultant, two senior consultants and 17 user support consultants. Altogether there are twenty IT support staff providing an IT service to 3,489 end-users. The ratio is thus one IT support staff per 174 end-users, **1:174**.

To compare this figure to the GartnerGroup report of January 1999, we need to calculate the percentage of IT staff to end-user. Of the 3,489 staff of the University of Natal, 78 of them provide IT support to the rest of the organisation. The 3,489 head count is inclusive of the IT staff and the figure 78 includes all IT staff except those who provide support to students. Thus we can calculate the total IT employee to organisation employee ratio as **1:45**.

NATAL UNIVERSITY AND THE IT MODEL

Leadership: The ITD Director reports to the Vice-Chancellor of Administration who is the executive representative for the Information Technology Division as well as other administrative divisions. There is no Chief Information Officer on the executive board of the University of Natal. The Information Technology Division of the University of Natal does not conform to the model's recommendation that the IT function requires executive representation on the University's governing board.

Hierarchy vs. Flat Structure: The structure of ITD is hierarchical in nature because it is mechanistic and there are clear lines of authority. ITD is structured according to functionality. You have the User Support function, the Technical Services function,

as well as the Academic Computing function. For each of these functions there is a senior manager who reports directly to the director. Depending on which section is being examined, there are at least two levels of senior management, including the director, and in the larger sections there is another level of middle management.

With over 24,000 students and more than 3,000 staff, Natal University is a medium-sized university in an environment that is neither stable nor completely dynamic. This puts it firmly in the middle of figure 2.5. The guidelines of the model do not provide any clear-cut recommendations for ITD.

Centralised vs. Decentralised Structure: The units or faculties at Natal University are not interdependent but are homogenous in terms of their IT requirements. The culture of the university is one of centralisation. The campuses are not too widely spread and all the other support functions like Human Resources and Finance, are centralised. The model, in this instance, recommends a centralised IT function.

The Information Technology Division of the University of Natal has a centralised organisational structure. Decisions are made at the higher levels of the department. The director is the head of the division and there is one level of senior managers below the director. This is the team that makes all the decisions for the department. The decisions made at this level affect the information technology support that is provided to all four campuses.

Internal vs. External Service: Natal University's current dependence on information technology is medium to high and so is the importance of sustained, innovative resource management. Judging from Natal's position on the strategic grid, the IT model recommends that ITD remains an internal service.

IT/Business Goals: In the mission statement of ITD, it states the need to provide "... excellence in service, to create, maintain and enhance competitive advantage in and through the use of IT. To achieve this, ITD needs to provide a full IT service that adds value and according to the model this can be achieved with a IT support staff to end-user ratio of 1:100. At Natal University, however, the ratio is 1:175. The

university also falls short in that it has one IT staff for every 45 end-user which is far higher than the recommended 1:32 of the IT model of chapter two.

ITD cannot be described as a full service IT unit especially when compared to the University of Indiana. Indiana's UITS offers far more services than ITD. In essence the model seems to fit, in that Natal University does not have the correct ratio to provide a full service and it can be seen by the services it provides that it does not offer a full IT service.

CHAPTER 5: CONCLUSION

INTRODUCTION

Chapter five provides a summary of all the universities' information technology units and compares each on size, organisational structure, IT staff levels and how they fit into the IT model developed in chapter two.

Recommendations will be formed about the organisational structure and staffing levels for the Information Technology Division of the University Of Natal. These recommendations will be based on the IT model as well as on what the other ten universities in the sample have in place.

SIZE AND COMPLEXITY OF THE UNIVERSITY

	Enrolled Students	No. of Campuses	No. of Faculties	No. of Divisions	No. of Departments
LSE	6,724	1	6		18
Oxford	16,500	45		6	21
Monash	21,253	8	10	20	
UniSA	27,263	6		4	120
Sydney	42,420	9			
Yale	5,668	3		12	
Indiana	53,600	6			
UCT	18,985	1	7		
UOFS	12,083	1	6		
Natal	24,236	4	10		12

Figure 5.1: Summary of Statistics of the Universities

The largest university in terms of student enrolment is Indiana University with 53,600 students with medium complexity due to its six campuses found throughout the state of Indiana. The smallest and probably simplest, with 6,724 students and single compact campus is LSE. Monash and UniSA have a similar number of student enrolments.

The most widespread university is Monash, which has most of its campuses in Australia, along with one campus each in South Africa and Malaysia and offices in

Italy and the UK. LSE once again is the smallest in this respect with a single campus found in the centre of London. Oxford University is made up of a lot of small campuses each with its own culture and governance which makes Oxford University the most complex.

Oxford, Sydney, Orange Free State, Yale, and Cape Town are within boundaries of a city. Indiana, South Australia and Natal are spread over a region or state.

ORGANISATIONAL STRUCTURE

LEADERSHIP

McNurlin and Sprague (2002) state that the IT leadership comes from a “chief information officer” CIO who must be high enough in an organisation to influence organisational goals and have enough in an organisation to influence organisational goals, and have enough credibility to lead the harnessing of the technology to pursue those goals. Furthermore, the major role of the CIO is to bridge the gap between the business and technology. The IT model in chapter two recommends that the IT function of all universities need a CIO or equivalent who is an executive member of the institution’s governing body. This is to ensure that the IT leadership is fully aware of the institutions goals and objectives and the governing body is able to understand the importance of its IT investment.

	Title of the Head of IT	Executive on Governing Body
LSE	Librarian and Director of Information Services	No
Oxford	No one single person	No
Monash	Executive Director	Yes
UniSA	Information Strategy and Technology Services Group	No
Sydney	Director	No
Yale	Director and University CIO	Yes
Indiana	Vice President and CIO	Yes
UCT	Executive Director	Yes
UOFS	Director	No
Natal	Director	No

Figure 5.2: Comparison of the IT Leadership at Universities

LSE, UniSA, Sydney, Orange Free State and Natal do not have a CIO or equivalent as the head of the IT function as recommended by the IT model. Natal and Orange Free State have a director who reports to the Administrative Executive, while LSE's IT function is part of the library services. Monash, Yale, Indiana and UCT do have an IT executive on the governing body of their respective organisations.

Oxford and UniSA do not have a single person as the head of their IT functions, but rather one or more committees who provide the direction and the strategy for information technology in the institution. This is interesting because these are the only two universities in this sample that have a completely decentralised IT function. In a decentralised IT function, the model fails because it does not accommodate for the fact that the IT objectives and strategy tends to be guided by a committee rather than one single person.

Of the ten universities examined four comply with the recommendations of the IT model by having executive representation of the IT function on the governing board of the institution, four have leaders who are not executives and two do not have a single person as head of the IT function, but rather one or more committees who do not have executive powers.

It seems that when the IT function is represented at the highest level of the university governing body, service delivery is better integrated with the vision of the university. Yale and Indiana, for example, provide a far better service than Natal University and one gets the impression that these university governing bodies are more prepared to invest resources into IT. Therefore, in a centralised IT function the model is not only correct in recommending an executive leadership, it is also advantageous to the organisation to adhere to it in this respect.

HIERARCHY VS. FLAT STRUCTURE

In a hierarchy, control is high but decision-making is slow. A flat organisational structure, on the other hand is fast, flexible and focused on areas of core competencies. Applegate et al (1999) introduces a third structure, the concept of the "Information Age Organization" that combines the control of the hierarchical

structure and the flexibility of the flat for large complex organisations that operate in a dynamic environment.

The IT model establishes which structure is ideal based on the size and complexity of the organisation and whether the organisation operates in a stable or dynamic environment. If the organisation is large and operates in a stable environment, then the IT function should be hierarchical. If it is small and operates in either a stable or dynamic environment, then the IT function should be flat and simple. If the organisation is large and complex and operates in a dynamic environment then the information age or collaborative structure is advised.

	The IT Model Recommends	The Actual Structure in Place
LSE	Flat	Flat
Oxford	None	Flat
Monash	Collaboration	Hierarchy (with elements of collaboration)
UniSA	Hierarchy/Collaboration	Flat (divisional structure)
Sydney	Collaboration	Hierarchy
Yale	Flat	Hierarchy
Indiana	Hierarchy/Collaboration	Hierarchy
UCT	Flat	Hierarchy
UOFS	Flat	Flat
Natal	None	Hierarchy

Figure 5.3: Hierarchy vs. Flat Structure

Only three universities, LSE, Indiana and UOFS follow the recommendations of the model. There is little correlation between the IT model recommendations and the actual structures in place. This is due probably to the fact that it is difficult to objectively assess the complexity of an organisation and the environment in which the organisation operates.

Once again the model does not fit with the two universities that have a decentralised IT function. The model is unable to prescribe an ideal structure for Oxford University and in the case of the University of South Australia (UniSA) the recommendation of the IT model would probably work if the IT function were centralised.

CENTRALISED VS. DECENTRALISED STRUCTURE

When the IT functionality is centralised, it means that a central IT unit is responsible for most computing activities. When a user department identifies a requirement for a new or enhanced information system they have to apply for it through the centralised IS department (Boddy, Boonstra & Kennedy 2002). When the IT service is decentralised, the organisational units become responsible for their systems – including development, acquisition, operations and maintenance. IT staff is dispersed over the various business units. The IT model of chapter two recommends that the IT function of universities should be decentralised unless their business units or faculties are interdependent or homogeneous and the culture of the university is one of centralisation.

	The IT Model Recommends	The Actual Structure in Place
LSE	Centralisation	Centralisation
Oxford	Decentralisation	Decentralisation
Monash	Decentralisation	Centralisation
UniSA	Decentralisation	Decentralisation
Sydney	Decentralisation	Centralisation
Yale	Centralisation	Centralisation
Indiana	Decentralisation	Centralisation
UCT	Centralisation	Centralisation
UOFS	Centralisation	Centralisation
Natal	Centralisation	Centralisation

Figure 5.4: Centralised vs. Decentralised Structure

Monash, Sydney and Indiana do not fit into the model's recommendation of when to centralise the IT function and when to have it completely devolved. Monash's IT function should be decentralised due to the fact that they have campuses and offices all over the world and need to accommodate completely different international cultures. The centralised model probably works for them because most of their campuses are in Australia and those that aren't are relatively small.

Most of the universities favour the centralised model and the IT model also seems to recommend centralisation more often than not.

INTERNAL VS. EXTERNAL SERVICE

Internal services are most simply defined as the services a firm requires to operate but for which there is no direct tie to revenue. In other words, internal services are not directly billable and therefore only subtract from the firm's net income or bottom line. Outsourcing is the movement of an internal service outside the firm and the establishment of a business relationship with another company to provide the service (Piede 1996).

The decision to outsource is based on, amongst other things, the company's position on the strategic grid. The strategic grid evaluates the company's dependence on information technology and the importance placed on sustained and innovative information resource development. If the importance of sustained, innovative information resource development to the organisation is high, then the IT model recommends that the IT function remains internal unless facing a crisis of IT competence or effectiveness.

Other factors that influence the decision to outsource is the level of IT integration within the business units. The more integrated IT is, the more difficult it is to outsource. If the company has not kept up to date with the latest technology it is easier and more cost effective to outsource the task of bringing the company up to date rather than attempting the task internally. It is also easier to outsource if the organisation is constantly changing and its people are able to adapt because then outsourcing becomes just another change.

	The IT Model Recommends	The Actual Structure in Place
LSE	External	Internal
Oxford	Internal	Internal
Monash	Internal	Internal
UniSA	External	Internal
Sydney	Internal	Internal
Yale	Internal	Internal
Indiana	Internal	Internal
UCT	External	Internal
UOFS	External	Internal
Natal	Internal	Internal

Figure 5.5: Internal vs. External

Every single university has an internal IT service without any indication of outsourcing at any level. It would seem that these universities agree on the fact that they are better served if their IT functions remain an internal service. The model seems to be irrelevant in this case.

IT STAFFING LEVELS

	Number of IT Support Staff	Total Number of Staff	IT Support Staff/User Ratio	Total Number of IT Staff	Total Number of Staff	Total IT Staff/User Ratio
LSE	27	1,300	48.15	37	1,300	35.14
Oxford (single division)	11	427	38.82			
Monash		5,300		200	5,300	26.50
UniSa		2,048		89	2,048	23.01
UniSa (single department)	8	350	43.75			
Sydney	28	5,819	207.82	81	5,819	71.84
Yale	75	7,892	105.23	334	7,892	23.63
Indiana	213	15,000	70.42	552	15,000	27.17
UCT	31	4,500	145.16	74	4,500	60.81
UOFS	10	2,438	243.80	20	2,438	121.90
Natal	20	3,498	174.90	78	3,498	44.85

Figure 5.6: Summary of Ratios of the Universities

In chapter two the Gartner report found that on average, across all industries, there was one IT employee for every 15.2 enterprise employee, i.e., IT staff constitutes 6.58 percent of the total head count. For institutions of higher education this average is 1:32.05. The median for this sector is an IT employee to total enterprise employee ratio of 1:40. The IT model uses average of 1:32 as a recommendation.

Furthermore, to calculate the required IT support staff to end-user ratio, the model examines the IT or business goals of the institution. The recommendation ranges from 1:50 IT support staff to end-user for institutions wishing to be at the cutting edge of innovation to 1:200 if cost effectiveness and scalability are most important.

	Recommended IT Support Staff/User Ratio	Actual IT Support Staff/User Ratio	Recommended Total IT Staff/User Ratio	Actual Total IT Staff/User Ratio
LSE	100-200	48	32	35
Oxford (single division)	200	39		
Monash	50-100		32	27
UniSa			32	23
UniSa (single department)	200	44		
Sydney	100-200	208	32	72
Yale	100	105	32	24
Indiana	50-100	70	32	27
UCT	100-200	145	32	61
UOFS	200	244	32	122
Natal	200	175	32	45

Figure 5.7: Ratio Calculations and the IT Model

There are currently 45 users for each ITD staff member at Natal University. This figure is considerably higher than the Gartner report average for institutions of higher education. Monash and UniSA in Australia are well below this mark while the third Australian university is much higher than the mark and exceeds Natal University. The two American Universities are also well within the suggested ratio.

Interestingly enough all the South African universities are above the 1:32 average with Natal University having the most favourable information technology staff complement of all three.

Both the American universities are the only universities to achieve the desired 1:100 ratio with Indiana far exceeding this requirement. Indiana University, it is interesting to note is the one university that comes close to providing a comprehensive all-encompassing service. Their IUTS service directory is extensive. Both Yale and Indiana offer a wide variety of services like media services, a film center (Yale) and Web development, which the other university IT units do not offer.

A point of interest is that the IT support staff to end-user ratio is more favourable when the support it provided locally. This means that departments that have their own IT support staff have greater and easier access to IT support.

RECOMMENDATIONS FOR THE INFORMATION TECHNOLOGY DIVISION OF NATAL UNIVERSITY

LEADERSHIP

Even though the majority of the IT functions of the sample universities did not have an executive representative on the governing bodies of their institution as recommended by the IT model, the ones that did seemed to offer a better service. The Yale, Indiana and Monash universities seemed to invest more resources into their IT function, especially in terms of staffing levels. This afforded them the opportunity to offer a wider range of services and allows them to add value to their institutions. This suggests that the model is correct in recommending executive representation of the IT function at the highest possible level in the governance of the university.

ITD lacks a representative at executive level. The university, by having a CIO will show that it is committed to its IT investment and this will also ensure that the IT strategy is closely linked to the goals and objectives of the University. Instead of the director reporting to the Acting Deputy Vice-Chancellor (Administration), he should be reporting to a Chief Information Officer who will represent ITD on the Executive Board of the University of Natal.

HIERARCHY VS. FLAT STRUCTURE

Only three of the ten universities comply with the recommendations of the IT model. For this reason, it makes sense to look at universities that are similar to Natal University rather than the IT model only.

Monash University and the University of Cape Town are similar to Natal in terms of student enrolment, total staff numbers and complexity. Furthermore UCT is similar in geographic layout to the university. In both of these universities we find that they have a hierarchical structure that contradicts the IT model, which prescribes a flat structure. This suggests that the best structure, perhaps, is a combination of the two, i.e., a flatter hierarchical structure.

There are currently three levels of managers at ITD: the director, managers of each functional unit and in some sections another level of line managers. The last level of line managers needs to be removed to reduce bureaucratic red tape and bring the director closer the user community. In essences, the Information Technology Division of Natal University needs a flatter hierarchical structure.

CENTRALISED VS. DECENTRALISED STRUCTURE

The IT model of chapter two is very good at prescribing whether the IT function should be centralised or decentralised. Only two universities did not fit into the model.

The best organisational structure for the Information Technology Division of Natal University is a centralised structure as recommended by the IT model. The scope and size of the university is not big enough to justify the inherent complexity of a decentralised organisational structure.

INTERNAL VS. EXTERNAL SERVICE

All the universities in the sample are internal, regardless of the recommendations of the model.

The major reason for outsourcing certain functions is to enable organisations to concentrate on their core functions. It could, therefore, be argued that even though IT is not a core function of tertiary education institutions, it is an integral part of teaching and research that are core functions. This is a possible explanation for universities preferring to keep their IT functions internal.

The IT function at Natal University needs to remain an internal service. There is a fair amount of flexibility in ITD in respect to having access to cutting edge technology and the ability to experiment. An external service provider will provide an IT strategy for a fixed period of time and will not deviate without adding to the cost of the agreement. Inflexibility is not an ideal situation for universities, especially since teaching and research encourages freethinking and experimentation.

IT/BUSINESS GOALS AND STAFFING LEVELS OF THE IT FUNCTION

The IT model uses the industry standard ratio of 1:32 total IT staff to end-user as a guideline. This is not an ideal figure, but it serves as good starting point. The second ratio, the IT support staff to end-user ratio, is dependent on the IT or business goals of the university and its IT function. The IT model's recommendations are fairly good because most of the universities' IT support staff to end-user ratios fell within the recommendations. Those that do not comply with the recommendation seem to be falling short of their goals.

For ITD to add value to the University and justify its existence, it needs to operate like a business unit and compete on full service and overall value. This means that, using the recommendations of the IT model, ITD needs more information technology staff and more importantly, the department needs fifteen more support staff to deal directly with the end-user and provide first level support.

CONCLUSION

Drawing from the recommendations of the IT model as well as from structures in place at the sample universities, the ideal organisational structure and staffing levels for ITD has been established. With this organisational structure and staffing levels, sufficient IT staff will be effectively deployed allowing ITD to extend their services and become a total solution provider and add true value to their role at the University of Natal.

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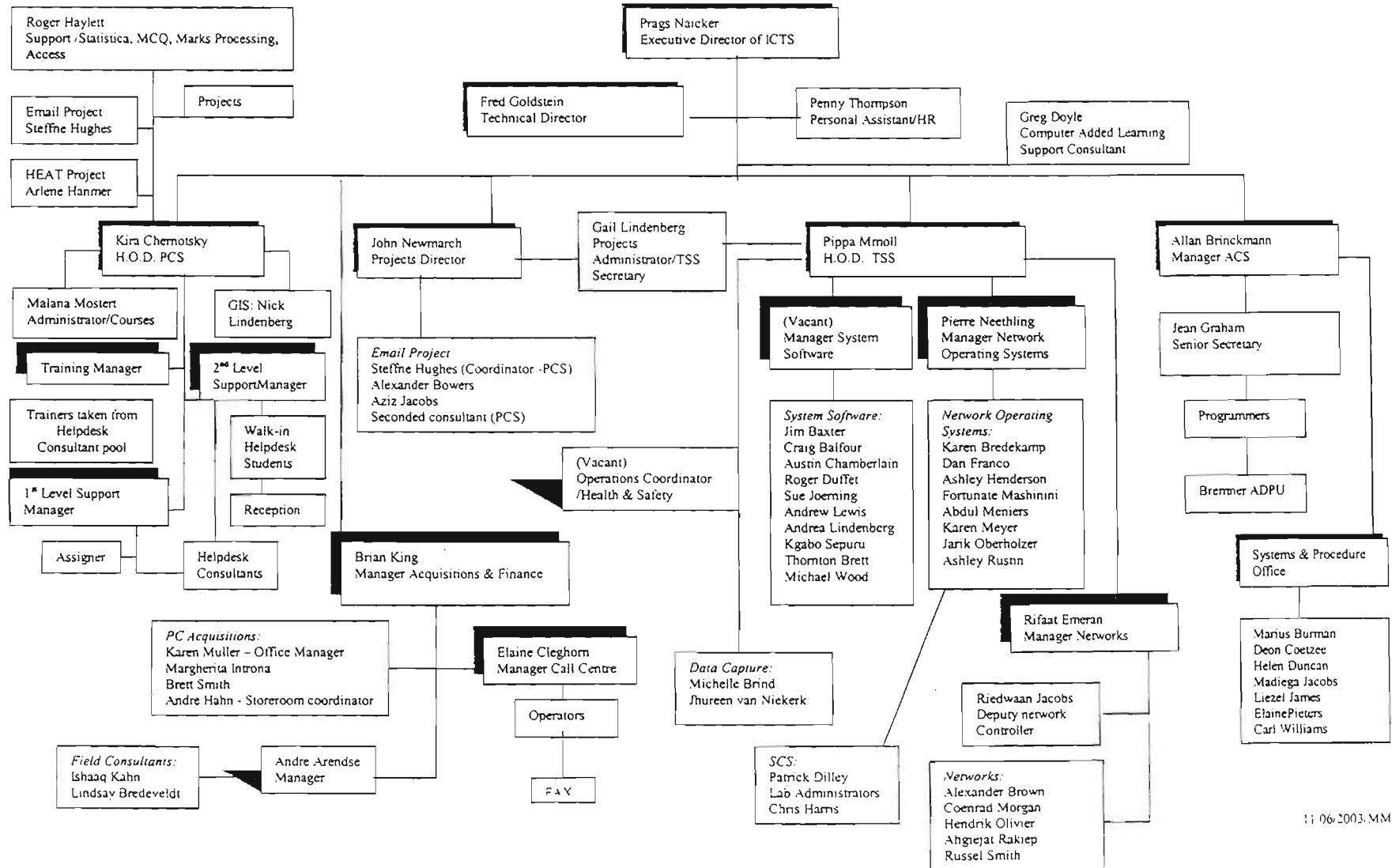
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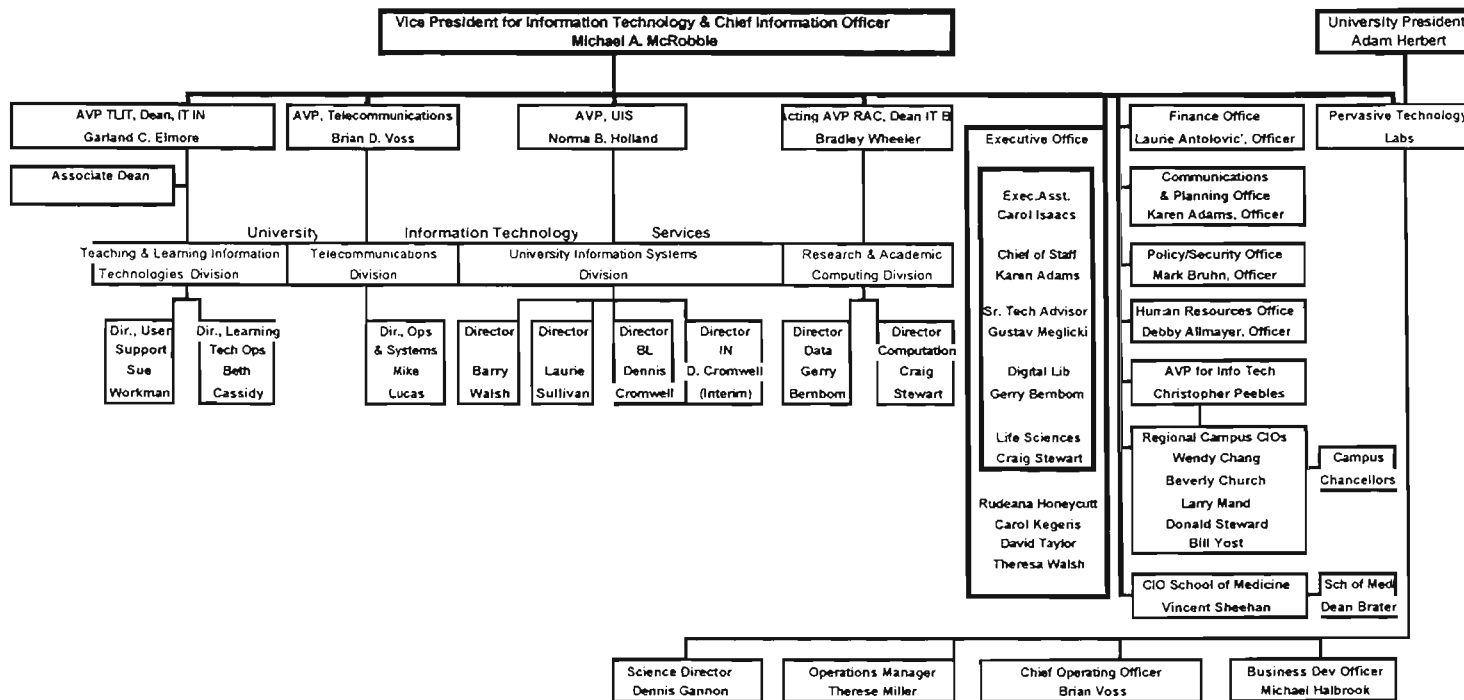
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APPENDIX I ORGANOGRAM OF ICTS OF THE UNIVERSITY OF CAPE TOWN
Information and Communication Technology Services



APPENDIX II ORGANISATIONAL CHART OF UITS OF INDIANA UNIVERSITY

Indiana University
Office of the Vice President for Information Technology
Organizational Chart
Jul-03



Organizational chart includes appointed staff only