3. The Information Technology environment

3.1 An idiosyncratic overview of the information world

The digital reality of the world is encroaching upon all of us as individuals. Broadly speaking the last 5 years have seen the distribution of networked personal computers onto the desks of individual employees in the workplace. The last 2 years has seen many of these PCs linked to the external world of the internet. We routinely email our colleagues internationally and nationally. Use of the telephone and 'snail mail' is decreasing as we conduct business by email. Internet technology has been adopted at an extraordinary rate, with the architecture being mimicked in-house with the developments of intranets as an internal information distribution backbone in organisations, and extranets which enable organisations to share selected portions of their own internal intranet information with trusted external partners.

In our personal lives, we are increasingly familiar with communications software and notions of connectivity through mobile telephones, modem hook-ups to internet service providers, interactive digital transactions via telephones and cable TV. Our children routinely play on the internet, less phased by the amazing technological achievements and advances which enable this to take place, than frustrated by the connection speeds achievable.

The speed with which all this has happened is nothing short of revolutionary. The social implications of such a change are emerging gradually and are likely to be no less radical than the impact of literacy or printing upon our society. The shape of nation states, the nature of international economies and cultural hegemonies are set to alter. At the same time, the nature of parts of our communities are changing with the emergence of communities on the internet. Organisations, too, are changing shape and dynamics. Steady restructuring is the norm for most organisations in response to rapidly changing environments and opportunities. Movement away from rigid hierarchical bureaucracies to team based, open ended, even virtual organisations is taking place.

In these social changes a huge reliance is placed upon the information infrastructure which is assumed. As a general rule, the information infrastructures have been lacking. If in 1994 John MacDonald described the office environment as the wild west, the internet is perhaps the latest (last?) frontier. Cowboys are everywhere. Power struggles erupt. The forces of law and order are struggling to keep a framework appropriate to the rapid developments of the net environment. Evangelists are there too - free speech, a 'pure' network for community and individual good rather than the nasty tainted commercial gain being sought by the entrepreneurs. Microsoft is battling it out at twenty paces with the regulators over trade restraint and monopolies. Various self interested or disinterested bodies are trying to establish standards for various components of the internet, but the reality has been that the absence of standards has fuelled the growth and development of the creature. Encryption software is classed as a military weapon. In various countries, the law men are out there patrolling the boundaries restricting access to the subversive
material on the web and monitoring what comes in. Hype abounds. Vapourware is the norm. Snake oil salesmen lurk around every corner.

The internet is an incredibly dynamic environment - get a conceptual hold of one part of it and - like Flubber - its off in another direction. It is also undoubtedly where the future lies. The internet environment is not only important for our personal interaction via the web, but because it is fast becoming the new mechanism to transact business. Business on the web is at present a slightly illusory promise, but the commercial realities of governments and organisations mean that in the next 5 years, business on the web will be a reality.

Governments are struggling to find ways to regulate the net. Issues such as censorship, privacy, encryption, taxation, regulation and deregulation, equity have been the subject of innumerable government reports in every nation. Fibre optic cables, digital telephone lines and satellites as the backbone technologies have been dramatically upgraded. New industries are emerging and huge businesses emerge in extraordinary short time frames (think of internet service providers or Netscape, for example).

These developments have considerable impact on individual organisations. The adoption of intranet technology as a private and protected extension of the internet software and protocols, means that the developments in the internet environment will rapidly be picked up and translated into the organisation.

As product cycles shorten, response time is demand driven and technological change will continue rapidly as our experience of the last 5 years has shown. There are developments which fall by the way side, or which fail to keep up to the pace of change. Records as a ubiquitous by-product of paper transactions, so taken for granted as to be almost invisible, has been one of the areas which has been ignored in this great technological rush. The recordkeeping community itself has been taken somewhat by surprise by the pace of change and the huge shifts in business and organisational dynamics. One of the high endeavours of this subject is about orienting us to take advantage of the internet enabled world and to think of strategies which will take us into the encroaching reality of electronic business. We must think at a conceptual and strategic level, understanding the ideas behind some of the technologies because the instances of the technologies are undergoing such rapid change that we need to follow the basics, so as to have enough understanding to apply in dynamic situations.

3.2 An impressionistic account of where most organisations are

Bold assertions that the internet provides us with views and developments for the future, need to be tempered with organisational realities. The uptake of various information technologies in organisations is as varied as the number of organisations themselves. No two organisations are comparable in terms of their information infrastructure. Many are avoiding the bleeding edge of technology uptake.

**Information systems**

Most organisations have a variety of information systems in current operation. These will include function specific information systems such as human resource systems, which may in themselves comprise a number of applications. They will have a variety of 'operation critical' systems or systems which support the actual base conduct of the business. Often these are transaction processing systems of one type or another. On top of these types of systems will be
information systems which abstract or extract from the various functional/transaction processing systems and provide management information systems or executive information systems for planning, forecasting, inventory control etc. Increasingly all employees will have access to a uniform set of office software - for example, an organisation might decide to adopt the Microsoft platform distributed to all desktops, operating Office 97 using local area networks and wide area networks. Some organisations have implemented groupware systems, such as Lotus Notes to assist collaborative work. Electronic document management systems and workflow systems are installed to assist in the management of specific areas of office automation. Records management systems are implemented in many organisations to supplement these office automation tools. Emerging from paper based paradigms of records management, such systems are in transition as they evolve further to actually store electronic documents, linked virtually to files.

Many organisations have developed and implemented intranets, email and internet connectivity during the last 12-18 months. Initially at least, the intranets are used to distribute and disseminate documentation and organisations are looking to use the intranet as a common user interface for access to a number of functional applications. Some organisations, using increasingly sophisticated 'firewall' security organisations, are exploring making parts of the intranet available externally, usually to trusted partners, via Extranets. Increasing numbers of organisations are thinking about doing business on the net, but most are hampered by the unclear legal status of electronic transactions, the lack of security, the complexity of regulations which apply across national and international domains and lack of an appropriate infrastructure for electronic payments.

All these operational application systems are typically based on database technologies. Again, organisations can support one major database platform, such as Oracle, or have a number of databases attached to each application, operating through a variety of interfaces.

**Information technology hardware environments**

In terms of information infrastructure, information architectures can be defined according to the hardware configurations employed by organisations. In this view of the information technology environment we find organisations in a variety of stages. Initial IT infrastructure was predicated on the main frame computer as the centralised locus of all data storage and operations. Mainframes were supplemented by 'dumb terminals'. These terminals were used to input data or to change data and to access the information available on the mainframe. Such implementation environments were prevalent until the late 1980's.

In the late 1980s the personal computer and its increasingly powerful processing capacity was introduced into the work environment. The PC initially stood alone and through standard distributed software individual business units developed small scale applications to suit their own operational requirements. With the stabilisation of network software in the early-mid 1980s, local area networks were introduced to allow PCs to be linked in various configurations within an organisation (and within one geographic location).

'Smart terminals' or PCs were also introduced into the mainframe environment in the mid 1980s, with a proportion of the data processing capacity distributed to the PC. Data was communicated to the mainframe applications which remained the locus of the authoritative data. This architecture quickly expanded to encompass more than only mainframe computers, with a variety of storage devices including midrange and micro computers being networked to one or many applications. The distributed hardware environment is still prevalent in most organisations.
The diversity of links between machines linked via networks makes this a very flexible information architecture.

Client/server and enterprise-wide computing environments are the information technology architectures most commonly developing in organisations. The client/server environment presumes a networked environment. In this environment, certain machines (of various sizes, capacity etc) are nominated as the server or storage device for a particular application - the server part of client/server. Clients (again of various size and capacity) are linked to that server for the purposes of data processing. One computer can act as a client in one application and at the same time a server in another. Some machines are nominated as the main locus, or server, for particular types of transactions - eg all the communications transactions. Data sharing using the network infrastructure and flexibility in deployment of the computers are the major advantages of client/server architectures.

Enterprise-wide client/server architectures extends the networking to embrace all applications of the organisation within one coherent information architecture. This information architecture deployment seeks to overcome the situation where individual departments have exclusive access to particular applications by extending their availability to the whole organisation.

In reality, most organisations have a variety of systems in place. While the supported information architecture may now be enterprise-wide client/servers, there are still many operational systems written to suit previous environments. These are the so-called 'legacy' systems which are often still in existence, often still supporting business functionality, or the repositories of years of valuable data still required for current business purposes.

This overview of information systems and their structures is obviously over simplified. A more comprehensive account of these things can be found in Information Systems textbooks. The point is that every organisation is dealing with the realities of introducing electronic information systems and work practices at different rates and according to the information technologies supported in each individual environment and their individual organisational imperatives.

3.3 The near future

The emergence and rapid adoption of the internet as a major information infrastructure in our society changes and will continue to change the information environment in which our organisations operate. In the past few years the dominance of the operating protocols derived from the internet environment have come to have significant impact on organisational operation through intranets and extranets. Basic office automation packages, such as the Microsoft Office suite, are internet enabled, capable of producing documents in forms which already contain the HTML tags necessary to transform them into documents distributable on intranets and extranets. Rather than merely passive objects to be disseminated or 'published' on these nets, businesses will rapidly move to transacting business over the net. Document-like-objects (DIOs) are already the dominant form on the internet.

3.4 Implications for our subject

The reality of the workplace which each of us operates within will therefore be a complex mixture of information technology architectures, information systems and information technology infrastructures (networks etc). Each of us will need to read the principles of dealing with electronic recordkeeping into our own environment. No course dealing with electronic
recordkeeping can hope to deal with the specific environments which confront us as individual recordkeepers.

In this reality, the most immediately implementable for starting electronic recordkeeping will be in selecting off the shelf packages and integrating their functionality to serve recordkeeping purposes. Such practical, real-life issues are dealt with extensively in IMS 5047, Business Records Management, a subject which takes an office automation case study and examines various technologies and implementation issues associated with those technologies.

Rather, this subject is interested in exploring options for the emerging environments. To evolve recordkeeping implementations as effective and implementable in the emerging technologies, we need to orient ourselves to what is happening. It is a dynamic environment and won't stay static for us to catch breath or to feel entirely comfortable. But I hope we will keep questions like the following in our minds as we progress through the subject:

- What options are available to us as recordkeepers with the advent of the internet environment and the truly networked society?
- How do we deal with records within this environment?
- What thinking is out there about the ways which DlOs will work?
- What infrastructure questions are being thought through or even implemented?
- How will these impact on recordkeepers?
- What strategies are being adopted by other information communities?
- How does the records community intersect or 'piggy-back' onto these developments?
- How good is our current state of understanding, and what else do we need to know?

An exploration of the current technologies and the rapidly approaching future technologies is the focus of this subject. We will be returning to these issues throughout our semester's work.

Reflection

The above sections contain a very superficial and subjective view of the information technology environment facing us today.

How do the assertions made live up to your own experience?

Can you describe your own organisation or experience in these terms?