EXECUTIVE INFORMATION SYSTEMS, COMPANY LIBRARIES AND THE FUTURE OF INFORMATION SERVICES IN BUSINESS

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"The secret of business is to know
something that nobody else knows"
(Aristotle Onassis)

This thesis is dedicated to Bernard S. McClemens 1925 - 1993

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SUMMARY

The aim of the study was to investigate the development of Executive Information Systems (EIS) in twenty large British companies and to also determine what role, if any, the company library played. Also investigated was the future of the library and other corporate information systems as a provider of information services to business. A multiple-case study methodology was adopted for carrying out the research. Interviews were conducted with nearly 70 respondents; these included librarians, EIS developers and senior manager users of the EIS, and EIS vendors.

All three corporate respondent groups have poor perception of Information Management policy, politics and culture. Most EIS are developed using prototyping or CSF method without reference to any frameworks or strategic business plan, and a lack of co-operation from senior managers.

EIS are developed because of internal pressures. Their main use is as an operational tool and for monitoring/analysis. EIS has made managers more aware of information as corporate asset but few request improvements to the system. Most EIS are successful and percolate further down the management hierarchy, but they have not lived up to their original expectations. EIS impact on both the library and company is slight.

Most librarians know about EIS, mainly by chance. Only four company libraries were involved in the development of EIS because most EIS are internal financial systems, and the library is seen as irrelevant. However, they are more likely to be involved if the library reports to a corporate strategy department, be physically near EIS teams, and personally know the EIS developers. Libraries are consulted because they are seen as external data experts; their main role is acting as external information consultants or as a conduit for external sources directly into the EIS.

Despite many librarians being proactive many also have a pessimistic view of their future. They believe they are seen by senior management as increasingly irrelevant and targets for cost cutting, and as such few openly promote themselves within the company. However, the study also shows that librarians may have new roles to play as information becomes much more widely accessible in business through knowledge management technology such as Lotus Notes and intranets.

INTRODUCTION TO THE STUDY

Aim and scope of the research

The object of this study is to investigate the development of Executive Information Systems (EIS) in large British companies, and to establish what role, if any, their libraries play in this development. In addition the future of information services was considered in the light of technology that is encroaching on the functions of EIS, i.e. knowledge management software such as Notes.

The research will consider what methods are used to develop the EIS and if there is any relationship to whether an EIS is a success of failure. It will also examine the methods EIS and libraries use to collect and store their information, and whether the position of these departments in the company has any bearing on how they are perceived by each other. Finally, the future of the corporate library and their role in providing information will be considered, particularly with reference to internet and knowledge management technology. Thus the study addresses three main questions:

1. What is the role corporate libraries play in the development of the EIS?
2. How are EIS developed and used in these companies?
3. What is the future of information services in British companies?

The study set out to glean data on EIS and libraries through a pilot study which involved the researcher visiting a major corporate library and a number of EIS vendors. Twenty companies were investigated and a member from each of the three groups targeted were interviewed; these included company librarians, EIS developers and senior manager users of the EIS. Multiple case-studies was considered the most appropriate methodology to use, because it enabled the researcher to both observe and collate information at the same time. It was also thought that a postal survey would not provide such a rich quantity of data to investigate, or achieve such a positive response from the respondents. Previous

research on the topic, revealed that no work had been done on the role corporate libraries have in the development of management systems for senior manager. The corporate respondents who gave their time for this research were interviewed between January - November 1994, while the study was finally completed by July 1999. However, within this time period there also appeared the graphical interface of the internet, the World Wide Web (WWW), sophisticated knowledge management software such as Notes and corporate intranets. This not also made a great deal of information easily available to company staff other than corporate librarians, they also offered some of the functions of a corporate EIS at a far lower cost.

It is hoped, therefore, the study has contributed in some small measure into how corporate librarians can, in the future, become more closely involved with the development of important corporate information systems, and moreover, utilise their skills to enhance the value of the library in the procurement of information for the company.

OUTLINE OF THE THESIS

Chapter one looks the background development of corporate libraries, Executive Information Systems (EIS), how the latter have evolved from other management information systems and a short description of some typical EIS packages. Also briefly investigated are how intranets and other information retrieval software may be the future for business information services.

Chapter two presents the literature review of the study. This includes sources used, contemporary research available on corporate libraries and EIS, and in particular, British studies of EIS.

Chapter three considers the methodological considerations of the study and looks and some of the techniques used for investigating management systems. Also explained is why the case-study method was chosen over others and a qualitative approach taken.

Chapter four presents the case-study method in more detail and outlines the case-study protocol of the study. Details of the interview strategy, questions, and method of data analysis are dealt with.

Chapter five looks at company information management policies, politics and culture. How the corporate libraries and EIS in this study collect and disseminate their information is investigated, as is the storage methods and structure of the information. Library budget and staff issues are looked at. It considers that it is probably factors such as politics and culture that are responsible for the perceptions and attitudes respondents have towards their company

Chapter six concentrates on the perceptions and attitudes of the respondents have towards each other and themselves, in respect of their company departments and interests, that is, the corporate library and the EIS.

Chapter seven focuses on the development of the company EIS. How and why they were developed and which corporate libraries played a role. The EIS's impact on the company and individuals is emphasised.

Chapter eight closes with the conclusions reached from the research, that is, the role of company libraries in the development of EIS and the future of information services in business. Also considered is the influence of other knowledge management software, such as intranets and groupware like Lotus Notes. Finally, future research recommendations are made.

CHAPTER ONE: BACKGROUND REVIEW – EXECUTIVE INFORMATION SYSTEMS, COMPANY LIBRARIES AND THE SUPPLY OF BUSINESS INFORMATION.

1.1 Executive Information Systems

Executive Information Systems, or as they are more generally known, EIS, are computer-based information systems designed to provide senior managers with easy access to information they consider relevant to do their job. An EIS can support both operational and strategic activities such as viewing market movements, analysing sales forecasts, setting policies, planning, and preparing budgets. The objective of these systems is to gather, analyse, and integrate both internal and external data, into dynamic profiles of key performance indicators that are critical to organisational success.

EIS are not the first type of information systems developed for managerial use; in the 1960s Management Information Systems (MIS) made their debut. These systems were mainly used for operational management in companies and were crude in comparison to the EIS of today. They tended to print copious amounts of data on line printers, meaning that to find any worthwhile information needed a great deal of time analysing text and figures. They had not been developed long before researchers such as Ackoff (1967) began to highlight their deficiencies and managers began to look for other alternatives. This came about with the introduction of Decision Support Systems (DSS) from Gorry and Scott Morton in 1971 and which are still in use today. These systems were based on mathematical modelling methods and are capable of 'what if' analysis using standard query language (SQL). Furthermore, DSS enabled managers to ask questions of predominantly internal data and accomplish sophisticated tasks, in particular; *ad hoc* queries, regression analysis, time series analysis and simulation analysis. However, Keen and Scott Morton (1978) argued that DSS are able to support the decision making of only structured or semi-structured tasks, but not unstructured ones. Moreover, DSS tended only to be used by managers in the operational and tactical departments of the organisation. They also needed an investment of time

and skill for their users to get the most from their complicated interface and modelling techniques. This complicated interface and the time it took to learn features such as SQL meant that DSS did not move on to the desks of the most senior managers, who were still being hampered by not having access to the information they required in a format they could readily understand and use quickly.

By 1981 Rockart and Treacy had introduced the concept of Executive Information Systems (EIS) in several working papers and later outlined their structure in a seminal article in an issue of *Harvard Business Review* in 1982 (Rockart and Treacy 1982). The main characteristic of EIS is that they are able to process less structured tasks with far more ease than either MIS or DSS. By the mid 1980s software that had evolved from both MIS and DSS began to appear under the name of EIS, or sometimes Executive Support Systems, ESS. While an EIS provides information, an ESS implies the addition of other support functions, like word-processing and diary entries. Watson et al (1991) conceptualises an ESS as including several capabilities that EIS omit, namely:

- support for electronic communication (e.g. e-mail, computer conferencing, word processing).

- data analysis capabilities (e.g. spreadsheets, query languages, and decision support systems).

- organising tools (e.g., automated calendars, electronic filofaxes)

The systems were developed by American companies such as Comshare and Pilot, who had looked at existing MIS and DSS and developed a more broadly based tool that was both easy to use and designed to access both internal and external data. EIS soon started arriving in Great Britain although according to Land in a report by the Economist Intelligence Unit (1991), the first EIS in Britain was not, as commonly thought in the literature, installed at ICI, but at the Naval Office of the US Embassy in London in 1984.

Although there are many definitions of an EIS, they all describe an easy to use computer information system that can access data and present it to senior

managers in an uncomplicated format. For example, Rockart and Delong state than an EIS is:

> "The routine use of a computer based system, most often through a direct access to a terminal or personal computer, for any business function. The users are either the CEO or a member of the senior management team reporting directly to him or her. EIS can be implemented at the corporate or divisional level" (Rockart & Delong, 1988)

However, this definition is so broad it could equally apply to almost any piece of software such as a spreadsheet package like Excel. A more succinct definition is given by O'Brian (1993), who incidentally states that an EIS provides top management with critical success factors (CSF), a method of identifying key business indicators developed by Rockart (1979)

> "EIS are information systems that combine many of the features of information reporting systems and decision support systems. However, their focus is on meeting the strategic information needs of top management, who need information to support their strategic panning and control responsibilities. Thus, the goal of EIS is to provide top management with immediate and easy access to information about a firm's critical success factors (CSF), that is, key factors that are critical to accomplishing an organisation's strategic objectives" (O'Brian 1993)

For the purpose of this study, and for interviewing respondents who may have not heard of an EIS, the following definition was devised by the author from the many cited in the literature:

> "An EIS is a set of tools designed to provide executives and managers with accurate, timely information about their organisations and products. An EIS organises data into different categories and reports. Because its primary focus is information, an EIS differs from a decision support system (DSS), which is primarily designed to help with analysis and decision making. The interface of an EIS permits a very intuitive and easy access to information primarily through the use of a mouse or touch screen"

While EIS differ considerably in the number of features built in to them, their most common attribute is immediate access to a single database where all current financial and operational data can be found. In many cases this information was previously available but was difficult to access or use. Some of the features of EIS include drill-down analysis capabilities (the incremental

examination of data at different levels of detail), trend analysis capabilities (the examination of data across desired time intervals), exception reporting, extensive graphics, providing of data from multiple sources, and highlighting information a senior manager may feel is critical. Whereas the traditional focus of MIS has been on the storage and processing of large amounts of historical operational information, the focus of an EIS is on the retrieval of specific information about the daily or weekly operational status of the organisation's activities, while some EIS can even retrieve data such as share prices in real time. The purpose of an EIS is the monitoring and scanning of the environment to give senior managers rapid exposure to changes in the environment, whereas the purpose of as DSS is to support *ad hoc* decisions as well as routine analysis. Furthermore, the core of DSS is extensive modelling and analysis capabilities but the core of EIS is status information about the organisations key performance indicators. Some EIS even use expert systems or artificial intelligence to help senior managers make a more informed choice, and at least one of the EIS in this study has this capability.

Apart from the need for a better computer interface to access data and the failings of previous information systems, several factors can also explain the appearance of EIS in the 1980s. These are:

- An increased competitive business environment and the recognition of the value of information as a corporate asset (Rockart and Treacy, 1982; Rockart and Delong, 1988; Meiklejohn & Harvey, 1989; Volonino and Watson, 1990; Watson *et al*, 1991; Wetherbe, 1991; Matthews, 1992; Matthews & Shoebridge, 1992b; Belcher & Watson).

- The emergence of a suitable technology, in particular the personal computer and graphical user interface (GUI) (Rockart and Treacy, 1982; Rockart and Delong,1988; Paller and Laska, 1990; Whymark, 1991).

- The increased willingness of senior managers to use IT and have it on their desks (Rockart and Treacy, 1982; Houdeshel and Watson, 1987; Rockart and Delong, 1988; Turban and Schaeffer, 1989; Paller and Laska, 1990; Watson *et al*, 1991; Jordan, 1993).

Most EIS are based upon a muti-dimensional modelling database which is capable of online analytical processing (OLAP). This describes a multi-dimensional approach which allows the user to draw data together from different sources and view it as a 'cube,' which can be turned in any direction, to report on any dimension or set of dimensions such as time periods, sales regions or products. An EIS can either act as a front end interface for existing applications, for example an Access or Oracle database, which will have data fed into its database, or it can be an independent system which requires data to be downloaded into it. Whatever architecture is used to build an EIS the main characteristics remain essentially similar:

- A separate executive database: this holds data regularly used by the senior management of the company and contains key performance indicators about the company from other systems; for example, weekly sales. Much of the information required by senior managers is not always in a suitable form for the EIS, and this means that it must be converted. This requires a high level of integrity and reliability, particularly as some information could be classified and highly commercial.

- Data aggregation facilities: an EIS should be capable of summarising data and performing trend analysis to different levels. Many of these capabilities can already be found in spreadsheets such as Excel, but they are harder to use.

- A highly user friendly interface: this usually means a Windows or other graphical user interface (GUI) with most of the commands being accessed by mouse or touch screen, with the keyboard taking a minor role. The interface will also have a simple password system and give a rapid response of less than five seconds.

- Flexible menu-based retrieval: senior managers are unlikely to take the time to learn keyboard skills, shortcut keystrokes, or SQL, therefore a menu approach is essential. There must also be a consistent method of access from the general to the detailed and a simple structured navigation to internal and external databases.

- High quality, colour, business graphics: an EIS must be able to display, compare and contrast to enhance the perception of the user. It must also have

the ability to translate tabular/cell data into graphical data and be able to overlay and open multiple windows.

- Simple modelling facilities: these include the 'what if' scenarios, planning and prediction, projections and trends, expected and actual performance. Any inconsistencies can be immediacy spotted by different coloured graphics or even multimedia.

- Communications: usually e-mail to send and receive data but also increasingly the ability to embed voice mail annotations.

- Automated links to other databases: an EIS must be able to transfer data to and from both internal and external databases. These can include the company's main internal financial databases and sophisticated external databases such as Reuters, Dow Jones, or FT Profile.

A typical EIS can therefore describe many areas of a company's information structure which a user can interrogate to various levels. Figure one shows a screenshot from an EIS which illustrates how this might appear.

Fig 1. EIS based information
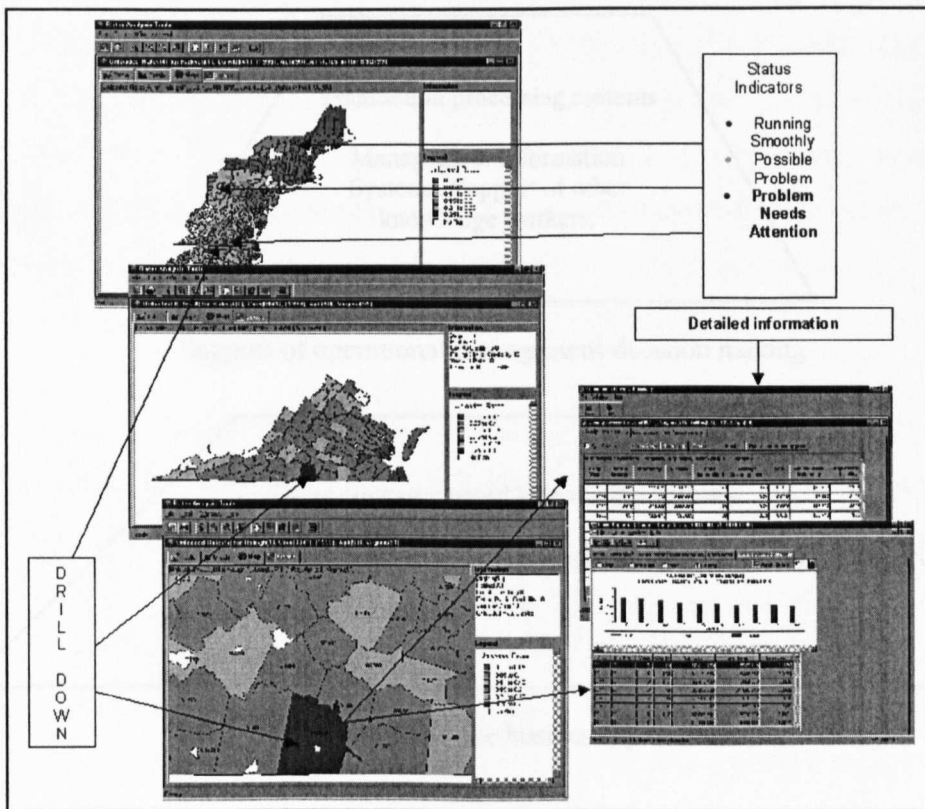
We can see from figure one that not only does an EIS show various data indicators but that it is also possible to drill down further into a specific set of figures to glean more detailed information, or to highlight and track a number of preset parameters which may require further attention.

The EIS is normally at, or near the apex, of the corporate information systems structure, with other underlying systems below as shown in figure two.

Fig 2. A typical corporate information system classification

EIS, AI &
Expert Sys,
Modelling.

Support of tactical and strategic decision making

Transaction processing systems

Management Information
Systems. Support of other
knowledge workers.

Support of operational management decision making

Other computer based information systems.

Non-computer based information systems (e.g. Library).

Support of corporate business operations

Although there is general agreement on what an EIS is and where it fits into the corporate information system hierarchy, there is no such consensus on which framework should be used to build such a system. Frameworks are commonly used to help the development of an information system and many are found in the literature; among the more notable is that of Gorry & Scott Morton (1971), whose framework for DSS is based on the premise that there are generic types of decisions, and which has been used constantly by DSS builders ever since, despite criticism by Moore & Chang (1983), Keen (1987) and Murphy (1992) that it is wrong to talk of structured or programmed problems when discussing DSS. Another widely used framework is that of Sprague's (1980) for MIS. He argued that such frameworks were useful because they are:

> "Helpful in organising a complex subject, identifying the relationships between the parts, and revealing the areas in which further developments will be required " (Sprague, !980).

Turban & Shaeffer (1987) called for a framework for the development of EIS, a call that was answered by several academics in the field. A paper from Watson, Rainer & Koh (1991) based on a survey of 50 organisations in the United States introduced a development process centred on three separate processes; the structural perspective based on personnel and data; the development process of the EIS, and the user-system dialog. This framework is often cited in the literature and is considered a good starting point for developers setting out to build an EIS, however, other frameworks have been developed since.

Edwards & Peppard (1993), for example, suggested that the work of Gorry & Scott Morton (1971) and others on DSS were not appropriate for developing frameworks for EIS because they classified information systems by functional areas. They suggest that instead an EIS should be built according to what similar characteristics they share, for example, monitoring or collecting information. The purpose for which an EIS is built will of course also depend on what information the user of the system wishes to access, however, there is a general consensus of type of information senior managers use in an EIS. Allison, for example, in a 1996 study, found that senior managers used their EIS for eight major tasks

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including monitoring progress, internal reporting and communication and identifying issues amongst the most important. Table one indicates what other uses senior managers make of EIS.

Table 1. The use of EIS by senior managers (Allison ,1996)

Use of EIS	Percentage of managers using EIS in this way
1. Monitoring progress	44
2. Internal reporting and communication	33
3. Identifying issues and early warnings	15
4. Improving the performance of the business	11
5. Analysis of business	11
6. External reporting	8
7. Trend analysis	8
8. Background information	8

However, the benefits a senior manager will receive from using an EIS will depend on how effective his use of it is. Rockart and Delong (1988) expect effective EIS use to bring several major benefits to the company, including:

- Decreased staff levels.

- An increased span of control for managers and fewer levels in corporate hierarchy.

- Changing staff roles, for example, the EIS taking over the role of the delivery of information to senior managers.

- Changing secretarial roles.

- Organisational change, mainly in the area of changing the business focus and power shifts among groups and individuals.

Although EIS have been seen in some quarters as a universal remedy to the problems of senior manager information overload, too much paper, lack of vital information, etc., they are not infallible and like any other information system they to have their limitations and weaknesses. Millet and Mawhinney (1990) note that the EIS is limited in a number of crucial areas including: most information is internal and to obtain acceptable external information is difficult; a change of data sources can mean reprogramming the system; most EIS utilisation is by pre-defined reports and hence output is limited to formats developed for the EIS.

There are many EIS packages available for a company to purchase ranging from simple PC programs such as *Forest & Trees* and *Lightship,* to larger, more complex mainframe/server packages like *Commander EIS* and Pilot *Command Centre.* Other popular packages that are available, and account for the majority in this study, are shown in table two.

Table 2. Popular EIS packages

VENDOR	PRODUCT	FIRST SOLD	PRICE*
Comshare Ltd	Commander EIS	1987	£70,000. 25 users
European Software Publishing	Forest & Trees	1991	£595
Holistic Systems	Holos	1988	£48,000. 4-20 user
Intelligent Office	Track & Essbase	1990	£995 per user
Pilot Software	Command Centre	1984	£30,000. 15 users
Planning Sciences	Gentium	1993	£35,000. 10 users

* 1999 Prices

The American company Comshare produces one of the most popular EIS packages called *Commander EIS.* This was first marketed in 1987 and is available on several different hardware/software platforms including IBM mainframe, DEC VAX, PC compatibles and Macintosh, Unix and Windows. *Commander EIS* operates on the principle of open and distributed architecture with a PC interface for graphics. It is essentially a suite of components that tries

to emulate the typical senior manager's use of paper based material, therefore, the systems comprised units such as a 'Briefing Book, 'Reminder', Redi-Mail', 'ExecuView' and 'News Navigator'. This latter unit is built around the Dow Jones News Retrieval Services, Infomat and Reuters for downloading the latest news to the users of the EIS. In September 1999 Comshare's current EIS was retailing at a price £70,000 for a minimum 25 user licence, however, there are other PC/Windows based EIS packages which are far cheaper to purchase; for example, Dun and Bradstreet's *Forest & Trees* package costs £595 for a single user in 1999.

Much of the information in an EIS, whether external or internal in origin, tends to be hard quantifiable data, such as financial statements. Senior managers rely more on external information than other groups in the organisation, but it is information of a more qualitative and nebulous nature that is needed and used, the very kind of information that is difficult to structurally quantify and include in a database. The sources of information for senior managers are, however, predominately the same as used by the EIS, that is, internal financial data and external competitor data.

The internal information content of an EIS is often specific, quantitative financial data such as:

- Sales.
- Accounts.
- Operational Plans.
- Trend Data.
- Personnel Data.

This particular category of information is typically used by senior managers and is often found in surveys of what information senior managers use; for example, a Romtec survey quoted by Holtham (1990) found that the majority of information used was internal quantifiable data such as sales, budgets and forecasts. External information in the EIS tended to be more a mixture of qualitative informal data

such as news and competitor information, formal quantitative data such as market data, and the share prices of companies. In fact, share prices, according to a report in 1992 by Business Intelligence (Harvey & Goodwin, 1992), is ranked first in a list of external information types for EIS on twenty-one organisations which they surveyed (Table 3). EIS mainly have internal, hard, quantifiable information because most of the data, such as weekly sales figures, personnel numbers, etc., are derived from the company's transaction processing databases.

Table 3. EIS external information types (Harvey & Goodwin,1992)

Rank	Information Type	No of Companies Using
1	Share prices	14
2	Comparative data on competitors' performance	12
3	Competitor activity monitoring	11
4	Market share analysis	9
5 =	Key customer or supplier information	8
5 =	Macroeconomic data	8
6	Brokers' reports	6
7	Standard and business news	4
8 =	Green issues	3
8 =	New technology and product trends	3
9 =	Single European Market	2
9 =	Demographic trends	2

EIS have generally had very little 'soft' information and although there is no accepted definition of what soft information is, it is usually thought of as nebulous, fuzzy, subjective and unofficial. A study by Watson, O'Hara *et al* (1996) of American EIS, found that senior managers did describe some of the information content of their EIS as soft. They found that the number of EIS containing such information varied considerably from rumours and gossip (9.4%) to predictions, speculations, forecasts and estimates (78.1%).

1.2 The changing role and use of EIS

Since the mid 1980s when EIS were first introduced they have undergone something of a metamorphosis both in their structure and use. EIS were initially mainframe based systems that cost a considerable amount of money to implement – usually in the order of £250,000 or more. However, since the advent of the personal computer (PC), servers and Local Area Networks (LANs), EIS can now operate from virtually any machine, for example, a copy of Lightship, can be purchased for less than £600 and used on an inexpensive PC, with the result that many companies have moved away from expensive mainframe-based EIS to cheaper, but no less capable, server-based systems. This change in the architecture of EIS has also been accompanied by a change in their use. EIS had originally been intended for the use of senior managers hence their name, however, since they were so easy to use and could retrieve corporate information without much difficulty, they became far more widely used by other personnel other than senior managers. It also became apparent that, for an EIS to become successful and survive it had to percolate further down the management hierarchy of the organisation.

The 1990s have not only seen a change in the architecture and use of EIS, it has also seen an explosion in the use of the internet, a world-wide connection of computers and networks that had previously be been accessed predominantly by academics and information professionals. This dramatic upsurge in the use of the internet in the early 1990s came about because of first, the invention of the World Wide Web (WWW) concept by Tim Berners-Lee, a British physicist based at the Conseil European por la Recherche Nucleaire (CERN), an international scientific organisation based in Geneva, Switzerland. He created a protocol, HyperText Transfer Protocol (HTTP), which standardised communication between servers and clients and also developed a basic software browser called Enquire to access the information that was stored on these servers. However, the rapid uptake of the WWW was further stimulated by the second important piece of software, the creation of a commercial web browser called Mosaic by Mark Andreessen at the University of Illinois supercomputing centre in 1993. This browser later became

the prototype for the development of both Netscape Navigator in 1994 and Microsoft Explorer in 1995.

The increase in the use of the internet and the rapid take-up of the WWW quickly led to the development of other technologies like intranets (internal company networks based on the WWW) and groupware (which facilitates sharing documents) such as Lotus Notes and Microsoft Exchange (Haley & Watson, 1996; Cheng & Chang, 1998; Watson et al, 1996).

Intranet and groupware technology has proved almost as capable as EIS and in some respects is superior to that of EIS, for example, in the multiple use of a single document. Senior managers have therefore begun to ask why should they pay for an EIS when there are compatible systems that are cheaper, but which can almost perform the same tasks? This new technology has also been paralleled by the development of new corporate information concepts such as knowledge management and business intelligence, and the development of information systems data warehouses. These are repositories of integrated information where data is extracted from other sources as a enquiry is generated, which makes it much easier and more efficient to run the query, were data is not so much retrieved but rather 'mined'. The 1990s thus saw a shift away from the concept of an executive tool for senior managers which was the EIS, to a more general business information system that could be used by many more people in the organisation, and which is now only a part of a suite of management tools that encompass the term knowledge management software.

1.3 The company library and the supply of business information services

Many of the larger British companies have long had their own company library (which are sometimes referred to as industrial or corporate libraries) in some form or another since the early 20th century, for example: Uniliver (1910); Rolls Royce (1906); British Aerospace (1911); Rover (1908); and H.J.Heinz (1900). However, it was not until the 1950s and1960s they began to employ full-time professional librarians even though the Association for Information Management (ASLIB),

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was formed in 1924 (Burkett, 1972). Therefore although some libraries in this thesis can trace their lineage back to the early 20th century, many of them in their present form date from only the 1970s.

Company libraries came into existence because of the ever increasing information and legalisation that the company needed to not only stay in business, but to stay ahead of the competition. Libraries now, however, play a much more important role in acquiring business information that can be vital to the success of the organisation, therefore, in some respects the company library can be viewed as an information system, in that it is there to provide the workers of the company some of the information needed to run it. Most corporate organisations have some form of business information service even if it is only a single librarian, or even someone in the marketing department tasked to provide such information. However, as information has become even more important and even a strategic asset for a company, the provision of accurate and timely business information has become an even more essential commodity for an organisation if it is to stay ahead of the competition. Although the development of simple information retrieval tools such as browsers and groupware like Notes has meant that many more organisational departments, such as marketing, IT and public relations are capable of providing information services to the organisation that was previously the domain of the company library, the latter still remains the primary department for the provision of information services in business.

Company libraries have traditionally been staffed by professional librarians and information scientists who perform a number of vital services for their organisation, in particular:

- Acquiring, distributing and administering journals and books.
- Housing reference materials.
- Retrieving information in response to queries from company personnel.

Libraries are also generally considered to be the company's information experts in that they usually have staff whose knowledge is beyond that of a layman,

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particularly in the area of conducting information searches in the area of published knowledge found outside the company. Moreover, in many companies librarians will be the holders of post-graduate degrees in information/library studies in addition to a first degree, thus making them amongst the most highly educated of all the organisations employees.

A report by the Library Association (1985) cited several reasons why the company library is an important part of an industrial organisation:

1. The library is equipped to organise documents, and more importantly the information they contain, into a structured form so as to regularise its retrieval. The library provides a centre of expertise in handling information, its storage, retrieval and exploitation.
2. Library staff are fully acquainted with the many formats and technology of information storage and retrieval.
3. The library helps the company by saving time avoiding duplication.
4. The library and its staff is the memory of the company library, and is often the central point for the collection and use of internal information.
5. The library is often the most up-to-date department in the company as it takes an active role in the acquisition of information for current and future use. It can filter relevant material for users.
6. The library can advise on information management in other areas of the company. (Library Association, 1985).

Although many of the above reasons given by the Library Association are laudable, and in many cases correct, they do of course rely on the senior management of the company recognising them as well. However, as we shall show in this study, this is often not the case and many companies ignore the skills and expertise of the library, although it must also be noted that sometimes librarians do not help their cause by their attitudes, for example, to an increased customer base.

Just has EIS are beginning to be challenged by other information technology such as intranets and groupware for the provision of information services, so to is the

library being influenced by new technology (Bates & Allen, 1994) in its capacity as a provider of information. An intranet, which is an internal company network accessed through the use of a browser such as Netscape Navigator, enables users to retrieve online information much more easily than they did previously (Wolfram & Dimitroff, 1998), if they did at all. Providing there are digital copies of books and magazines available through the intranet or Lotus Notes, users can access them from anywhere in the company. Although this can be done, and still is, with networked CD-ROMs, intranets offer users an interface and technology that is becoming standard and many more users can access a web site (Commings, 1997; Watson ,1999; Lynch, 1997). Moreover, information retrieval technology of intranets and the WWW is fast being integrated with many other common corporate applications, for example, Microsoft Office. Such technology has also resulted in change in the vocabulary of information management which has now become knowledge management, a concept that also includes MIS and EIS. Moreover, as information has become increasingly important as a strategic asset, so to has the profile of information management risen (Heim, 1997). This may give company libraries an increased role in the management of corporate information which they have previously been denied.

CHAPTER TWO: LITERATURE REVIEW - COMPANY LIBRARIES AND EXECUTIVE INFORMATION SYSTEMS

2.1 Sources

An examination was made of the literature covering the two primary areas of research, that is, Executive Information Systems (EIS) and company libraries, however, both these areas are also the subject of other cross-disciplines such as information science, computer studies, sociology, psychology, accountancy and information management. Sources used in both areas of research included the *Social Science Citation Index, Social Science Abstracts, Library and Information Science Abstracts (LISA), Educational Resources Information Centre (ERIC)* and *Decision Support Sciences Transactions.* Use was also made of *Current Research in Great Britain* and *Dissertation Abstracts International* and several computer orientated popular periodicals such as *Computerworld, IT Week* and *Computing.*

Research on Executive Information Systems (EIS) is, as noted above, likely to be found in several disciplines, however, the most common journal sources of research include *Journal of Information Systems Management, Sloan Management Review, MIS Quarterly, Harvard Business Review, Journal of Systems Management, Information Management* and *Decision Sciences.* Many of these journals are American in origin because EIS were not only developed in the United States, but they have a far more prominent role in American than British companies. British or European sources include *International Journal of Information Management, Executive Information Systems Report,* and *European Journal of Information Systems.* Investigation of the company library is dominated by the *Special Libraries Association's* journal *Special Libraries,* an American journal. Other notable publications surveyed included *New Library World, ASLIB Proceedings, Information Technology and Libraries, Electronic Library, Journal of Information Science, Library Trends, Library and Information Science Research,* and various research reports produced by the British Library. Many of the index and citation sources are available either through the internet, such as the *Social Science Citation Index* via the Bath Information and Data

Services (BIDS) gateway, or through the use of a CD-ROM, for example, *Library and Information Science Abstracts* (LISA).

All these publications and more ranged from the early 1960s to the present day, but research on EIS was not undertaken until the mid 1980s when they were developed and metamorphosed from earlier Decision Support Systems (DSS) and Management Information Systems (MIS). It also became apparent that EIS themselves were beginning to be augmented, or even replaced, by other information systems such as Intranets and groupware like Lotus Notes. The development of EIS are also being influenced by new concepts such like knowledge management and business intelligence. Some of this technology, however, also appears to be of increasing importance in the role of company libraries. Naturally, this is reflected in the research literature where we see a shift in the terminology, with old technology and ideas giving way to new. A search of the LISA database indicates that there were, on average, 50 articles per year on EIS in 1987/88,but less than 12 in 1997/98. An even greater difference is found in the concepts of knowledge management; 6 articles in 1987/88, 149 ten years later; business intelligence, *no* articles in 1987/88 but 13 in 1997/98. This is a remarkable change, even accounting for the fact that there are probably more journals devoted to the subject of information systems today than there were in 1987.

The literature search provided the necessary background to understanding the role of company libraries, the development and use of EIS, and the future of business information services. Additionally, research was undertaken on the information needs of senior managers for whom EIS were initially developed, new areas of information management such as intranets and groupware, and the area of qualitative research, in particular the case-study method. Research in all these areas provided a background for developing the respondent questionnaires, case-study framework and protocol, and the identification of the key issues of concern to the study question.

2.2 Company Libraries

The main approach to the study of company libraries was to gather information on the role of these corporate departments and what, in any, interaction they had with information systems such as EIS.

There are copious surveys and case studies on what is perhaps the most consistently researched topic in the library field, that is the evaluation of the library and its users (Fisher,1966; Ryans & Ryans, 1977; Knightly, 1979; Busha & Harter, 1980;Matzrazzo, 1981; Martyn & Lancaster, 1981;Baker & Lancaster, 1991;Warden 1981;Slater 1980, 1984; Roberts, 1984,1985; Brimsek, 1989), but there are varying degrees of accuracy and indeed usefulness. The study by Warden (1981), for example, found, unsurprisingly, that online searches were more likely to retrieve the correct information when the user requesting the search was present to interact with the librarian conducting the search, while that of Ceppos (1982) discovered that good communications between the library manager and their superiors was a factor in the success of the library.

Evaluation of libraries, however, can be done from several different perspectives, Knightly (1979), for example, identified four types of evaluation. He called his first group 'effort evaluation' and it focused on inputs or resources such as budget, space and salaries. The second class was 'process evaluation'; this concentrates on the appropriateness and efficiency of activities and programs, for example collections and cataloguing. The third category of evaluation was 'effectiveness evaluation' focusing on outputs and utilisation. The fourth and final type was 'impact evaluation' or the assessment of benefits such as learning, costs savings and improved decisions. It is in these types of studies that the term 'performance measures' is seen as concept that both encapsulates input and output measures. Nevertheless, not everyone considers performance and output measures to be interchangeable concepts. Henon and McClure (1983), for instance, argue that performance measures are broader and more generic than output measures. They view output measures as a class of performance measure that focuses on a specific result, service or activity. However, the importance of performance measures for industrial libraries is illustrated by Matarazzo's (1981) study of the closure of

company libraries. In each of the five case studies he conducted, lack of evaluation of the library was found to be a factor in the closure or reduction in the library; other factors included a reduction in the R&D budget of the company and the proximity and availability of external sources in the library. Performance measures in corporate libraries can be split into three general types: first, older studies that deal with input variables (Randall, 1965, 1975; Fisher, 1966): second, those concerned with variables in a single library (Borbely, 1981; Warden, 1981; Strain, 1982) and, third, those that advocate the analysis of outputs, without suggesting, however, how they may be carried out (Surace, 1978; Drake, 1982).

A problem with the these types of surveys of company libraries is that the authors do not identify the procedures for collecting the data on the library's performance, unlike public libraries for which there is a standardised manual (Zweizig, 1982). The majority of surveys are also concerned with library use, however, *non-use* of the library is a theme taken up by Slater (1980;1984) who, in two surveys four years apart, established that nearly 87% of libraries experienced some kind of sub-optimal usage problems. She further concluded that the library's negative image, difficult library staff, and lack of user-friendly systems were prime factors in the poor usage of company libraries. Unfortunately, however, she acknowledges that her findings in the 1980 survey are potentially unreliable because of a poor response rate of 15% to her survey, but her 1984 survey produced a more reasonable, but still unsatisfactory, 38% return. A similar survey undertaken by Brick (1999) fifteen years later, and based on an improved 53% return, astonishingly produced almost an identical figure of non-use, 88%. Senior managers were the main group of non-users in Brick's survey, exactly the type of people that decide the future of the library. However, it appears that in both the 1984 and 1999 surveys, little has been done to rectify the problem of non-use.

Marketing the library by promotion, presentations, personal contact, etc., is still the most popular method of trying to alleviate non-use, but there are no novel or new solutions. Several librarians also comment that if there was a substantial increase in demand for their use, many would be unable to accommodate it without a major escalation in their budgets and staff. The answer, according to

Yates-Mercer and Steward (1991) is to make senior management the prime focus of library marketing primarily by using personal contact. They argue that only when the company library is closely integrated into the overall information management strategy of the company, will libraries be a crucial organisational level activity.

Studies of senior managers and their use of libraries are fewer probably because they have less time to do interviews and surveys. Matarazzo and Prusak's (1990) survey of 164 Canadian libraries on behalf of the Special Libraries Association and how the corporate worlds' senior managers value the company library, highlights a need for libraries to adopt a more proactive approach. Among their findings are that the quality of information made available was the single most important component for evaluating libraries, and that 40% of senior managers want the library to reach a larger audience and generate a bigger impact on the business, yet these same managers could not say which library services added value to the company:

> "Coupled with the fact that more than 60% of the corporate managers in our SLA study elected not to respond to or did not know about specific value, the research indicates a need for the librarians to demonstrate in business terms the value of the services provided".
> (Matarazzo & Prusak, 1990).

Cost-effective corporate libraries is a theme taken up by Ratcliff and Weeks (1995) who conclude that charging users and making the library pay for itself is the ultimate proof that the library provides a service, and that since their own library followed this route, library usage has increased by 38%, and a further library location added. However, many libraries are inundated with work they cannot cope with, surely evidence they provide a service, yet are probably a loss making department. Although the funding operation advocated by Ratcliff and Weeks was successful, it is unlikely it would be widely adopted particularly as many corporate departments now have access to their own online databases and have their own collections (so called 'mini-libraries'). Ironically, senior management use of the company library can be often be inferred from research in a different area, that of senior mangers and their information needs. A study by Auster and Choo (1992) on environmental scanning of 207 senior managers of

Canadian companies, elicits the information that the company library is amongst the least frequently used sources, only slightly above conferences and trips; that company libraries have a low perceived quality of information; and that they rate only as average an accessible source. Moreover, similar findings were reported by Coyners (1989), whose study of 51 British organisations found that the company library was not always highly regarded or fully exploited.

Library surveys are not only concerned with the impact of the library but also with factors that impact *on* the library, most notably IT; this is particularly true since the mid 1970s when libraries began to access online databases and the early 1980s when the personal computer (PC) appeared. In 1983 the British Library commissioned a report (Jones, 1983) to see how the demand for information had changed in British industry between 1977 and 1983 and how the industrial library had adjusted to it. It was found that since 1977 there had been a increased demand for information which was being satisfied by the deployment of online databases, both in and out of the library. At the same time the Primary Communications Research Centre at the University of Leicester (Singleton,1982) undertook a study of all the industrial firms in Great Britain that possessed a library (374), and concluded that 66% of libraries had access to online databases. A further study by Withers (1985), using a sample and therefore not as accurate as asking every library, indicated that the proportion of libraries that possessed a online system had increased to 85%, while the research of the author on the libraries in this study found this figure now to be 100%.

Generally however, the literature is concerned with how libraries can make use of an MIS themselves, for example, for tracking users, requests, etc., (Cortez, 1983; Homer, 1986; Hawks, 1988), rather than what impact a corporate wide system can have on the library. Nevertheless, in an article as far back as 1982 Puretz recognised that corporate libraries may have to reconsider their position as the primary information gathering department of the organisation:

> "It is useful to examine the similarities and differences of a library and
> a management information system. They are both competing for
> corporate resources to provide information. Which is better prepared

to provide the information needs of the corporation in the future? (Perutz, 1982).

Examination of the literature, however, reveals that there is little in the way of how MIS, much less EIS, have affected the company library. An editorial - *'Cracking the EIS'* – by Black (1991) commented that EIS were difficult to develop and that corporate librarians could be of help in this process, rather than hindering the system as he seems to think some may do.

> "Sometimes vested interests block the development of the system. Many middle mangers do not want to submit information which they see as an integral part of their authority...Information professionals such as corporate librarians may well be in this category of resisters, since they may be asked to contribute to the new system but not join the development team...Their role is often overlooked and they may need to find a way of becoming part of the process. They have a strong case, since they are experts in where to find information, particularly from those external sources which can be crucial to making EIS a success". (Black, 1991).

Although his comments at the time were speculation, this research study has demonstrated that some of them are correct. Considering that information systems have had such a huge impact on business organisations, it is surprising that there has not been a great deal of research into the impact of them on company libraries. However, there is some research available on the impact of other forms of IT on libraries. Muir-Scott (1991) investigated the installation of a LAN in the company library of an American power generating company and concluded that the most important aspect was the planning and continuous maintenance of the LAN. Other technology that is the subject of research includes high speed networks (Postlethwaite, 1992; Kibirige-Harry, 1991) and electronic publishing (Vickers & Martyn, 1994; Rollins, 1996; Yaacob & Harun, 1996).

Hyde (1997) argues that one possible way of enhancing the effectiveness of the company library is by networking it with other libraries in the same subject field and geographical area and to generate what he terms the 'invisible college'. Certainly, within some industries such as pharmaceuticals, construction, defence and aerospace such networking is common, for example the co-operation between

Glaxo and Zenica. Not only does it extend the depth of coverage for each member library, but it facilitates the information handling techniques necessary to a specialist subject and each library gains by becoming a strong focus for the sector it represents. Yet, despite all these advantages, in this study at present it was found that it was not a regular occurrence for libraries in other industries to network, in fact they were more likely to have a reciprocal relationship with their local public or university library.

There is recognition in the literature, that with new technology such as Intranets, World Wide Web (WWW), and groupware such as Lotus Notes, that corporate libraries need to change, either in retraining their staff or altering the library itself, if they are to continue to provide business information in the future. These new information tools are generally referred to as Knowledge Management tools, for the way in which they are supposed to co-ordinate and enhance an organisations' information and knowledge.

Thury (1988) has concluded that due to the change in corporate information systems libraries must become information centres. No longer are they mere 'warehouses of information' but 'disseminators of information sensitive to the needs of managers in every division of the company'. This is a laudable concept but it assumes that managers know what they want; although libraries currently provide selected dissemination of information or SDI to customers, this is only usually a small part of the information needs of senior management. She also assumes that being proactive means existing as an information centre rather than a library, thus emphasising the information role, yet such titles have not stopped users still describing or thinking of information centres as the library (Pay 1991) and treating it as such, nor is there any rule that states libraries cannot be proactive. Much the same argument has been put forward by Hohhof (1994), Pirttila (1998) and Greene (1988) who calls not only for the library to become an information centre but the organisation's competitive intelligence hub:

> "Sources from within the organisation must be co-ordinated so that the
> data from different operational units are channelled directly to a
> central facility. This information is then combined with that obtained

from external sources, e.g., online databases and print materials, to produce a fully integrated intelligence system" (Greene, 1988).

This concept may still be some way off because organisational departments must be willing to undergo an information culture shift and give up their information to a central department, a difficult concept for many to follow when information is still seen as power. Moreover, such centres would also have to employ a great many people trained to evaluate critical information that might not readily be apparent as such, except to a minority, while senior managers often state that they only know what information is critical and important when they see it. However, this is exactly the way how Davenport (1997) thinks companies and libraries will change. In what he has termed 'information ecology', which is an holistic perspective of information management, Davenport's examination of corporate information management and information culture has led him to the conclusion that company libraries will only survive, if they are part of a complete restructuring of the organisation that places more of an emphasis on how people create, share and use information, rather than on the belief that IT is a panacea for everything.

A more realistic approach is argued for by Culnan (1986) who states that librarians should be developing new skills to go with the dramatic changes in technology, although she fails to itemise what these are, and Piggot (1995) who calls for libraries to network their staff among company departments so they can deliver information across borders to remote customers. Such a concept would now be called the corporate intranet which may or may not be under the control of the company library. A different approach is taken up by Bauwens (1993) who calls for the establishment of a network of 'cybrarians' strategically located around the company. These IT-literate individuals are members of management teams and are networked with each other, each team and external cybrarians. Cybrarians thus manage the network of information and knowledge that exists within the company, and the library becomes a back-up for difficult queries, IT support, etc,. A similar concept is envisaged by Davenport and Prusak (1993), the latter incidentally a specialist in the design of EIS, whose clarion call is to 'blow up the company library'; by this they mean that what they describe as the

'warehouse model' of company libraries should be abandoned and a new one developed, that takes more into account the increasing need for librarians to provide information using a sophisticated array of IT, rather than just storing data.

> "It is time for a new model of the corporate library and the librarian. The warehouse concept must be blown up; librarians, or rather information managers, must view themselves not as warehouse custodians, or even as providers of centralised expertise, but rather as overseers of a multimedia network".(Davenport and Prusak, 1993).

Implicit within these last two papers is the acknowledgement by some authors that the day of the traditional central library is rapidly approaching extinction, with networks and cyberspace workers perhaps taking their place in the provision of business information.

Networks, in the shape of corporate LANs, have existed for many years but it is only with the introduction of intranets and groupware, and the comparatively simple and cheap technology which is required to run them, that there has appeared a viable alternative to a centralised library. The literature on the subject (Commings, 1997; Fishenden, 1997;Ptak, 1998; Wen & Anaandarajan, 1998; McMurdo, 1998; Knowles, 1999; Watson, 1999) deals primarily with how such technology will impact on the company library, and how it can take advantage of this new technology by promoting and even increasing the significance of the library. (A more fuller discussion of this issue is given in Chapter 8).

Although intranet technology may take some time to alleviate the need for a central library as we know it today, many authors realise that such a change will need a radical shift in thinking how people provide information throughout organisations and increased resources. However, it is apparent that the message of the literature in the 1990s is that libraries must adapt and take advantage of new technology like intranets and Notes, if they are to survive as one of the main providers of business information in the future.

2.3 Executive Information Systems

2.3.1 Contemporary research available

Not only is the study of EIS a relatively new field of study but, as noted earlier, because it is part of the emerging discipline of MIS and its associated fields such as computer science, psychology, etc., it has resulted in a fragmented and variable mixture of articles on the subject, many of which have little research substance to them, as many papers are based on subjective argument and try to capture creative research by means of speculation and opinion rather than empirical observation. EIS are also very successful commercial software with *Computing* stating that 90% of *The Times 1000* companies use this type of software (Computing, 1994). Because EIS have been marketed so much as a 'must have' executive tool, many non-academic articles appear in the IS trade journals and press such as *Computerworld, Information Week, Computing* and *IT Week.* They typically offer advice on how to install EIS systems or which pitfalls to avoid with titles such as 'Seven Steps for Success', and 'EIS: its all downhill from now on!', or offer a descriptive comment on a company case study. These are generally written by system managers or EIS developers whose first concern is to publicise the benefits of various EIS packages rather than to offer a research paper, however, this is not to say that such articles are without value. Many academic research papers cite them as references as they are particularly useful for statistical information on various aspects of EIS such as how many companies possess EIS, or how much money has been invested in them in the last year. But what it does mean is that within the scope of EIS investigation there is not a large body of research available recognisable by the normal academic methods as research, i.e., case studies, surveys, and field tests.

2.3.2. Developing EIS

Executive Information Systems (EIS) have had many precursors since the arrival of the digital computer in the 1960s when many companies had already developed Management Information Systems (MIS). These early systems allowed

managers to interrogate their companies' sales figures, accounts, stock prices, etc. with the aid of simple text and graphics. Moreover, before the introduction of EIS in the mid 1980s MIS came to symbolise any computerised management information system, and much of the literature reflected this (Dickenson *et al* , 1977; Ein-Dor and Segev , 1978; Hamilton and Ives, 1982; 1983; Ives *et al* 1980; Vogel and Wetherbe, 1984; Dock, 1985).

Although to-day the term EIS is very specific, MIS can still either mean a general information system that all sectors of management use, or an EIS, and there are those who interpret both as a single system when writing about them (Jackson, 1986; Hicks, 1987; Culnan & Swanson, 1986; Kydd, 1989; Bretschneider, 1990). Cullen and Swanson (1986), for example, argue that MIS is emerging from a supporting base of three foundation fields; computer science, management science and organisational science, but that MIS is becoming a distinct field of study with its own cumulative tradition.

Cooper (1988) has written that MIS is *"generally thought of as an integrated, user machine system providing information to support operations, management, and decision making functions in an organisation"* (p.73). The essential descriptor in this context is the word "management" meaning management in general, however, EIS are designed specifically for the use of senior management and not a general management structure which may encompass several layers. As this study is concerned with the impact of EIS on the Library and Information Centre (LIC), and to a lesser extent, other information systems and the future of business information, a literature search concentrated on systems that were designed as EIS. The majority of such systems are known by the title EIS or sometimes Executive Support Systems (ESS), although such systems themselves often have their own acronym, for example, the Management Information and Decision Support System (MIDS) at Lockheed-Georgia (Houdeshel & Watson,1987). Most EIS are developed for the purpose of monitoring organisational performance and competitor activity by the senior mangers of an organisation (Rockart and DeLong, 1988; Tang, 1991). Such systems do not come cheap - typically £70-500 thousand for a full development and implementation of a complex mainframe or server system, and as such they

remain the prerogative of large companies, often with a turnover in excess of £50 Million (Meklejohn & Harvey, 1989). However, this is beginning to change as software developers not only flood the market with rebadged packages that purport to be EIS, but EIS vendors themselves bring out simpler and less costly systems, for example, Pilot Executive Software's Lightship product at £500. But since EIS were not developed until the mid 1980s much of the relevant literature dates from this period even though research into more general information systems management was widespread before this period.

The term Executive Information System was first coined by Rockart & Treacy (1982) in a number of unpublished studies conducted at the Centre for Information Systems Research (CISR) at the MIT Sloan School of Management, in which they identified the phenomenon of executive computer use by analysing the activities of 20 executives. They also brought out the distinctions between EIS and Decision Support Systems (DSS) on the basis of different management tasks supported by each type of system. Executive activities tended to be less structured, more *ad hoc*, and far more wide ranging than those of the typical middle management DSS user. Scott Morton (1986) made further distinctions between EIS and DSS arguing that EIS provided capabilities to meet the "various and variable" information needs of executives, while DSS generally focused on a single recurring and rather structured idea. In addition he also implied that the models so typical of DSS could not provide the flexibility needed by executive decision makers. EIS therefore rely more on data retrieval than a model-based DSS system.

By the mid 1980s the term Executive Information System had been renamed Executive Support System (ESS) by John Rockart in the United States although confusingly the terms are used interchangeably, with the majority of studies still using the term EIS even when they mean ESS. The term 'Executive Support System', however, usually refers to a system with a broader set of capabilities, such as word processing, than an EIS (Rockart & DeLong, 1988).

Both Reck and Hall (1986) and Friend (1986) investigated the early development and architecture of EIS; in particular how executives would contend with the new

systems and how companies should assimilate and prepare for the introduction of such advanced information systems. Friend argued that, because of the growing recognition that executives are information users and not analysts, systems must conform to the way executives work rather than attempt to redefine their jobs. Friend is a particularly apt investigator and commentator on EIS as he is the developer of Pilot Executive Software's 'Command Centre', one of the largest selling EIS software packages in the world.

One of the first in-depth studies in situ of EIS was that of Houdeshal and Watson's (1987) investigation of the Management Information and Decision Support System (MIDS) at Lockheed-Georgia in the United States. The MIDS system is an example of an in-house designed EIS (most EIS in use are commercial packages) that senior managers can access to assess the current state of the company, and was also one of the first attempts (1979) at designing an information system for senior managers. It is also one of the very few uses of EIS in the manufacturing area of product and assembly testing, a phenomenon noted by Evans *et al* (1989) who investigated the EIS at General Dynamics. Although Houdeshel (one of the designers of MIDS) and Watson give what is essentially only a description of how the system was designed and built, they offer an important testimony and insight into how an EIS should be correctly developed. The study submits a comprehensive listing of exactly how Lockheed-Georgia developed MIDS even to the extent of quoting company figures such as sales and profitability, and printing actual screens and reports from the system. Houdeshel and Watson also give an explanation as to exactly how the MIDS system acquires its data . They note that:

> "In order to provide the information needed, a variety of internal and external sources must be used. The internal sources include transaction processing systems, financial applications, and human resources. Some of the data can be transferred directly to MIDS from other computerised systems, while others must be re-input or entered for the first time. Access to computerised data is provided by in-house software and commercial software such as DATATRIEVE. External sources are very important and include data from external databases, customers, other Lockheed companies, and Lockheed's Washington D.C. office" (Houdeshal & Watson, 1987).

The data that MIDS receives is keyed in by trained information analysts who understand what they are keying in and have usually previously worked in the areas for which they supply data. The description of how the MIDS system is supplied with data is a material piece of information in itself, as the majority of researchers into EIS systems usually refer to this important detail only in generalised terms i.e., data is input by 'personnel' from 'external' and 'internal' databases. This may or may not include the company library and its personnel.

One must also take note that this system was one of the first EIS in the United States, and as such could be considered a prototype other EIS may emulate. Many of the critical success factors Houdeshal and Watson (1987) encountered in developing MIDS have since been replicated and used by many other companies.

Many of the benefits that MIDS produced for Lockheed-Georgia and subsequently revealed by Houdeshel and Watson's studies, are now regarded as the characteristics of a successful EIS implementation. Such benefits include better information, improved communications, an evolving understanding of information requirements, a test-bed for system evolution, and cost reductions. The study concluded that there were also a number of factors required for the system to be successfully brought on line, viz.:

- A committed senior executive sponsor.
- Carefully designed system requirements.
- Carefully designed information requirements.
- A team approach to systems development.
- An evolutionary development approach.
- Careful computer hardware and software selection.

Houdeshel and Watson's findings have since been confirmed and reiterated by many later studies of EIS (Meixer, 1988; Rockart and DeLong, 1988; Bergeron and Raymond, 1992; Paller and Laska, 1990; McNamara *et al*, 1990; Preedy, 1990; Watson *et al*, 1991; Belcher & Watson, 1993;Warmouth and Yen, 1992;Stein, 1995) and now form part of the standard 'guidelines' to adopt when designing an EIS (Cerullo, 1980; Byun & Suh, 1994). The most consistent

finding is that an executive sponsor is usually responsible for initiating and promoting the EIS - and without one the system will not succeed. However, Watson *et al* (1992) did discover a 'surprising' finding in the significant role that the information systems department often plays in initiating the development of an EIS, or serving as its operational sponsor, as opposed to a senior manager or CEO. This is the case, for example, at British Airways where Cottrell and Rapley (1991) state that the IS staff, and not a senior manager sponsor, have been responsible for initiating the EIS.

2.3.3 Rockart and DeLong's study of 1985-88

Following on from Houdeshel and Watson's investigation came what is perhaps the most extensive (the result of which was not a paper but a book) and cited study into EIS - that of Rockart and DeLong (1988). This was the first long-term study (1985-6) of the development, installation, and senior management use of EIS in more than 30 large American, Canadian, and British companies including Boeing, Xerox, Firestone, and ICL. Rockart and DeLong decided that since there were a growing number of senior executives using EIS to increase their effectiveness and to create change in their organisation, an in-depth analysis was needed. Because EIS were still a relatively innovative concept and not widely used when the study was carried out Rockart and DeLong (plus their research assistants) were able to investigate a great many companies, consultants, and developers, to a considerable degree. Although Rockart and DeLong itemise and discuss the various replies to their questions, they do not give a full analysis of their results and it is not possible therefore to ascertain to what degree the answers are relevant, or to investigate the raw data for the potentiality of other interpretations.

The central research issue that Rockart and DeLong focused on was the study of computer use by senior managers in medium to large companies. This was accomplished predominantly by the methods of interview and observation and a large proportion of the results comprise verbatim comments from those taking part in the research. Rockart and DeLong explain that their research philosophy

and methodology attempts to reflect Mintzberg's (1973) approach of direct research in that: *"We present many hard facts. But the real feel for the subject is best captured in the words of those interviewed - words which we will often quote"* (p.11) . Although a breakdown of their results is too long to be repeated here, they have tried to cover many factors associated with the use and development of EIS, in particular: the use of EIS for office support, planning, and control processes; how EIS may enhance the mental models of senior managers; the hardware and software aspects of EIS; implementation, sponsorship, and organisational resistance; and the evolution and impact of EIS. Although the central question revolves around senior management computer use one can determine that such a question covers a very broad sweep of investigation, too broad to be researched in any great depth.

The main findings of their study were as follows:

- Committed senior manager sponsors are necessary both for initiating and operating the EIS.
- The key application and most dramatic impact of EIS was the redesign and enhancement of the planning and control processes.
- In the long term the most significant effect of EIS may be in the enhanced mental models of the systems' users.
- Some company departments and groups are likely to resist the introduction of an EIS.
- A successful EIS needs a clear link to business objectives, management of data, appropriate technology and the percolation of the system down the corporate hierarchy.

Many of Houdeshel and Watson's findings from their MIDS study (1987) were replicated by Rockart and DeLong; however, several more factors critical to the success of EIS implementation that were found are, notably: an operating sponsor (usually not the executive sponsor), appropriate IS staff, a clear link to business objectives, and the management of organisational resistance. These 'critical success factors' (CSF) are now considered to be mandatory objectives that must be pursued to ensure a company attains a successful implementation of an EIS.

As a consequence many designers and developers who offer their advice on EIS, support Rockart and DeLong's 'critical success factors' recommendations (see for example Barrow, 1990; Friend, 1986, 1989; Runge, 1988; Preedy 1990). However, although these success factors are now virtually a prerequisite for developing an EIS, they are sometimes confused with the method of determining a company's critical success factors for managing the organisation. Rockart has defined a CSF as:

> "The limited number of areas in which results, if they are satisfactory, will ensure competitive performance for the organisation. They are the few key areas where things must go right for the business to flourish. If results in these areas are not adequate, the organisation's efforts for the period will be less than desired" (Rockart, 1979)

For example, a CSF could be the prompt shipment of an order or the spot price of oil; each of these major CSF is determined by a number of key performance indicators (KPI). Part of the reason for this confusion is that this method of determining the CSF for an EIS (but sometimes other systems), is that this concept was also developed by Rockart (1979).

Rockart and DeLong also remark that their research left them with several impressions concerning EIS, in particular:

- that EIS are still emerging from a pioneering stage and must be treated in this context. EIS are now where decision support systems were situated in the 1970s.
- that EIS are just one tool in the arsenal of senior managers.
- that EIS are not suitable for all senior managers.
- office support, especially electronic mail, and planning control systems, will continue to be the prime uses of EIS.
- the real benefit to senior managers is the enhanced understanding of the business environment that EIS can provide.

However, even though the study of Rockart and Delong is cited in almost every study on EIS some of their notions about what determines a successful EIS and managerial attitudes merit further investigation. They assume, for example,

almost a casual connection between certain factors like a senior management sponsor and EIS success, and that they must be present for an EIS to succeed. There is no explanation, as noted by Cottrell and Rapley (1991) why some of their CSF are not present in EIS that *have* succeeded. Their model also reflects almost a passive attitude of the senior manager waiting to receive information on his EIS, while in fact most senior managers, at least in this study, tend to be proactive. Rockart and DeLong's study, as a guide for developing an EIS, is also limited by their emphasis on 'what' to do, rather than 'how' to do it.

Rockart and DeLong (1988) observe that an enhanced understanding of the business environment is the most frequently argued reason for the expense incurred in installing an EIS. As Moad (1988) notes *"the real payoff, however, is in giving an executive quick access to reliable information that can be used in new combinations and may lead to new ways of thinking and better decisions" (p.46)*. This has been echoed by Gleason *et al* (1989) who, in their study of the EIS at the Upjohn Pharmaceutical Company, quote John Gisler, the manager of Marketing Decision Systems as commenting:

> "It's not just that they get their information faster or prettier. The big payoff is going to be that it helps the understanding of how our business works in the minds of the people who run the business. They ask different questions and they see different relationships, and they begin to have a whole different mental model of the business".
> (Gleason *et al*, 1989).

An excellent example of this reasoning is found in the case of the former President of Phillips Petroleum who spotted an unusual data pattern in the Middle East oil market through his EIS, and then went on to make his company $50 Million in one day (Paller and Laska, 1990). Such examples are of course unusual and most EIS produce far less material benefit than a $50 Million windfall, although, Preedy (1990) does cite the case of a UK manufacturing company who generated £24 Million more profit because of their EIS. Phillips were able to take advantage of this anomaly in the oil markets because they had the relevant data downloaded to the EIS in the first place, however, Paller and Laska fail to emphasise that it was only by chance that the anomaly in the data pattern was

spotted in the first place, and their work remains more marketing hype than serious academic study.

Not all the literature concentrates on large private companies that have successfully installed an EIS. Mohan *et al* (1990), for example, explore the differences between public and private systems. In particular they look at the EIS of the New York State Office of General Services which was implemented using standard, inexpensive PC software tools. The main differences and similarities between public and private sector EIS are investigated and a description given of the overall development framework used. Because this is a study of a public system, it can afford to be, and is, more generous about giving explicit details regarding the cost of the system, mistakes made, and reproducing the screens and reports of the system. Mohan *et al* found many implementation factors similar to those in the private sector, but state that the commitment from top management is even more important in the public centre.

The research of Fireworker and Zirkel (1990) looked at designing an EIS in a multidivisional environment. The firm in question, an aircraft, defence, and space technology company, wished to remain anonymous as many organisations do when research into their EIS is carried out. Kuehn and Fleck (1991) describe the attempt, and subsequent failure, of an insurance company to install an EIS. The failure to correctly identify all the necessary costs, corporate politics, and waning executive support eventually led to its demise, but only after a considerable amount of money had been spent.

A different avenue of investigation was taken by Hämäläinen (1990), who argued that to successfully initiate, develop and exploit and EIS within a corporation depends partly on what she describes as people dynamics. This area was explored because the parent company Alko Ltd (Helsinki) was decentralising, and the IS departments wanted to enlist the support of corporate planners and unit mangers in initiating an EIS. The system was developed as part of an overall information strategy that could exploit the company's untapped information resources, and then apply the knowledge gained to specific organisational objectives. In essence what Hämäläinen sought to do was address 'people' issues - e.g., organisational

resistance before they became problems and barriers to the flow of information within the EIS.

Hämäläinen also comments that the IS department was very active in developing the EIS, not the normal method of EIS initiation, but one that has been replicated by the study of Watson *et al* (1991) into the current practices of EIS development. Their primary objective was to develop a framework for the building of EIS: this was designed from a structural perspective of the elements and their interaction, the development process, and the dialogue between the user and the system. Watson *et al* (1991) cite a need for such a framework because EIS are becoming *"more important and prevalent, and yet little research has been done on them with much of the literature being case studies or anecdotal in nature"*. (p.2). Their methodology was the postal questionnaire which gave a 39.1% usable response rate, which although not conducive to the most accurate of results - Hakim (1987) has argued that anything less than 50 % is unreliable - is better than some response rates (sometimes < 25%) for this type of survey e.g., Watson in 1990 (21½ %), Raghunathan and Raghunathan, 1990 (25%), and Bretschneider also in 1990 (36%). Moreover, as EIS became more popular and accepted academics and EIS developers heeded Watson's *et al* (1991) call for a framework for the development of these types of systems (Edwards & Peppard, 1993; Partanen & Savolainen, 1995; Green & Murphy, 1995).

Many of the results of Watson *et al* (1991) are unsurprising and to be expected, for example: most EIS are mainframe-based; the number of users and the number of screens increases over time; most EIS use colour in presenting information. However, some findings are cited which can be regarded as surprising, namely, that there seems to be a growing trend in IS departments to initiate EIS and an IS manager is most often the operating sponsor.

2.3.4   The improvement and integration of existing EIS

There can be very few companies who, once having had an EIS installed, cannot think of some attribute they would like to improve, or who wish they could

integrate a novel experimental concept. For example, the integration of EIS with other software programs such as expert systems (ES) and artificial intelligence (AI), Lotus Notes or Intranets. Hindsight is wonderful but can be expensive as well, so there is no shortage of EIS developers looking for ways to improve their products.

Manheim (1989), himself a senior manager, has examined key features lacking in an EIS that managers would appreciate to help them analyse their managerial problem working processes, and decision making. In a novel paper he investigated his own decision making processes (Although a senior manager, Manheim also seems enough fortunate (or possibly not) to be: a university academic, consultant, director of several multinational companies, chairman of a company and president of an international professional society) where his main objective was to examine his managerial decision procedure so that he could identify the key features of these processes, and then formulate what support an EIS needed to provide some of these features. On the basis of this he identifies the need for a Personal Information Manager (PIM) such as Lotus's Agenda. This is a software package that uses both user-directed and computer-directed processing to organise items, categories, and category association capability to provide facilities through which the user can analyse his perception of the problem he is working on, and thus operate on it in ways which increase his effectiveness as a manager. Manheim was writing just after Lotus Notes, a groupware product, was released in 1988 but since then the product has made a huge impact on corporate networks. Notes has also made an impact on EIS because it offers functions and strengths that are sometimes lacking in EIS, for example, bulletin boards and electronic libraries.

Many EIS provide minimal support for automating many of the tasks of senior management according to King (1989), who rather than use modelling techniques to monitor and warn of unusual data patterns, proposes the concept of 'active' monitors to carry out pre-determined plans of analysis on behalf of the user. Rather than a full integration of an AI package or expert system, King bases this concept around a knowledge-building program built around a spreadsheet. He describes these active monitors as 'intelligent agents' and goes on to explore some

of the technical issues associated with developing such a system. In particular he envisages his 'intelligent agents' replicating some of the skills of a executive staff assistant, and automating some of the tasks faced by executives in various phases of the strategic planning and decision-making process. These passive monitors lie dormant until the level of the variances flagged as unusual are reached. The result is then displayed and highlighted in a bright colour to make it conspicuous. These type of active monitors or intelligent agents were adopted by several EIS vendors including, in 1990, Intelligent Office, a British company, for their flagship product, EIS Track. Intelligent software is also envisaged by Knowles (1999) who believes that such software is ideal for three key functions in information retrieval, specifically: profiling, matching and filtering.

EIS have also migrated from were they ran only on large mainframes using propriety software such as that found on computers like the IBM RS/6000, Microvax VMS, DEC VAX and HP 9000, to less propriety based platforms like Windows and even open-source operating systems such as Unix. The result has been that some companies that offered products which, at the beginning of the 1990s could only be ported to mainframes, for example, Commander EIS (Comshare), Holos (Holistic Systems) and Gentium (Planning Sciences), now supply EIS which run mainly on a Windows, Mac, Unix or Client/Server platform. EIS has also gradually moved away from the term Executive Information System which implied it was for only a small number of people, to a more general phrase which better describes what these systems can do, for example, intelligent office systems or online analytical processing (OLAP) systems.

Generally speaking, the major contribution of EIS is in monitoring and interpreting large quantities of data, for example, monitoring unusual trends or abnormalities. This has been stressed by Milett and Mawhinney (1992) who conducted a telephone poll of EIS experts, and found that although most EIS are monitor oriented, almost all of this functionality could theoretically be delivered by the more mundane capabilities of an MIS.

The specific need for more research into the integration of ES, DSS, and EIS has been put forward by Turban and Watson (1989) who describe the various ways this may be accomplished. No actual experimentation was done and the result of the research is theoretical and descriptive rather than a design blueprint. The primary goal of the study was to see how EIS could be made more useful, or even intelligent, by adding an expert system. Their argument is that such a combination makes sense *only* (their italics) if the integration of EIS and DSS makes sense, an issue which is still being debated.

EIS integration with other programs is also the subject of study by Warmouth and Yen (1992) who concentrate on how such systems can effectively support decisions which could improve the profit potential of a company. They itemise and comment on a number of new boundaries and possibilities for the integration of EIS with other systems, these include; AI, ES and speech recognition, Multimedia and ISDN. The integration of EIS with other similar systems such as MIS and DSS started to occur in the mid 1990s, when EIS vendors and developers began to realise that EIS were no longer being used only by senior managers but by the more middle ranking managers of the organisation. It is now therefore accepted that EIS are no longer the preserve of senior managers with the result that some have argued that such systems should no longer be referred to as 'EIS' (Frolick, 1994; Nord & Nord, 1995; Rai & Bajwa, 1997).

2.3.5   Information Management of EIS

Rockart and DeLong's (1988) report noted that not only do data play a critical role in an EIS because they are the basis for the information provided, but there is often difficulty in obtaining data that the EIS can use. The explicit recognition that data retrieval could be a problem in developing EIS has also been recognised by several companies, who are beginning to address this issue by appointing a manager to oversee this area:

> "A role that is becoming increasingly common with the rise of EIS is that of data administrator. This individual is authorised by top management to maintain the quality of the databases and decide who

gets access to what data. At Firestone, the director of financial systems co-ordinates the data system, handling both maintenance and questions of data access. Although he reports to a controller, he stays separate from the corporate accounting group to keep his primary functions of data security, data integrity, and systems development from being diluted from other special projects" (Rockart & Delong, 1988).

EIS depend primarily on data drawn from existing internal data bases, the majority of which have been developed for operational and internal use or financial accounting. Much of this internal data is extracted from existing organisational databases that are used by transaction processing systems and functional area applications;. this is often hard quantitative data. However, the use of this hard data in an EIS is not as simple as it might seem. This is because of the different reporting and updating cycles, functional area feelings of data ownership, and multiple, incompatible databases (e.g., inconsistent data definitions). Other internal data comes from human sources and tends to be 'soft' in nature, that is, it is vague, fuzzy and subjective, rather than factual, clear and explicit like hard data; soft data can be defined as news, rumours, ideas, predictions, explanations, and plans. Watson, O'Hara *et al* (1996) have suggested that Lotus Notes is particularly ideal for incorporating soft data into an EIS as it is already in use in many company EIS. External data are also important to EIS (Runge, 1988) as data from external sources can be in a completely different format and structure, making it difficult to convert for use in the EIS. Like internal data, they can be either hard or soft and may come from existing databases or require special collection. A survey conducted by Watson *et al* (1991) into 50 companies that possessed an EIS found that the prime sources of external data were news services (56 %), stock markets (46 %), and trade and industry data (34 %). Frolick *et al* (1997) point out that environmental scanning of data, both hard and soft, by senior managers can lead to information overload, and that EIS which make use of expert systems for information retrieval *'better address the needs of strategic planners than traditional systems'* (p.39).

Many, but by no means all, of Rockart and DeLong's (1988) 1985-6 survey results discussed earlier have been replicated by both other academic studies and companies investigating the implementation of an EIS, however, certain discrete

differences appear to surface between companies in America and Europe. Cottrell and Rapley (1991) for example have reported which factors are critical to the success of EIS in British Airways, one of the few companies to develop its own in-house system - Airline Information Management System (AIMS) - rather than use a standard commercial package such as Panning Science's Gentium. As both Cottrell and Rapley were involved in the development of AIMS they were, of necessity, interested in which factors were critical to the success of their system. In particular they were concerned with the aspects of organisational resistance and data management. The former appears to be less of a problem in the UK than in America and this is borne out by the experience at British Airways and other UK studies (Fitzgerald, 1990). In British Airways support from data providers was gained by identifying them prominently on the screens displaying their data, while user resistance was overcome by offering information in the EIS that was not available from other sources.

Data management is considered to be crucial at British Airways and is the focus of a continuing cycle of research. Although external data such as aviation news is downloaded to the EIS, the majority of data held in the system is from internal sources like marketing, accounts, and seat reservations. Factors which are considered important in data management at British Airways include: the fast speed of data extraction; a daily link to the reservation system; a high quality, graphical user interface; an IS staff that have a strong sense of business and salesmanship. The last factor, that IS staff should have a strong sense of business and salesmanship, which Cottrell and Rapley have argued is important (at least in British Airways), is also supported in part by a study undertaken by Watson and Frolick (1992). Although the main thrust of their research was to determine the most appropriate method for determining the information requirements for an EIS, they maintain that because the IS manager may have problems understanding executive work, he should have a strong business background together with considerable experience, and excellent interpersonal skills.

David Preedy (1990) suggests there is a growing dichotomy between data-driven EIS applications where the object is to provide easy access to greater detail about the company, and information-driven uses where a deeper understanding into key

performance indicators is more important. Certainly, successful EIS usually create a demand for more and more data from their users.

Data is the crucial cornerstone of a successful EIS; it must be easily accessible, timely, relevant, and accurate (Warmouth and Yen, 1992). Friend (1990), notes that data integrity is the most crucial system-level feature and also that two important trends are taking place within the area of EIS.

> "The first is a dramatic growth in the scale of EIS applications. The second is the downgrading of monthly data in favour of rapidly churning daily, or near real-time data" (Friend, 1990).

He cites one company who have a near real-time data demand, whose EIS can produce the astonishing number of between half a million and a million different data screens, but he neglects to mention that the management of so many data-screens is extremely complicated and unnecessary.

Crockett (1992) believes that up to 50% of EIS are not giving managers the quality of information they expect:

> "It turns out that the hardware and software are not the problem - the information or data going into the system is" (Crockett, 1992).

Crockett describes not so much of improving EIS as 'revitalising' them. He comments that in his experience, (as a senior partner with Price Waterhouse), the primary problem with EIS is "the *right* (his italics) information is not reaching executives ", and it is with this issue in mind that his research is channelled. The key question which Crockett asked was: are the main users of the system and those responsible for system support identifying the right performance measures on which decisions are taken? He thinks they are not, and argues that a multiple approach is needed including 'brainstorming' sessions involving all those concerned which should identify stakeholder (suppliers, employees, customers, etc.) expectations, and establish what they are, organise the precise method of data collection, and outline a process of generating reports. An important necessity of this method is the regular re-examination of both internal and external

components of the system, to ensure that they are not deviating from the desired path. EIS developers should therefore:

- identify the critical success factors and stakeholder expectations;
- document performance measures that monitor them;
- determine the EIS reporting formats and frequency;
- outline information flows and how the information can be used.

The regular consultative discussion of users, IS personnel, system designers, etc. is an approach also recommended by Preedy (1990) who is concerned with the way data is interpreted and modelled in EIS design. Rather than use a 'computer-driven' approach in which the system tries to provide easy access to ever increasing amounts of data, he argues that a modelling or 'information-driven' procedure, which entails the use of less data and more qualitative information to try and isolate more representative patterns in the company's performance, would be more appropriate

The issue of strategic information has been examined by Cruise O'Brian (1991) who looked at the importance that EIS can have in the context of strategic control. She states that although an EIS is not essential, the addition of an EIS can give a chief executive the ability to rapidly estimate the progress of particular businesses or corporate strategic moves. This advantage has been utilised at the American toy company Fisher-Price (Volonino and Drinkard,1989) where the EIS has successfully been integrated with the company's strategic business plan, by providing managers with quick, flexible access to timely information to monitor their rapidly changing markets. Rather than just describe how the EIS was developed and installed, this paper has a joint academic/developer authorship approach and there is evidence of how the environment and culture of the company changed after the introduction of the EIS; how the system was consolidated into the strategic plans of the company; and how the EDI network was incorporated into the EIS.

A specific need to determine information requirements of EIS has been put forward by Watson and Frolick (1992) who argue that although EIS focus on

critical success factors (CSF) their stability varies over time with each level of information requirements: organisational-level and application-level. They list four major strategies than can be used for determining information requirements: these include; asking users, deriving requirements from existing systems, synthesising the characteristics of the utilising systems, and experimenting with an evolving information system. Not all strategies for determining information requirements necessarily involve computerised methods. For example formal CSF and strategic sessions can be held to discuss information requirements. It is also interesting to note that Watson and Frolick (1992) recommend the investigation of the hard copy documents that executives use on a regular basis. This includes newspapers, books, articles, government publication, newsletters, and correspondence.

The need for effective and correct information requirements has also been investigated by Wetherbe (1991) who has determined that there are four prime reasons why systems do not provide the right information to executives:

1. Most systems have been viewed as being functional as opposed to cross-functional.
2. The system design team usually interviews managers individually instead of using a group process.
3. The designers usually ask the wrong questions.
4. Manager are not allowed to determine and refine the conceptual information requirements through trial and error.

Failure to deliver accurate and relevant data to senior management is one of the prime causes of EIS being aborted, with consultancy Metapraxis citing an 80% failure rate (Computing, 1992). Nigel Pendse, a director of Comshare, comments in a report by Guest (1992) that first, some senior executives have information needs (e.g., political) that computers are simply not suited to. Secondly, the information they require is often not available to them or it is in such a poor format that the 'owners' may be reluctant to release it. Finally, some senior executives cannot cope with a computer however simple its interface. Although senior executives often lack a clear idea of what information they want to see, or

how they want it presented, this should come as no surprise to EIS developers as the problem has been recognised for many years, as has the problem of company politics and information hoarding. Bussen and Myers (1997) presented a detail picture of an EIS in New Zealand in which nearly all of the problems mentioned by Guest (1992) occurred: the accuracy of the data was always being questioned; one of the sponsors of the system left at a crucial time; the users of the system found the IT difficult to use; and there was no access to external data and what internal data was available was already accessible to senior managers via paper reports. Walstrom and Rick (1997) suggest emphasising the graphical capabilities and merits of an EIS to gain user acceptance of an EIS.

Davenport *et al* (1992) report that at one insurance company were an EIS was installed, the only serious user was the company CEO. Other business units were apparently nervous regarding their performance and so kept their own information sources within their own boundary. This failure suggest information politics have played a large part in the lack of use of the EIS, however, Overton *et al* (1996) argue that information politics can be kept to a minimum by organising role playing games that dissipate any concerns. But this idea relies on the premise that managers will be truthful when they participate in such games; given the suspicion, and sometimes even paranoia, that information politics can engender in an organisation, particularly when people feel their positions may be threatened by new technology, it is arguable whether such games would be a success. McLeod *et al* (1984), however, have suggested that executives can manage information to some extent themselves by controlling the selection of sources and media. In doing so they achieve control over volume and value, but the key is knowing who are the good sources and what are the good media.

Research carried out by Mintzberg (1972), Rockart (1979), and Isenberg (1984), has shown that the information needs of senior managers are very different from those of other users and that most of their information (75-95%) comes from direct human contact. The more senior positions in a company reflect an increasing intuition and rationality, an ability to act while thinking and see problems as interrelated (Isenberg, 1984). Instead of having precise goals and objectives, senior managers tend to have overriding concerns and think more often

how to do things, than about what is being done. Besides relying on their ability to analyse situations quickly, they also rely heavily on a mix of intuition and disciplined analysis in their decision making and consolidate their action on a problem into their diagnosis of it.

A specific need for EIS designers to acknowledge that human networks play a crucial information role in organisations has been put forward by Grosser (1991), who argues that, unless they do so, organisations will never achieve maximum effectiveness from their systems. However, some have argued that no matter how complex and sophisticated an EIS is, it can never be a total technical take-over because too much information is passed between senior managers in an informal way (Economist Intelligence Unit, 1991).

2.4 British studies of EIS

Far more research into EIS is carried out in the United States (US) than in Great Britain (GB), perhaps because there are more departments and schools in the US dedicated to researching senior management use of information systems, and many more companies have EIS. British studies in this context can mean either studies of British EIS or studies carried out on EIS by British researchers; the latter are often pieces of research on how to build a successful EIS (Preedy, 1990; Holtham, 1990). Moreover, because EIS only became widespread in Britain after 1990, much of the research dates from this time rather than the mid and late 1980s in the US.

An annual conference on EIS, organised by a company called Business Intelligence, has been held in London since the late 1980s, usually entitled EIS 89, EIS90, etc., although since the 1996, they have changed the event to Business Intelligence 1996, 1997, etc., to emphasis the route they feel EIS represent (and perhaps to enhance their own corporate name). This company produces each year a survey or multiple-case study into a particular aspect of EIS development, for example, in 1992 it was *External Information & EIS* . Because this is a commercial organisation, research is not carried out for its own sake and many of

the studies are often subsidised by one of the main EIS vendors, or are done by the company itself to later sell, at a considerable price, at conferences they organise. However, they do provide some useful statistics, such as the increase in system use in GB, and because they have a strong relationship with the EIS vendors and their customers, they can often carry out case studies in companies that would otherwise say no to anyone else. On occasion they will sponsor an academic to undertake a study on their behalf, for example, a study of British companies by Fitzgerald (1990). But they rarely do any original research and many of their case studies and surveys are descriptive only, and lack any real evidence; it would be more accurate to say they offer a guide to the current practices in EIS development. This is less true of another commercial organisation, The Economist Intelligence Unit (a department of the respected international economic journal *The Economist*) who commission reports on issues of topical interest, which in 1991, was EIS. This report (Economist Intelligence Unit, 1991) unfortunately, had very little new to say other than what could be already found in the study by Rockart and Delong (1988).

Studies of EIS by their own developers are rare, even in the US, but offer a unique insight into the trials and tribulations of developing an EIS. The study by Cottrell and Rapley (1991) of the EIS at British Airways (BA) discussed earlier is in many ways, similar to the study carried out by Houndshel and Watson (1987) on the MIDS system at Lockheed-Georgia; both describe the implementation and pitfalls of the system and both have released actual screen shots of their EIS. Cottrell and Rapley's study describes the implementation of two EIS in BA; the first, called AIMS (Airline Information Management System) was considered a failure because it was underused by senior managers – it provided little information they actually wanted and was difficult to use, and the second generation, called MERLIN, the latest incarnation of EIS. Although most of the development of BA's EIS follows the model suggested by Rockart and Delong (1988) there are some interesting differences in that there appears to be less organisational resistance to the development of the EIS, and a greater involvement of IT staff in implementing the system. Popovich (1990) – the manager of the MERLIN system - also describes some of the pitfalls of the EIS development at BA and notes that the 2nd generation system, MERLIN, is targeted at the top 50 senior

managers of BA, unlike the 1st generation system, AIMS, which has now become more of an MIS for middle management.

What is not mentioned, however, in either of the above articles, is the participation of the company library in providing some of the external data for the system. Like most studies of EIS, the library appears to be ignored even if it is involved in some way with the development of the EIS. Stone (1990) describes the implementation of not one, but four EIS, in British Telecom and comments that the only sensible way to develop an EIS is to use rapid prototyping methods. His view of an EIS is defined by its features and, more importantly, the number of users being kept to an elite few. He therefore does not regard a system percolating down the corporate hierarchy as necessary for its survival, which is contrary to most of the literature on EIS. Allison (1996) for example, in his study of 30 British companies, concludes that the principle application of EIS was the monitoring of internal activity by middle management.

Although there have been no large time consuming studies of EIS in GB, unless this study is counted, such as that done by Rockart and Delong (1988), there have been large multiple-case studies and surveys done. Perhaps the most well known of these is that of Fitzgerald (1992), who investigated the development of EIS in the UK. Many of Fitzgerald's findings replicate those found in the US; in particular he directly compares and contrasts his study with one done by Watson *et al*, (1991). It appears that in the UK external information is far less important higher up the organisation and that senior managers do not really know how to handle it, particularly if it is 'soft' external information. Fitzgerald also indicates that office politics and data ownership are perceived as less of a hindrance in the UK than the US.

However, the most surprising difference between the two studies, is that British companies prefer to keep the development of their EIS as far away as possible from their IT departments, a complete reversal of the situation found in the US. Fitzgerald believes this is because the IT departments of some British companies are held in very poor esteem. They are regarded as:

- Lacking credibility with senior management.

- Not to be trusted, usually due to past experiences.

- Unable to develop systems at the speed required.

- Restricted by procedures and documentation standards not applicable to EIS

- Unable to communicate with senior managers.

- Lacking understanding of business.

- Thinking they know better what is required. (Fitzgerald, 1992)

Both Watson *et al* (1991) and Fitzgerald (1992) regard the implication of this as extraordinary as they believe it shows the negative, and sometimes hostile, attitudes towards the IT departments in some British companies.

Further evidence for some of the inadequacies of IT departments can be found in the study by Holohan (1992) who argues that the CSF method for developing EIS, is not being used as rigorously as it might be. Criticism, however, is also levelled at the senior management of the companies he investigated for not modelling their EIS on their business strategy; even worse, he concludes, was that this was not deemed a problem. Similar worries were expressed by Mathews (1990) who believes that because corporate strategy depends on competitive advantage, a failure to take this into account when building an EIS, leaves a large gap in the information structure of system. Nandhakumar (1996) attributes different problems to the development of EIS, by focusing attention on the argument that much of the literature assumes each critical success factor, such as a committed sponsor, is an stable independent variable which takes no account of the dynamic and changing nature of the organisation.

In contrast to the studies that emphasise the problems companies have in developing EIS or which methodology to use, Matthews and Shoebridge (1992a) lay the blame firmly of the EIS vendors for failing to clearly explain what exactly EIS are capable of, and for hyping the belief that computing power can replace the intelligence of managers. Similar views are express by Preedy (1990) who points out that companies are increasingly being 'swamped' by the pressure to

implement EIS and investing large amounts of money which achieve no visible benefits.

2.5   A summary of the central research issues in the literature

The early studies of EIS such as those by Rockart and DeLong (1988) and Houdeshal and Watson (1987) concentrate on the methods of developing a successful implementation of a system. Because EIS were only beginning to appear on the commercial market in the mid 1980's, there was a need to collect data on what exactly was needed to develop a system that was considered successful or at the very least, worth the effort and money put into it. EIS were not just another software program that could just be added to a company's repertoire of computer technology and forgotten about; they were very expensive and needed considerable thought into how exactly how they were to be phased in: who was to direct the implementation of the EIS?; what type of data was to be downloaded?; and who would gain or lose by the introduction of the system?

There now seems to be a general consensus of how one can successfully develop an EIS, with the result that main issue of research has shifted to how EIS can be improved or integrated with other products such as Multimedia and Expert Systems (King, 1989; Turban and Watson, 1989; Preedy, 1990). The improvement of existing EIS covers a considerable field of exploration as it can be researched from many angles, from re-evaluating key performance measures (Crockett, 1992) and information requirements (Watson and Frolick, 1992), to building a framework for developing EIS (Watson et al, 1991; Edwards & Peppard, 1993; Partanen & Savolainen, 1995; Green & Murphy, 1995) or pre-empting organisational resistance (Hämäläinen, 1990). We have also seen a shift in the exclusive use of EIS by senior managers to the more general use of the systems by less senior managers, in such a way that EIS have almost come full circle and become MIS again (Frolick, 1994; Nord & Nord, 1995; Rai & Bajwa, 1997).

However, although the successful implementation of EIS is no longer reflected in the amount of work being done in this area, there are still studies carried out in the less well known use of EIS, for example in the public sector (Mohan *et al*, 1990), the integration of other systems (Allison, 1996) or where investigation has shown contradictions to the norm, for example, Cottrell and Rapley's study of British Airways' EIS in 1991 and Carlsson's *et al* investigation of different cultural uses of EIS (1995).

CHAPTER THREE: METHODOLOGICAL CONSIDERATIONS AND RESEARCH QUESTIONS

3.1   Introduction

Any major piece of research must have, first, a logical reason for the manner in which it is carried out and, second, a research framework to give other practitioners a guide not only to the methodology being used, but also to provide future researchers with possible insights where further research could be undertaken This chapter explains the reasons why the methodology for this piece of research was deemed the most appropriate for this study.

3.2   A brief overview of commonly used research methodologies in MIS/EIS

Research in executive information systems (EIS) can be carried out in a number of ways, each of which has its own strengths and weaknesses depending on how appropriate the method is to the research under investigation. From the outset one must be aware of the main questions to be answered as this is the most important single reason for determining which research methodology is most suitable. This point has been emphasised strongly by Milton Jenkins (1985) who stated:

> "A clear, unambiguous statement of the research objective is necessary to enable the selection of an appropriate research methodology. The selection of an appropriate methodology is critical to ensuring that the research will contribute to the body of knowledge in MIS" (Milton Jenkins, 1985).

There are many interpretations of what can be defined as a research methodology and how it should be categorised. Within the empirical and scientific research approach there are generally considered to be four primary methodologies; case studies, field studies, experiments, and surveys. However, this is not the opinion of everyone as there seem to be numerous definitions and subsets of what firstly, constitutes empirical research, and, secondly, what can be readily identifiable as a

separate research methodology. Yin (1984) identifies five main research methodologies; experiments, surveys, case studies, histories, and archival analysis. Benbasat (1984) split the experimental mode into two distinct methods, that of field experiments and laboratory experiments, while Diesing (1971), a philosopher of science, in what he terms an 'anthropological' approach, espoused the participant-observer approach and formal methods such as statistical analysis.

Some of the definitions of what constitutes a research methodology can be both unusual and extremely focused, Brewer and Hunter (1989) for example view multiple methods as a separate style of research. The latter is not a common interpretation as multiple methods are regarded by many researchers as the basis of good research, the theory being that multiple methods gives the researcher the advantage to use more than one source of evidence, and they have the advantage of using the strengths of both quantitative and qualitative methods to counteract their associate weaknesses.

In contrast, Galliers (1985), among others, has argued for a number of alternative approaches which are distinct from the classic empirical methods (surveys, experiments, case studies, field studies) a view which has also been echoed by Hirscheim (1985a; 1985b) who describes such research as methodological pluralism's; that is, it allows EIS research from multiple paradigms and seeks to escape from the constriction of the natural science model. The other methodologies which have been put forward as worthy of greater consideration include:

- Futures research - in which different scenarios, or futures, are speculated upon and the different impacts of IT and IS are identified given a number of different situations. Such research can be done within or outside the organisation.
- Action research - in which the roles of researcher and subject may be reversed. The researcher actively associates himself with the goals of the research in addition to any theoretical objectives he may have postulated.

- Phenomenology /hermeneutics - an approach in which the researcher regards himself and the method as part of the phenomenon being investigated. It sets out to describe the situation being studied and is more concerned about what things are, rather than how things work. Borland (1984) comments, rather optimistically, that it relies on the belief that others will perceive its descriptions as true.

- Longitudinal studies - the approach in which a long- term view is taken of the relationship between organisational structure and process within the framework of historical change.

An even more extended taxonomy of research approaches is given by Milton Jenkins (1985) who offers no less than thirteen, and who bases his taxonomy on the strength of hypothesis testing and the amount of control the researcher can exert over his subjects. Thus we have at one extreme, mathematical modelling and experiments, while at the other is case studies, archival research, and philosophical research.

It is clear that some of the above methodologies are identical, and that the only difference is semantics. It is also possible to divide an accepted definition into further subsets, append a new name to each subset and define them as a new research methodology. Nevertheless, it is also clear that, even though they may have their detractors, there are several well defined and accepted research methodologies that appear frequently in most taxonomies of EIS research, namely the four empirical approaches offered at the beginning of this chapter (though there are differences of opinion here as well). These methods account for most of the empirical research in EIS being carried out today although there is still many conceptual monologues appearing (Ives & Olson, 1984; Jarvenpaa et al, 1985). Cooper (1988) has noted that the latter has decreased significantly since the 1970's, from around 67% to 28% in the 1980's, while case studies and surveys have risen in the same time period from 13% and 9% to 25% and 32% respectively.

3.3 Case Studies

The case study method involves the investigation of a single or multiple group of organisations or people in situ. There are no control groups as found in experiments and the research is carried out primarily to generate hypotheses or describe the workings of a system. One of the key features of the case study method is that it is possible to capture reality in very great detail, the other is that the data are usually collected by multiple methods thus giving added credibility to the validity of the results and interpretations. However, the view that the disadvantage of case studies are that sometimes they are limited to a single event, and thus cannot be replicated, does not really stand up. A case study of a aircraft crash can only be done once and case studies do not set out to be samples; the reason for case studies is to explore, describe or theorise and not to replicate for statistical generalisation. There is also the view that case study researchers can be too subjective and that the investigations often contain too much qualitative information as opposed to quantitative data. This belief is, however, refuted by Yin (1984) who argues that other methodologies are just as capable to being subjective and that case study research can emulate the more quantitative based methodologies.

A particular problem in conducting case study research, single or multiple, is obtaining the permission of the group or organisation under investigation to gather evidence. This problem stems from the fact that a high proportion of EIS are operated by large companies and contain confidential data - and companies who prefer it to remain that way. When one is fortunate enough to able to undertake such a study *in situ* it is usually after many months of negotiation, with the proviso that any results obtained remain confidential (as was the basis for this study). It is also very time consuming to enter upon such a study of any great depth or significance - witness the two years Rockart and DeLong (1988) and their assistants spent carrying out their research. This is one of the reasons why there are too few good case studies in management information research and EIS in particular, with the result that much of the research relies upon postal surveys.

Despite the case study methodology being one of the most popular and beneficial forms of empirical research carried out by EIS researchers, most of the papers published in this area are studies of single systems with many being simply a blow by blow account of how a EIS was implemented in a particular company, with little new information being elucidated. There are even fewer investigations into realm of multiple case studies such as those carried out by Rockart and Delong (1988) and Fitzgerald (1990).

However, one of the most cited case studies is that of Houdeshel and Watson's (1987) study of an EIS at Lockheed-Georgia. This study has already been touched upon in chapter two and there is therefore no need to repeat what has already been stated. It has only been mentioned here as an good example of what constitutes a good case study. However, to be fair, one must admit that one of the authors is an employee of Lockheed-Georgia which may have negated the difficulty of obtaining permission to conduct the study.

3.4   Selecting a research methodology

In offering some pertinent advice to the research student on choosing an appropriate research methodology Mumford (1985) has written:

> "How does the researcher choose between these very different kind of approaches? The answer is by deciding very firmly the kind of data that is going to be most useful in providing an answer to the principal research question" (Mumford, 1985).

An alternative consideration is propounded by Cooper (1988) who comments:

> "The choice of methodology should be based on the theoretical view imposed on the problem being examined. Because researchers see what they expect to see, an appropriate methodology should be whatever methodological choices compensate for the restricted theoretical views (e.g., rationality) that researchers impose on the problem" (Cooper, 1988).

Other important considerations are resources available to the researcher such as time, finances, and the co-operation of the subject or subjects under investigation.

The principal research question this thesis is concerned with is to ascertain what role libraries are playing in companies that have installed Executive Information Systems (EIS). In other words *how* has the *impact* (if any) of EIS on this particular part of the company organisation affected their role as a library and to determine what future may hold for information services in business?

It is always important to acquire as much information and data as possible on the research question, and only logical to carry out this research *in situ* for the principal part of the research as it is of course impractical to transfer a library and corporate information system to a laboratory; this leaves us with several options for the effective investigation of the impact of EIS on specific area of an organisation, which at the same time may reveal some impressions of what may be the future of business information services. As the researcher is not emphasising his role nor building various scenarios of the future the techniques of futures research and action research cannot be considered. This of course limits the methodology to the more traditional empirical methods of field research, surveys, and case studies. Field studies are slightly limiting in the fact that they require control over behavioural events. Surveys can provide a lot of data about subjects we know little off but because this study is looking at companies that possess first, an EIS, and second a company library/information centre. It was also felt that because some very large and important companies agreed to take part in this research, many people, particularly senior managers, would not have the time nor inclination to fill out questionnaires, while such an approach would not elicit as much in depth information as a study conducted in the field (Franz *el al*, 1986).

We are thus left with a field survey or case study. The former has many attractive possibilities and methods that directly parallel case study research. However, surveys rely heavily on a statistically significant number of subjects, which would mean a far greater number of companies being researched than would be possible

for an individual to complete in the time span available. This leaves only the case study methodology as a viable alternative for a number of reasons. First, because of the amount and nature of the data to be captured in depth, an investigation must be carried out at the company premises. Second, a single case study would be inconclusive at arriving at some genuine understanding regarding the impact of EIS. A multiple-case study was therefore chosen as the ideal method for this particular piece of research. Third, the multiple methods of collecting evidence, which is a hall mark of case study research, can provide a more holistic and verifiable indication of what is happening to company libraries and the role EIS may or may not play and what will be the future of business information services. Finally, there is enough time available to the researcher to conduct a reasonable number of in-depth investigations.

3.5 Research methodology: multiple-case studies

Multiple-case studies differ only from single-case studies in that they investigate more than one case. They are also of course liable to take up much more of the researcher's time, particularly if he is working alone.

Yin (1984) has defined a case study as :

> "An empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used" (Yin, 1984).

This is echoed by Clegg et al (1985) who state that:

> "The aim of a research case study is to identify and examine phenomena and meanings, in order to establish relationships and configurations, with an eye to generation or (loosely speaking) testing of a hypothesis" (Clegg at al, 1985).

while according to Benbasat *et al* (1987) case studies are:

> "particularly well suited to Information Systems research because the technology is relatively new and interest has shifted to organisational behaviour rather than technical issues" (Benbasat *et al*, 1987).

The central research theme of this study has already been noted - that is, the impact of EIS on the role of the company library and what this impact, if there is one, may have on the future of business information services. This of course presupposes that the EIS has already been installed and that any subsequent effects during implementation cannot be measured.

Within the case study methodology Yin (1984) has proposed three different strategies according to the investigation in hand, these are: explanatory case studies; exploratory case studies; and descriptive case studies - each one is self explanatory. However, he does point out that such strategies are not rigid and may overlap. The is certainly the case with the research involved in this study as it is intends to explore, explain, and describe the central research theme.

Case studies can offer, at their most rigorous level, an extremely flexible research strategy in a natural setting, but the value of this premise depends on how well the research protocol is constructed and how well the study is focused on the phenomenon under investigation. The advantage of multiple-cases is that the confidence of the generality of results increases with the number of cases studied (Sudman, 1976), while an important recognition is the perception of the strategy as replication logic, analogous to the replication used in multiple experiments and *not* survey samples. The ability to generalise from replication not only gives a more holistic viewpoint of the phenomenon under study, but it also helps develop a richer theoretical framework and increases the external validity of the research.

One of the strengths of multiple-case studies is the fact that they deduct their reasoning and explanations from more than one source of evidence. There is a general recognition that there exists six major data collection methods:

1. Documentation- memos, newspapers, reports.
2. Archives - organisational charts, personnel/financial records.
3. Interviews- open-ended or focused.
4. Direct observation - meetings, etc.
5. Participant observation.
6. Physical artefacts - EIS outputs, programmes.

Multiple methods of collecting evidence, or triangulation as it is sometimes called, is the most important technique to increase the construct validity of the case study and is therefore one of the most vital principals of the case study methodology. Other techniques include establishing a chain of evidence and having preliminary drafts of the research reviewed by key informants. Internal validity is best accomplished by analytical techniques such as pattern-matching, explanation building, and time-series analysis, while as we have seen the measure of how reliable a case study is depends on the case study protocol and how well the study can be repeated by another researcher and arrive at the same results.

Despite the potential for illuminating the many research possibilities of EIS there have been very few reliable case studies completed. The principal ones are described in chapter two and it would be pointless repeating their content here. One of the reasons why there is so little research in this area and an significant impediment into carrying it out, is the reluctance of many companies to give permission to research into a subject area that often contains highly confidential data. Many companies do not even openly advertise that they possess an EIS, while completing a multi-case study of such issues involves far more time than many researchers can invest.

Moreover, within the case study methodology, as within some other empirical techniques, an important question arises of what type of data should be collected and used - quantitative or qualitative data. This is a major issue of contemporary research and can involve arguments ranging from a technique being too 'scientific'

based or, on the other hand, being too subjective and fraught with qualitative information.

3.6 Quantitative and qualitative methods: the debate

Although the multiple case study methodology has been determined to be the most appropriate methodology for this study there is still the question of how research should be carried out, and there are constant arguments as to what should be the methodological basis of case study research (Yin, 1984, 1993; Benbasat, 1994; Benbasat, *et al*,1987; Kaplan and Duchon, 1988; Lee, 1989; Straub & Carlson, 1989; Adelman, 1991).

What is quantitative and qualitative research? In some areas of study they are perceived as competing methodologies in which various sub-disciplines of social science ought to be studied, and as such they are essentially divergent paths of epistemological assumptions, that is, of what should be valid aspects about the social world under study. In essence quantitative research is usually exemplified by experimental investigations and qualitative research by the social survey (Denzin, 1978; Cook & Campbell, 1979; Fielding & Fielding, 1986). Various alternative terms have been proposed as the terms quantitative and qualitative came to imply much more than just the ways of gathering data; they also implied a divergent assumption about the nature and purpose of research in the social sciences. The very terminology seemed to signify that quantitative research or the lack of it had become the central issue of argument.

Quantitative and qualitative methods can also be viewed as simply different ways of conducting research. When this view is taken they become just different approaches to data collection with the preference for one or the other, depending on the subject under scrutiny. There are differences between quantitative and qualitative research in terms of the data each generates and the level of analysis at which they operate. However, the tendency to argue about quantitative and

qualitative research as though they are separate paradigms have produced idealised descriptions of each genre with strong programmatic overtones. Guba and Lincoln (1982) have used the terms 'rationalistic' and 'naturalistic' while Evered and Louis (1981) prefer the alternate description of 'inquiry from the outside' and 'inquiry from the inside'.

One of the central issues of contention on quantitative and qualitative research is how the former is much closer to the natural science model than the latter. There is a consistency of debate whether social science research should try and emulate the strengths of the natural science model. In the 1960s it was argued that the application of a 'scientific' method (primarily in the form of surveys and experiments), could not possibly take into account the differences between people and the objects of the natural sciences (Kuhn, 1970).

The increasing development of qualitative research in the 1970s helped to fruition a growing number of journals and books that advocated qualitative research as a viable methodology. In 1979 a special edition of *Administrative Science*, an academic journal of predominantly quantitative investigation, published an issue that was wholly devoted to the burgeoning development of qualitative research. Nevertheless, there is a strong opinion that qualitative research has a long road ahead before it will have achieved the same status as experimental research.

A specific need for a scientific basis as the basis of case study methodology within the MIS (of which EIS are a part) field has been put forward by Lee (1989). He argues that among management researchers, the natural science methodology is already a well-known and widely accepted model for conducting studies into management and organisations and secondly, many of the criticisms directed at case studies are argued from the direction of the natural science model. Case study research in particular and MIS in general will never be able to replicate completely the exacting experimental methods of the natural sciences, but this does not dissuade Lee from advocating that the case study methodology in MIS research can meet some of the rigorous requirements of scientific research. MIS

case studies are capable of achieving the same scientific objectives through different means he argues: *"logical deductions in the general case do not require mathematics"* (Lee, 1989 p.40). Lab controls, mathematical propositions, etc., are merely just a means to an objective end rather than criterion to be utilised as a normal procedure, and case study research can be replicated and validated in order to subject a theory to further verification. However, in his appeal for a scientific methodology Lee is relying on the use of quantitative methods more than the qualitative use of data - an issue in itself that is cause for debate.

Although quantitative research is usually associated with the testing of theories and qualitative research is analogous to the generation and exploration of theories, there is no reason why qualitative research cannot be used to test theories in the way typically associated with the model of quantitative analysis. Much of qualitative research has an empirical quantitative streak within it, while quantitative examination shares a concern for subjects' perception and interpretation, which is supposed to be the exclusive province of the qualitative investigator. As many have commented each model has its own strengths and weaknesses and each has an important role to play in the area of MIS (Jick, 1979; Yin, 1984, 1993; Bryman, 1988a; Bryman, 1988b; Kaplan & Duchon, 1988). One method may be more important or more appropriate than the other in certain circumstances, but it is now becoming increasingly rare to find a piece of research in MIS that is exclusively dependent on quantitative or qualitative methods.

CHAPTER FOUR: CASE STUDY DESIGN AND INTERVIEW STRATEGY

4.1 Research purpose

In this piece of research three prime questions are of concern, namely:

1. What is the role corporate libraries or information centres (LIC) play in the development of the EIS?
2. How are EIS developed and used in these companies?
3. What is the future of information services in British companies?

The research was carried out primarily using in-depth semi-structured qualitative questionnaires with seventy respondents and acquiring source literature on the subject. The research can be broken further down into a)*what* is the effect of EIS on the LIC? (if indeed there are any) b) *how* is the effect manifesting itself?; c) *why* and *where* are such effects taking place? and d) *what* will be the future role of business information services? Some of these questions may be presumptive; one may find, for example, that librarians view their role in the organisation with complete indifference to the EIS, or the latter may have no affect whatsoever. However, research is being carried out on the presumption that the presence of an EIS may have some bearing on how librarians perceive their role in the organisation, how senior managers use information, and what will be the future of business information services in the light of EIS and other information retrieval systems.

4.2   Case study design and protocol

4.2.1   Design

1. The study was designed to explore what role the library or information centre has had since Executive Information Systems (EIS) were introduced. It will explain the impact, if an, such systems have had on the present role of the company library and also any involvement of the library in the development of EIS. It will also investigate

what the future may hold for business information services such as the library and other corporate information systems.

2. The main unit of analysis in this study is the Library & Information Centre (LIC) of British companies. The head of the LIC or another senior person was interviewed using a research instrument based primarily on a series of semi-structured questions. Similar interviews were conducted with a senior person responsible for the company EIS, and a typical user (i.e., senior managers) of the EIS and an EIS vendor.

3. The primary method of collecting evidence for the research was focused semi-structured, qualitative, interviews with first, three different corporate groups; librarians, EIS developers, and EIS users, and second, EIS vendors. Other techniques used were collecting evidence from reports, survey data, observation and a review of the literature. A pilot study was also conducted to obtain information on the current state of EIS technology from commercial vendors, all of whom were also asked to provide the names of EIS corporate users who they thought would be approachable for an interview on their use of the EIS.

4. The criterion by which this study will be judged to have been successful are an explanation of the affect, if any, the development of EIS is having on corporate libraries and how this and other information retrieval will affect business information systems, that can be logically inferred from the qualitative evidence. Such conditions are obviously based around the fact that for the study to prove a success, one must gather together the evidence from several case studies and then deliver a logical analysis. There are certain logical tests which any piece of research must pass.

a) Construct and content validity: establishes the correct operational measures for the concepts being studied. This is accomplished by a number of different methods which are carried out during the pilot test and collecting the main body of data, as it enables the research to be based on more than one data collection approach and thus correct the weakness of any one source by the use of another. (The use of multiple methods to collect data is sometimes described as 'triangulation'). Evidence was therefore collected using a variety of instruments

including interviews (EIS vendors and company personnel), questionnaires, observations (of the company library and the EIS in use), and documents (internal formal documents on the EIS, other case studies, survey data, news items from specialist journals and the mass media) from within and outside the targeted companies. A number of key personnel in the EIS software development field were interviewed and a major industrial library visited. A chain of evidence was established and specific procedures were carried out as stipulated in the case study protocol (CSP), whilst bearing in mind the questions of the initial study. Such a chain of evidence establishes which specific documents, interviews, etc., are cited, where and how the evidence was collected (dates, methods, etc), how consistency was achieved (i.e. by replication) and by following the procedures outlined in the CSP.

b) Internal validity: in this research explanation building is used to construct and model casual linkages among general variables and refine any theory from the case study evidence that may develop. Here the idea is to build up an explanation of what is being researched by comparing the findings of one case with another, making revisions and then comparing the details of other case against the revision. The result of this is a cross-case analysis of all the cases under study, not only to develop a theory but also to look for other explanations and negative cases, with the premise that the absence of strong supporting evidence for a rival explanation or negative case, gives more credence to the emerging principal explanation of what has occurred. Moreover, the majority of multiple case studies tend to be dynamic in nature in that the direction of the research can alter in some way, but by following the CSP, establishing a case study data base for each case and following a chain of evidence, the initial statement of intent can remain with few minor modifications that do not detract from the original CSP.

c) External validity: this is accomplished in the research design stage by using the replication logic of multiple case studies. This is not the same as sampling which is a quantitative statistical generalisation; it is the analytical generalisation of the case studies in question. The researcher is trying to replicate one set of

results from a case study in another to build up some idea of what is happening, in much the same way a scientist can build a theory on the replication of an experiment.

d) Reliability: by following the case study protocol (CSP)as closely as possible and developing a case study data base during the data collection. Each case study must be carried out as exactly as possible as all the cases in order to minimise any errors in the procedure, or bias in the investigator. By documenting the procedures involved it should be possible for others to closely follow what has occurred in the investigation, and to arrive at the same conclusions from the case study data base. This will include tapes, written notes, any documentation such as academic papers, vendor reports, company notes, etc., and any materials created by the investigator, for example, charts and tables.

4.2.2. Protocol

Case study questions: as noted earlier, the central question in this research is "what is the impact, if any, of EIS on the company library?" This is a very wide ranging question and it must be broken down further to be properly explored.
The main unit of analysis in this research is the library/information centre (LIC), however, there are two other important areas that must be looked into and these are the EIS (its operation and management), and the main users of such systems i.e., senior managers and executives of the company.

The main questions to be considered are first, those questions that are asked in each case study and second, cross-case questions.
Case study questions:
a) What type of data does the LIC hold, how much of it is external and how much internal, how it is collected and disseminated, and who uses the LIC? Such questions are important because one must first establish what kind of LIC the company possesses and what is its position within the organisation?

b) The librarians knowledge of EIS in the organisation. i.e., who controls it, uses it, what type of data does it access and where it originated. The library manager's relationship with the management of the EIS.

c) What tasks does the LIC perform for senior managers (SM) How do senior managers get their information, how they use the EIS?

d) What kind of information the EIS can access, how is this information conveyed and what are the main sources, how much is manually input, are there any barriers or bottlenecks in data flow, what is the relationship between the EIS and librarians, are there any benefits from an EIS that can be quantified?

e) What do librarians, EIS administrators and senior managers perceive to be the future of business information systems and suppliers such as the company library and EIS?

Cross-case questions:

i) What is the perception of EIS that librarians have and what is their relationship with the managers and users of these systems? Is there any difference due to the type of company, how much were librarians involved in the planning process of the EIS?

ii) Have EIS altered any processes or channels of information flow in the organisation? Have LICs altered their data management in any significant way and what exactly is their contribution to the operation of the EIS? Are there any advances in EIS that could radically alter the way data is collected and disseminated?

iii) Do senior managers now use data in a different way, and has their perception of information management and the LIC changed to any extent?

4.3 Interview Design.

4.3.1 A qualitative approach

The primary method of obtaining evidence in this research study is the use of qualitative semi-structured interviews and, although it was not the only technique used in collecting evidence, it is the dominant one. The debate regarding qualitative versus quantitative research has been addressed in chapter three, but the main question in case study research is the quality of the analysis, rather than the sample size or style of an interview, although the latter is also important. It was decided to use qualitative interviews rather than a quantitative sample for four reasons: first, as the research was conducted in large British companies that had both libraries and EIS it was thought, correctly, that such organisations would more likely respond to an interview rather than mail shot; second, it was felt that more accurate data could be collected through an interview than through a quantitative survey; third, the interview method would give a more descriptive and holistic view of the data collected than a survey could; and finally, it enables the interviewer to raise tangential questions and control the data collection much more closely. However, it must be remembered that qualitative evaluation of data is not hard science; it cannot rely on physical laws or absolute certainties that can be 'proven'. Although some aspects of its methodology, such as replication, may try to emulate it qualitative evaluation does not have a mathematical certainty.

Qualitative research is therefore speculation and conjecture, but speculation and conjecture based on a rigorous analysis of the data. As Patton (1987) notes:

> "The evaluator who has studied the program, lived with the data from the field, and reflected at length about the patterns and themes that run through the data can reasonably be expected to speculate, make conjecture, and formulate hypotheses" (Patton, 1987).

4.3.2 Pilot study and EIS vendor interviews

Before the full study was undertaken a pilot study was conducted first, to acquire details of EIS and users of the systems in British companies and, second, to test and validate the interview schedule for different participants. Because EIS are designed for senior managers and chief executives and contain highly confidential data about the company and are often regarded as a strategic weapon, not all companies advertise the fact that they possess one. It was felt that interviewing EIS vendors would enable the researcher not only to glean up-to-date information on the technology of EIS and the vendors' opinions on the value of EIS, but to also gain from them the names of companies and, more importantly, company EIS personnel who could later be approached about their system and users. It was believed, correctly, that a referral from the EIS vendor would enable to researcher to be more successful in gaining access to the EIS administrators in the company, on the basis that he already knew something of their EIS. Many IT periodicals such as *Computing* provided details about the EIS vendors such as product outlines, future developments, customers, and most importantly, a contact name and address. A visit was also made to a major company library to observe and question the head of the library on the provision of information to senior managers of the company, and to discuss if any questions needed to be revised or added to raise the quality of the interview schedule. The pilot study also enabled the researcher to gain interview experience and to refine the interview procedure, and to learn from simple errors such as checking the spare set of batteries for tape recording interviews work.

The EIS developers varied in size from the large well established companies such as Pilot and Comshare who are responsible for the majority of large corporate systems, to the new and smaller companies like European Software Publishing who market a PC based product. From May to June, 1993 nine companies were approached with a request for a reference interview with a senior member of the company, usually the marketing director or business manager. All the companies approached agreed to co-operate. These included:

1. Cognos: developers of *PowerPlay 3*, a PC based EIS.

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2. Comshare: developers of *Commander*, a mainframe and server EIS.

3. Dun & Bradstreet Software: developers of *Smartview*, a PC DSS/EIS.

4. European Software Publishing: developers of *Forest & Trees 3*, a PC and server based EIS.

5. Holistic Systems: developers of *Holos*, a mainframe and server based EIS.

6. Intelligent Office Company: developers of *EIS Track*, a PC and server based EIS.

7. Metapraxis: developers of *Resolve 2000*, *Empower*, and *Enterprise Knowledge Server* (EKS), all of which are PC or server based EIS.

8. Pilot Executive Software: developers of *Command Centre*, a mainframe and server based EIS, and also *Lightship*, a PC and server based version.

9. Planning Sciences: developers of *Epic EIS*, a PC and server based EIS.

Interviews lasted an average of 45 minutes and were conducted with senior representatives of the above companies with the exception of Cognos who refused a face-to-face interview and instead arranged for their PR company to fax the replies to the questions. Naturally, since these EIS vendors were interviewed in May/June 1993, some have since unveiled new products, for example Planning Sciences now market an EIS product call Gentia OLAP. Other vendors have since been taken over by other companies, for example, Pilot Executive Software is now a part of the Dun & Bradstreet group, and Holistic Systems is now known as Seagate Holos. The term 'EIS' has also given way to products that are described as 'Business Intelligence' (BI) applications' or 'Enterprise Resource Planning' (ERP) software, both of which rely heavily on the use of OLAP (Online Analytical Processing), however, the systems still perform the same basic functions, if a little more quickly.

There were five questions (See Appendix C) designed to give some idea of how the developers of EIS perceived the attributes, use, and design of their systems from both the users and designers perspective, while the final sixth question was designed to obtain details of possible reference sites which could be used for further investigation.

It was natural for the developers to talk about their own particular systems when discussing EIS and although each developer was asked for their opinions about EIS *in general*, many still gave reasons why users picked *their* systems and not their

competitors, mainly by listing their strengths and the opposition's weaknesses. All of the vendors were willing to provide names of company users of their systems who could be later approached for an interview. This was not so much of a problem as was anticipated because many of the vendors had agreements with several customers to use them as a reference site for marketing purpose, in exchange for a discount on their products.

4.4 Company interview schedule

4.4.1 Case studies

The target population was drawn from large British companies that had both company libraries and EIS. This initial targeting was compiled by scanning computer journals such as *Computing* and research papers to determine which companies possessed an EIS and, as outlined earlier, EIS vendors from the pilot study provided numerous examples. This list was then cross-referenced with that of the *Industrial Group Index* (Nunn,1992), a reference book published by the Library Association which is an index of industrial librarians in the UK and overseas. This cross-referencing produced a final list of about twenty-seven companies that had both libraries and EIS of which twenty were chosen as a good representation of British industry. The companies included those in oil and gas production, retailing, chemicals, power generation, telecommunications, banking, and other major industries. The majority also had a capitalisation that placed them in *The Times FT Index* (i.e., The top 100 companies in Great Britain). A brief description of each company can be found in Appendix A.

From the target population of companies which possessed both corporate libraries and EIS a respondent from the specific group to be investigated was approached. These included the head of the company library, the leader of the EIS development team or the person that had responsibility for the running of the EIS, and a senior manager user of the EIS. In addition seven EIS vendors, usually the head of marketing, were approached to gain an insight to EIS development and EIS corporate clients. Thus sixty-seven respondents were originally targeted. However, the investigation of

company E warranted the interview of a second librarian and in company C, two EIS administrators and two senior managers.

Only the main central library of the company was visited (with the exception of Company E where two major libraries were visited) as time did not permit the analysis of every satellite or sub-library. Although the oldest libraries have been in existence in one form or another since the early 20th Century (Companies R,E, T & H), the majority are recent innovations with most, in their current format, being formed in the 1970s. Nine libraries described themselves as the central library. For those companies that did have "outstations", these tended to be specialist libraries attending to the specific needs of a department in the company (i.e., Law, Marketing). The EIS of every company was investigated except for companies C and O in which there were two EIS systems; both EIS were studied.

Of the twenty companies which were chosen, none of the targeted respondents, initially, refused an interview. The first approach was made to the librarians as it was thought that they would be the most amiable to agree to an interview; all agreed without conditions within a few weeks of being contacted in the period January – June, 1994. The interviews lasted for approximately 1-2 hours including an inspection of the library itself. If a name for an EIS developer, the next group of company respondents to be interviewed, was not available, the librarian was asked to suggest someone whom the researcher could interview, an approach which accounted for about 50% of all the EIS developers who were eventually consulted. The interviews with this group occurred between January – August, 1994; a slightly longer time period than the researcher spent with the librarians as the latter tended to move around different company locations more, and have a more busy diary (see Appendix D for complete interview schedule). The EIS developers were interviewed for around 60-90 minutes, however, few were willing or offered to show the researcher the EIS under discussion.

The same method was used to obtain the name of a suitable senior management EIS user, that is, if the researcher did not already have a name under consideration, the EIS developer was asked to provide one. This approach accounted for about 70% of the

senior managers as the other 30% had been suggested by the EIS vendors; in fact there were several cases where the same person was nominated from both the vendors and EIS developers. The interviews with the senior managers surprisingly lasted the longest of all four groups of people that were contacted, with the average being about 90 minutes. However, the time period in which the interview occurred was by far the longest, lasting from January – November, 1994. The reason for this was that many of them had full appointment books for months in advance and were simply not available; indeed, more than a few were not even in the country at the time they were approached for an interview.

Nevertheless a high response rate was achieved with 97% of all company respondents agreeing to an interview of between one and three hours which indicated an interest in the research question. Interviews were conducted at various corporate head offices, nearly all of them in London. The only refusal was from company M where it was discovered that the 'EIS' system the IT respondent (who was identified by the librarian respondent as the correct person) was familiar with, was in fact not an EIS, however, when the correct system was tracked down both the EIS developer and senior manager declined to be interviewed.

4.4.2 Multiple-case studies and replication

Although the term sampling is often used in the social-sciences the correct term in multiple-case studies is replication, a term analogous to that found in multiple experiments whereby each experiments tries to logically replicate a given case. Moreover, replication logic in case studies does not follow the sampling techniques of surveys, meaning a small number of cases can be used to achieve the overall goal. This point has been made effectively by Yin:

> "When using a multiple-case design, a further question you will encounter has to do with the number of cases deemed necessary to sufficient for your study. However, because a sampling logic should not be used, the typical criteria regarding sample size are also irrelevant. Instead you should think of this decision as a reflection of the number of case replications – both literal and theoretical – that you would like to have in your study".
> (Yin,1984)

Although replication is used in multiple-case study design, the procedure does in fact closely resemble that of non-probability sampling or 'judgmental' sampling (Goldthorpe *et al*, 1969; Patton,1987; Baker, 1988; McNeill, 1990) which is a recognised technique in the social sciences. This process is based on finding common characteristics of the population, in this case libraries and EIS, which the research is concerned with, and then identifying and locating them with a view to contacting them to help with the research.

The librarians of the companies were the first to be contacted regarding the research in the belief that this group would be the most amenable to granting the researcher an interview. A letter (see Appendix B) explaining the outline of the research was sent with the names of some of the other companies in the study, on the basis, that if R thought X, Y and Z was also aiding the study, it must be of some significance. If the name of an EIS administrator was not yet available to the researcher the librarians were asked if they could suggest anyone. This approach resulted in about 50% of the respondents in the EIS group being those suggested by the librarians, while the other half was provided by the EIS vendor group in the pilot study.

The EIS administrators and development teams were then contacted. Usually these people are at a higher organisational level than the library staff and were thought less likely to be interested in anything affecting the company library, so the letter described the research outline with a view to the impact of EIS and pointed out that a department in the company, the library, had already co-operated with the research. The final letter went to the most restricted group in the company, the senior manager users of the EIS, who, in two of the companies, were the chief executives of the company. This letter was slightly altered to give the impression that the views of senior managers were being sought on the EIS and company library and, again, it was emphasised that two persons in the company had already co-operated with the research. It was also explained that they were the final person to be contacted and without their participation a case study could not be completed. In all the letters to the respondents words such as 'student' and 'thesis' were avoided as being unlikely to encourage the respondent to say yes, particularly as one went higher up the corporate ladder. Even

this approach could not escape some near rejections from some companies, for example, the library respondent from Company H initially refused because he was, in his own words, *"Inundated with requests from students, especially from MBA students! To fill out this and that survey, and to grant time for all sorts of interview"*. However, perseverance from the researcher elicited a positive response from all those approached, even the chief executives whose time was limited and, in salary terms, very expensive.

4.4.3 Interview Strategy

The object of the interview was to gain as much information on the research question from the interviewees as possible. One of the first items to be addressed was what type of interview should be conducted? Although there are different terms for the same methods, there is a general consensus that the qualitative interview is designed to capture as much information as possible; that it has generally a low-level of structure imposed by the interviewer; many of the questions are open-ended; the focus is on specific situations and actions in the domain of the interviewee (Patton, 1987; Miles & Huberman, 1994;Cassell & Symon,1994). Central themes in the qualitative interview are the emphasis on depth and detail, although depth is a relative notion to the interviewer and interviewee. Moreover, for conducting an interview with key respondents the researcher must cater to the interviewees schedule and availability. This was particularly problematic with the senior manager respondents, who varied from chief executives to IT and marketing managers, and who, when personally contacted after the initial postal request, made it perfectly clear that their time was extremely valuable.

It was decided that a focused, hybrid, semi-structured questionnaire would be the most appropriate interview instrument to administer to the respondents. For external validity and replication logic in the case-study method each interviewee would be asked the same set of questions. At the same time the respondents would be free to provide as much information as they thought fit about the questions, and the researcher was free to ask the questions in a different order if the interviewee had

already covered one question with an answer to another. Some-opened ended and structured quantitative questions were also included when the information need justified them, to vary the content of the interview and thus keep the interviewee interested and focused on the subject matter.

Because the interviews were expected to provide a great deal of information it was thought necessary, with the respondents' permission, to tape record each one. This method is strongly recommended, notably by Lofland (1971) and Patton (1987)

> "One's full attention must be focused on the interview. One must think about probing for further explication or clarification of that he is now saying...therefore, if conceivably possible, tape record; then one can interview". (Lofland, 1971).

> "A tape recorder is a part of the indispensable equipment of evaluators using qualitative methods. Tape recorders do not tune out of conversations, change what had been said because of the interpretation (either conscious or unconscious), or record more slowly than what is being said...In addition to increasing the accuracy of data collection, the use of a tape recorder permits the interviewer to be more attentive to the interviewee...The pace of the interview can become decidedly non-conversational. In brief, the interactive nature of in-depth interviewing is seriously affected by the attempt to take verbatim notes during the interview" (Patton, 1987).

Interviews can be difficult enough without having to write down everything that is said; furthermore, recording lets the interviewer concentrate on what is being said to them, to retain eye contact with interviewee, and to observe and pick up the nuances of what is being spoken. In many of the interviews conducted in this piece of research it was quite clear what the answer to a question was going to be by the expression of the interviewee, as a wry smile, grimace, or raised eyebrow can convey a great deal, however, this does not mean that notes should not be taken and as such they were. An expression of surprise can convey a meaning this is not apparent on a playback of a tape, therefore, simple notation keys, such as exclamation marks, were used when taking notes. Another reason is that until the tape *is* played back and heard there is the remote possibility, for example, that the sound quality was not good enough because of interference from other electrical sources (offices are now full of all sorts of

electromagnetic fields which can interfere with a tape recorder), the tape heads or tape are defective, or the battery level low.

Respondents reacted favourably to the tape recorder, with the exception of one, but who, after being told that the conversation would be written up as a coded reference agreed to speak. Confidentiality was extremely important in this study, not only because of the involvement of EIS which in some companies are regarded as a confidential strategic asset, but because departments in the same company were wary of making their opinions freely known about their company. Thus any information from respondents used in the research had to be coded and made anonymous; this also applied to any research made public.

All the respondents provided at least the one hour interview time that was requested in the interview letter, with many extending the time well beyond this point to around 90 minutes. This was particularly true of the senior managers, the group initially very strict about the time they had for the interview, who often went over the allotted time period given to the researcher. However many of this group, once they had begun the interview, began to expound their theories and explanations on the subject matter. Very few individuals from any group had to be drawn out because they were unwilling to talk frankly about the research question.

4.4.4 Interview questions

The content of the interview questions given to all four groups involved in the study was a mixture of empirical knowledge based questions designed to bring out key information aspects of EIS, libraries and senior management information needs; experiential questions designed to gather the experience of the individuals in their respective groups that could only have otherwise been possible had the researcher been present; value based questions aimed at more speculative responses concerning the corporate environment and the future of business information services; and purely factual questions to get data and figures about the company, library and EIS.

The pilot study questions given to the EIS vendors were designed to obtain the latest current information on EIS at present installed in companies and also systems under

development for the future. Vendors were also asked their opinions on what they thought senior managers and other users wanted from an EIS, and what in their judgement where the priorities a company gave in choosing an EIS. They were also asked to nominate any reference sites or personnel they knew who would be interested in participating in the research exercise. This question was left deliberately until last and after a relationship had been established between the researcher and interviewee, to avoid any reluctance on the part of the interviewee in confiding, in what in many cases, was confidential commercial data.

Each of the groups in the companies involved, librarians, EIS developers, and senior managers were each given a different set of questions designed to reveal their knowledge and experience of their specialist area, however, they were also each given some identical questions to gather their perception and understanding on the same contentious organisational issues, such as information politics. Each session began with simple factual and opinion related questions to establish a comfortable atmosphere with the interviewee. As the interview progressed more difficult analytical and contentious issues were raised with probes being used when the answers appeared lacking in content, or if the questions had been too long for the interviewee to contemplate all at once. Interviewees were also allowed some leeway and permitted to go off at a tangent if the content was meaningful to the initial question. Several interviewees had a lot of information to confide to the researcher, to whom it was explained, was the recipient of information rarely expressed to someone outside the company. However, careful control of the interview was kept by the researcher as losing control of interviews and allowing the subject to speak about situations that bear no relationship to the questions, is one of the pitfalls of qualitative interviews.

The questions given to the library managers were divided into two parts; those dealing with the library itself and the use of it by senior managers plus one question about EIS, designed to reveal if they knew anything about the system in the company; and questions about the EIS in the company. This second group was only given to respondents that knew of the EIS as there was little point in asking any further questions of people who knew nothing whatsoever about the systems.

Questions given to the EIS developers or administrators followed a similar pattern; the first half of the interview session was devoted to questions on the development and operation of the EIS and the company library, whilst the second half dealt with the EIS from the perspective of the users, the senior managers. Finally, the group with the highest status in the company, the senior managers, were given a single set of questions about their use of the EIS and their information needs.

4.5 Data Analysis

As each interview was concluded it was transcribed by the researcher as soon as possible while the memory of the interview was still fresh if time permitted, however, because the majority of the research was carried out in London most of the day was actually spent travelling with no time left to immediately transcribe the tape. Depending on the length of the interview, this took between 6-10 hours for each case, but because of travelling and other incidental ongoing research the final transcriptions was not completed until December, 1995. A paid assistant could have been used but might misunderstand some part of the interview and would find it hard to grasp any nuances or subtleties.

4.5.1   Constructing case studies

The primary technique of analysis used in this multiple-case study, is that of developing a case description for each case study and then using content analysis and explanation building to create a final analysis of the research problem within the boundaries of the case- research protocol (Yin,1984, 1993; Silverman,1993; Patton, 1987; Cassell & Seymon,1994; Miles & Huberman, 1994). Cross-case analysis was then finally carried out using all the individual case studies to produce several chapters of analysis.

The first stage in the analysis of a multiple-case study is to arrange in some order all the data that was collected, therefore, once all the tape transcriptions had been completed a copy was made of each case to work on with the original acting as a reference or master copy. A great deal of text was produced by transcribing nearly seventy interview tapes, however, a lot of organising of the text was done by word processing (Microsoft Word) and a simple text retrieval programme called Idealist (Blackwell). Both these programmes were useful for identifying specific words and comments in the text made by the interviewees. However, when it came to sorting and analysing the text for themes and patterns to produce explanations of what was happening, the use of Word and Idealist was not sufficient. Software packages such as Nudist (Nonnumeric Unstructured Data by Indexing, Searching and Theorising) are available for qualitative data analysis, however, because of need to build several large matrix displays from the text and the researcher's familiarity with it, a manual process of using cards, creating card indexes and using charts was used. [1]

Analysing and interpreting the data began with an analysis of each case study, whilst bearing in mind that the focus of the analysis is derived from the questions used in the interviews; each case had three interview transcriptions from the librarian, EIS developer and the senior manager user of the EIS. In addition there was data from a number of other different sources, for example: interviews from the vendors when they had mentioned a specific company or EIS user; data from case studies on the companies conducted by the vendors themselves for marketing purposes; data available from academic and trade journals which also had undertaken research on one of the companies in the study; and data collected from within the company by the researcher, i.e., printouts and observations. A case description of each company was built up and coding notes made in the margins of each interview transcript, which together with other data sources on the company made up each case. Each case was then analysed to produce a single case study of each company, for example, the transcription notes from each of the three groups of corporate participants on their perception of information management in their company were compared and contrasted, to highlight any similarities or differences.

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[1] Nudist is primarily designed for theory building

4.5.2 Multiple-case studies and cross-case analysis

After the data for each case has been collected, ordered and analysed, a cross-case analysis of all twenty cases was made; this was done in a number of ways. Several master charts were constructed from all the single case studies; these were full of mainly descriptive data about the companies, the EIS and the library, for example, the EIS master sheet contained data such as:

- The EIS system.
- The number of users.
- EIS initiator.
- EIS administration.
- External/Internal EIS.
- User consultation.
- Most essential EIS data.
- Requests for improvements.

Although these large matrices outlined a great deal of data, they were gradually refined, summarised and reduced through partitioning and clustering so that they became more ordered and manageable. From these matrices several factors became apparent such as the methods of development, hostility to the EIS, library participation, etc,. The content analysis of large matrices is designed to identify not only themes and patterns, but also to provide examples of observation and quotations that can be used to enhance these recurring themes and patterns that offer an explanation of what has occurred. In addition to the large display matrices, a card based index was also constructed which consisted of all the notations and quotations itemised around the questions of each case interview transcription. This was assembled around the views, perceptions and observations of all the four groups of participants in the study using different coloured cards for each group. Using both the matrices and card index it was possible to identify significant recurring themes of the study which were important, for example, attitudes and perceptions, information management and the personal familiarity of some librarians with their colleagues in

the EIS development teams. By using the CSP and following the research strategy, the emergence of these themes and patterns from the data led to the identification of causal linkages and relationships between the librarians, EIS developers and users of the EIS.

CHAPTER FIVE: INFORMATION MANAGEMENT - POLICY, POLITICS AND CULTURE

5.1 Information management policies.

To determine the information policies of each company all three categories of corporate respondents was asked if their company had an information management policy, and if so could they explain it. Since there are many preconceived ides of what exactly determines the practice of information management, the following definition was used:

> "Information management is the collection, classification, processing and distribution of information for the benefit of the organisation. It is the process of managing information not information technology"

Among the librarians, all but one, (respondent H), replied that there was no information management (IM) policy in the company that they knew off; if fact, the actual question elicited first a non-verbal response in the manner of a smile or laugh, which turned out to be indicative of the answers many of the librarians gave. Some typical responses included:

> "Information policy? I don't think there is one! No. There is nobody that is in charge within the company for information management, Information Technology, yes, but not Information Management and there is a big difference between the two. People use the word very freely without understanding the difference between the two. We have a managing director responsible for IT but nobody at that level who has responsibility for the provision or management of information". (Librarian, Company C).

> "I think I would have to say not anymore. I joined four years ago before it [the company] started making huge losses and at that time there was an information strategy for the company formulated in the US and driven by the company's many libraries in the US, and in those days they were libraries and information centres. When the financial cuts came many of those libraries were closed and the whole infrastructure fell apart, a lot of people were made redundant and a lot of work simply stopped. What we have now left at the company is a much smaller number of libraries which service their own site. We still have an international bulletin board so we help each other out with journal articles and pieces of information as colleagues, but there is no longer anyone whose job it is to provide strategy or guidance for any

particular policy". (Librarian, Company N).

"There is no information management policy that I'm aware of even though I've pushed for one time and time again. We are close to having a documentation management policy but that's rather different from an information management policy". (Librarian, Company U).

"I think they have some idea of it in the IT context; it's more likely to come from IT than us. We haven't got an information management policy and no one has ever shown the slightest interest in creating one. I think the information function in the company is not as highly regarded as it ought to be judging from the amount of use we get". (Librarian, Company J).

No less than twenty library respondents (95 %) replied that there was no information management (IM) policy within their company; this of course could also mean that there *is* an IM policy but the library respondents were unaware of it, but it would be unusual for a department whose primary function is the collation, storage and dissemination of information not to be aware of such a policy, and some respondents did say that *if* there was one they were unaware of it. Many also stated that that there was unlikely ever to be one, and that the people responsible for developing such a policy could not tell the difference between an IM policy and an IT policy (for example see the comment above from library respondent C), however, further questioning revealed that some of the library respondents were trying to get an IM policy implemented. Only one library respondent (Company H) stated categorically that their company did have an IM policy.

"Yes. Our mission statement is 'To enable all parts of the company, businesses and function, etc to establish and maintain competitive advantage by promoting and developing and maintaining the effective exploitation by others of internal and external information'. So our mission is for the company to do better than anyone else by promoting the effective exploitation of information by those departments. We have regular meetings of information managers, at least annual, where we share knowledge and experience. We have run for the last 20 years the co-ordination of the central purchase of all online databases. We have a single contract with Dialog, Datastar, Orbit, etc. It's totally co-ordinated which has lots of benefits including discounts, savings on administration, and you are managing information and you know how much the company is spending where". (Librarian, Company H).

To the systems managers and administrators responsible for the EIS, the term

'information management' evidently means something very different from what the librarians envisage, as most of former replied with a description of an IT policy. When told that an IT policy was not the same as an IM policy and the difference explained, only five (H, N, R, S & T) said yes, their company did have an IM policy, leaving six who said there was none and twelve who were unsure whether their company did possess an IM policy. Senior manager respondents were more sure of their answers but no less that twelve admitted their company did not have an IM policy:

> "I think I'd be embroidering the truth if I said yes we did have (an IM Policy)...and absolutely no doubt that whatsoever that on disk drives all over this business there are many duplicate copies of many pieces of information". (Senior Manager, Company I)

> "No we don't. The company's business is really to grow and sell products and not to supply information back to head office which is often a source of friction. It's certainly subsidiary to some of the other priorities we have got" (Senior Manager, Company R).

while six respondents were unsure if their company did possess one. This left only three who categorically stated that their company did possess an IM policy:

> "Yes we do (have an IM Policy). We have it in the businesses, in the centre we have various functional responsibilities and pockets of knowledge" (Senior Manger, Company H).

> "Yes there is one but I don't know if it has a great impact. The IM policy tends to be related to the legal and contractual side of IM, that is, key information has to be kept for X years, that sort of thing rather than you have to make X available but it's changing over time. The [company] culture is largely founded on litigation that was raised against us in the 1970's, and that has led to a level of secrecy and lack of information and deliberate removal of old information, so we don't have to worry about it anymore. I chuck stuff away now". (Senior Manager, Company N).

Table four indicates the perceptions of all the corporate groups on their company's policy of information management or lack of it. The analysis of all three groups of respondents reveal what these perceptions may actually mean.

Table 4. The perception of corporate information management policy

COMPANY	LIBRARAIANS	EIS ADMINISTRATORS	SENIOR MANAGERS
A	Does not exist	Does not exist	Unable to say
C1	Does not exist	Does not exist	Does not exist
C2	Does not exist	Does not exist	Does not exist
E1	Does not exist	Unable to say	Does not exist
E2*	Does not exist	n/a	n/a
F	Does not exist	Unable to say	Does not exist
G	Does not exist	Unable to say	Does not exist
H	Exists	Exists	Exists
I	Does not exist	Unable to say	Does not exist
J	Does not exist	Unable to say	Unable to say
L	Does not exist	Unable to say	Exists
M*	Does not exist	Does not exist	n/a
N	Does not exist	Exists	Exists
O1	Does not exist	Does not exist	Unable to say
O2*	n/a	Unable to say	Unable to say
P	Does not exist	Unable to say	Unable to say
R	Does not exist	Exists	Does not exist
S	Does not exist	Exists	Does not exist
T	Does not exist	Exists	Unable to say
U	Does not exist	Does not exist	Does not exist
X	Does not exist	Unable to say	Does not exist
Y	Does not exist	Unable to say	Does not exist
Z	Does not exist	Unable to say	Unable to say

* E2 Company E had two library respondents interviewed
* M No senior manager was interviewed from company M
* O2 Two EIS administrators and senior managers were interviewed from company O.

- There was a consensus from all three groups in only three companies (A, C & U) that their organisation does not possess an IM policy.

- Only one library respondent (H) said their company had an IM policy, the majority of EIS developers did not know, unlike the senior managers were just over half commented that their company did not have one.

- Some respondents admitted that if their company did possess an IM policy, it was only concerned with information retention or security, and therefore more of a records management policy.

- Only one company (H) had all three groups of respondents in complete agreement that their company had an IM policy.

Perhaps it is informative that within the 'mission statement' of the information services department of company H, is the declaration 'promoting, developing and maintaining the effective exploitation by others of internal and external

information '. Certainly, among the librarians, there was the perception that management had not initiated an IM policy because to exploit information one must first be aware that it exists, and then also be willing to share it. Although IM includes operations such as collecting and processing information, it was the belief of the librarians that there was a problem with information politics when it came to organising and distributing information.

5.2 Collection, storage and dissemination of information

Despite a majority of respondents believing that their company does not have an information management policy or is unable to state what it is, the management of information is carried out in one form or another; information is still collected, stored and distributed throughout the organisation; however, some companies will be more adept at this management than others.

5.2.1 EIS - Information sources

The information sources of the EIS is this study are predominantly internal in origin, in fact six company EIS collected information from *only* internal sources. EIS in this study are therefore mainly internal data based EIS with the exception of two systems at companies C and H, where the information sources are predominantly external. The internal sources are mainly financial and business oriented, in particular accounts and sales figures, although many systems are also beginning to collect data from personnel, operations and customer databases. A particular feature of a number of EIS is that often the source of the information is shown, and nearly two thirds of the systems in this study adopted this procedure. This is because the users of the EIS, senior managers, will often want to know the source so they can make an assessment of its worth if they have reason to doubt its validity, while at the same time it can also give the originators of the data a sense that their data is valued. The small amount of external information sources in

nearly all of the EIS appears to be because there is both a lack of interest in the information and little need for it. Although the lack of external information in the EIS may appear at odds with the belief that senior managers information needs are primarily external to the company, in EIS this is not so. Where the senior managers differ from the EIS administrators, and indeed librarians, is the nature of their sources as many of them are not electronic but hard copy and oral.

5.2.2 EIS - Collection and storage of information

The capacity of an EIS to store electronic information is one of the reasons for the success of the systems as it would be extremely difficult to manipulate such large amounts of data from a hard copy. Although this does not preclude an EIS having a degree of hard copy content, none of the systems under study had such a feature; all were 100% electronic and stored their data as such. However, how their data were initially collected and stored was not the same in all the systems.

The results from the EIS developer respondents indicate that the majority of the EIS take data from various databases, such as financial and personnel, by an automatic feed or update at a pre-set time, usually when the system can expect the least number of users to be logged on. All of the systems in this study had a least one automatic feed such as this, the most frequent being a financial data stream of some kind. Moreover, many of these feeds are sent automatically from another computer so human involvement in the data transfer is negligible. However, there is a human factor in the data chain when the data is manually input to the EIS because there is either no direct feed, or because the data need to be entered in this manner as direct input would be impractical, for example, the comment of a senior manager on the latest weekly sales figures. Eleven respondents identified problems with collecting data for their EIS in this manner, either because it was input into the system late or because the data were corrupted in some way.

5.2.3 – EIS Information structure

Information can be structured in many different ways; by origin, by use, time, etc. Within the scope of this study, a standard model describing the attributes of information according to its operational or strategic use was used to determine the structure of information held in the EIS and company library. This model was considered the most suitable because EIS are primarily used as either operational or strategic tools depending on their design, with some being utilised as both.

<div align="center">

Table 5. The structure of information

Strategic	Operational
Broad	Narrow
Non-specific	Specific
Long-term	Short-term
Qualitative	Quantitative
Reports	Facts
Internal	External

</div>

Within the companies in this study, only three of the senior manager respondents described their EIS as strategic systems (Companies C, R & S), compared to nine who stated that they were operational, with approximately the same number, eight, stating their systems were designed to be both strategic and operational in nature. However, despite the fact than many EIS are considered strategic tools all but two of them rely primarily (more than two thirds of the information content) not on external information as the above model would suggest, but on internal information. Of these three EIS described by their users as strategic systems (C, R & S) only one, company C, had an EIS whose constituent data was mainly external, and not internal as the above model would suggest, while company S was one of the companies whose EIS was 100% internally based. Thus, many of these EIS, although having predominately internal information, do not seem to be considered primarily as a strategic tool by their senior manager users. However, this is not to say that the senior manager respondents never used their EIS as strategic tools, for as we have seen, nearly a third of the senior manager

respondents claim that their EIS are designed for some strategic use. This finding is replicated by a 1989 IDC survey carried our by the Economist Intelligence Unit in 1991 (EIU,1991) of one hundred companies using EIS; 67% said they would be using strategic data.

It is difficult to say how much of the information held in the EIS is not hard information but what is termed 'soft information', as nearly all of the EIS developers described the information content, both internal and external, as hard data, however, some of the EIS were able to access e-mail, memos, diaries, etc., and a considerable amount of soft information exists in this form. Several of the EIS developers wanted to address the problem of including soft information in the system by using Lotus Notes, a application that has particular merits for storing exactly this category of information.

Besides categorising information from the viewpoint of being operational or strategic in nature, qualitative or quantitative, one can also consider information as either textual or graphical, a particularly important aspect of arranging information in EIS. Just over half of the EIS respondents reported that the information in their systems had been structured to be more graphical than textual, because senior manager users preferred to view information in that format and graphical information, particularly trend data, could be interpreted much more quickly and also be easily manipulated. However, not all EIS have their information structured this way; in fact three companies said their senior managers preferred text/figures while the remaining six respondents replied that their users had their own personal preferences for viewing information.

> "We thought that they preferred graphs to numbers and we originally set up the sales figures up as a graph with a number behind it, but then we had a request for the numbers up front and the graph behind it which surprised us little bit. It's old habits really – when you talk about sales they like to see numbers. Key Performance Indicators (KPI) are obviously all graphs with numbers behind, so in that sense they are looking at more graphical information. The major change in terms of information in the way that the group sees each business, is the actual CEO's prefer an annual moving total rather than just a cumulative information, so they prefer to look at trend data for the business over twelve months rather than a specific point

in time" (EIS Developer, Company F).

How the information was structured on the computer screen also varied; for example, company I has an A4 quadratic approach, with the screen data split into four sections according to four critical success factors; in contrast, company T, has its information structured around a set of time frames, while the EIS of company H has its data modules arranged in the format of a square, a system the company calls a monopoly board approach.

All but two of the senior manager respondents interviewed (from companies A & N) agreed that they had different information needs from more middle and junior grades. These information needs were a top level view of the organisation from an overall perspective, and looking at a broader and more long-term picture than most individuals. The structure of their information was primarily internal and quantitative financial data, particularly accounting and marketing data. Although some senior managers relied exclusively on internal data while using the EIS, this was not the case when it came to their whole environment. All of the senior managers used some external information for their role in the organisation, but unlike the formal internal quantitative financial information of the EIS, this tended to be more qualitative and informal; specifically, this included economic factors, shareholder data, competitor information and market trend data. Moreover, many of the senior manager respondents interviewed did not, as the literature has suggested in the past (Mintzberg, 1973, 1975; Daft *el al*, 1984; Mcleod *et al*, 1984) have a preference for oral communication, as when asked what their preferred method of communication was, only five of them expressed a predilection for receiving information in this form. The majority did not have any preference, while seven respondents said it was by e-mail. A similar result was found in a study of external information flows of senior managers in four companies by Adam and Murphy (1994). They established that senior management did not prefer oral means for communicating information, but pro-forma reports sent by support staff. They also, however, found that senior managers had a negative vision of computers, a finding which was not replicated in this study. However, it would be difficult to state firmly if this study, and that

of Adam & Murphy (1994), demonstrate conclusively if the communication behaviour of senior managers have changed in the last few decades, as more relevant data is needed.

5.2.4   Dissemination of EIS information

Many users of the EIS studied the information on their display screens, but nearly every EIS also had a colour printer attached. The reason for this according to the EIS developers, was that senior managers also liked to annotate the data on a sheet of paper at a later date. Further examination of the EIS revealed that a specific department or group in the company, either IT or financial specialists, or in some cases both, were responsible for operating the EIS and disseminating the information to the desks of the senior manager users. This was done via a LAN or WAN to a PC using Windows in all but one case, that of company O, which used an X terminal connected to a Unix mainframe.

Senior managers accessed the EIS using a graphical environment because many were unable and unwilling to use a command line to access data. It was also felt by the EIS developers that a graphical user interface would not only be easier to use, but would encourage senior management to draw on the computer for tasks other than accessing the EIS. It was also possible, in thirteen of the companies, for the senior management to access the EIS away from the company premises by telephone. Moreover, three of these EIS users were also able to download EIS data on to a laptop and access the system remotely using a mobile phone. The companies that did not have these remote services said security reasons were the reason that they had not yet been implemented. Several senior managers also made the EIS available to other mangers by way of a projection unit; the senior manager and sponsor of the EIS in company G for example, uses this method for his monthly reviews to show his more junior managers where they were failing and succeeding.

5.2.5 The company library

Like the outline of the EIS set out earlier, this section deals with what kind of information was collected and disseminated by the company libraries in this study. Likewise, it also investigates what type of information is requested by the senior management users of the EIS, however, it also considers some of the statistics involved with running a corporate library, for example, staff levels, funding, services offered, etc,.

5.2.6 Library staffing, services and budgets

The average number of staff in all twenty-one libraries was 5.38 with fourteen of them having less than five staff, therefore the majority of company libraries in this study were not large, indeed the smallest consisted of just one person, with the largest having twenty-one staff. A study by Ryans and Ryans (1977) in 1977 of 100 of the Fortune 100 company libraries in the USA reported similar findings for the number of the staff employed in the company library, with 60% having less than five employees, therefore, the size of the corporate library has changed little in over twenty years both in Great Britain and the United States. Well over half of all the libraries (fifteen) reported a decline in their staff since 1990, with only four having taken on more workers. Surprisingly these 'growing' libraries were not the ones with large numbers of staff or a large budget, but among the smallest libraries in the study.

Table six gives a breakdown of staff numbers in the company libraries visited as part of this study.

Table 6. Staffing levels of company libraries

No of staff	No of libraries

< 5 staff	14 libraries (3 larger since 1990)
>5 - <10	4 libraries (1 larger since 1990)
10 - 14	2 libraries
15 - 19	Nil
20+	1 library (21 staff)

Each library was asked what their budget was for the purchase of stock and the cost of the services they provided including the salaries of the staff. The lowest budget was £20,000, the mean £87,000 and the highest budget approximately. (the library in question could not give an exact figure) £1.8 million. Table seven gives a breakdown of library budgets.

Table 7. Library budgets

Budget	No of libraries
< £100,000	7 libraries
> £100,000 - <£250,000	8 libraries
> £250,000 - < £500,000	2 libraries
> £500,000 - > £750,000	Nil
> £750,000 - < £1 Million	1 library
> £1 Million - < £2 Million	2 libraries

One library (Company S) did not have a budget as such because all their costs were met by the relevant departments of the company which requested specific items, hence Table 7 totals to twenty libraries and not the twenty-one investigated. We can also see from Table 7 that the majority of libraries have a budget that is below £250,000 with only three having a budget of more than £750,000. These three libraries (Companies F, O & X) did not have the largest staff numbers nor were they exempt from cuts in staff themselves, thus having a large budget does not apparently insulate you from cutbacks in the company. Studies of British company libraries (Jones,1983; Rothwell, 1984.) have shown that companies with intensive research activities such as banks and pharmaceutical firms have higher

budgets than, for example, engineering and manufacturing companies; research that is reflected in this study.

The three companies with budgets over £750,000 were also amongst the largest of the companies studied, with all three citing increased competition and the value of information in their respective fields as some of the reasons for their large budgets. Table 7 also, however, shows the huge gap between libraries with very small budgets and those with more substantial funding. It would appear that there was also no relationship between size and budget; for example, Company J has a staff of seven and a budget of £220,000: Company X has nine staff and a budget of £1.8 million.

Each library was asked what services they offered their users, in particular senior managers. Specific categories were used (see Appendix F) for example, SDI, books, journals, bulletins, competitor analysis, etc., but they were also asked if they offered any other services other than these categories. This part of the study was not designed as a user evaluation of the library, but simply as a indicator of what services each library could offer the company's personnel and senior staff. Standard categories of service were used as can be found in the standard texts on library investigative measures, some with special reference to the company or industrial library (Fisher, 1966; Burkett, 1972; Martyn & Lancaster, 1981; Aldrich, 1985; Baker & Lancaster, 1991). Most categories such as journals, books, abstracts, etc., have changed little over the years, however, since the 1970s and 1980s there has been a large increase in the use of electronic sources, such as online services and CD-ROM.

The majority of the libraries offered at least half of the service categories used, however, not one library offered all these services. Each library had to justify spending its budget wisely, and in many there was either no demand for a service or they could not justify one for a minority of users. Surprisingly, the one service that one might expect of a library, book lending, was not a service offered by all; four libraries (Companies F,G,S & X) did not provide this service because they

placed more of an emphasis on current research periodicals and up-to-date electronic information, rather than hard copy books. These four libraries were also heavily involved in doing information research on a variety of topics, with the exception of company library G, who did not possess enough of a budget to justify buying books for the purpose of lending, however, all these four libraries could and did buy books for their own reference when the need arose. They could also purchase books on behalf of others though the cost was usually put down to the department or person concerned.

Only two services were offered by all the libraries; Online access (which, strictly speaking, was more of a tool for the library staff – few libraries offered their users direct access to online services because of the skills needed to utilise them, and their access cost) which is an internet connection to a commercial information service such as Dialog or Datastar, and journal subscriptions. Online access was used primary to do searches for financial research, mainly on competitors, and for accessing Online Public Access Catalogues (OPAC) such as the British Library Automated Information Service (BLAISE). The few libraries that did offer their users direct online access only did so after training them in search strategies, not because it is overly difficult, but because online access rates were expensive, sometimes accounting for over 50% of many of the libraries budgets. In this study, company library F was one of the few willing to let personnel other than library staff access their online systems; with many of the users in this company highly qualified in pure sciences they often have a better understanding of the scientific and patent information they are seeking than even the company librarians.

The nature of services offered in an company library is slightly different from those normally found in a public or academic library, because as Brimsek (1989) noted in her study of US and Canadian company libraries:

> "central to many …is the concept of problem solving or providing accurate, timely and critical information to the user for corporate decision-making processes" (Brimsek, 1989)

As we shall see later, company libraries are more liable to be ruthlessly pruned or shut down altogether than their counterparts in the public domain; company libraries are also expected to prove their worth as they are not there for the public good or as an accepted and necessary service. Culnan (1986) observes that:

> "Corporate libraries differ dramatically from other types of libraries in that their collections are likely to be more current and highly specialised, and they provide highly customised or personalised services " (Culnan, 1986)

Many of the libraries collection of books, for example, dealt only with their company's area of specialisation, and we have seen that journals are considered more important for their current information; however, despite this, only two libraries (U & Z) used the British Library online access system, BLAISE, for searching.

Corporate libraries are also more likely to offer services such as SDI and Current Awareness tailored to individual personal requests. These services were on offer to senior managers and some staff in only eleven libraries, but such services are often very time consuming and labour intensive and many libraries said they did not have the staff, or the time, for them to offer this service to even senior managers. Scanning newspapers and journals was also a popular service (sixteen libraries) and this was available to all the users of the libraries, rather more than SDI or current awareness profiles.

The use of CD-ROMs was found in eighteen of the libraries with various Standards, Abstracts and Bookbank CDs being most common. However, in seventeen of them this service consisted of a single independent computer, thus restricting the use of it to one person at a time. This was a surprising finding as it is now quite common for computers to be networked together with multiple access to the same database, however, company library R was the only library with networked CD-ROM access. Some libraries said they intended to network their CD-ROMs and many others expressed a wish for them to be connected, but

explained that computer installation were the remit of the IT department. Certainly the experience of company F in this respect is instructive; on being asked if their CD-ROMs were networked the respondent replied:

> "No, these are at the moment individual workstations because we have been unable to network them so far due to a change of strategy in Information Systems really. They were working on a VAX base-network and we went through the process of getting the CD-ROM to work through the VAX when they changed their strategy to become a PC-Network. So we have to wait for that infrastructure to be in place to take advantage of that. We are dying to do that as it will be a massive improvement for us." (Librarian, Company F)

Less popular services included the provision of newspapers (other than those used by the library staff for scanning, etc.), bulletins, reports, translations and a guide to the library itself (nine libraries only). The lack of a publication explaining the library's services in over half of the libraries in this study may seem at first glance strange, as it is one of the ways a library can tell company staff the services it has to offer them. However, given the reluctance of many of the libraries in this study to publicise their services, for reasons outlined later on in the study, it becomes apparent why so many libraries do not offer such a guide.

5.2.7 Library information sources

Among the librarians surveyed the most common information sources in use were the external commercial online hosts, particularly those that dealt in financial and business databases. Some of the most popular are noted in Table eight.

Table 8. Library use of commercial online hosts

FT Profile	Dialog
Maid	Orbit
DataStar	Dun & Bradstreet
BSI	Textline

101

Lexus   Dow Jones
Kompass   ABI Inform
Inspec   Reuters

Many of these online hosts have become a standard source of financial data for most libraries, although one or two such as Lexus, are the remit of more specialised information like legal data.

Thirteen library respondents reported some difficulties with obtaining information from their external sources, particularly with finding competitor data such as pricing policies from foreign counties in S.E.Asia. The reasons cited for these difficulties was that data was time consuming to obtain and also hard to track down, because of the poor regulating policies of some foreign countries.

Other external sources of information were many and varied but can be split into seven main groups:

1. Local libraries.

2. Local Universities.

3. Specialist information companies and agencies such as Esmerk.

4. Business Schools.

5. Government sources such as the House of Commons and Embassies.

6. The British Library Document Supply Centre at Boston Spa (DSC).

7. Specialist libraries and institutes.

No less that thirteen libraries were users of the British Library's DSC at Boston Spa, yet as noted earlier, only two libraries (U & Z) said they used the library's online enquiry system, BLAISE. Many of these external sources were used because they kept distinctive information particular to their collections, for example, The Institute of Petroleum has an unrivalled collection of information on the oil and gas industry. Other sources, such as the London Business School or Economic Intelligence Unit, were used because of their reputation in getting hold of difficult data or simply because they were the cheaper option.

The sources of internal data acquisition by the librarians was less eclectic than the collection of external sources, in fact over half the libraries did not collect any internal data from their own company, and those that did received only deposits of predominantly annual and special reports. Libraries also reported that other groups in the company, for example law departments, collected and stored their own data. Company M was quite specific why it did not have a policy of internal data acquisition.

> "No [we do not collect internal data]. That's really a policy I have not adopted to be honest because it's so unmanageable. There is no management at all of internal information and a lot of it comes from within the company, and you need several people on it to produce a very good management of internal information. But that is also why there are a lot of little libraries, because they keep internal files and that type of thing and I don't see that as a job that I would like anything to do with to be honest". (Librarian, Company M).

5.2.8 Library requests: collection and storage of information

To determine what type of information was requested a number of questions were put to the library respondents. They were also asked to identify, if they could, if there were any particular groups of personnel that used the library more than others, if senior managers were given any priority when it came to servicing their needs, and if their requests were declining or increasing. Internal information was defined as company reports, memos, annual reports, accounts, etc., and external information as journals, government reports, data on other companies, online database reports, etc.

Although some librarians reported requests were for 'anything and everything', the majority said there were specific areas such as information on competitors, finance, marketing and business (see Appendix E). In fact according to Wilson (1989), this type of information is considered the most important by all types of managers for both strategic and operational roles.

Personnel from economics, marketing and legal department were amongst the most frequent users of the library, although five libraries reported that no group was more representative than another. The economic, marketing and law departments have traditionally relied on copious amounts of data, however, Withers (1985) in her study of the provision of business information in UK company libraries, found that R&D, production, and marketing were the most frequent users. Only one library, (Company F), in this study reported the R&D department as the main user, and this was because it was a library specifically tailored to the provision of information to the company's R&D department.

> "We are very much geared into the R&D side of the industry so they are our most intensive customers. Outside of that I would say our marketing department, but that has fallen in with a business trend that industry are trying to bring the research and marketing together, so we are actually riding on the back of that trend really. It enables us to make the right links". (Librarian, Company F).

When the requests of senior managers was discussed with the library respondents many of them explained that very few actually made their requests personally. If they did make a direct request they were as a rule likely to use the phone, the most popular mode of communication, however, they were also more likely to use an intermediary such as their secretary or personal assistant. E-mail, although used by half the libraries, was a less popular (seven libraries) method for senior managers making requests (see Appendix E). Each library was also asked if they had ever knowingly provided information to a senior manager that had proved critical or important. Eight libraries replied that they had, including the respondent from Company F, who had heard, indirectly, that they had passed on some critical information, but half of the libraries (ten) do not know because they either had not asked or been told. Surprisingly, however, when those libraries who reported good feedback are compared with those who say they have given critical information, there is no correlation. There was very little internal information asked for by senior managers but it was mainly company reports when it did occur. The overwhelming information requested by senior managers from librarians is external; business and financial data, with competitor data amongst

the most requested, and to a far lesser extent, marketing, management and general data. Much of this data is already held by the library as many of them have special files on their major competitors which are regularly updated.

Among the librarians it was apparent that, when it came to how the information they used was stored, there were two kinds of library in operation; those that used predominantly online databases and recorded the information as such, usually within in-house developed databases or as simple flat word processor text files, and those libraries that had a 50/50 split between electronic and hard copy collections. Since the mid 1970s there has been a large increase in the use of online service providers, such as Dialog and Datastar, for business research and a decline in the purchase of hard copy sources. Work by Coyners (1989), however, has indicated that although information like market trends and competitor data are important external electronic sources, they are not rated highly as an information source when accessed due to lack of content relevance and accessibility.

Although most libraries could not provide a breakdown of how much of their budgets was spent on electronic information, the three largest consumers (F, H, & X) admitted it was a "considerable" amount. However, there was a general opinion among the librarians that more of their budget was spent on accessing online hosts than buying hard copy information. Nine company librarians reported that their information was held equally as electronic and hard copy; eight said they relied mostly on electronic storage, but only two (A and I) used predominantly hard copy storage methods. These two libraries used very little online sources and relied much more on being a 'traditional' library, by which they meant they were primarily a lending library whose budgets were used to buy hard copy information such as books and journals, rather than accessing online databases. The most frequent type of data that was accessed electronically (either in computer databases by library staff or on CD-ROM) was financial and business data while hard copy information tended to be company and other reports, books, journals, technical standards, legal and government papers.

5.2.9   The structure of library information

Within the company libraries the structure of the information held was far more varied than the company EIS or that utilised by senior managers. The main library stock naturally varied with which line of business the company conducted but all the libraries naturally kept information on their particular speciality, be it engineering, chemicals or finance. However, as well as their core speciality there was also several stock subjects that almost all the libraries held. These were:

- Management.
- Business and finance.
- Information technology.
- Competitors and markets.
- General reference material.
- Newspapers and periodicals.

In fact, the majority of the company libraries held the broadest range of information from qualitative to quantitative, historical to current, internal to external, strategic to operational, etc,. However, it would be difficult to accurately gauge the structure of the information from the viewpoint of the information structure model used earlier, for example, if it was skewed more towards operational or strategic need, because the range of information collected is so broad for even the smallest of the company libraries.

5.2.10   Dissemination of library information

The results from the librarians indicate that the most prevalent method of disseminating information is by internal post and in hard copy format, despite the fact that two thirds of the company libraries had e-mail access to their customers.

Electronic dissemination was not widely used; first, because the initial requests, particularly from senior managers, did not come via e-mail but often through their secretaries or personal assistant, and second, the librarians reported that senior managers often asked for a hard copy print even if sometimes it was possible to send the information in its original electronic format. Although this may seem at odds with the preference of senior managers, as noted earlier, for utilising electronic information, it is not so. Many senior managers simply preferred to read information from paper rather than an electronic screen.

The one area where it is common for the library to disseminate information electronically is when they have a direct input to the company EIS; only four company libraries conducted this service (Companies E, H, R, & X). This information is sent either manually when it has been collected and formatted, for example the customer relation survey from company E, or automatically at a set time, for example, competitor profiles and news items for company X. By contrast, some librarians (again four in all) although not having a direct input into the EIS, did send information to the EIS administrators which could sometimes eventually end up in the EIS. An example of this is company A, where the library was responsible for looking up the daily oil prices and passing on the data, which was then included on the EIS menu. However, the EIS in this company no longer needs the company librarians to look up this data because it now receives a daily feed of financial figures which includes oil prices. This example from company A demonstrates that when information can be gleaned from more than one source, the EIS can have an adverse affect on the company library in its role as a collector and disseminator of information. Not only was the library in question no longer asked for this information, the librarian was not informed that the EIS now downloaded this data automatically.

5.3 Information politics

Rather than ask a question of each respondent, a indicator card was used outlining what information politics meant within the study because the term 'information politics' may have a different meaning for each respondent. All the respondents were shown a list of five models of information politics as devised Davenport, Eccles & Prusak (1992) on the management of information. They were then asked to pick the one model that they thought best represented the practices of their respective companies. Davenport *et al* (1992) looked at the management of information in twenty five companies and identified five information models or 'states' that represented the practices they observed in these companies. They argue that only when information politics are managed and considered an integral part of the company, can information be managed properly and true information based organisations exist:

> "Many efforts to create information-based organisations – or even to implement significant information management initiatives – have failed or are on the path to failure. The primary reason is that the companies did not manage the politics of information. Either the initiative was inappropriate for the firm's overall political culture, or politics were treated as peripheral rather than integral to the initiative. Only when the information politics are viewed as natural aspect of organisational life and consciously managed will true information-based organisations emerge". (Davenport, *et al* 1992).

It was considered that respondents would more readily reply to descriptions of the 'states' without labels such as 'Anarchy'. The five models or 'states' shown to the respondents (without labels) were as exactly as described by Davenport *et al* and are follows.

A. A heavy technical approach to information management stressing categorisation and modelling of an organisation's full information assets, with a heavy reliance on emerging technologies.(Technological Utopia).

B. An absence of any overall information management policy, leaving individuals to obtain and manage their own information.(Anarchy).

C. The management of information by individual business units or functions, which define their own information needs and report to the overall company. (Feudalism)

D. Information categories and reporting structures are defined by the company's leaders, who may or may not share the information willingly after collecting it.(Monarchy)

E. An approach to information management based on consensus and negotiation on the organisation's key information elements and reporting structure.(Federalism)

Among the librarian respondents nine thought that their company pursued a policy of feudalism, seven a policy of anarchy, two a policy of technical utopia and the remaining three a policy of federalism; there were no monarchists in this group. This pattern was not repeated in the EIS developer groups where there was a more definite identification for the state of feudalism (fourteen companies); again none thought their company's information politics was based around the monarchy principle. Finally, the senior managers were asked to indicate their response; eleven also chose the state of feudalism, however, alone among the three groups of respondents, three of them indicated they thought their companies state of information politics most equated to the state of monarchy.

We can see from looking at all the responses (see table nine), that the most common 'state' to all three groups is feudalism, where each business unit or division defines its own information needs. We can also see that although this state of defining information needs is strong in the EIS and senior management groups, it is less so amongst the librarians where only two fewer respondents (seven) replied that their company most represented an anarchic state, a view shared by only one respondent in the EIS group and none of the senior managers.

Table 9. Respondents opinion of Information Politics.

COMPANY	LIBRARAIANS	EIS ADMINISTRATORS	SENIOR MANAGERS
A	Feudalism	Feudalism	Monarchy
C1	Anarchy	Feudalism	Feudalism
C2*	n/a	Federalism	Monarchy
E1	Feudalism	Feudalism	Feudalism
E2*	Federalism	n/a	n/a
F	Anarchy	Feudalism	Feudalism
G	Feudalism	Feudalism	Feudalism
H	Feudalism	Feudalism	Feudalism
I	Feudalism	Federalism	Federalism
J	Tech Utopia	Tech Utopia	Feudalism
L	Federalism	Feudalism	Feudalism
M*	Anarchy	Feudalism	n/a
N	Feudalism	Tech Utopia	Federalism
O1	Tech Utopia	Feudalism	Feudalism
O2*	n/a	Feudalism	n/a
P	Anarchy	Feudalism	Monarchy
R	Feudalism	Federalism	Federalism
S	Federalism	Federalism	Feudalism
T	Feudalism	Feudalism	Feudalism
U	Anarchy	Feudalism	Tech Utopia
X	Feudalism	Tech Utopia	Feudalism
Y	Anarchy	Anarchy	Tech Utopia
Z	Anarchy	Feudalism	Tech Utopia

* Companies C2, E2, and O2 had two respondents in their respective groups to interview.
Company M had no senior manager to interview.

Despite the lack of using labels like 'Anarchy' it seems that 'an absence of any overall information management policy', is not a description the EIS and senior manager groups feel best describes their company's information politics, but this may be because senior managers such as these are less willing, even if it were true, to attach such a description to any aspect their company's information management policy.

Davenports *el al's*. opinion is that there are only two possible realistic choices to be made from among their 'states': monarchy and federalism. Nonetheless, they also add that first, federalism is more preferable but that it is much harder to achieve over time and, second, that many companies are in the stage where they are developing more than one model at a time. Federalism was almost equally popular among all the groups of respondents but the monarchist supporters were only found in the senior manager group, perhaps indicating they were more

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familiar with the type of person who would dictate such a policy, for example, the chief executive.

Closer examination of the results also indicates the differences of opinion in each company as only four organisations (E, G, H, & T) had the same state identified by all three groups. However, with the exception of company H, the remaining three also disagreed over whether their company possessed an IM policy. There seems to be some correlation between positive perception of IM policy and 'state' and the respondent group. Thus the librarians who were the most negative on whether their company possessed an IM policy, were also the least likely to choose the most practical states of federalism and monarchy, whereas more than twice the number of senior managers, the most positive on IM policy, said their company pursued information politics based on the federal or monarchist model.

If we look at both areas of information management and political states by combining both in a scatter diagram (Figure 3)several areas of interest stand out:

Fig 3. Respondents perception of IM policy and political states
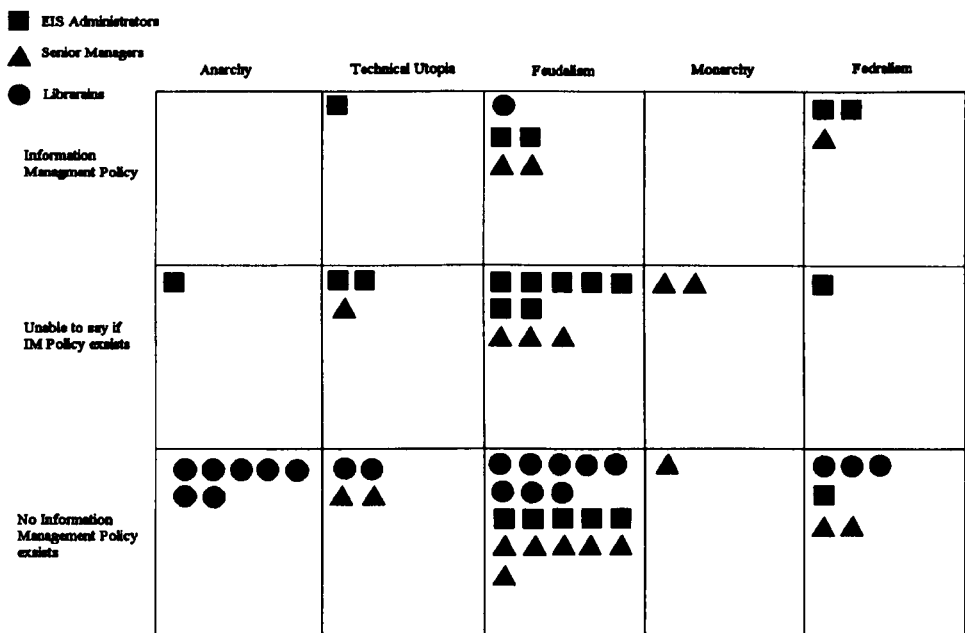
- The librarians' responses, with the exception of respondent H, indicate they believe that there is no IM policy in their respective companies and are clustered predominantly in the states of anarchy and feudalism.

- The feudalistic state is the state that most respondents feel their company's information politics most represents, irrespective of the existence of a company IM policy.

- Senior managers were more likely to choose the more favourable states of monarchy and federalism irrespective of whether their company had a IM policy.

- Only one company's respondents (H) were in complete agreement not only on their company having an IM policy, but which state its information politics best represented.

- The largest cluster was centred around respondents who stated their company possessed no IM policy and most closely represented a feudal state.

These examples demonstrate that the respondents' views of the information management policy in many of their companies is almost non-existent and that the culture of information politics is, according to Davenport *et al's* (1992) model, best represented by a feudalistic state. Very few respondents could say their company pursued policies more conducive to a more positive and efficient information culture, in the respect that they had both a company IM policy and a favourable information political environment such as federalism.

5.4 Information Culture

Many studies of corporate culture (e.g.,Pettigrew, 1979;Deal & Kennady, 1982; Kilman, Saxon & Serpa, 1985; Horton, 1988; Stamper, 1988; Davenport & Shyer, 1990) deal with the entire range of corporate cultures, however, it was felt in this research that a study specifically of the *information* culture of the organisation would help understand what role libraries may have since the introduction of EIS. Information culture has been described by Davenport (1997) as:

"The pattern of behaviour and attitudes that express an organisation's orientation toward information. Information culture can be open or closed, factually orientated or rumour and intuition based, internally or externally focused, controlling or empowering. A company's information culture can also include organisational preferences for certain types of information channels or media – for example, face-to-face communication versus telephone or teleconferencing" (Davenport, 1997)

We have already seen that many of the respondents in this study believe their companies possess poor or no information management policies, and that many of the respondent's perceptions of information politics is that it is feudalistic in nature. These perceptions in themselves give some idea of the information culture of the companies under study; however, to gain a deeper understanding respondents from all three groups were further questioned in areas that would elicit an improved appreciation of their company's information culture; questions on information flow and exchange and barriers to information were put to all three groups whilst only the EIS group was queried on whether there was any hostility to the EIS.

To gain some idea of what the information flow and exchange was like in the company not only was each respondent of all three groups asked to describe it in their own words, they were also asked to describe if they had encountered any problems in obtaining internal information. Drake (1984) has argued that one of the features of a successful information culture is the sharing of information to a wider cluster of people, which can mean a reduction in several layers of corporate hierarchy, while Davenport (1997) regards information sharing as likely to make the largest impact on an organisation's information environment.

The librarians proved to be the most forthcoming on the state of information flow and exchange in their companies: more than half of the (twelve) respondents replied they thought it was not good but not bad either i.e., indifferent, patchy, getting better etc., and that they could not recall many occasions when they had had difficulty in getting internal information. Most often this was because, as has already been noted, they were rarely asked to get information from within the

company in the first place and although there are requests for internal information, this is usually for annual reports, etc., which the library already holds and thus they rarely have to approach company departments for information.

Were the librarians do seem to have some difficulty is finding out *where* to look for information in the organisation rather that retrieving it once it has been discovered. Moreover, this applies both to respondents citing difficult information flow and exchange and those who relate no such problems:

> "It can be difficult to find out where to go for information because of the way the company is. Some time ago we tried to get hold of some brochures on our product copies, so we could put them downstairs in reception. We had to find out who was the manager for that particular product before going through his organisation to get the brochure. There was no easy way of getting them".(Librarian, Company I).

However, there also appears to be a downside to a good policy of information sharing. The library respondent from Company N said that although the information flow and exchange were good in the company, it was detrimental to the library which was now facing competition for the provision of information from other departments in the company.

> "It's[information flow and exchange] good if you can find out where the information is. I'm not sure that the company libraries are not being marginalised because information is so freely available in other ways throughout the company" (Librarian, Company N).

> "From being in the forefront of IT in libraries we are now kind of sliding back into the darker ages, where the library is once again a repository for paper and for fairly low level library services like loans and acquisitions, and a place to keep reports. I really feel it is becoming more marginalised from the information that is genuinely the life blood of the company all over the site. Information is being provided by other people. The library has competitors within the company and we only supply a small proportion of the information to people that is actually crucial to their work". (Librarian, Company N).

Five library respondents reported that their companies' information flow and exchange was bad or difficult. One, company R, replied that it was:

"Pretty appalling. Within a commercial organisational structure the way this [company]is, ownership of information … although frustrating, is only sensible. I think the problems are that nobody is sure at what levels to stop the information exchange. Groups want to own their own information but they don't want to manage it". (Librarian, Company R).

while only five of the librarians could say that the flow and exchange of information was good in their companies, but surprisingly they were not the ones who said they knew of no barriers, in fact, if anything, the reverse was true.

Four respondents could say they had not come up against any barriers to information, yet at least one described the information flow and exchange in their company as appalling. Good information flow or no barriers also does not equate to any particular "state" either. Four respondents said there were barriers but stated they were minor and to do with official barriers and individuals, rather than gatekeepers or the reluctance to share data. Three of these four were companies that once were under government control, and since privatisation certain regulatory controls have come into force. Many of these former national concerns have internal controls known as Chinese Walls by which some departments of the same company are legally prevented from sharing information, and this seemed to be the only real problem. Thus, for the librarians, as already noted, the issue is not people withholding information but trying to discover who holds it. An example was given in one company (Y) were the respondent said that they did not even have an organisational chart of the company, and that it was more important to know the 'right person' to find the information one needed.

In was in cases such as these that unofficial channels of information became important; all companies have unofficial channels of communication and exchange which is usually termed the 'grapevine'. Not surprisingly all the library respondents knew of it and used it. But what is perhaps unusual is that for some companies (C, Y & E2) this network is growing in importance because of the lack of any formal information management system. However, some librarians say there is also a growing awareness that information can be a strategic asset and that information flow and exchange is improving.

"I think it's getting better. I think the awareness of people of the value of information and how to get it is improving, simply because in their own sectors the physical resources are being paired down and the value of information is gaining ground. Circumstances have forced them into it really" (Librarian, Company Y).

"Certainly when I joined there was very much the nationalised industry mentality. That has now got better over the years. Communication within the company is much better, I think they have realised the need to do so and certainly since privatisation it has got far and away better than it ever was before. It's getting better all the time I think. There are new people coming into the industry – for a long time it was very static in terms of the people who were here. It was kind of jobs for life thing. There are more fresh blood who are computer literate and that is certainly having an impact". (Librarian, Company C)

Among the librarians, and only the librarians, there arose the problem of duplication of information. This did not seem to concern either the EIS developers or senior managers as much, however, just over half of all the library respondents reported that duplication of information was a problem, but that there was nothing they could do about it and indeed in many respects it was sometimes necessary. Certainly they have a point in the fact that amongst large companies such as these, it is inevitable that there will be groups who wish to own their own information for reasons such as redundancy and ease of access. Some cases of duplication are based on the practice of departments buying the same reports, periodicals and other materials:

"Yes![there is duplication] Again it's by the very nature of individuals in as much as anything. It's not a company failing; I think it's an individual failing. I know for a fact where there are engineers that keep files of information that we have here. Now they may be based five minutes away but they like to replicate what we are doing here, even though they have easy access to us. We have found lots of mini libraries… have sprung up within departments and they are ordering materials that we already have in stock, but they feel more comfortable having them there". (Librarian, Company C).

"Market research [is duplicated]. We try and encourage people to come through us but I know a lot of people buy their own which could cost £2000, but what happens now is I actually tell people if they are looking for something to contact a company like Ovum before they buy it and check that [we do not already have it], and that is an example of how bad information management is here. It's easier to contact a vendor to find out if someone

from the company has brought a report rather than try and find out within the company. You get an answer that much quicker". (Librarian, Company M).

Although this sort of duplication may be understandable to some extent the other type of duplication which many library respondents report is far less so, and far more costly; this is the practice of departments using the same online services without consulting each other and in the process being billed many times over. However, all online hosts exist to make money and it is clear that many do not, and would not, give their customers advice on how they can save money by not duplicating costs and thus use their services less. One of the perceived benefits of a good information management policy is to avoid this sort of expensive duplication; Company H has such a policy and thus co-ordinates all purchases of online databases which has resulted in an agreed single company rate. Most company libraries, however, do not seem to be tasked with this sort of responsibility, and many feel powerless to prevent what they see as a needless waste of money:

> "The company continually reinvents the wheel, goes out and buys the same information again and again and again from the same suppliers, so what we have attempted to do is to try and negotiate corporate level contracts with suppliers and to try and train them to stop exploiting the size of the company by selling the same information again and again". (Librarian, Company X).

> "That is one of the biggest bugbears in the company, duplication. And it's going to get worse. It's across the board. With the demise of the competitive marketing central point information section, each one of them is going to buy a complete set of what I have here. Think of that multiplied by twelve; that to me is a waste. My estimation on the bottom line for what each of the companies is that it is going to cost them each £500,000 a year. Nobody bothers to ask. I'm the only professional librarian in the whole of [the company] which is pretty astounding. You would not think they would have only one solicitor or accountant". (Librarian, Company G)

However, others have recognised this sort of duplication can a serious problem and are taking steps to eradicate it. Company E, as for example, has two major libraries; a technical research library and a business library. Both library managers were interviewed.

"Yes we know it [duplication] goes on and we try and cut it down. One of the areas was ourselves and the research library where it was said that they had their own library and we had our own library, but we now have a technical agreement with them that if it's business information they want they will come to us and if it's a technical request we go and ask them, so that has cut down some of the duplication". (Librarian, business library, Company E).

"There is a degree of overlap between the research library and business research, they also have access to some of the same databases as we do. They will inevitable interrogate the same database but not at the same time. Setting up formal links between them and us to tell each other what we have done, would probably be more expensive than just doing the same search at about the same time so the duplication is cheaper than the alternative I guess". (Librarian, research library, Company E).

The EIS administrators and developers generally followed a similar pattern as the librarians in their regard of their companies' information flow and exchange in that the majority of them described it as patchy, improved or could not say; that is, very few were willing to offer a definitive description like good, bad, or excellent:

"It is much improved on what it was before I took this work up: there is still perhaps not what I would like to see, from a cultural point of view, that data is an asset and to the benefit of everyone and I would still say there is not a view that everybody sharing information is a benefit to the organisation" (EIS Developer, Company S).

"It's improved a lot, certainly over the last three years, partly because EIS but it's still a very big company with lots of departments, lots of layers of communications, chains of command and inevitably there will also be some problems and issues associated with that" (EIS Developer, Company Z).

In fact, only three respondents (E, H, and R) replied it was good, with two of them (E and H) agreeing with their colleagues in the library.

"There is no desire to hide the information. I think it's not just having a vision on how you can use IT to influence your business we also have a pretty open culture at [the company] and there are not too many people that sit upon numbers" (EIS Developer, Company E).

However, respondent R's belief that the information flow and exchange in his company was good was the complete antithesis to the company's librarian who described it as appalling. In fact the only companies whose library and EIS

respondents did agree were those of E and H.

The EIS administrators also thought that there were few barriers in their companies that prevented them from sharing information, and that those that did exist were there strictly for a purpose i.e., Chinese walls or security. However, despite this over half (12) replied that they did have some difficulties in getting internal data for their EIS systems. This was not due, in the main, to barriers or people withholding data or, like the librarians encountered, discovering who has the data, but more mundane – people and departments sending in data late, inaccurate data that had to be returned or amended, or data that was time consuming to input because it was still done manually.

> "Yes, [we do have difficulties] because we are dealing with a number of separate groups. Getting them to focus on providing information to a system like this is difficult. They are coming round obviously because we have senior management sponsors now who are putting a value on the information that's provided by the system" (EIS Developer, Company A).

> "Yes, almost all our internal data which is one of the reasons I think we went for so much external data. It's very political. People are not, in some of the business units, 100% happy about it (the EIS) being available to the board. They guard their own information" (EIS Developer, board EIS, Company C).

> "Yes we do [have difficulties] The flash sales (early daily sales figures) because its by fax (and then entered into the EIS). That's a human problem. Generally by Wednesday the information is complete but Wednesday is a bit late so I think you will find most users will rely on the faxes they get and will look at them rather than information on the EIS" (EIS Developer, Company L).

An example was given by one EIS respondent from company U who identified the problem of recording the relevant data by a specific time as one of the reasons for the failure of their EIS, an observation echoed by one of the targeted senior manager users. The result of this was the data was recorded behind schedule and the information in the system was no longer up to date and therefore of limited use. This quickly resulted in a decline in the use of the EIS and the eventual demise of the whole system to the point were almost none of the intended users

access the system.

"Where there is an automatic interface there is obviously no problem at all because the main data is kept up to date. Where it is manual it is difficult and a lot of the systems I've known are not longer up to date because they are not being used (the EIS) by the actual directors, then obviously the guys who are providing us with the information don't bother to wire into us, which is not unreasonable" (EIS Developer, Company U).

"Right from the outset I think we believed the data was going to be generated from existing databases, pulled in automatically, and the reality is that doesn't happen now and never did happen. It [the EIS] wasn't integrated with the rest of the databases and consequently the provision of data to the EIS - I'm not saying this was all databases, but certainly the ones I'm associated with - involved a lot of manual activity in terms of preparing data to get specifically on the EIS and that was exactly what we didn't want. We wanted to find a way in which we could quickly track what was going on, and I think the way it was initially presented was that it was going to be automatically; that was certainly my belief and the level of resource that I had to put on my site was quite incredible". (Senior manager, Company U).

From this it is clear that information culture can adversely effect the support of an EIS, namely the timely capture and recording of information for an EIS; this can be a critical feature in the success or failure of a system. This information retrieval problem can be, certainly in the cases of companies L and U, directly linked to a lack of support from the original sponsor of the EIS. When the original sponsors of the EIS left the company there was little support from the new 'owners' of the system and this lack of support contributed to the eventual demise of the EIS's in question. Furthermore a good deal of the current literature on EIS (Rockart & Delong, 1988; Burkan, 1991; Evans *et al* , 1989; Barrow, 1990; Friend, 1990; Watson *et al* 1991; Wheeler *et al* 1993; Young & Watson,1995) is clear and unambiguous on the need for senior management support.

The majority of EIS tend to be developed because of internal pressures (Watson *et al.* 1992); that is, there is a need for mainly internal data and as such most EIS have no external links to databases other than those in the company, and therefore contain largely internal company data. Moreover, as has been noted earlier few EIS even hold external data because there is not a great demand for it. The internal data is primarily financial data derived from transaction databases and this

study was no exception, with only two systems (those of companies H and C2) concentrating on external data, while five of the EIS systems were completely internal. The main sources of internal data were overwhelmingly financial (sales and accounts) although more companies are beginning to include personnel data.

More than one of the EIS respondents also stated that it was the information culture and corporate culture of their organisations that were responsible for not only many of the problems of obtaining data for the EIS, but for the initial hostility to the EIS. Five companies said they experienced some sort of hostility when they were developing the EIS, however, this ceased when the systems became operational.

> "I think there is hostility to it for all sorts of reasons. People think it's... what's the word ? An 'Executive Toy' is bandied about. There is defiantly hostility towards it but I think that may improve, hopefully" (EIS Developer, Board EIS, Company C).

> "There was a lot of early hostility in terms of 'why do we want this system at all?', not particularly from the directors, but from the next level down because the original intention was to take the system not only to the groups board, but to each business at finance director level. The early conversation we had went 'we have all this info in a book and it arrives in a book every month, if I want to know something I look in the book, why should I should I need the system?' (EIS Developer, Company F)

> "Yes [there was resistance] by the established collators of the information. Traditionally the information was stored within financial systems not available to executives and the EIS freed that and forced them to free up the information that they collated. There was significant resistance there" (EIS Developer, Company R)

Although the majority of EIS developers experienced no overt hostility to the development of their system, many did say that there was still a healthy dose of scepticism towards the EIS.

We find again within the group of senior manager respondents, despite the fact that most of them cannot say if their company has an IM policy, that thirteen could reply they had no problems in obtaining internal information. Only four senior manager respondents were unfortunate in having trouble obtaining information

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from both inside and outside the company. Senior managers also seem to be the most contented with nine of them reporting no problems at all in getting the information they required, a reality likely made possible by their position to delegate information retrieval to others, and the knowledge by the provider that the information was for a senior manager of the company.

> "Yes,[I do have trouble in getting information] internal and external. What I find very hard to get is comparative data, either from inside or outside the company. I think there are two reasons for that: firstly, people are generally very nervous about such stuff and secondly, in every piece of data there is a judgement of what where the criteria to select these categories and are they the same as mine. Everybody looks at data slightly differently and so their comparisons become very different, and that's the hardest problem. People in organisations are sensitive about sharing information and, hardly surprising in what is a very competitive financial environment, in some cases you are competing for resources or kudos or something. People sometimes think data will be used against them and they want to know why you want their data – there is a nervousness". (EIS Developer, Company N).

Although few senior manager respondents replied that internal information was a problem for them, curiously enough some of them explained that they did not know where to find the information in the company – a problem more common with the librarians.

There appears to be no emerging pattern among any of the three groups of respondents regarding the difficulty of obtaining information in comparison to whether they have an information management policy. All three groups of respondents of some companies possess no IM policy while, conversely, others that have such a policy report difficulties in obtaining information. However, only company H had a complete agreement between their respective respondents on IM policy and the lack of problems in obtaining information. EIS administrators and senior managers were more consistent in their agreement on whether there were any difficulties obtaining information of any sort in their respective companies. There were also few companies which, although possessing no information policy, where all three respondent groups seemed to concur on the problems or lack of them in obtaining information.

It was also apparent that, although there are variations in what all three groups of respondents argue about the merits in obtaining internal information, the librarians on the whole find knowing where to look for internal company information more of a problem than either the EIS administrators or senior managers, whose difficulties lie more with the problem in obtaining accurate and timely internal information. Each of the respondents in this study was relaying their own experiences in the behaviour and attitudes of themselves and others to the practice of information sharing, therefore it would be wrong to assume their perceptions and values are held by every other person in their organisation. Davenport (1997) suggest that managers must *'come to grips with their information culture subjectively'* (p.84) rather than try to formally analyse it. However, as most people's environment is in part responsible for shaping their ideas and beliefs, then so it is likely that their work environment also helps to determine their attitudes and perceptions towards the company.

5.5 Summary

In many ways the information held by corporate libraries and EIS is similar; both rely heavily on the electronic collection of financial and business data, but that of the EIS is mainly internal, hard and quantitative, as opposed to the external, qualitative and soft information of the library. Despite libraries allocating much of their budgets to accessing online hosts, much of the information disseminated to senior managers is by hard copy. It was recognised, by both the librarians and EIS developers, that very little of the information content of the EIS came via the company library.

It is also clear from the EIS developer and senior manager respondent's views that either they can not say what their company's information management (IM) policy is or, in the case of the librarians, it simply does not exist. It is not surprising therefore that for the librarians they regard the condition of information politics in

their company as equating to an 'anarchic' or 'feudalistic' state. However, more surprising perhaps, is that many EIS developers and senior managers also expressed this opinion. There was a consensus of opinion on IM policy between all three groups in only company H.

Most of the respondents from all three groups reported that information flow and exchange was adequate in their companies, with very few of them coming up against any barriers, and only the EIS developers citing a problem with obtaining internal information for the EIS. The librarians and senior managers were more likely to have trouble finding out where to obtain the information in the first place. The only real problem of any concern was the librarians' view that too much money was wasted duplicating information. Not only was this expensive, but it was felt by many that the developing of mini-libraries throughout their companies could jeopardise the existence of the principal library. The librarians were also more critical about their company's apparent lack of any information management policy. Not only did all but one of them believe their company had no IM policy, most expressed the view that the company could not tell the difference between information management and information technology.

CHAPTER SIX: PERCEPTIONS AND ATTITUDES.

Chapter five dealt with information management and what respondents thought of their company's information management policy, politics and culture. This chapter follows on to further illuminate some of the perceptions and attitudes the respondents have of the library and EIS and how they view future developments in business information; it is therefore primarily concerned with their opinions and perceptions rather than an discussion of how the EIS was developed.

6.1   The Library

All the librarians were asked to express how they thought they were perceived as a department within their organisation, not only by giving their own views, but by indicating how high their profile was in the company; did they do any publicity about the library for example? The majority stated that they had a fairly good profile (medium to high) in the organisation:

> "It's certainly well known within the research area and we do provide a service to the whole of the company. It's maybe not as well known outside of research as it could be, and we are forever aware of the fact that we do need to do some publicity and advertising. But the danger there is that we are so overworked at the moment with just three of us, that there is some reluctance to try and pull in business from outside research, because we are not sure that we could actually handle it" (Librarian, Research Library, Company E)

> "Yes, we are very obvious. We are in a very good place and that was a strong point when we were set up - we had to be central so that everybody would know about it and we have always tried to encourage that...No we don't [do any publicity] because we have more than enough to do as it is. Its something we would like to do but we can't and we have shied away from it. The business has built up to such an extent and we don't want to do much to stimulate further demand, and then find out we can't fulfil it. This is the reason we try and get people to be open, we show them where things are, how the classification system works, how the various microfiche and CD-ROM's work so they can come in and use them themselves" (Librarian, Company J)

Others, however, replied that they kept their profile rather low:

> "No.[we do not have a high profile] We have found that...being as our main remit was to support and supply information to the people here, the engineers... Although in the past we have attempted to expand our customer base in the HQ and operating companies. We never gained any successes there". (Librarian, Company I).

> "We don't actively publicise ourselves. The library booklet that you have is a tortuous process. We have so few staff we are hardly able to keep up with the demands they make of us. Any marketing has to be well thought out. We are always in danger of being swamped. A lot of the initiatives that were taken have had to be honed down because of the danger that we couldn't cope with the demand. It would reflect badly if we couldn't satisfy that demand, and would have the opposite affect of what you are trying to achieve which is an increased customer base. You may loose your customer as you can't provide the service. We are on a fine edge, staff and budget wise". (Librarian, Company Z).

Moreover, as we can see from the reply of respondent Z above, some librarians are concerned not only about their increasing work load, but also about their position in the organisational structure. This group of library respondents concerns is best characterised by the replies from respondent G on the profile of his library and what, if anything, he did to improve it:

> A."[The library is] Fairly well known. Certainly I am. I had a high profile down at Winerish and it seems to have followed me"

> Q. Do you do any publicity to raise your profile?

> A. "Not likely! I want to keep my job. That's the one thing you do not do in this company. You don't want to appear to noticeable, especially in the sort of functions that can get chopped very easily...Basically the less anybody knows about what you are doing in the company the better it is. You have to watch your back. We have lost 10,000 staff in the last three years out of 31,000. In dribs and drabs". (Librarian, Company G)

If we take the librarians perceptions of themselves and include the results from other questions put to the respondents on feedback, if they regard their department as reactive and how they see their future in providing business information, we can determine several patterns apparent in table 10.

Table 10. Company libraries: promotion, perceptions and attitudes

| Comp | | Profile | | Publicity | Pro/Reactive | Feedback | Future |
	Low	Medium	High				Pos/Neg
A		*		N	Reactive	None	?
C		*		N	Reactive	None	?
E1#			*	N	Reactive	None	?
E2#		*		Y	Proactive	Good	Pos
F			*	Y	Proactive	None	Pos
G	*			N	Both	Poor	Neg
H	*			N	Both	Poor	?
I	*			N	Reactive	None	?
J			*	N	Reactive	None	?
L			*	Y	Proactive	Good	Pos
M		*		Y	Proactive	Good	Pos
N			*	Y	Reactive	Good	Neg
O			*	Y	Proactive	Good	Pos
P		*		N	Proactive	None	?
R			*	N	Reactive	Poor	?
S			*	N	Reactive	None	?
T	*			N	Reactive	Good	Pos
U			*	N	Reactive	Poor	Neg
X		*		N	Both	Poor	?
Y	*			N	Reactive	Poor	?
Z	*			Y	Reactive	Poor	?

Two libraries were visited in company E.

We can see from table ten that none of the libraries with low profiles in their
company were described by their staff as proactive although two (Companies G
& H) did say they were a bit of both. We can also see that the profiles of the
libraries are split between those with a low and medium profile (twelve) and those
with a high profile (nine). However, all the libraries that have described
themselves as proactive have either medium or high profiles in their respective
companies, and all used publicity to raise that profile in the company.
Unsurprisingly, most of the libraries that reported good feedback and had a
positive view of the future, were also among this group. What is most striking
about the respondents answers is that approximately two thirds of the libraries do
not do any publicity at all, have no or poor feedback from their users and are
unsure about the future of their library in the company. But even some libraries
who are either proactive (Company P) or have a high profile and good feedback
(Company N), still retain a unsure or negative outlook about the future of their

library, a perception which is exclusively centred around the concern that their department may be closed.

As we have seen some libraries have a high profile but do no publicity or marketing and the respondents replies to the questions about their profile and marketing seem to indicate why. Companies E1 and J have *high profiles* but do *no* marketing or publicity, but companies G and Z also do *no* publicity but have *low profiles*. It seems quite apparent from the reasons the respondents give that not only are all of them concerned at being flooded with work they know they cannot cope with, some are pessimistic with regards their future employment. All these four libraries had seen their staff decline by 25 -75% over the last few years, a common occurrence in this study with fifteen of the libraries having lost staff. Many of the librarians, although not overly pessimistic about the future of the library, were unsure about it to the extent they voiced some concern about exactly what their future role in the company would be.

> "We are over stretched, but I would hope the new group structure would enable us to pull our socks up. The problem is all the units have been very reactive and part of that's the status of information generally. Everyone says that information is power, but everyone seems to work on the principle that information has a cost only when they don't have it. As soon as they have it, it has no value at all. They are totally unaware of the concept of information provision, actually acquiring and producing information in the format required". (Librarian, Company R)

> "I don't know [what the future will hold]. What I would like to think is that we could probably do more desk research instead of providing more tailored research to people. At the moment we are not able to do it because we are dealing with a lot of queries that people could deal with themselves, that kind of thing. And becoming more specialised probably and dealing with more difficult information requests that needs the skills and experience that we have, and other people won't have because it's not their area basically".(Librarian, Company M).

> "It's very difficult to see the future. I think it will be the same but more technically developed. Certainly the changes I've seen since 1980 have been quite amazing. When I came here there was no online searching, so all of our research was done by checking printed copies here or in another library. Now it's much easier and more information is available. I suppose it depends on how the online services go, will they try to woo the end users so they can do their own searching?". (Librarian, Company P).

The uncertainty about the future the majority of librarians express, however, is at least not overtly pessimistic, unlike the three respondents who thought their future was bleak.

> "I don't think the library could be in a more threatened situation. It's virtually gone the library itself. There will always be a need for internal company documentation, that bit's safe. But the external information side of things; it's already gone and I don't think anything worse could happen apart from the library could go".(Librarian, Company U).

> "The library structure in the company is constantly under threat. I survive by the skin of my teeth each time. I was given 90 days notice once at... but I was rescued from there. I'm kept on I think mainly as a token, because it just about makes the company compliant with ECC regulations for public service tendering". (Librarian, Company G).

> "I'm very pessimistic. The worst possible case, and there is the possibility the library may close altogether because although we are much cheaper than we used to be, we still cost more than £150,000 per year. We may be contracted out of the organisation so we would not longer be a part of the company, but a contracted business part like catering, and then the service would be pretty low level, really document delivery".(Librarian, Company N).

The difference between these librarians and those that are *not* reluctant to market themselves are obvious.

> "We have certainly a lot more high profile than other organisations' libraries because three years ago, as we are the main information area of the group, I set up a series of seminars which I now hold quarterly in London. I invite people from throughout the UK groups to give presentations on their area, on what products they are producing, new services, to stand up and market their own departments. Beforehand everybody else in the group were going outside to services like ICC, Dialog, etc., and doing their own thing and setting up their own accounts, but I have consolidated all of those things and we now have a corporate account with external services. We have saved the bank a hell of a lot of money by doing this. It's very proactive". (Librarian, Company O).

> "It has a high profile. I tend to have staff that are particularly outgoing. I like to have staff that have good personalities, good communication skills. We also produce library literature; we have a fairly attractive brochure on the library services which is updated on a regular basis and that is very well received. The Chairman on down would probably have a copy in his briefcase. In addition to the marketing of our services we have got lots of bulletins that the library produces, sort of current awareness bulletins of new titles that we have produced or we have brought in new series". (Librarian, Company L).

This confidence in their ability and their proactive marketing is reflected in their positive belief in the future of their libraries within the company.

> "The major trend in terms of the library is we are going to be facilitators and network operators, rather than central services. Certainly we see this trend very strongly in scientific areas, in that because of IT the users are becoming more and more able to manage their own information again. In the past, before the information explosion, a scientist could keep up with his journals but now that's impossible, and they can now do much more themselves with IT, but it's our job to train them and give them the facility to do that". (Librarian, Company F).

> "I'd like to get a lot more exposure within in the group and develop it far more as profit centre by selling our publications a lot more, and providing our data online through a PC based system to other areas within the group". (Librarian, Company O).

> "I'm not sure if one will call it a library. I can see it having very little in the way of books really. I think there will be some printed material around but not many books. Journals and newspapers will be electronic. I think the library will develop even more, managers will not change a lot but there will be a lot more tasks they will have to do, and in order to do that they will need more information and much more refined information".(Librarian, Company L).

A British Library research report commissioned in 1984 (Slater,1984) highlighted problems the company library has of its image. Margaret Slater, the author, recommended that 'promotional activity' was needed in a lot of the firms to bolster the image of the library. However, this does not appear to have happened in many of the libraries in this study. We can also see Table 10 that the majority of librarians who have an uncertain or negative view of the future, receive little or no feedback from their users unlike the positive libraries who all actively seek feedback. The former do not only get no or little feedback, but because of their reluctance to market themselves or raise their profile higher than it already is, they do not actively pursue it unlike the latter.

> "You also hear about your services via third parties etc., and I also do questionnaires (about twenty questions) to about fifty selected managers on the whole service, not just on the actual material but on the staff and the physical part of the library which we will then evaluate". (Information Librarian, Company L).

There was no difference in the services the 'positive' librarians offered than those of the 'negative' ones, so one cannot say that the former are more confident about their future development because they offer a superior service. All but two (Companies J and N) of the libraries operated a free service to their users, so it also cannot be said that the costs of information provision were hampering the development of a user base, although some users have been toying with the idea of introducing costs. Ratcliff and Weeks (1995) have shown that operating a fee based library service can increase library usage and gain credibility with management, as it is has users 'paying' for a service and is 'proof' that the library provides a valuable service. However, we have seen that many librarians have a reluctance to raise the profile of the library too high, not only because they feel they cannot handle the extra work, but that the library is more often as not to be amongst the first to suffer cuts. Although this is an understandable attitude it comes at a time when information management is getting a higher profile in organisations, thanks to the belated realisation that information is a strategic asset of a company. This profile elevation of information management has also been helped by management consultants, information system vendors and others, who have created the environment of knowledge management and associated tools to go with it, moreover, there is also the timely emergence of the World Wide Web and corporate intranets; these issues are discussed further in chapter eight.

An alternative strategy is of course to render the corporate library if not indispensable, then extremely useful to the very people who hold the library's fate in their hands, the senior management of the company. Each librarian therefore was asked if they gave senior managers preferential treatment. Two thirds (fourteen) replied they did so because of the position of senior management in the company, although many commented that they should really give priority to the most immediate requests, an attitude the remaining one third (seven) said they did do. Librarians who have described themselves as positive about their future all gave senior managers priority and five out of eight of them were proactive, but of the three respondents who had a negative outlook, only one gave senior managers priority. It is therefore possible that the former generate their confidence and have good feedback due to a more positive relationship with their senior mangers.

To determine what the senior management of the company actually knew about their library all of them were asked first, if they had ever had occasion to use it and, second, if they could describe what sort of information the library held. Of the twenty senior manager respondents asked just under half (nine) stated that they had never used their company library; of these nine non-users, five of them had no idea what sort of information the library collected. The senior managers who had used their company's library had a better knowledge of what they held, although one respondent (J) did admit although he had made requests of the library in the past, he had no idea of what was actually there as he assumed that when he asked for some information it would be provided. Only two senior managers, those from companies I and X, expressed surprise that there organisations actually possessed a library. However, the use of the library by senior managers, or more strictly speaking by their assistants, was limited, and many of them were hard pressed to describe exactly the information they had sought and when they had asked for it. The non-use of company libraries is not new; Slater (1984) reported that the largest group of non-users of the company library were senior managers, but what is disturbing is that this non-use continues fifteen years later as this study and others by Auster and Choo (1992) and Brick (1999) testify.

Another reason for the pessimism of a lot of librarians, particularly regarding the decline of staff (which affected all but four libraries), was the continued development of electronic sources of information and the disappearance of printed matter, both of which have meant less staff are needed to manage the library. Librarians are not being luddites in the sense they resent the introduction of new technology, on the contrary, many welcome the ease with which they can now do searches, send information, etc., but they also realise that such technology means less staff to manually retrieve information. It could also mean that a wider range of corporate personnel may no longer need information professionals to conduct their searches for them. All of the libraries in the study had access to online databases such as Datastar through the internet, however, at the time the librarians were interviewed (Jan-March, 1994), the WWW was in its infancy as the first commercial browser, Mosaic, had only been released in September 1993 and none of the libraries had internet access using the interface of the WWW.

However, since then all the major hosts have offered a web based information retrieval service, therefore it seems more than likely, particularly since all but one of the companies in this study now have public web site, that most if not all of the libraries now access a considerable amount of information through a web interface.

By contrast, the more optimistic librarians, which included three of the four libraries that had increased their staff, thought that electronic data could be more of an opportunity for the library to become a facilitator of networks rather than just a library. Certainly there are ongoing discussions about the role of the library in the new information age. Piggott (1995) calls for the company library to reengineer itself by utilising more 'research stations' (CD-ROMs), user friendly online systems and mobile networks of staff. Hohhof (1994), Agada (1996) and Pirttila (1998) all envisage the corporate library becoming more of a company intelligence centre, collecting and analysing information to support the strategic decision making of senior managers.

Davenport and Prusak (1993) have argued that the current model of the company library is based upon an obsolete model of information provision, and should be changed to what they call the 'network' model. This would be a collection of information experts from both the library and information systems that would operate in a virtual network were there would be little provision for printed books.

> "Corporate librarians and information systems managers should align more
> closely. Better yet, those employees who are skilled at information content
> issues – not only librarians but also some information systems professionals,
> business analysts, and functional specialists – should align with each other,
> and providers of technological infrastructure in both camps can join together
> in a separate organisation". (Davenport & Prusak, 1993).

Yet Davenport and Prusak are under no illusion that such a new information architecture would require people to undergo a paradigm shift in the provision of information in their organisation, or that it could be done without extra resources and funding. Their argument is echoed by Bauwens (1993) who envisages the emergence of a network of 'cybrarians'; company librarians would be in the middle of concentric circles of cyberspace levels such as external databases, e-

mail, conferencing systems, etc., These new 'cybrarians' would be IT literate people strategically located throughout the company. He also agrees that this new model would require a new attitude to the provision of information within the company.

<u>Fig 4. Attitudes and perceptions of librarians: the positive and negative</u>

The Negatives
Loss of staff.
Low and medium profiles
in the organisation.
Reactive.
Poor feedback.
Little publicity.
May give SMs priority.
(A C E1 G H I J N P R S
T X Y Z)

The Positives
Increase in staff.
Medium and high profiles in
the organisation.
Proactive
Good feedback.
Does publicity.
Give SMs priority.
(E2 F L M O U)
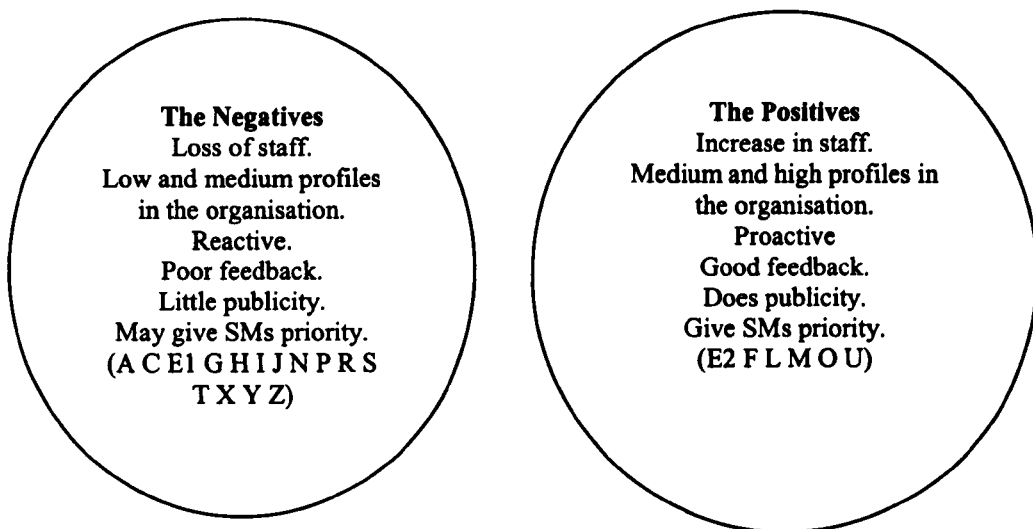
If we take all of the perceptions and attitudes of the library respondents we can see that in general there are two groups of librarians emerging (Fig. 4); those in the minority that are essentially positive about their future and exhibit the same positive attitudes, and those who are rather more negative but are the majority of the librarians in this study. The librarians in these two sets do not exclusively exhibit all the attributes shown but they are more likely to do so. For example, of the four libraries that have increased their staff, three are in the positive group; of all the libraries that have a low profile in the organisation only one of the six is in the positive group. Thus the libraries in each category are more *liable* to have the properties of their respective groups than not.

How librarians view their department can of course be irrelevant to how it is perceived by senior management. The library that assumes it is the most efficient department in the company may well be closed if someone else considers it the perfect area to cut costs. Some idea of what the management of the organisation

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thinks of the library can be gleaned from what they call the library, and to whom they report. Therefore, to determine where in the company hierarchy the library stood each respondent was asked what the title of their position and department was, and who were their immediate superiors.

It is also often difficult for the senior executives of the company to know exactly where to place the library in the company hierarchy. Bauwens (1993) has wryly commented:

> "Despite a great deal of talk about 'information as a strategic resource' the information centre is usually seen as an overhead cost and in times may be a vulnerable target. Much of the information that is provided by corporate libraries is seen to belong to the 'nice to know' category, hence not considered critical to the survival to the firm in tough times. Often the library manager is not part of the senior management, and the services that are provided are filtered through middlemen (junior managers, assistants, secretaries). They get the credit for the work done, not the librarian".
> (Bauwens, 1993)

It is apparent that most 'librarians' still hold this job description with some being described as an 'Information Librarian' or 'Corporate Librarian'. Several of the respondents had the title of 'Manager of Information Services' but were still librarians. However, the title of 'Information Officer' or 'Information Manager' is also used, although with the continued transformation of titles, these descriptions are now beginning to give way to the title of 'knowledge worker/manager'. About half (eleven) of the company libraries still retained the word 'library' in their department title with the remainder becoming Information Centres/Services and one (Company G) describing itself as 'Business Intelligence'. This was, the respondent replied, to avoid giving the impression that all he was there do was to collect information, buy books and nothing else. However, more than half still reported to departments such as administration, management services, personnel, etc., because their superiors did not know where they should go. There were fewer libraries who were under the control of departments such as corporate strategy, were they could possibly be of greater use by becoming more integrated with a department whose use of relevant information is more critical than say, for example, the public affairs department.

<u>Table 11. Titles and reporting structure of corporate libraries</u>

Company	Title of Respondent	Title of Dep't	Reports to
A	Librarian	Library	Administration
C	Head Librarian	Library	Company Secretary
E1	Information Librarian	Research Library	Research Division
E2	Business Research Librarian	Business Information Centre	Public Affairs & Communications
F	Head Research Librarian	Research Library	Regulating Services
G	Lib & Info Service Officer	Business Intelligence	Group Financial & Business Services
H	Manager	Information Services	HQ Services
I	Manager	Information Services	Business Manag't & Strategy
J	Corporate Librarian	Information Centre	Personnel
L	Information Librarian	Library	Group Business Strategy
M	Head of Library Services	Information Resource Centre	Research & Strategy
N	Library Manager	Library	Networking Systems
O	Information Manager	Economics Library	Economics
P	Librarian	Library	Public Affairs
R	Information Services Manager	Information Services	Corporate Strategy
S	Librarian	Library	UK Institutions
T	Head of Library	Economics Library	Corporate Strategy
U	Head of Documentation	Documentation	Administration
X	Manager	Information Resource Centre	Services Manager
Y	Library Manager	Library	Management Services
Z	Information Resource Officer	Library & Info Centre	Administration

There have been some calls for libraries to become 'Information Centres' and to reconsider their structure and function. Pay (1991) has reported her particular situation:

> "We considered changing the name of the latter (Library and Information Services) to Information Resource Centre, emphasising its information role. However, users persist in calling it 'the library' no matter what name or acronym is chosen" (Pay, 1991)

Moreover, as far back as 1967 the concept of the information centre was already beginning to take shape:

> "The information centre is the special library with the added function of analysing and synthesising the information needed by management, staff, and the technical personnel of the organisation. It does not replace the company library, rather it expands its services and becomes the major source and disseminator of information for immediate and practical purposes" (Meltzer, 1967).

While Thury (1988) argues that the evolution of library into 'Information Centre' is inevitable with the change in the delivery of information and in the nature of the corporate information system (normally the term 'Information Centre' in the US & Canada means a software support section which deals primarily with helping users of IT products – however, in this case information centre has the same meaning as in the UK).

> "The change of name from library to information centre indicates a real shift in the focus of the facility. 'We are more active in providing information than the typical library'."(Thury, 1988)

She further argues that the library itself has become an information system:

> "Corporate libraries are becoming information systems as they move from being warehouses of information, to functioning as self-initiating disseminators of information sensitive to the needs of managers in every division of a company" (Thury, 1988).

Some librarians go even further and call for the library to be developed into a corporate business intelligence centre. Greene (1988) states that:

> "Information gathered on the environment in which a company operates has come to be known as a competitive intelligence, or simply CI…Sources from within the organisation must be co-ordinated so that the data from different operational units are channelled directly to a central facility. This information is then combined with that obtained from external sources, e.g., online databases and print materials, to produce a fully integrated intelligence system". (Greene, 1988)

Company 'G' exhibits some of the attributes that Greene calls for. It is known as the Business Intelligence department; in this instance the 'Library and Information

Services Officer' spends a great deal of his time sifting electronic data for information about his competitors, and what contracts his company could bid for. His department reports to the Group Financial and Business Services Division, and he often has direct access to, and requests from, senior managers.

There was no relationship between the positive or negative groups and how the librarians viewed their company's information management policy, or the information flow in their respective companies. A positive group was just as liable to describe the information politics of their company as feudalistic as anarchic, or to say that information flow was good or bad. Thus a positive library can be found in a company that has good information exchange, little duplication and few barriers, just as much as in a company which exhibits the reverse.

Of the fifteen respondents who said that they knew of the existence of EIS systems in the organisation, thirteen correctly identified where the EIS was administrated from, however, one did not know (this was the technical library from company E) and the other respondent (Company M), after completing her interview, turned out to be misinformed about what exactly what was her company's EIS. The respondents were also asked if they knew of any senior managers, or any other users, that had access to the EIS system. Ten respondents, including naturally the six respondents who have an involvement with the EIS replied, yes, they did know some of the users. Of the five respondents who knew of no EIS users (this included the respondent E2 who did not know where the EIS was administrated from) all were in the group of six who had heard about the EIS by chance. Thus this latter group, although they know of where the EIS is administered from, is limited in its knowledge about the EIS unlike the other ten respondents. Respondent C, however, despite hearing about the EIS by chance also had considerable knowledge of the system as she was personally aquatinted with the EIS developer. Four libraries had some involvement in the development of their company's EIS. These were libraries H, L, R and T. However, three other libraries have at present some link with the company's EIS even though, initially, they had not participated in the development of the system. Thus, out of the total of twenty-one company librarians interviewed, fifteen knew of the EIS in their

organisation, leaving six libraries who had no knowledge whatsoever that their company had an EIS.

Of the nine libraries which were not consulted about the development of the company's EIS, their librarians cited several reasons why they thought they had been not called upon to help. Their reasons fell into three distinct groups: the first group (M, O and U) could not give any explanation why they were not consulted. Respondent M, for example, stated the system was there before she came to the company; respondent O, although ignorant of the reason why she was not consulted, was later given a demonstration of the EIS; respondent U said although she was not consulted, that it didn't surprise her; this library was in the negative group but had a high organisational profile. The other two libraries however, were in the positive group. It does not therefore necessarily mean that because a librarian is positive and outgoing about its future, they will be consulted about the development of the EIS.

The six remaining libraries fell into the other two groups; librarians that felt that their department was of no importance or relevance to the EIS (E1,F,G & Y).

> "We may be looked on as just the research library and perceived to be full of technical information rather than business, and therefore it was not necessary to consult us. Another possibility is that it could have been construed as being a computer project, and the project was to get the system going with the information that came out of it a sort of by-product". (Librarian, Company E).

> "I think in the sense that being with research information services is commonly perceived in the company as being really there to service the research department, and secondly the pharmaceutical area, so we are physically removed from the corporate management level, and I wouldn't have thought they would have perceived us as having any relevance to any of their projects in that area". (Librarian, Company F).

> "The company is a very conservative organisation. It tends to live about ten years behind everybody else and the basic perception of the library, particularly at the top end of the middle management and a few of the senior managers, is that it's a place where you can waste your time. Or at the best it's a little old lady at the counter stamping books. That's the syndrome. It's a terrible thing to say but it's true. No matter how much work and proselytising I do behind the scenes…I'm slowly changing business

intelligence [the library] but I can't change the whole company". (Librarian, Company G).

"I don't think he [Library Manager] was particularly interested in the work of the library. The library is so often in many organisations...senior managers are not sure where to put the library within a structure. It does not fit in very easily. We rather got the impression at the time that he took over that the library was effectively bolted on to his existing responsibilities, and perhaps it wasn't the thing he welcomed most at the time. That's being very diplomatic". (Librarian, Company Y).

(Library Y was the only library in the study that had a manager from IT imposed on them as part of his responsibility). There were also the librarians who felt that the EIS was perceived to be more of a computing or IT project than an information one (C, & Z):

"It's difficult to say, we were just getting going at that stage, it was also a period of upheaval and flux. They may have viewed it as a computing problem rather than an information problem. We have a very large IT department. We were more of a library than an information service in those times". (Librarian, Company Z).

If we compare the six librarians who can give reasons why think they were not consulted in the process of developing the EIS, with the actual reasons the developers give for not approaching them (see chapter seven), some consensus becomes apparent in the belief that it is indeed the information that the library holds that makes them irrelevant in the development of the EIS, even if some librarians have other ideas why they were not consulted. Even the librarians (O, U and X) who could not give a reason why they had no involvement, had not been consulted for exactly the same reason as most other libraries; the information they held was seen as irrelevant to the operation of the EIS. What may be more important is why a minority of librarians were involved with the development of the EIS, rather than why the majority were not.

Despite the fact that the majority of library respondents were not consulted about the development of the EIS, many still thought they could have been of some help. Ten librarians replied that they were certain they could have contributed to the development of the EIS, although three said no, they could not have been, (L,H &M), and three (R, O & T) who were unsure. Thus the majority of

respondents were adamant that the library could have been of some help in the development of the EIS, with all of them citing their expertise in external information sources. Other skills that were mentioned include their experience in developing information systems, screen design, and having relevant information:

> "I think so, yes. We could have complimented it, we may have had things to feed into it, enabled them not to do certain things because we would do it a better way. I think Information Services have a very good understanding of the user interface, in that because we deal with online searching, because we have long experience of dealing with people that use information, I think we have a lot to give to such projects and to IS projects, understanding how to present information on a screen to end users".(Librarian, Company F).

> "Yes, I think we could have provided our expertise in the whole area of information, and I think that is fairly typical that there is this split between information services in the computer sense in the company, and the library, and when I look back I think the library could have played a greater role and made itself more known, so I think it's down to both of us".(Librarian, Company U).

> "Definitely. In terms of the speed of response, what level of overload you are going to get to people, how you profile people, the level at which you profile, the find of general concepts people are looking for in terms of business news, how you design the screens, what information you expect and what sort of external information is out there and at what reasonable price. There is a whole load of things really". (Librarian, Company X).

> "I think at the time it was set up we could have had some interaction. We could have indicated to them that a lot of the external information that was going on the system, was readily available from the Library and Information Centre here. The press coverage. There was some information we could not have provided and the bulk of the information on the EIS we don't have access to anyway; generation figures, staff figures, stuff like that". (Librarian, Company Z).

Although the respondents would naturally like to think they could have been some help, it is interesting to note that none of the 'elite' four libraries who *had* been consulted were certain they could have been of any more help other than what they had already contributed; all four said either no (L & H) or were unsure (R & T).

> "No, because the way Command Centre [EIS] is set up it's very easy to use". (Librarian, Company H)

"I'm not sure, I guess you have to balance it with work loads. There is lots of information you can show but you have to get the key bits of it that are relevant, and I think we are involved in that". (Librarian, Company T).

Library respondent H, for example, reported that the EIS was a very intuitive system and once all the external information sources had been set up there was little for the library to do. If a senior manager makes a request from the EIS for something, the EIS design is such that it automatically downloads such a request to the library. Thus because the way the EIS is structured and used, they feel that have done all they could do. Librarians R & T were rather unsure because they lacked the comprehensive knowledge of the content and use of the EIS that was so apparent in the respondents from companies H and L. Moreover, we will see that the attitudes expressed by most of the EIS developers to the idea of library involvement in the development of the EIS is bordering, in some cases, on derision. It is therefore highly likely that the belief of nearly two-thirds of the libraries that they could have been of some help in the development of the company EIS, is misplaced.

There was found to be no connection between the librarians who knew of the EIS, even those currently involved with the EIS, and whether they were proactive or positive, as three said they were and four were unsure. Neither was there any indication that their perception of their companies political 'state' made their awareness any better. However, there did seem to be some sort of relationship between the librarians who did not know of the EIS systems and their general outlook; all were either uncertain or negative about it. There were none of the 'positive' librarians in this group. It is difficult to say why this is so because some of these libraries have high profiles and do try and promote their departments within the company.

6.2 Executive Information Systems

Chapter seven deals with the development and use of the EIS. It also discusses how senior managers use the system, and what they thought the impact of it had been on their companies. Many of these observations were based on narrowly

focused objective questions and the direct consequences of EIS use, however, in this chapter deals with several broader, more open, questions that were put to all the participant groups on what they perceived was the indirect use and impact of the EIS. These questions related to some of the more well known perceived benefits of EIS found in the literature; for example, did the EIS result in any cuts in management levels or did it give the company a competitive advantage?

As most librarians consider themselves information professionals and deal with electronic information retrieval all the time, for example, Dialog, Datastar, FT Profile ,etc., it was felt important to get some idea of what they thought of the EIS as an information system, a perception which would also enhance and bring out more of the knowledge they had of the EIS itself. Seven library respondents stated they could not comment as they had never seen the system, but three respondents (C,R & Z)said they thought the EIS was a good information retrieval tool and that the users were happy with it; however, it must be remembered that some of the librarians have limited information about these systems:

> "It's very nice and snazzy and looks absolutely wonderful. It's a lovely toy and a lovely interface, without a doubt, better than our company office system and things like that. How useful the information it contains is difficult to say. I tend to use the World Energy File just as a current awareness thing. I scan journals, newspapers, etc, but they[EIS] cover a wider area than I am able to pick up and sometimes very now and again I'll pick up something from there I've not picked up from other means".
> (Librarian, Company C).

> "The demo we were given showed it was very effective retrieving information, very simple to use". (Librarian, Company Z).

This contrasts strongly with the six respondents (E2, F, G, H, L & X) who thought the EIS was a poor information retrieval tool, had serious deficiencies and was extremely limited; three of these respondents have direct links with the EIS and another sat in on development meetings.

> "I think the current one has some shortcomings as it's not as friendly as it could be I suspect, it's certainly not the latest technology but I think it's providing a function that's for sure. We have considered giving them all of the data from the customer service survey themselves, but it has restrictions on actually doing that at this point, so we have shied away from doing that".
> (Business Librarian, Company E).

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"When you have used Boolean logic it's Mickey mouse but you have to accept you are dealing with senior managers who don't even use the keyboard, most use the touchscreen. And it's simple so if you have not used it for a while it's easy to use again". (Librarian, Company H).

"Pretty hopeless. It's incredibly slow, the server is not up to the job. It's limited because of the hardware and another limit to it is having the project manager in between us and the end users, because they are not really asking people what they want, they have a technical solution rather than a customer driven solution. They are guessing at what people want and we are offering to supply them with individual profiles for each director which we could do. So rather than say to them there is a profile for all seventy of you we could have seventy individual profiles. We have suggested that and there has been no take up or it, from none of the divisions anyway".(Librarian, Company X)

These examples demonstrate that the librarians critique of the EIS covers different aspects of the system, for instance, respondent E considers their EIS is old and not easy to use, quite the reverse of respondent H who thinks their system is limited by the very fact of its simplicity. By contrast, respondent X is more critical of the information content and how the system was set up in the first place, rather than how it can be used. As respondent H rightly points out, senior managers do not have the time, nor often the inclination, to learn how to use complicated information systems; more often than not it had proven difficult enough to get a computer on their desk in the first place. Because librarians are trained in such skills as Boolean searching and are used to powerful retrieval programs such as those in Dialog or Datastar, it is apparent that in the view of some, that EIS are a poor tool for information retrieval. Moreover, two of the respondents (F & G) although knowing very little about their company's EIS system, had heard on the company 'grapevine' that the EIS was proving of limited use.

Further questions and closer examination of the respondents knowledge of the EIS and their senior manager's use of it, enabled some of them to offer their opinion on whether the EIS had been of benefit to senior managers, and if they were making full use of the systems.

Nearly half of the fifteen library respondents questioned could give no definite answer to whether the EIS was a benefit to their senior managers, as they simply

did not have enough knowledge of who was using the EIS, and had never spoken to any of their senior managers about their familiarity of the system. This group also included a library (X) that had recently started supplying external information to an EIS:

> "I don't know. We are still at a very initial stage. What may be significant is that our own divisional director has refused to have an EIS, because he thinks they are crap and he doesn't want one. He would rather have access to our system because he believes EIS are fatally flawed". (Librarian, Company X).

By contrast, seven respondents thought that the EIS had been of benefit; most of this group fell not unnaturally amongst those libraries that had the stronger connections with their company's EIS:

> "Yes, I think it's been a benefit and I don't think it would have lasted this long had it not been of use. It has really kept senior management informed and I know it's used at the chairman's Monday meeting, it is used in discussion. The interesting thing about that is because the senior managers use it the people below use it, as they don't want to be any less informed". (Librarian, Company H).

> "I think definitely [that it is useful] even though it's not used in the right sort of way; it's a real plus and I'm sure if it was taken away from them overnight they would be terribly distressed. I know from the logins that the finance director makes a lot of use of it. Some of our people sit on other boards such as the CBI Retail Board, and some of the information from our EIS would be used to help in those discussions".(Librarian, Company L)

Closer examination of respondent's L statement above reveals that although she believes the EIS has been of benefit, the system itself is not being used to its best advantage. Her opinion was based on her substantial knowledge of the EIS and exactly who used it and for what. She was also well aware that the system was not being used as it should be, because not enough relevant information was on it. Respondent H also expressed a similar view regarding his company EIS:

> "No, I think it could be used a lot more. But these are very busy people and they don't have the time to delve in and make sense of some of the information that is there. I think all of the modules there are used by a minimum number of people otherwise they would not be there, but I do find it surprising when I talk to the EIS people and find about the lack of use of some of these things". (Librarian, Company H).

Library respondent H was also very familiar with his company's EIS and many of their senior managers, and in the final analysis, this is the only way one could become aware of how senior managers are using their EIS. As we have seen in chapter five, the majority of librarians although receiving requests from senior managers, do so over the phone or via their personal assistants and secretaries. In many instances then it seems, not unsurprisingly, that senior managers are not prone to discussing their use of the EIS, as even the other libraries closely involved with EIS, such as E2 and R, could not give a definite answer. Their response was usually 'maybe', 'possibly' or more than often than not, 'I can't say'.

What the EIS developers thought the impact their system had been on its users, the senior management of the company, varied but can be grouped into three areas. First, were a group of developers who positively thought the EIS had had a good impact, particularly as a catalyst for change, in that it made senior management more aware of IT, and also raised the profile of the IT department in the company:

> "One or two [senior managers] have taken initiatives; for example, the head of personnel has had changes made in the computer strategy of his division, and I'm convinced that it was because of his use of the EIS, because he had no knowledge of computing and became a very enthusiastic user of EIS. So it's been a catalyst for change there" (EIS Developer, Company E).

> "There are a lot of people who are on the EIS. It was the first system that they were involved in, previous to that they had no PC skills, no knowledge of mainframes or systems, so it has certainly been a catalyst to make them aware of what they can get out of the computer systems" (EIS Developer, Company Z).

Second, they have made senior managers more aware of the information available to them, with some developers even declaring that productivity has increased:

> "Certainly on the original releases, the impact has been to turn mangers around from turning up at meetings and presenting information, to turning up with reasons for their performance, or at least making them look at what is causing the performance issue, rather than worrying how to measure it"(EIS Developer, Company G).

> "I think it has upped their productivity beyond measure. It's allowed more people access to sophisticated information, were as before a product manager would have to rely on information that is a lot older than he gets out now, less precise, because of the traditional backlog in development of batch reports. Some of these guys can't use terminals in any way - but they can use a mouse button" (EIS Developer, Company I).

> "They [senior managers] are starting to rely on it [EIS] now as being a primarily means of reviewing information. I think that in part the fact that we have got a lot of people outside the finance department looking at numbers, has actually made the finance department more thorough in actually checking information and making sure its all consistent, simple, because if they don't do that the charts look silly" (EIS Developer, Company P).

However, no less than seven EIS developers replied that the EIS impact on their senior managers had been minimal or even non-existent, with some arguing that it had been nothing more than a novelty for them:

> "I think the impact on senior managers has been negligible really. The system certainly hasn't delivered any of the benefits that it has been capable of. I believe the plan was to initially get it up and running, so they put a sales module on and management accounts, and then develop it from there, but that has not happened so it has really been a test module that was put up and its been stuck there for the last two years" (EIS Manager, Company L)

> "It was a novelty really. It was interesting but not essential" (EIS Developer, axed EIS, Company O).

It was clear that this latter group of EIS developers believed that there was nothing wrong with the programme they set up, but that it was the senior mangers who were at fault in not using the EIS to its greatest advantage. Many of the EIS developers complained of not getting enough time and input from their senior managers to enable them to develop the systems to the standard they wanted, whereas from the viewpoint of the users of the system, the EIS does not perform as well as expected. When the developers talk about the impact of the EIS on the company as a whole, rather more (twelve respondents) think that in this area the impact is has been even less or very limited. Yet despite this rather pessimistic view, nine EIS developer respondents claimed some organisational success from their investment in the system:

"I would say in terms of the information providers it's actually taken out a layer of people involved in the process, because it has forced us to do reprocessing engineering, and that's the biggest impact because it's actually highlighted some of the weaknesses in our process. We have taken out layers of process and streamlined some of them" (EIS Developer, Company E)

"Its very difficult to claim too much for the system. It has certainly led to other businesses building their own EIS and we have a lot of those. And if that's the only impact I think its a good one" (EIS Developer, Company H)

"It's had a cultural impact in that it's been a catalyst for various changes that have taken place in the company. The idea of data ownership, breaking down this idea of department conflict, whatever you want to call it" (EIS Developer, Company Z)

The view of the EIS developers was not replicated by a clear majority of the senior manager respondents, who thought that overall the company EIS had been of some benefit. Only the respondents from companies L and U who had invested in systems that were severely underused, replied that the benefits had been almost zero.

"The core benefits? Primarily its been to open the eyes of senior people in the company who had not been expected to be aware in the past of what was happening in the competitor market... its provided them with that opportunity in a controlled and disciplined and attractive way. I think the other benefits have been...once again the second behavioural one will have been that the aim was met of having data or information that they all signed on to and didn't dispute. The third would be more the matter of becoming more informed" (Senior Manager, Board EIS, Company C).

"The core benefits? less staff, less links as well. Initially you would get a breakdown that would be seen in the control room, checked by the foreman, passed on the charge engineer who then tells the day shift engineer - then I would ring him. Now its down straight to the control room and they put it on the EIS so its bypassed three-quarters of the links" (Senior Manager, Company J)

"The core benefits to the division are that its allowed people to have a common source of information which is structured in a consistent way across the world, so it allows people to compare similar aspects of the business across countries or across various measures of business success. Its allowed them to do that from their desks in a way that is straightforward and easy to use, even for people who don't use computers much and I wouldn't split it into senior manager and others; I tend to split it into people who use computers a lot and those that don't...because those that don't can still be very skilled. Its very fast in terms of its response, so people can follow their

train of thought to its logical conclusion rather than loosing their thread while they wait for the system to come back, and that's often overlooked by IT people who have no insight into how business people work. And it's available to other people who are developing policy and strategy, and to people who are working on the analytical detail supporting that policy and strategy. So that's where we are today" (Senior Manager, Company R)

"The system provided a structure for defining and delivering a wider range of data in a disciplined way that we had previously. The real benefit to the company is the impact that going through that discipline has; it doesn't actually, frankly, matter whether we are using this particular system, or as far as I'm concerned whether we were using any similar system, they would probably have had the same sort of impact" (Senior Manager, Company S).

The respondent from company S even went so far to state that the exercise the company went through to develop the EIS had brought out how inadequate their information management was in the first place:

"Well it's certainly...yes, in some respect it's certainly confirmed well beyond my expectations, a suspicion that traditional ways of managing information in the organisation have been highly inefficient, and remain in many cases highly inefficient, a lot of duplication of activity on a fragmented level with people whose information needs may not be identical but are very similar, essentially doing it themselves in different areas. Quite a lot of that has been identified, and some of it has been addressed through a common ability to use the EIS, but there is an enormous amount more which needs to be done, or which can be done and which would improve efficiency in that way. The other way that we would like to develop the system is, as I rather indicated right at the start, that having defined our ideal data model which identified twenty KPI's for the business, we are in practice in any depth only looking at about seven out of those twenty, on a consistency and frequency with which I'm comfortable, so that there is significant ability usefully to expand the range of information with which we gather and look at" (Senior Manager, Company S)

Although it is apparent that senior managers of the companies seem to be more pleased than do the developers with their company EIS, more than half (twelve respondents) reported that possessing such systems did not give their company a competitive advantage:

"No, I don't think it does [give a competitive advantage]. If you read the FT or the Economist you probably have some competitive advantage of some small degree to the guy who reads the Express. To the extent that is a building block, this is a building block but in terms of it alone making an

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impact, no I don't think it does. Its not designed for that in my view, others may have a different view but I didn't have it designed from that point of view. The modelling work that we have done that enables us to do pumping schedules has been an enormous benefit for us, but that is not in the EIS; that's in the platform that lies below. The real competitive advantage we have is in the DSS which is where the modelling takes place" (Senior Manager, Company Y).

Senior managers were even more scathing about one of the perceived benefits of implementing an EIS, that of fewer management levels in the company and the flattening of the organisational pyramid. For example, Rockart & Delong (1988) suggest that a reduction in middle management is one of the benefits that a company can expect from their investment in an EIS. Within this study however, only one company (H) reported that the system had resulted in a more leaner management structure:

"The sharp focus that managers can now put on decision taking means you don't have to have so many managers, there is less need for discussion and consultation, perhaps more importantly if you take the level below the managers who would be the human EIS if you like, they of course have been progressively eliminated. That as a management tool enables a smaller number of managers to care for the same span of responsibility" (Senior Manager, Company H.

From the these and other comments made by the senior manager respondents it was determined that there were three categories of perceived core benefits:

- A culture change in the company in that employees were now more used to sharing information and found accessing it easier;
- Better and more timely information;
- The creation and maintenance of a common set of data.

If we look at chapter seven and at the reasons the EIS developers and senior management had for wanting an EIS, it is apparent that some of their intentions have succeeded but others appear to have failed. For example, all of the above three benefits were cited as being among the main reasons for the development of the EIS. But other cited reasons, such as there being too much information and paper do not appear to have been realised. Although EIS can reduce information

overload if used in the appropriate manner, they can of course also produce more information for senior managers if they cannot decide on what they need. Senior managers and other personnel have also become inundated with new information as new technology comes into the organisation. Many managers complain that the first thing they have to do in the morning is go through a mountain of e-mails. Some EIS are also migrating to other technology such as intranets and groupware which may make more use of company information, but only if it is managed correctly.

Information overload can be a dilemma as senior managers are being told on the one hand, that they should have more information so they can make better decisions, but the proliferation of new sources makes it almost impossible to keep up with the latest data. It is said that *The New York Times* contains as much distinct information every day as the average 17th-century person encountered in a lifetime. The notion that an EIS would mean less paper also seems to have been perceived as a failure, as several developers and senior managers complained that not only had the EIS not reduced the amount of paper circulating, but had actually increased it. One of the reasons for this may be perhaps the preference for reading information on paper, rather than on a computer screen. It was noted in chapter five that although many users of the EIS used their display screens to read information, nearly every EIS had a colour printer output option so a hard copy could be later annotated it need be.

CHAPTER SEVEN: THE DEVELOPMENT AND USE OF EIS

7.1 Frameworks and reasons for the development of EIS

There are several frameworks that can be used as a template to build an EIS (see chapter one for examples) however, the framework proposed by Edwards and Peppard (1993) was one of the methods used to determine why the corporate EIS being researched in this study were built. This framework was chosen because it is relatively simple to categorise each EIS using the taxonomy devised by Edwards and Peppard, which is based on the premise that EIS share similar characteristics. Moreover, because the research done by Edwards and Peppard included five of the companies also researched in this study, it was felt that it would be a useful exercise to assign the remainder of the companies in this research to the classification categories designed by them.

The EIS framework used by Edwards and Peppard identifies four classes of EIS which are:

- Conglomerate EIS: these systems that are designed with a common objective of a parent company collecting information from a subsidiary.
- Control and monitoring EIS; this allows business unit managers to monitor the performance of the unit in question.
- Competitive and intelligence EIS; a system to support the highest levels of management in monitoring competitors and their environment.
- Communication and personal support EIS; systems designed to improve personal productivity by giving users equipment to manage personal information.

All four classes also have differences in the type of information, design features and benefits. In addition, because EIS can exhibit several of the attributes of each class, a company may represent more than one group. Table twelve assigns the corporate EIS in this study into these four classes.

Table 12. Primary design classes of EIS

COMPANY	CONTROL/ MONITOR	COMPETITIVE/ INTELLIGENCE	COMMUNICATION/ PERSONAL	CONGLOM
A	*		*	
C1*	*			
C2*	*	*		
E	*		*	
F	*			
G	*		*	
H	*	*		
I	*			
J	*	*		
L	*	*		
N	*		*	
O*	*			
O*	*			
P	*			
R	*	*		
S	*	*		
T	*	*		
U	*			
X	*			
Y	*	*	*	
Z	*	*		

* Two EIS were investigated at companies E & O

If we look at table twelve we can see that all of the EIS in this study (Company M's EIS was not investigated) can be classed as control/monitor EIS, that no companies exists in the conglomerate class, but nearly half (nine) are also in the competitive/intelligence class, that is, they were designed with more than one element in mind. It is also more likely that each class is not mutually exclusive because, as Edwards and Peppard (1993) note, a competitive EIS would be unlikely to be found unaccompanied because a control EIS would far more likely to be implemented first to get senior manager acceptance. Although Edwards and Peppard (1993) provide a framework for selecting an EIS based on organisational type and information requirements, others look more deeply at the EIS itself. Partanen and Savolainen's (1995) framework makes an analysis of the characteristics of a number of EIS packages available on the market (Commander, Command Centre, Holos, etc.) according to their functional capabilities and qualitative and technical properties, and then attempts to use this evaluation framework to 'match the managerial needs according to the organisational contingencies'(p.1). A completely different approach is argued for by Green and

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Murphy (1995) who eschew the technical and organisational approach to develop frameworks beyond the technical perspective, and look instead to an interpretative, cultural approach. They contend that such an approach provides richer insights about EIS's meaning and role in the organisation.

> "[Our framework] Views organisations in holistic terms: actions, events and cultural are artefacts, and the significance which organisation members attribute to them, are to be understood in relation to the totality of which they form a part. The aim is to explore the cumulated, embodied symbols of other peoples', to reveal the hidden connections, deeper salience lying beneath the surface evidence of ethnography" (Green & Murphy, 1995)

Such an approach, they argue, can lead to a reorientation on the part of EIS developers, away from the technology towards the wider organisational issues involved in the implementation of information technology'(Green & Murphy, 1995).

No one specific framework was used by any of the companies to develop their EIS despite the fact that many EIS developers were aware of at least some of the literature on the subject. Most, for example, knew of John Rockart and that ICI was amongst the first of British companies to install and develop an EIS. However, as we have seen in table twelve most of the EIS fall into the control/monitor category of the Edwards and Peppard (1993) framework. If we look at some of the reasons why their EIS were developed in the first place we can see that they closely adhere to the underlying characteristics of each class in the framework. Both the EIS developers and senior manager users of the EIS were asked what were the main reasons for the development of the EIS, as it was thought not only would it be valuable to understand the reasoning from both sides but that it may also bring out differing views. Some of these reasons included:

> "Back in 1989 somebody decided to provide the CEO with his black-book (a hard copy summary of essential information) in a Harvard Graphics slideshow format. Two PC's were installed in the CEO's and FD's office and at the end of the month the black-book and slideshow were presented and refreshed. That was primarily financial monitors of the company's performance – sales against targets, etc…We believed it was a better way of delivering information than the black-book and it could provide the

information to a wider audience. It was also a catalyst for change" (EIS Developer, Company E)

"The MD found it very difficult to find a very simple presentation of information that allowed him to compare and review the business at the level he operated. He couldn't get information and that sort of thing without actually going to send someone off for the information. The other problem was confusing sources of information; someone would produce one set of statistics and somebody else would make the same numbers look different. So he was looking for a system and source that he could actually turn data out and say 'this is the answer, where is the problem ?' and that moved the focus away from presenting information, to doing something about the way it was coming [in]" (EIS Developer, Company G)

"The MD was very keen on office automation, reducing the information overload, having information delivered electronically, and having provided that information electronically as part of the management process. He was very keen on that. Those were the main reasons". (EIS Developer, Company X).

"There are two main reasons in my mind. The fact that there was just large, massive amounts of data and information that were around, certainly at that time, some of that has eased off, but lots of departments, stations, lots of information and the Chairman and directors were finding it difficult to actually absorb all that information, so there was clearly that side of things. And I think also they saw it as a catalyst for cultural change, to try and break the idea that a department was responsible for a set of numbers and they were the only ones who could provide that information. I think they saw then that the EIS was a means of sort of breaking all that down and opening up information to whoever in the company needed it" (EIS Developer, Company Z).

The explanation for the implementation of the EIS in company Z is echoed by the manager who was the project officer for the EIS. The company's EIS development are now used as a case study example by an EIS Vendor (Pilot Software, 1992). However, there is no direct mention by this former project officer that the EIS was seen as a catalyst for cultural change.

"We have tried to get managers to focus their attention on the key business issues and, as a part of that, we wanted to get rid of the reams of paper that go around. We wanted to stop people telephoning to ask a very simple question about a piece of information they should have had at their fingertips. We wanted to get back to the source data, and we wanted managers to think about the bottom line" (Pilot Executive Software, 1992)

The reasons senior managers give for the development of the EIS are broadly similar with no disagreements on why the system was installed; however, they appear to be more conscious on the need to move away from a paper based reporting system. Some of the reasons given by senior managers were:

"Quite early one, towards the end of 1988, I decided that rather than rely on the corporate data processing department to develop something, I would get a young turk in dedicated to the task, described to him what I wanted and get him to do it for me. I vividly remember after having gone through the process of developing this model of coming to the conclusion that the business was multi-dimensional, but in my mind I was already thinking the business was five dimensions. But since I wanted the an EIS to reflect the business and to enable me to look at various aspects of it, the conclusion I came to was that I needed a five dimensional model to be the basis of an EIS...My information needs were not being met. It was not the right information, poor information and too little information" (Senior Manager, Company G).

"I think the reason [the company] got a EIS was twofold; one to move away from a paper based information gathering system and secondly, [the company] having been putting an awful lot of money in IT within each of the businesses, particularly over the last 4/5 years and I think this was seen as an opportunity to build that bridge between the centre and the other systems and to be given the opportunity to drill down into each business, both accounting and products"(Senior Manager, Company L).

"I think it was to provide a more comprehensive set of information in one place – I don't think its objectives were very clear. There have always been those ideas of can I get rid of paper? can I put it all in one place? sort of intangible relatives really. What happened was that it did put things onto one place and the people down below us [middle managers] did find that incredibly useful and so its user base became decision makers all over the company... When PCs became available and better front ends were possible and we had enough money and enthusiasm to have a go at it – we had a go with it [EIS] and that top group" (Senior Manager, Company T).

"The old division and current division is made up of a number of disparate businesses and whilst we have regular reporting on a monthly basis on paper, what we didn't have was online access to see the information to see what the situation was at any point in time and to read the main headlines in the division. So we wanted a corporate dashboard for the division in terms of looking at what the key numbers are, what the trends are, where we are behind, and with an update on reporting and exceptions reporting so you can see instantly which areas are behind the plan" (Senior Manager, Company X).

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If we take both the EIS developers and senior managers' reasons for their company developing an EIS, we can gain some idea of the main purpose of these systems.

Table 13.Reasons given for the development of EIS

Company	Too much Info	Better Info	New Info	Faster Info	Cultural Change	Less Paper	IT on Desk
A				*	*		*
C1#		SsI		*			
C2#			*	*			
E		*		*	*		
F		*	*				
G	*	*					
H	*						*
I		*		*			
J		*		*	*		
L		*				*	
N		*	*				
O1#	*	*					
O2#		*	*		*	*	
P		*	*				
R		* SsI		*			
S		*		*			
T		*		*		*	
U				*	*		
X	*	*				*	
Y	* SsI	*		*	*		
Z	*				*		

Note: Two EIS systems were studied in companies C & O. SsI= Single source of information.

We can see from table thirteen that the primary reasons for the development of EIS in the organisations under study include:

1. A preference for better electronic information thus giving users the ability to manipulate such data; also obtaining information from a single source such as a common database;
2. Quicker information and less paper;
3. Using the EIS as a catalyst for cultural change such as breaking down information barriers;
4. Too much information for senior managers to comprehend at once;
5. New information – often external information.

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Most of the reasons given are unsurprising as much of the literature on the development of EIS indicates similar intentions, for example, companies A and H underlying reason was to get IT on their senior manager's desks, the EIS being the perfect *raison d'être*. However, it is also possible to look at why the EIS was developed from another perspective than the reasons senior managers wanted an EIS, and that is from an organisational perspective. Markus and Robey (1988), for example, look at the way IT is fostered upon companies from a push and pull viewpoint. They argue that IT can affect organisational change from either an 'technological imperative' whereby the need for technology is created by organisational change, that is the senior managers decide on the implementation of an EIS, or an 'organisational imperative' were the result is technology is pushed on senior mangers to hasten organisational change. Thirteen of the companies EIS were the result of senior managers wanting an EIS, whilst eight companies had EIS thrust upon them, usually by a CEO who had seen EIS in action in other companies and decided that their own company should not be without one. Among this latter smaller group were the EIS developed initially for a single individual, usually an MD or CEO (Companies G, I & Y), but which were later rolled out to a larger population of senior managers. There was no evidence of what Fitzgerald and Murphy (1994) term 'EIS envy' among this group of companies; that is the fear by some senior managers that they would be marginalised if they did not become involved in the EIS process. What was apparent, however, was that some senior managers, for example in companies C, K, J , Y & Z, had experience of EIS in their previous organisations and wished to implement similar systems in the companies they had moved to.

In a similar vein, Watson *et al.,* (1992) look to where the pressure for the introduction of EIS comes from - internal or external forces. Without exception, all of the EIS in this study were the consequence of internal pressures in the company; that is, they were the result of stresses induced by the need to access, redefine, or get faster internal data about the company rather than access external data. Moreover, although nearly all of the EIS are both internal and external systems, most (seventeen) have remained resolutely dependent primarily on internal information (more than 75% of data content) with only two systems, (Companies B & H) relying more on external data for their operation and use, and

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two being 100% internal EIS. This is because, as noted in chapter five, senior managers expressed little interest in looking at external information on their EIS:

> "What we did in the prototype was grab some of the information from Reuters, key exchange rates, etc., and refresh that information everyday through to the senior managers. But we really could not get their enthusiasm for it and the guy who was heading the group didn't have a great vision for how you could use computing for those sort of things" (EIS Developer, Company E).

> "No, we tried that.[external data] This is one example of me trying to push data at the senior managers instead of them asking for it. We subscribed to BIS Informat a number of years ago and we put in a gateway that rang up the BIS computer at a given time every night, pulled information that BIS has gleaned from journals and publications around the world, and sent it via e-mail and information sponsor who divvied it around the company according to their whims. I don't know what happened to that really; I don't think they were particularly interested or whatever. But the budget ran out and we stopped the service. The next time I saw these people they were looking at articles out of the FT again". (EIS Developer, Company I).

None of the frameworks available for developers of EIS mentions the notion of involving the company library (if one exists) in the development cycle. At best, there is the advice to talk to various holders of information in the company. A 1992 report from the company Business Intelligence entitled *External Information & EIS: A guide to acquiring and using external information* (Harvey & Goodwin, 1992) explains the many sources of external information and where to find them, yet makes no reference to the company library which is often the largest repository of knowledge about external information sources in the organisation. Black (1991) in an issue of *Information Management Report* argued that librarians were often disregarded in the development of EIS:

> "Their role is often overlooked and they may need to find a way of becoming part of the process. They have a strong case, since they are the experts in where to find information, particularly from those external sources which can be crucial to making EIS a success...External data sources are still the most neglected element of the EIS, even though they may be as important as internal sources" (Black, 1991).

While Davenport & Prusak (1993) have called for a greater integration between the company library and the IT department:

"Corporate librarians and information systems managers should align more closely. Better yet, those employees who are skilled at information content issues – not only librarians but also some information systems professionals, business analysts, and functional specialists – should align with each other" Davenport & Prusak (1993).

To determine which libraries knew of EIS in the company all the respondents were asked if they where aware of any such systems, where they were administrated from, who used them and how they became aware of them in the first place. Those libraries that had no knowledge of the company EIS (A,I,J,N,P &S) took no further part in the research. The remaining fifteen libraries, however, were then asked questions pertaining to their involvement in the development of the EIS and whether they possessed any current links to the system.

Table 14. Library awareness of EIS

COMP	AWARE OF EIS	PROCESS OF AWARENESS OF EIS	AWARE OF ADMIN	AWARE OF EIS USERS
A	N	n/a	n/a	n/a
C	Y	Chance & specified user	Y	Y
E1	Y	Chance	N	N
E2	Y	Specified user	Y	Y
F	Y	Chance	Y	N
G	Y	Chance	Y	N
H	Y	Personal knowledge & Development	Y	Y
I	N	n/a	n/a	n/a
J	N	n/a	n/a	n/a
L	Y	Personal Knowledge &Development	Y	Y
M	Y	Personal knowledge	Y	Y
N	N	n/a	n/a	n/a
O	Y	Personal knowledge	Y	Y
P	N	n/a	n/a	n/a
R	Y	Personal Knowledge &Development	Y	Y
S	N	n/a	n/a	n/a
T	Y	Personal Knowledge &Development	Y	Y
U	Y	Chance	Y	N
X	Y	Involvement	Y	Y
Y	Y	Personal knowledge & chance	Y	N
Z	Y	Chance	Y	Y

* Two libraries were investigated in company E

Four libraries (H, L, R, & T) were consulted from the beginning on the development of the EIS; however, as there are seven libraries currently involved in some way with EIS; this means that three libraries (E2, C & X), although they have a current involvement, were not initially consulted on the development of the EIS.

Many of the librarians knew of the company EIS by hearing about it by chance or on the company 'grapevine', while others had heard about the system because they had some particular knowledge, such as knowing some of the IT staff involved in the development of the systems. Indeed one library respondent from company Y said that the former library manager who had moved from the library to the IT department, had actually helped develop the EIS.

> "We became aware of an EIS by chance from another librarian. We found out what it was and what information was in there essentially on the premise that we could provide information to them; as it turned out there was no information we could offer them and there was no information that they could offer us" (Information Resources Officer, Company Z).

> "I was taking to an engineer who was fixing one of our machines and he happened to mention it to me. He gave me the name of the guy who was responsible for it and as I knew him I gave him a ring and he said come over and have a look at it. As a result of that he then gave me access to certain parts of it [EIS], otherwise I might not have never known about it". (Librarian, Company C).

There was no relationship between the standard of information flow and exchange in the company or the existence of an information management policy, and whether the library was approached to help in the development of the EIS. It was also clear that the public profile of the library was not a factor; only one of the development libraries (Company L) out of a total of seven actually marketed the library to attract business and raise the their profile in the company.

This left six respondents who had no idea that their company possessed an EIS system until they were approached to help in this study, however, several have since made enquiries as to exactly what the system is and what information it holds. Why then were only four company libraries consulted out of the twenty-one (two libraries from company E) that participated in this study? Some of the

reasons given by both the EIS developers and librarians from these four

companies were as follows.

Company H:

> "We were involved from the outset by providing and setting up the external
> contracts for the external information into the EIS... We already had contact
> with the suppliers of information they wanted, on exchange rates, company
> information, share prices, business intelligence, etc".(Librarian, Company
> H).

> "They were involved in as much as we used external databases quite a lot
> and the library does all the negotiations for us on our behalf and looks for
> the best sources" (EIS Developer, Company H).

Company L.

> "Yes we were. [involved] The actual decision as to what system was
> purchased. I sat in on the meeting but didn't have any final say at all...I
> think because the library is here [Company HQ] and is a well known and
> well used information provider". (Librarian, Company L).

> "I'm not aware that they were ever involved – the data is mainly financial
> and there is nothing that is non-financial and that's something I'd like to
> change" (EIS Developer, Company L)

The reason the EIS developer from company L thought the library was not

involved, was because he had taken charge of an already developed system and

was not aware of who had participated in the original installation of the system.

Company R.

> "I was probably involved somewhere along the line. We were actually
> involved in setting up their information supply...I would normally go out
> and ask. People don't normally tell you so you have to have your contact on
> the grapevine. I think it's that, historically, there are various management
> groups responsible for their business and as such they tended to be isolated
> in their thinking and who needs to know about them".
> (Librarian, Company R).

> "Yes, they were involved in the news delivery. They are news stories
> basically, well profiled by the supplier in terms that the executives are
> interested in – particular named competitors and named products". (EIS
> Developer, Company R).

Company T.

> "The person who managed the library before me was...They asked 'what do you think should be shown', 'is there anything that would help lessen the workload of answering regular questions' that sort of thing...People from the EIS still call me and ask what I think should go in there, is what we are showing still relevant, that sort of thing" (Librarian, Company T).

> "Some of the information that goes into it [EIS] is library information but that is probably a small part" (EIS Developer, Company T).

It is clear, therefore, that one of the reasons why these four libraries were consulted on the development of the EIS, is that they are considered the company's external information experts, a element that is often cited as one of the main functions of a company library (Culnan,1986; Brimsek, 1989) even if the company library is amongst the least used sources of information by senior managers themselves (Slater, 1984; Auster & Choo, 1992; Brick, 1999).

If only four libraries were initially consulted about the development of the corporate EIS, what were the reasons the other fifteen EIS developers gave for not consulting their library colleagues?

> "They had little input to the key requirements of production statistics" (EIS Developer, Company A)

> "They are not as up front as you might think and I don't think we appreciated that they would get involved in that sort of thing anyway. I think it's called the research library. We use them if we want to order various periodicals or books but we don't use them much at all" (EIS Developer, Company F).

> "They have a different type of information and they don't tend to get involved in the operational information of the company in terms of finance, personnel information as far as I know. They are a source of information but it's mainly manuals, journals, publications and as our system doesn't really hold much publication stuff, there is probably not a strong connection there" (EIS Developer, Company N).

> "No I don't [know why they were not involved] and when I learned you had talked to them in connection with the EIS my first private reaction was 'why'? as I'd never thought of them as a force. Maybe it's a comment on the library more than anything else" (EIS Developer, Company Y).

"I think there is a big distinction between the library and information that is held there which is very much reference and probably not referred to on a regular basis, but one needs to know that if you need something you can find it there. Whereas the EIS is very much more live day-to-day current information, totally different set of needs and requirements I would say" (EIS Developer, Company Z).

The reasons why EIS respondents gave for libraries not being consulted can thus be grouped into several categories:

- EIS are predominately internal financial systems, therefore the information the library holds is irrelevant;
- The EIS is considered an cutting edge IT project and not an information project;
- Despite the fact that the majority of EIS have some external information content and even use some of the same online databases, for example Esmerk, for that information, the EIS developers prefer to obtain their own external sources.

However, other reasons for the lack of consultation become apparent when the position of the library in the organisation and the knowledge of the librarians was looked at as here we still find that the library has been 'filed' under rather nebulous departments such as Administration or Personnel; at least half of the libraries in this study report to such departments, were they are considered just , another administrative section. However, some companies regard the library as being a component of a section where information would be considered vital, such as group strategy, or report directly to departments that need and use information as a critical asset; departments such as Research and Economics. However, with the exception of company Y, where both the company's library and EIS were controlled by the management services department, there was no relationship between the position of the library in the company, including the four development libraries, and where the EIS was administrated from; the majority of the libraries were not responsible to the same department as the EIS.

The four libraries consulted on the development of their company's EIS accounted for two thirds of the libraries that reported to either the company's corporate strategy department or were part of the company's HQ staff. EIS are generally considered a strategic tool so the position of the library as part of the corporate strategy department may have given the libraries a visibility that they might not had achieved had they reported to a general administrative department. Moreover, the location of these four libraries were in close physical proximity to the senior mangers who are responsible for the company's strategy, and this to may have some bearing. Reasons such as being physically close to the EIS may seem trivial but although many of the EIS in this study used some external information, their libraries were *not* consulted. It was also found that the library staff of these four libraries personally knew not only many of the EIS development staff, but who was heading the EIS endeavour before becoming involved with the project. Indeed when the library respondent from company R was interviewed one of the EIS developers was a passive observer. This was because of his interest in what questions were being asked of the library in relation to their involvement in the operation of the EIS.

Fig 5. Library consultation in the development of EIS

Libraries consulted

Regarded as external data experts.
Physically close to EIS developers
Personally know EIS team
Report to corporate strategy or HQ
team.
H L R T

Libraries not consulted

EIS perceived as IT project rather then
information project.
Tend not to know EIS team
Tend not to report to corporate strategy of HQ
teams.
Seen as irrelevant
Not physically close to EIS
developers
C E1E2 F G M O U X Y Z

Figure five shows the difference in some of the factors that may be significant in why only some of the corporate libraries in this study were asked to participate in the development of their company's EIS. If the physical location of the library and the fact that some librarians personally know the EIS developers, then this means that environmental factors play a substantial part in the library's involvement with the development of the EIS.

The EIS developer view of librarians as external data experts is certainly important as it is to the internal/external information content of the EIS. However, many of the libraries are viewed as external information experts and most EIS are dependent of a combination of internal and external information, yet the majority of libraries are *not* near to where the EIS developers work and neither are their staff acquainted with the EIS developers.

7.2   Instigating the EIS

EIS, as noted earlier, are developed primarily to give senior managers access to better, faster and new information in a package than they can readily assimilate. However, as companies A and H have acknowledged, the reasons for an EIS can also be to put IT on senior manager's desks; that such a system can provide them with information they want or could use in the future is secondary to the initial motive to get senior managers using IT.

The most common method of initiating the development of an EIS is to have a very senior sponsor of the system such as the CEO or Chairman, and also to have an operating sponsor from a lower managerial level to see the project thorough to completion.   Most of the systems in this study followed these normal procedures for initialising the EIS; however, there were also several unusual cases as we can see from table fifteen. The majority of systems originate from top management; for example, a study by Fitzgerald (1992) of British companies found that 65% of EIS's had senior management initiators and similar figures were found within this study (76%). Moreover, he noted that senior managers, CEO, MD, etc., accounted for 19% of the original idea. Again, similar results were found in this

study with six companies (28%) having their most senior director initiating the idea for the EIS. Two of the managers in this study who had the EIS developed as their personal IT project to which initially only they had access, and which was exclusively based on their information needs.

Table 15. Development origins of EIS

COMP	EIS ORIGINATOR/SPONSOR	PERSONAL EIS	EIS GROUP CONVENED
A	IT Department/Opp Manger		No
C1*	Chairman	Yes	Yes
C2*	Management Info Dep't/Div MD		No
E	CEO		No
F	CEO		No
G	Divisional MD	Yes	No
H	IT Department/CEO		No
I	MD		Yes
J	Operations Director		No
L	Group Financial Dir		No
N	Senior Managers of IT		Yes
O1#	Divisional MD		Yes
O2#	Divisional MD		No
P	Divisional Finance Dir		No
R	Divisional MD		No
S	Quality Information Dep't/CEO		No
T	Information Managers		Yes
U	Operations Director	'	No
X	Divisional MD		No
Y	CEO	Yes	No
Z	Chairman		Yes

Company C had two EIS researched as did company O, however, the latter also had a redundant system (O1) and no users. The EIS of company M was not investigated.

These personal EIS also had no operating sponsor with the reasoning being that, as a personal project of the most senior manager in the company, they would not incur any development 'problems' along the way. Company G also had a personal EIS; however, this was at the instigation of a divisional MD and not the CEO of the company.

Either the IT or Information Management department normally propose the development of EIS according to Lowes & Matthews (1990). However this is

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refuted by Watson *et al*, (1992) and Fitzgerald, (1992) who both contend that the majority of EIS are still proposed by individuals like an MD or CEO, and not departments, even if the latter do occasionally originate the proposal. They also argue that there is a difference between American and British companies, with IT departments in Britain having the initiative taken from them for various reasons such as lacking credibility with senior management, lack of trust, poor system development speed and having a poor understanding of the business.

> "It appears that many IT/IS departments are pushing EIS very hard – indeed, initiating them – in the hope of persuading senior management to adopt them, as a way of increasing the credibility of the IT/IS department in the organisation. This approach can be successful if executive sponsorship is quickly obtained, because in many organisations the credibility of the IT/IS department is already so low that their initiation of the EIS acts as a turn-off to senior management" (Fitzgerald, 1992).

Six companies (A, C2, H, N, S & T) in this study had their EIS proposed by the IT/IS department. This was because several IT departments wanted to put computers on senior manager desks, for example, companies A & H, or to provide senior managers with better information, as in the case of companies C and T.

Although none of the respondents interviewed said that they had initiated their EIS to promote the viability of the IT department, four of them, companies A, C2, H & S, needed a senior manager to sponsor the development of the EIS. Although many senior managers were responsible for originating the idea of an EIS the systems were, administrated from, in most cases, the IT or finance department.

- IT/IS function – 13 companies
- Financial function – 5 companies
- Business Planning function – 3 companies

How the EIS was actually developed into a working information system varied in some respects amongst the companies. This is because there is no accepted formal method for developing an EIS, and although there are many frameworks available many authorities advocate their own particular favourite method. The method of development is also designed to ascertain what the information needs

are of the senior managers who will be using the system. One of the most logical first steps in developing an EIS is to set up a special group consisting of at least users and developers, which meets regularly to discuss how the system is progressing. However, only seven companies in this study went to this trouble as the more common technique was to build the EIS with only marginal access to the users. One of the most frequent bugbears of system developers is the complaint that they cannot get enough time with the intended users of the system because they are too busy; this was exactly the case in many of companies involved in this study. Moreover, with the exception of company L, none of the librarians was involved at the primary stages of deciding which EIS was suitable for the users; in fact, the library respondent from company L was unique in that she sat on the team that decided which EIS the company was to purchase although she had no final vote on which one was acquired.

Watson *et al* (1992) recognise four main strategies for developing EIS:

1. Obtaining information requirements by asking people about their information needs.
2. Obtain the information requirements from an existing information system.
3. Develop information requirements based on the characteristics of the system being served (i.e., the object system). The requirements for information stem from the activities of the object system (for example, critical success factor analysis, process analysis, decision analysis).
4. Establish an initial EIS then refine it as information requirements become better understood (for example, prototyping, heuristic development).

The primary approach used in developing the EIS in this study were a mixture of all of the above but, in particular, asking senior managers, critical success factor analysis and prototyping were the main methods in use in all the companies, with the exception of one system in company C (which had two EIS) that used a formal methodology for the development of one system.

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7.3   Development methods

7.3.1   Asking users of the EIS

Senior managers were asked in a variety of ways: some filled out a series of questions from the development team as to what their information requirements would be, others were involved in working parties. However, all to often senior managers were 'too busy' or were involved 'very little' and a common practice was to have a senior manager representative instead of the actual user. The developer respondent from company E stated that his sole meeting with the CEO lasted only 45 minutes but it was more about how he wanted the system to look, rather than what information he wanted; the respondent went on to say that because the CEO was so busy *he* had to focus on the critical success factors of the company.

The obvious exception to these time limits were the personal EIS which were developed for, initially at least, only a single user. In this case the senior manager looked on the EIS as his pet project and the developers had no trouble in gaining access to discuss his exact requirements. In fact the senior manager respondent from company G actually helped build part of the EIS himself and only later brought in a full time developer to finish and tidy up the system. Fig six indicates how the users of the EIS were asked about their information needs.

Fig 6. Establishing senior manager EIS
information needs
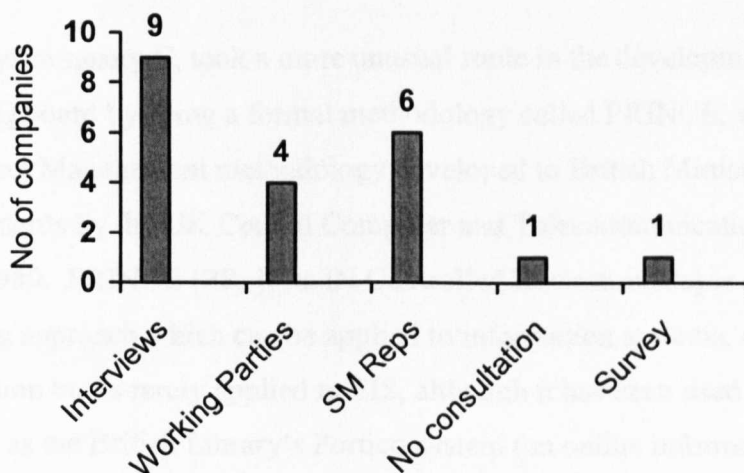
7.3.2 Prototyping

A prototype of the EIS is built and then later amended. The prototype is often developed from existing information systems which many senior managers already use. In the case of EIS, these are often formal quantitative financial systems. This method also builds on which format senior managers want to see their information, for example, type of graphics, colour, etc.

7.3.3   Critical Success Factor Analysis

Another recognised method used was the critical success factor approach (CSF) developed by Rockart (1979) in which the information needs of senior managers are based around several key areas of the business. Fig seven shows the methods used to build the EIS in this study.

Once these CSF have been identified, measures to monitor them are formulated – key performance indicators or KPI. This approach is also recommended by nearly all the EIS vendors who in many instances act as consultants when the company has purchased their EIS. Only three of the companies (I, N &O) in this study had no vendor help because they had built their own EIS using the programming language Visual Basic.

7.3.4   Miscellaneous Methods

One company, company C, took a more unusual route in the development of an EIS for its HQ board by using a formal methodology called PRINCE, which is a detailed Project Management methodology developed to British Ministry of Defence standards by the UK Central Computer and Telecommunications Agency (CCTA) in 1989. PRINCE (PRojects IN Controlled Environments) is an all encompassing approach which can be applied to information systems, engineering and construction but is rarely applied to EIS, although it has been used for library systems such as the British Library's Portico system (an online information server

which provides internet users with information about the library). PRINCE has since been upgraded to PRINCE 2 which is more generic in nature in that is it no longer aimed specifically at the IT sector (CCTA, 1999). Other techniques, often associated with one or more of the major methods outlined above include: interviewing the support staff of senior managers, (in particular personal assistants), group meetings, and tracking senior managers as they go about their day-to-day activity. Taking into account the various methods discussed above it was found that prototyping was by far the most popular approach (Figure seven)

It was also established that some companies used both prototyping and the CSF although, strictly speaking, they are two different methodologies. Only four companies (C, H, I & S) said that they had developed their EIS according to their

Fig 7. EIS Development methods
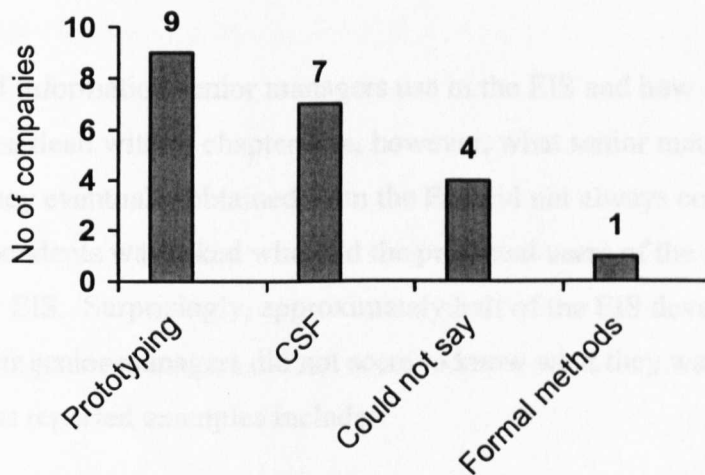
company's business strategy, but this is not an uncommon result according to Fitzgerald (1992) and Holohan (1992) who have argued that most UK EIS are developed without a clear link to business strategy. These results are surprising considering that most of the EIS were initiated from the amongst the most senior managers in the company, who would also be responsible for defining company strategy. However, the fact that the majority of EIS are initiated from board level is in itself not unusual, as more than half of all types of information systems strategies are initiated at this level (Wilson, 1989).

The general discussion above on how the EIS were developed indicates that there is no correlation between method of development and the type of EIS. A personal EIS is no more likely to have a special EIS group convened or use prototyping than is a competitive EIS. Neither was there any relationship between the method of development and the functional area; for example, an EIS developed within a financial function was just as likely to use the critical success factor method as any other method. Nevertheless, the two EIS sponsors who were known to have a financial background did have their EIS developed within the financial and not the IT function. Although there is a high preponderance generally of corporate senior executives coming from either a financial or legal background, it would be difficult to state firmly whether there was a correlation between the background of the EIS sponsors and the development function of the EIS.

7.4 The information needs of senior managers

What format of information senior managers use in the EIS and how it is accessed has already been dealt with in chapter five, however, what senior managers asked for and what they eventually obtained from the EIS did not always coincide. Each of the EIS respondents was asked what did the projected users of the system request in their EIS. Surprisingly, approximately half of the EIS developers replied that their senior managers did not seem to know what they wanted. Some of the numerous reported examples include:

> "They didn't ask for a great deal. The main contact we had was with the finance director who was involved before we bought the product and went to demos and fortunately expressed a preference for the one we chose! He sold it to the rest of the board. In terms of making requests that's where the difficulty arose because having decided they wanted a system, it wasn't very easy to get from them what they really wanted on the system. We were shielded from the CEO, I don't know why but we were, and the sorts of things we have got are the sorts of things people thought we ought to have. We didn't get a lot of input from directors. We went to see each of them as they came on to the system as it rolled out and when I went to see them I asked early on if there was anything they wanted on the system, but we weren't getting anywhere. The didn't come back and say, 'put this/that on'; I think initially they were just happy to see what they had got in it, see how it worked. We were hoping it might stimulate interest or ideas by putting

something in front of them but I think its something they found difficult to perceive before they had seen it" (EIS Developer, Company F).

"I don't think they had thought of it to be quite honest. The controller (finance) knew what sort of information he wanted but he had already got that from his finance people. Admitably only on paper! but he had never used a computer before. The acquisitions manager was used to having confidential data given to him only on paper. The concept of having the information on the screen was new". (EIS Developer, Company H)

"I suspect that all the end users were very naive at the time and probably didn't know what they wanted. The company has always used paper- based information and non of the executive directors had worked with an EIS before so there was no one who had come in fresh - with fresh ideas of what we wanted. Certainly when we got on to the next stage of the EIS which was 'Where do we go from here?', are we looking to point them to their needs and wet their appetites? that's how I imagine would have been the exercise" (EIS Developer, Company L).

These statements were typical of some of the replies that the developers received, which indicates that either the senior managers could not articulate accurately enough to the developers what they wanted, or that the developers were asking the wrong questions or perhaps the right questions the wrong way. There are a number of possible reasons why there seems to be such a lack of understanding between EIS developers and EIS users. First, although all of the developers used a portfolio of methods, a multiple method technique can have its pitfalls. For example, prototyping, by its very name, implies that developers are experimenting with an evolving system and interpreting senior manager information needs from an evolving system is not possible for the EIS, because there is no previous version. Nevertheless, this method remains very important for later versions of the system. In addition, the critical success factor analysis also can give rise to the wrong information needs if senior managers cannot determine what information they require for the EIS; the CSF method deals primarily with information needed for management control and not strategic planning (Rockart, 1979), yet many EIS are developed for exactly this use. Second, EIS developers are primarily IT specialists, but most of the EIS users in this study were not; they were for want of a better word, business managers. Information system personnel often have problems understanding exactly what senior executives want because of a lack of familiarity with their work and how they think. This lack of knowledge could be improved by a better understanding of the executive's job by possibly spending

some time shadowing them. Systems analysts assume senior managers know what they want, while the senior manager assumes the systems analysts know what they are doing. Isenberg (1984) has argued that senior managers think differently from other corporate staff:

> "In making their day-to-day and minute-by-minute tactical manoeuvres, senior executives tend to rely on several thought processes such as using intuition; managing a network of interrelated problems;dealing with ambiguity, inconsistency, novelty, and surprise; and integrating action into the process of thinking" (Isenberg, 1984).

Wetherbe (1991) stresses the ambiguous nature of the information senior managers want:

> "Unfortunately, managers usually do not know what information they need. They give it their best attempt, assuming these brilliant computer wizards will sort things out. Several months later when the system is delivered, managers quickly discover the system does not give them the information they need". (Wetherbe, 1991).

However, not all the blame lies with the EIS developers; as noted earlier, developers have complained that they simply cannot get enough time from the users to ascertain their senior managers' information needs properly. It would seem that senior managers are quite willing to sign off an IT project that could cost many hundreds of thousands of pounds or even millions, yet find it difficult to give more than a few hours of their time. The only requirement about the EIS that all the senior managers seemed to be of the same mind on, was that it should be easy to use and fast. It seems, however, that assembling a special EIS development group comprising of developers, users and information providers, could well eliminate many of the above problems, as six out of the seven companies who had formed one, reported no problems assessing the needs of their senior managers. Given that EIS developers could not ascertain their senior managers' information needs in nearly half the cases, it is therefore no surprise to discover that when both developers and users were asked about their wishes and needs being implemented, most replied either that they had not or they could not tell.

Of the EIS developers, only three (Companies G, I and Y) claimed that all the wishes of their senior managers had been satisfied. Among the senior managers it was even worse, only the CEO of company Y, who had a personal EIS, happily declared that all his desires of the EIS had been met. Some of the complaints of senior managers included lack of relevant information, poor or slow information and various technological problems with the EIS hardware. Company S was unfortunately characterised by a serious problem with their EIS almost immediately it went live:

> "There are problems. There are really two sets of problems; one is that, in terms of the data we want in the system, the data model we have defined terms quite a long way ahead of our current ability to capture the information. That is because this business really lacks an effective management information system (MIS) on which I think, in a ideal world, you would have below. What it has is a whole series of tactical management information systems which are not integrated and in some cases they are not even consistent, so there is a significant problem in capturing and making consistent data which we want to put into the system. We have been able to, I mean we have been seeking to overcome that, we have focused therefore on a relatively narrow range of indicators in which we are ultimately interested. And, even there, the mechanisms by which we input data to the system have to vary quite a lot, so that's one set of issues which is really our problem.
>
> Another set of issues that we have, concern really the complexity and capacity of the system to hold data on as many variables and as many dimensions as we are interested. One of the things which was conceptually attractive about the system when we started was the idea that data could be 'sliced & diced', as I think Metapraxis are fond of saying, in a number of different dimensions, and that appealed to us because of the number of appropriate parameters within our own business. We like to look at information in terms of clients and clients segments, in terms of products, in terms of geographical sectors, in terms of business units which will relate to accounting information, a number of dimensions. Therefore the number of parameters and labels which one would want to apply to the mass of data are potentially very significant. As it has turned out, the complexity of the data which our model would demand seems to be straining at the limits in terms of performance and response times of the system. This is actually less serious than it might be because, paradoxically, of the first issue; in other words because we haven't been able to get all the data which we would be interested, by a long way, into the system, we are not actually faced with the full implication of the performance limitations of the system" (Senior Manager, Company S).

This respondent, the CEO of company S, mentions the problem not only of poor information management but the technical limitations of the EIS itself. One of the worries EIS developers cite are that senior managers were often being influenced or 'charmed' into buying an EIS that was not up to the job. EIS vendors would try to target senior managers for the sale rather than the IT department, in the knowledge and hope that the former would probably be more impressed by the technology and thus willing to purchase an EIS. However, apart from company S only one other company (A) reported technical difficulties in assimilating information into their EIS.

7.5   Library participation

As noted earlier, one of the reasons some EIS developers chose to involve the library was for their external information skills. But how the libraries became involved with the EIS varies and some played more of an active role than others. However, recalling that the library played some part in the development, however minor, seems to have been a problem for the EIS developers as only the administrator from company H acknowledged the role of the library. With the exception of the EIS respondent from company L who was genuinely ignorant of the library's role, it was only when they were asked in more detail how the EIS was developed, that the EIS developers remembered exactly how the library had been involved.

7.5.1   Company H

The library respondent was very well informed on not just the HQ EIS in which his main interest lay, but in other EIS spread around the company divisions. The library was consulted from the onset because they already had contracts with many external information services, and were thus considered the corporate experts on the topic. His specific role in this respect was negotiating the price contracts for the provision of external information to the EIS; this included sources such as Esmerk, Datastar, ChemAbstracts, Predicast and Reuters. They

continue to of be of help in this area by constantly monitoring such external sources to see if they could be useful to senior management in the future. The library will make various offers of external sources of information and senior management and EIS developers will then decide which source to use. Another role for the library is to offer an SDI service for management; this also can be fed into the EIS although most, around 80%, is still produced as hard copy because senior managers prefer to read it that way. The final responsibility of the library is to provide full text copies of any information senior managers examine on the EIS. For example, if a senior manager requested the full data on a news story a message would be automatically generated and sent to the library, who would then arrange for the hard copy to be forwarded to the manager. Thus this library was involved not only in the initial development of the EIS, but has a continuing responsibility in retrieving information and seeking new external sources for the EIS.

The head of HQ IT who was responsible for developing and administrating the HQ EIS was equally as well informed on his area of speciality, the EIS, but less so on the role of the library.

> "They were involved in as much we used external databases quite a lot…they do all the negotiations for us on our behalf and look for the best sources" (EIS Developer, Company H).

He could not recall that the library also retrieved any information senior managers requested from their initial query on the EIS, or that the SDI awareness programme could also be integrated into the EIS if the user requested it. Because this EIS is an 'old' and very well developed system, the IT manager is often called on to speak about its development. It is also the source of numerous case studies from both academic and EIS vendor analysis; in five of the case studies on this EIS system, including the current history of the system used by the IT manager when lecturing on it, the library and the role it plays is never mentioned; a box is usually marked on a diagram with the legend 'external' sources. No mention is made of how this external information is sourced, any SDI awareness or the continuing search programme the library carries out for new external sources.

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7.5.2   Company L

Company's L librarian was also characterised by a good knowledge of the EIS to the point of who used it, how often and even how much it had cost to buy.

> " We have had an EIS here for about four years and I think it was probably around two years before that. It was quite difficult initially to get it accepted within the organisation because we are already a little bit tough, the city was a little negative towards us, and the EIS system was incredibly expensive. We decided to purchase a Pilot system and in order to maintain it needed a lot more funds in terms of staff etc., In order to get it approved by senior management the budget was set artificially very low, without allowing for any staff time for input or management of it, and it really remains like that today" (Librarian, Company L).

As was noted earlier in this chapter, this library respondent sat in on the meeting to discuss which EIS to purchase and what external information should go into it. The interviewee commented that she was included because, first, the library was in the same HQ building, second, it was a well known company department, and finally because they are a highly regarded information provider, particularly to the senior managers of the company. The library was responsible for getting several online databases on to the system including Profile, Textline and Datastream; however, since then it has undertaken no further role. Although the group finance manager is the person responsible for maintaining the EIS he was not involved with the development of the system, hence his knowledge of the EIS was not as comprehensive as that of the librarian respondent. He did mention that he was keen to get some external information news, such as Reuters News Service, on to the EIS to avoid the library having to scour the newspapers for the senior managers' SDI reports. It is apparent, therefore, that there is a disagreement as to what exactly is on the EIS at present, as the library believes it to have access to external information, but the EIS administrator describes the system as purely internal. It would be difficult to state who is right or wrong without having access to the system; however, at the time of interviewing the EIS administrator did seem to have more current information about the system than the library respondent, who admitted she had not looked at it in some time.

What they both agreed on, however, was that although the EIS was very expensive to set up and maintain, scarcely any senior managers accessed it and for that reason it was considered a failure. Unlike company H, a case study by the Economist Intelligence Unit (1991) of company L does mention the library in the context of external information:

> "In the medium term the company is interested in adding external data such as market share, share price and a news analysis service. Currently a librarian supplies daily cuttings to senior staff" (Economist Intelligence Unit, 1991)

This above statement is essentially correct but the external data is no longer there because of lack of use.

7.5.3 Company R

In this company the library manager cited the fact that although she was involved with the development of the EIS from the outset, she only later discovered through the company 'grapevine' that the information system she had been working on was an EIS. She believes this is because of segregation of the management groups in the company have led them to be isolated in their thinking. She also described the information flow and exchange in the company as 'pretty appalling'. This respondent, however, did know where the system was administered from and who used it, but was far less knowledgeable about the overall capability of the system and information in it than either of the library respondents from companies H and L. The library was initially involved in setting up the external information sources but has since taken on the responsibility for the daily Esmerk feeds and other news stories. These are scanned and edited before finally being put into the EIS through a Lotus Notes interface. The EIS respondent was well aware of the library's involvement in the development of the EIS, in fact the respondents are on first name terms. He reiterated what the library respondent declared about her involvement in the EIS with the added information that the EIS and the external information, news feeds, etc were specially tailored to the division's EIS. External information is profiled

for predominantly competitor data and specifically named consumer products the company manufactures. A case study on this company from the EIS vendor's marketing department describes the EIS, but as with company H, no mention is made of the role of the library in the development of the system.

7.5.4   Company T.

The company library within company T is unique in the study in that it exists only to serve a single department, corporate strategy, and not the whole company and, as such, it is directly responsible to the department head who thus has control of the library. The library respondent was also unique in that she was a team leader in the IT department that developed the EIS before she moved to corporate strategy and as such was the most informed of any of the library respondents on the EIS. The library is primarily responsible for collating information from online sources such as Reuters (This is a direct feed for news and share price, however, it is made through the corporate strategy department and not the library) and Aviation Weekly which is then entered by them into the EIS. The library is also responsible for the fleet database (an index of airlines and aircraft) which is updated quarterly and also integrated into the EIS. Other information the library inputs, though on less regular basis, relates to airports and the CAA (Civil Aviation Authority) and in addition the library is still consulted on which external sources should be in the EIS and whether they are relevant. The EIS administrator was, like company R, on first names terms with the library respondent and was well aware of the role the library played in the development of the EIS. Another Economist Intelligence Unit case study report (1991) on the development of this EIS does not recognise the role of the library specifically, only that the EIS receives some of its external information from the corporate strategy department.

The discussion above deals only with the four libraries who were involved with the development of the EIS from the outset. Why they were chosen to participate has already been dealt with in an earlier section of this chapter. However, it was

apparent from looking at the way they were involved that we can see they have several factors in common, as well as some that are unique to individual libraries.

- All of the libraries were approached because of the need to include external data into the EIS. None of the EIS takes any internal company data from the library.
- Libraries are linked to the EIS is two ways: first, by acting as intermediaries they arrange for an online feed directly into the EIS, for example a real time update of share prices. Secondly, by accessing an online feed themselves they edit data according to a given set of parameters which is then later fed into the EIS; for example, news and customer data.
- With the exception of library L, libraries H, R and T continue to play a role in the operations of the EIS, primarily by inputting edited data and searching for new external sources of information that could be used in the EIS in the future;
- While some EIS developers are aware of their library's involvement others seemed to have overlooked their role or regard it as minor;
- Case studies from vendors and other interested parties on the development of EIS rarely credit the library as a potential source of expertise on external information sources.
- Only company T convened a special EIS group which included the library when the EIS was being assessed.

Although companies H, L, R and T included their libraries right from the start of the development of their EIS. However, as noted earlier there are two further libraries, E and X, which have a current data link to the EIS in some way.

7.5.5   Company E

Company E has two main libraries; one that deals with technical matters and the other a business research library. The former had no knowledge of the EIS in the company while the latter did, and it is this library that has the link to the EIS.

"This (EIS) was basically built around the customer satisfaction survey data which this department provides and which we wanted to get in from of a management team so they knew what had gone on. It also shows them what they have to work at so we are an inputer to the system". (Business Librarian, Company E).

It is responsible for a customer satisfaction survey which the company carries out at least every six months. The library collects this data from its customers and enters it into a number of categories which is then passed to the IS department which manually inputs the data in the EIS. This external/internal source is one of the designated KPI (Key Performance Indicators) for use in the EIS and is thus considered of great importance. To check that this information is correct and has been input correctly by the IS department, the library is one of the few users of the EIS that has full access to the system, a privilege given to only a few senior managers. The respondent was also well aware of why his library was not considered in the initial development of the EIS:

"Because the initial system was developed to meet a financial division's need rather than a company's needs, so I think that's the way it got developed. There were other people developing alternate systems to meet similar needs from a different direction" (Business Librarian, Company E).

In the interview conducted with the EIS manager, the respondent's first words to the question 'was the library involved in the development of the EIS in any way?' was 'the library played no role', which was essentially true. This EIS was initially first and foremost an internal financial system were there was no need for external information. However, despite the initial comment from the EIS manager, further into the interview he revealed that the library was included in the development of the prototype EIS. This early EIS then evolved into the current EIS but without any external information content due to the lack of interest in it.

"In the prototype we included the business research library because they know the economy, competitors and a lot of their information is electronic. They pick information up from Reuters and other external databases…What we did in the prototype was grab some of the information from Reuters – key exchange rates,etc – and refresh that information every day through to the senior managers. But we really couldn't get their enthusiasm for it - the guy who was heading that group didn't have a great vision for how you

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could use computing for those sort of things. He was also developing a customer satisfaction survey and he was doing that totally separate from the EIS, and it created great frustration at board level that finance were going ahead delivering EIS, and whenever we wanted information on customer satisfaction he was coming along with a set of slides, the old way, and in fact that caused a change and information is now part of the EIS" (EIS Developer, Company E).

Company's E library link to the EIS was thus characterised by a failure on the one hand of that of a senior manager in not persuading his colleagues of the benefit of external information, and on the other, by the success of the library in obtaining a niche in the development of the system and becoming a full user of it.

7.5.6 Company X

The company library of this company is known as the Information Resource Centre (IRC); it deals only with external public data which means if a senior manager requests some internal data regarding the company, the IRC has to go to an external provider to supply it. The interview respondent had no idea how the library had become involved with the development of the EIS in question:

> "It was set up by someone that used to be in our unit. I don't where the approach came from and I don't know if it was them or us approaching them" (Librarian, Company X).

However, with regard to why the library was not involved with the EIS from the beginning, he thought that this was because the system was initially internal:

> "I think it's because the EIS were not seen to be supplying external data. There were seen to be supplying and managing internal data. To get it in perspective: when you went into that thing [EIS] you had two buttons, one for everything and one for what the information resource centre sends. That's almost what it's like. I think we were an add on to gloss it up a bit". (Librarian, Company X).

Company X is similar to company H in that it supplies more than a single company EIS, in this instance, four of the five systems located throughout the different divisions of the company. However, as noted earlier in chapter four only

one EIS was studied due to lack of time for field research. Various online sources such as BIS Strategic Decisions, Consensus Research, Esmerk, Pira, etc., are purchased by the library who then search and edit them to collate pre-determined profiles which are then sent to the EIS. Therefore, unlike company H, where there is a direct external feed into the EIS, this library acts as an online intermediary; no data, such as share price, from an online source is directly fed into the EIS. The EIS manager confirmed the library's role as an data intermediary exactly; he also cited the benefit of using a unit that was already set up and specialised in retrieving external data.

In general all of the six libraries so far mentioned are associated with the company EIS either through being consulted about external data sources, or because they provide the system with edited external data. However, company C's link is neither of these connections; company's C association is that is of a specified user of one of the two EIS in this company.

7.5.7 Company C

Company C has several libraries situated throughout the country, but the primary one, and the subject of this study, is at the HQ of the company in London. It deals with both internal and external information and regularly delivers a SDI service both to middle and senior managers. Unlike the respondent from library E who needs to use the EIS to validate the information they download to the EIS, the respondent from library C is unique in this study because she has entrée to certain areas of the main board EIS (there are two EIS in the company) purely for its function as an information retrieval system and because she specifically asked for access to it. The respondent explained how this arrangement had arisen:

> "I think I was talking to an engineer who was fixing one of our machines and he happened to mention it to me. He gave me the name of the guy responsible for it [EIS] and as I knew him I gave him a ring, and he said come over and have a look at it. As a result of that he gave me access to a certain part of it, otherwise I might never have known about it" (Librarian, Company C).

and why she was granted access:

> "I think because A, I knew the project manager quite well and we had dealings on lots of different projects and B, also I have access to that part of it which is published information. There are some parts of the system they would not allow me access to because it has more critical information" (Librarian, Company C).

The respondent described that she has in fact access to only a small part of the EIS called World Energy News, a monitoring and abstracting service provided by Informat (an online host that the library does not subscribe to); her access is restricted because the system is considered an important strategic tool for the company with its user population strictly confined to the company's main board directors. Despite her limited access she was very knowledgeable on what the system could and could not do, and seemed quite certain why her department had not been included in the development of the EIS:

> "I think it's just the way the company operates. I don't even think they would have thought about coming to us to ask us about it. However, it's this difference between the technology and the content I think again, marks it here. When they think about IT as opposed to information management or information provision, and because there isn't anybody of a senior enough level to fight the cause of information professionals, this is what tends to happen. They will bring in computer people because they think they will know best about it". (Librarian, Company C).

The project manager to whom library respondent C refers to earlier is also the EIS manager responsible for the HQ EIS. He was thus in a position to relate exactly why the HQ library was deemed unnecessary in the development of the EIS.

> "Our mission was to develop a system for the group and corporate executives. We needed a corporate information unit and we did not have that. On a day-to-day basis there are managers who want certain information like standards of service, etc. But at the corporate executive level we will be interested in what our markets are, what our competitors are, and top level corporate indicators. No one information centre could meet our needs in this respect so we had to go for external sources as well. We knew what was available in various information centres" (EIS Developer, Company C).

The reasons given by the EIS respondent indicates that first, he has a specific view on what information a library or corporate information unit should hold, and

second, knowing what the information the library does hold made them irrelevant simply because the EIS developers believed they could not supply it. This particular library respondent was therefore in error in believing the EIS development team did not even consider them; they did. Moreover, the operating sponsor of the EIS, that is the senior manager tasked to oversee its development, was also able to shed some light on to why the library was not involved. An important factor was that this EIS is an important strategic tool for the board; its development had an unlimited budget and was kept to a few key personnel, a situation that also caused much resentment among other system developers in the company. This senior manager respondent argued that the main board thought the task of providing the external information was beyond the capability of the corporate HQ library:

> "We made our decision that we were going to use a specialist information provider, because had we asked the library to do a task that was monumental, you would have been back to the same question – why don't we form our own department to do this sort of thing. This is what Shell and Mercedes and Mitsubishi did – they have departments of between 50-60 people to deal with competitor information" (Senior Manager, Company C).

It appears therefore that, taking into consideration the view of the EIS and senior manager respondents of company C, not only did the library not have the relevant information, the EIS developers and senior management considered that the task of providing such information was beyond their capabilities.

Taking into account all seven libraries that have been involved, or are currently involved with the company EIS, their roles fall into two main categories. First, that of an external information consultant who provides not only details of the main data sources the company may require for the EIS, but arranges the connection between EIS and data provider. Second, the library can take a more involved role in addition to the referral function by acting as an intermediary by delivering edited data direct to the EIS.

We can also see from table 16 that a library need not necessarily be involved in both roles. For example, they can act as intermediates after someone else has

arranged for the EIS to retrieve its data from external sources, or only perform a consultancy role.

Table 16. Library links to EIS

COMP	EXTERNAL DATA CONSULTANT	DIERCT EXTERNAL DATA FEED	DISTRIBUTION OF EDITED DATA	APPROVED EIS USER
C	No	No	No	Yes
E	No	No	Yes	Yes
H	Yes	Yes	Yes	No
L	Yes	No	No	No
R	Yes	No	Yes	No
T	Yes	No	Yes	No
X	No	No	Yes	No

7.6   EIS user resistance

When a company is building an EIS one of the difficulties that developers are cautioned about and encouraged to resolve as soon as possible, is the notion that company politics can instigate hostility to the system, because information by its ownership and use reflects and reinforces power and authority in organisational structures. Markus (1981) identifies three major causes of EIS resistance, namely:

1. People problems: for example, people who fear the loss of control of information;
2. Weakness in the technology: for example an EIS could be to slow in retrieving information or could not access specific databases;
3. Issues springing from the interaction of people and technology: user reluctance to use new IT.

It has already been noted in chapter five that some EIS have difficulty in capturing both internal and external information for the system, due to corporate resistance which is a result of the information culture of the organisation. This attitude to accessing or sharing data has also been encountered by EIS vendors:

"I have had a number of personal experiences were it's been a nightmare [of trying to access data]. It's important when we go into a company that we position ourselves as the facilitator. We tell people we are going to make it easier for them to provide information. We are going to improve the flow of information from the executive on down to you. It's very important we position ourselves in that way. To often the EIS is seen as all encompassing. That is not what it is. It's not a vast data warehouse. I asked the chairman of Shell research what the biggest benefit was of their system, and he said it put in an infrastructure for information into our company which didn't exist. That's all an EIS should do; facilitate the flow of information within the company from outside the company to inside the company" (EIS Vendor, Intelligent Office Company).

No less than five EIS respondents (from companies C -both EIS- F, N & R) reported problems getting the EIS accepted by some of the very people it was designed for. Whereas poor or late data was something of a problem for a few currently operational EIS, hostility to the initial development of the EIS was centred more around the withholding of data and the reluctance of the targeted users to use the system. Moreover, some of this hostility seems to be retained even after the EIS had become operational.

"It's very political. People are not, in some of the business units, 100% happy about it [the EIS] being available to even the board. They guard their own information" (EIS Developer, Board EIS, Company C).

"There was a lot of early hostility in terms of 'why do we want this system at all'? not particularly from the directors, but from the next level down because the original intention was to take the system not only to the board group, but to each business at finance director level. In many of the early conversations we had were 'we have all this information in a book and it arrives in a book every month, if I want to know something I look in the book, why should I need the system?' " (EIS Developer, Company F).

"Yes [there was resistance] by the established collators of the information. Traditionally the information was stored within financial systems not available to executives, and the EIS freed that and forced them to free up the information that they collated. There was significant resistance there".
(EIS Developer, Company R).

Of the five respondents who reported some hostility to the development of the EIS, the majority (four) appear to have been due to company politics and

reluctance to release information. Only company C (Divisional EIS) reported some lack of enthusiasm on the part of their executives to use the EIS because of the technological factor, but this now appears to have ceased. Although only one executive was interviewed for each EIS, the level of resistance may well vary between the type of executive who uses the system. Fisher (1995) for example, has shown that accountants have a far more positive attitude to EIS than other types of senior manager groups.

A report by Watson & Glover (1989) on the subject of American EIS stated that executive resistance to technology was the fourth most common cause (28%) of EIS failure, with a later study by Watson *et al* (1992) reporting a greater 38% failure rate. Yet a similar study by Fitzgerald (1992) of British EIS found that resistance issues were not a significant difficulty. Although it was clear that problems were encountered in this study, with five companies reporting problems due to information politics, only one (Company R) called it 'significant'. It would seem therefore, that this research does reiterate the results collated by Fitzgerald in his 1992 study. What neither Watson, Fitzgerald or many others mention, however, is the possible resistance by the library – itself a major collector of information. Black (1991) maintains that this is entirely possible:

> " Sometimes vested interests block the development of the system. Many
> middle managers do not want to submit information which they see as an
> integral part of their authority. Information professionals, such as corporate
> librarians, may well be in this category of resisters since they may be asked
> to contribute to the news system but not to join the development team"
> (Black, 1991).

It was apparent, however, that there was no resistance from the corporate libraries for a number of reasons that have already been mentioned, for example, the library not having the relevant information, not knowing about the system, or being asked to provide any input. Moreover, it is almost certain that had any library withheld any information from an EIS sponsored by a senior executive of the company, they would have been simply bypassed at the very least. The majority of the libraries in this study, even the ones involved with the development of the EIS, were in a uneasy state with regard to their budgets and staff. It would be highly unlikely they would jeopardise a chance to become

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associated with a prestige project like a corporate EIS, despite the fact that it would inevitably considerably raise their profile in the company. However, this is a condition that some libraries would not naturally endorse, as already noted, unless it was accompanied by the availability of more resources.

7.7   EIS Use

How the EIS is used can depend a great deal on what the system was designed for in the first place. The primary reasons for developing EIS are all to do with access to information; either too little or too much, speed of access, manipulation of data, etc,. Also noted earlier was that although only one company (S) admitted developing their EIS with a strategic business plan in mind, slightly more were using their EIS as strategic tool with three companies (C, R & S) stating this was their prime use of the system. Just under half (nine) said that it was largely used for operational purposes, with only slightly fewer (eight) saying that the EIS was used for both operational and strategic reasons.

Looking more closely at what the senior managers used the EIS for it was found that there were two main EIS activities: monitoring operations and evaluating information. Other activities included analysing data and doing 'what if analysis'. Many senior managers also stated that there was a temporal aspect to their use of the EIS with some activities, such as checking share price movements occurring daily, whilst others, such as market analysis, were done on a weekly or even monthly basis. Another interpretation of these results is that EIS are used predominantly for scanning data and less for more focused research such as a 'what if analysis'. However, Vandenbosch & Huff (1997) have argued that such focused research can in fact help make the organisation more efficient, through fine tuning the company's' operations and verifying assumptions. At the other extreme, twelve respondents also admitted they used the EIS purely for browsing and exploring data with no purpose in mind other than curiosity.

Even though EIS are essentially a front end to many internal databases and external links, a great many senior managers looked upon the EIS almost as a

distinct information database which they rarely are. It was therefore, surprising that many senior managers (thirteen) used the EIS to confirm information from other sources in the company; the EIS was used in this sense particularly to check the accuracy of information. An example was given by one senior manager who, if he was dubious about personnel data, said he would use his EIS to confirm it, but his EIS would almost certainly retrieve data from the same personnel database he was initially sceptical of, although using the EIS to check data from a total different source, however, is a different matter. Another example was of a senior manager who would regularly check financial news stories the Reuters screen on his EIS gave him, if he had read something in a hard copy newspaper he wished to verify. In the final instance of course how an EIS is used depends on the individual using it and their information needs. Nevertheless, Carlsson *et al* (1995) argue that there is a distinct cultural difference between users of EIS. Their study on EIS use between executives in the United States and Sweden suggest that Americans put more emphasis on monitoring operations, whereas in Sweden the emphasis is on both monitoring and analysis.

It is difficult to say whether this study of British EIS exactly parallels the findings of Carlsson *et al*, although it has already been noted by Fitzgerald (1992), Watson *et al* (1992) and others (Allison, 1996) that British EIS are very similar in the development and use to systems found in the United States. The systems in this study seem to follow the Swedish model of use in that they are used both for monitoring and analysing, which is surprising given the conviction that British companies have more in common with their American counterparts than their European partners.

7.8 EIS Impact on senior managers

An information system can have an impact on many different levels and is multidimensional; for example, on individuals, groups, or the organisation as a whole (Whisler,1970; Stewart, 1971; Bj✱rn-Anderson *et al*, 1986; Millman & Hartwick, 1987; Miller & Doyle, 1987). The impact can also be static or dynamic, have a personal or technological impact, be expensive or economical,

used a great deal or ignored. However, to look at all the possible ways an information system could have an impact would be beyond the scope of this research. The word impact also implies that there has been some sort of force applied by the EIS, whether on a personal or corporate level. Nevertheless, the study needed to identify some broad areas of EIS impact, particularly with regard to the company library. Senior managers respondents were firstly posed questions on their use of the EIS and secondly what they thought the impact of the EIS had been. Their answers therefore give an indication not only on how the EIS has affected them personally, but also their perception and speculation on the impact of the system on the organisation. The latter has been dealt with in chapter six, but it was clear that the answers became more speculative and uncertain as the scope of the EIS impact increased. A senior manager would be quite certain on how the EIS had affected him personally but less so when describing the impact on the company. EIS respondents were also asked some similar questions about the impact of the EIS but as their answers also tended to be more speculative they are confined to chapter six. This also applies predominately to the library respondents; the majority can only speculate on what effect they think the EIS has had on the company library. However, the five libraries that retain some operational link to the EIS (E, H, R, T & X) can, on the other hand, convey something more than speculation as they have firsthand knowledge through working with the EIS developers and users of the system.

Perhaps the most revealing answers regarding the impact of the EIS is from a technological perspective. Senior managers were asked just how reliant they were on the system. More than half (eleven) replied they were not very reliant on the EIS at all but they would miss the system if it was terminated; the general feeling here was that the EIS was a 'nice' item to have but it was not an vital piece of technology. Moreover, it was clear that although many senior managers respondents would be reluctant to see a demise of the system, they could still do their job without it even if it took slightly longer.

> "I'd hate to have it taken away! I don't think I am reliant on it but I think its justified the investment we have made in it. Take that away now and, yes, we could build up everything that's in there again, but the amount of manual

intervention and compilation of data that would be required to replace
what's in there now would be enormous".(Senior Manager, Company E)

"Again in a lot of things like this there is a redundancy in every system. If
that fell down then I have other ways of getting information. But I guess the
reason I have it is because it's handy and conformable to use. It doesn't
improve the quality of my decisions but it makes my life easier".(Senior
Manager, Company Y)

Even among the EIS (G, I & X) that were initially developed for only one
individual, two of these senior managers replied that they could, if necessary, do
without their EIS. Six respondents replied that they could do their job without the
EIS but they would miss it and that its absence would cause many problems for
them in information retrieval. Typical of this group was the senior manager of
company I:

"We would find a way of doing it but it would be very difficult. It would be
so labour intensive it just wouldn't be true. It would mean each sales
manager tracking their own performance, which they do anyway, but....no.
There would be an incredible vacuum - I hate to think about it!".(Senior
Manager, Company I).

This left only three senior mangers (Companies F, J & R) who admitted that they
could not do their job without their EIS. Although the respondents cited similar
reasons why they could eventually get a similar system up and running, the
difference here was that a failure of the EIS would cause immediate problems for
them because some of their information needs could now only be retrieved
through the EIS.

"If it's down it causes a lot of problems. We have had cases when it was out
for a day and I had to go through all my old contacts, and phone up every
station and try and get the same answers and that took one and half hours
longer" (Senior Manager, Company J)

There was no relationship between the age of the EIS and the company's reliance
on it; on the contrary, many of the companies who had developed their EIS in
only the last few years, had, by having a tighter integration of certain information
in the EIS, become more reliant than companies who been using systems for much
longer. Moreover, there was not one respondent who admitted that the EIS was

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an absolutely essential piece of technology in the vein of the telephone for example; it seems that all of the respondents, some more easily that others, could if necessary access information the EIS provided from other sources. It was also found that many of the respondents still used other information systems just as much as they had done before the introduction of the EIS, with only four senior managers reporting that they used them less, however, two of these (Companies J & R) were from the group of respondents who said they were very reliant on their EIS.

Where there does seem to have been a significant technical impact of the EIS, is the way it has altered the value of information that senior mangers use. This was almost exclusively due to the time factor involved in retrieving information; the EIS was not only faster in retrieving information, it could also manipulate and process data more quickly. Also cited was the fact that information was more consistent and accurate which in turn resulted in more confidence in data.

> "Yes, I suppose it has [had a large impact] because of time. People are looking at more specific information within the management accounts, giving me a better feel of what's happening in a particular operation or operation overall, so yes, its just giving me a better grip of what's actually happening in the company" (Senior Manager, Company F)

> "Primarily because of presentation and consistent availability - its always there at that time, at that way, but the thing that makes a big difference is the story it tells. Presentation puts things in context - from my perspective it's because it's graphics. It puts numbers in context. It gives you a slightly longer term perspective - you don't end up chasing every variation and it gives you a confidence either to ignore or take seriously some data". (Senior Manager, Company T)

Not only was the value of some information enhanced by the EIS, the majority (sixteen) of senior managers were more aware of how much it had become a company asset, and had a better understanding of how information could be used in the company. Particularly important areas in this respect were the improved understanding of the company, a greater sense of urgency, the need for a consistent and single source of information, and highlighting the sensitivity to change in the area of information politics, especially in the area of information

access. Several managers became aware that information had to become more widely available within the company for it to be utilised more efficiently.

One area where EIS are excepted to have made some difference to senior managers is in their decision making process, with specific examples identified by Leidner & Elam (1995). They suggest that senior managers using EIS make quicker decisions and that frequent use of the systems gave them increased information availability. Within the group of companies in this study some of their findings were confirmed; for example, when asked if the EIS had changed the way they made decisions, eight senior managers replied that the system definitely had by increasing the speed at which they made decisions. Other enhancements to their decision making processes included a wider perspective and being better informed regarding strategic issues. However, no less than seven senior managers could not say if the EIS had improved their decision making processes at all, the reasons being that either they did not use the system enough, or the use of the system was limited to more mundane aspects of their work that involved little decision making, for example browsing. Several managers also reported that they consulted people less when making decisions, mainly because they no longer had to refer to them to get the information they required, yet for some of them this did not necessarily mean that they made their decisions more quickly. Half of the senior manager respondents replied that there was either no change in the number of people they consulted, or they simply could not say; while the three senior managers who had reported that they consulted their colleagues and staff even more, replied it was because the EIS highlighted more questions which they wanted answers to.

7.9   EIS Impact on the Library

It has already been noted that only a minority of corporate libraries in this study have, or have had, some link to the EIS either through a consultancy role or by acting as an external information channel. It therefore follows that only these libraries could reasonably be expected to provide any insight into the ways the EIS had effected them, while the rest of the corporate libraries that knew of the

EIS, but have never had any interaction, can only speculate on what the impact may be. Of course the fact that several libraries had become involved with the development of the EIS means that there has already been an impact of sorts. What also needed to be determined was the question did the EIS have a more wider impact by directly in its role as an information system, or indirectly as a tool for senior management and its derivative effects, for example, culture change?

The impact of the EIS as a IT system has already been noted; it is mainly in the area where the library acts as an information conduit, that is, it provides information to the EIS either directly, as in the case of company E, or indirectly as in companies T and X. The business research library of company E was the only instance were there was a migration of information directly to the EIS, because previously this information had been sent to the senior managers concerned. All the other libraries who had links to the EIS were acting as information channels only, that is they did not provide the information themselves but only made certain that certain external information reached the EIS. Only in library A has the EIS had a direct technological effect, an effect that was unknown at the time to the librarian concerned who did not even know his company had an EIS. The EIS in this instance took a direct feed on oil and share price movements from an external information provider, a service previously provided by the company library. This was the only occurrence were some of the library's services and skills had become redundant through the technological capabilities of the EIS. Thus the direct technical impact of the EIS was limited to the libraries from companies A and E.

As one of the purposes of an EIS is to retrieve information from many sources, a question was posed to the library respondents to ascertain if there had been an increase in information requests to the library, that they could directly attribute to senior management's use of the EIS. Only three libraries (H, L, & R) could offer a positive answer, that yes, they had seen an increase in the requests made by senior managers to them about information they had initially seen in the EIS.

"Well they have certainly given us a broader audience for what is there and it has led to more requests for more articles, etc., - it has raised the profile slightly even though as I've said it's not high anyway. This is one area where it's become more high because of it" (Librarian, Company H)

"The information requests have increased. Before EIS most senior managers had no PCs at all around, so I think the fact that PCs are on their desks makes them think of the uses of online information, how specific it can be" (Librarian, Company L)

"It's making a group of us who were previously isolated within departments available to the whole of the corporate centre, and I would hope and would be seriously worried if it does not generate more work" (Librarian, Company R)

These three libraries have received more enquires relating directly from the company's senior manager using the EIS. However, library respondent E2 has benefited the other way; his library now has *less* work to do since the EIS was developed. The customer satisfaction survey which the library undertakes for the company, and which is now input into the EIS by various IS departments, is now a lesser chore thanks to the EIS:

"I think it has eased our work load being in that in the past what has happened is that we have produced all the results, and then analysed and photocopied them... by being in the EIS it saves us presentation time and materials and it's helped us quite a lot". (Business Research Librarian, Company E).

However, although most of the libraries reported no influence from the EIS that they were aware of, the majority of libraries also have poor or no feedback from their users. Several do not keep statistics on their requests and it seems likely therefore that they would be unable to differentiate between their normal requests, and those originating from an EIS enquiry, unless a user of the system mentioned they wanted some information relating directly to something they had seen on their EIS. Feedback was also said to be poor in two (H & R) of the companies who did report some influence and good in others that did not; it would seem therefore that it is not simply a case of getting good feedback to determine if the EIS has exercised any influence on the library. Even the explanation that it is the personal connection between a librarian and an EIS developer, does not fully explain why only some libraries have been knowingly affected by the EIS;

respondent C knows the EIS administrator personally but her library has not been affected, despite the fact she alone in the library has access to the EIS.

Unless there is a direct affect such as diminishing or increasing the library's work load, the impact of the EIS appears to be negligible. A more tentative conclusion might be that any ripple affects from the EIS on the company library depend heavily on the users of the EIS and their utilisation of it. Virtually all senior managers have access to e-mail to enable them to send a request directly to the library, however, as already noted senior managers tend to use their assistants to make requests from the library. Moreover, the external information content of the majority of EIS of this study is limited so users would have very little to enquire about.

Although the remaining libraries who were linked in some way to the EIS (C, T & X) reported no increased, or decreased for that matter, requests to the library because of the EIS, the senior management of company C, as noted in earlier, did not think that the company library was capable of providing the external information that the main board EIS needed. The senior manager interviewed from this company also explained that they wanted to keep the development of the main board EIS project (the other company EIS was targeted at middle management) to as few as people as necessary. It is not possible to say if the company library of this organisation would have been capable of providing the necessary external information, however, what is undeniable is that over the period of the last few years the library had seen its budget and staff diminish to the point were it was causing some concern to the head of the library. Despite being a user of the EIS, she thought that it had given the library no new opportunities, a question posed to all of the libraries that knew of the EIS in their company. Only three librarians replied they did believe the EIS would provide them some new opportunities:

> "I just see that [EIS] as a way of almost speeding up our operations here, of getting that information [customer satisfaction survey] to people much more quickly, being less laborious for us if you like, because at the moment someone has got to read the article regardless of whether you are going to scan it or copy it, but scanning it would be much easier. So that would be an advantage if we could do that" (Librarian, Company E)

"Fantastic possible opportunities. It's making people more aware of how you see these things to more than just your group. How information is coming in from these should not necessarily be duplicated, but shared amongst the groups and there is common cause and common purpose across the groups as a whole, and there are benefits to be gained if its managed properly. And perhaps by somebody not intimately involved with that particular cycle of information. Makes you look at it objectively" (Librarian, Company R).

The library respondent from company H was the only one to voice any misgivings about the EIS and its future development. This library, as already noted, has been involved with its company's EIS, one of the first in Britain, since the beginning of its inception in 1985. It is therefore not a library that has suddenly become aware of the what implications these systems may have on the company library. This library respondent was the only one to say he thought the EIS will be a threat as it matures and becomes more advanced.

"Yes, it has now [been helpful] but I think it may be a threat in the future. I think ultimately we are intermediaries - what is our role? If you add AI you wonder how its going. People want to move to decisions, they want the data and information and intelligence to arrive automatically...People like Eslvier are going to be providing electronic copies of journals three months before publication - therefore what is our role then? We don't have a role.These things can be picked up and put into the system (EIS)...I think its bound to happen" (Librarian, Company H).

Respondent A was also of the opinion that the EIS could be a threat to the library, but by contrast knew nothing of the EIS in his company, a perception which may turn out to be accurate as the EIS is already responsible for automatically retrieving some information that previously had been the responsibility of the librarian of this company.

The remaining librarians were split between those (eight) that believed the EIS would give them no new opportunities at all, and those who commented that there may be a possibility but could not say how. Libraries H and R also cited that one of the false positive aspects of their dealings with the EIS was that, although it had indeed raised their department profile in the company, it was a factor that they were not wholly at ease with. This was because they felt that they were already overwhelmed with work at the present moment in time, and they could not

adequately deal with more requests. It was also the main reason why these two libraries, among several, did not promote their services in the company with as much enthusiasm as one might expect of departments under constant pressure to cut costs and improve performance.

7.10   EIS growth and improvement

One of the prime directives in developing EIS, according to Houdeshel and Watson (1987), Rockart and Delong (1988) and others, should be to plan for the system to expand and spread to more users other than those originally targeted, usually senior managers. An EIS must grow if it is to become a successful EIS; if it does not it will either stagnate or fail. Rockart and Delong (1988) make a distinction between the growth of EIS whereby the applications of the EIS are increased, and the spread of the system which they defined as an increase in the number of users of the EIS. Their model is essentially therefore an evolutionary development from the view of a change in applications. However, others such as Nolan (1973), IBM (1981), McFarlan *et al* (1983) and Zmud (1984), view the evolution of IT from a different standpoint, for example how an organisation assimilates technology or as a process of technology transfer. Saarinen (1989), on the other hand, has argued that nearly all models are limited in their understanding of IT evolution, and as such has developed a framework that includes elements from economics, diffusion theories and organisational learning. Houdeshel and Watson's (1987) comment on the development and evolution of the MIDS system at Lockeed-Georgia is perhaps indicative of why EIS developers should plan ahead:

> "Over the years, MIDS has expanded and evolved as more users have been provided access to MIDS, management's information requirements have changed, better ways to analyse and present information have been discovered, and improved computer technology has become integrated into the system" (Houdeshel & Watson, 1987).

Specific examples of how the EIS must evolve have been put forward by Burken (1991) who states that data maturation is among the most important factors for a

successful EIS, because as data moves up the evolutionary curve it gives the user greater insight. Maturation of the EIS therefore can only be accomplished by the primary users of the system. Some EIS vendors even see the EIS becoming the basis of a whole new collection of information management products:

> " I think they will be seen to be systems in their own right and they will cease to exist as EIS; EIS will become a group of computer technologies which will include word processing, graphics, spreadsheets and whatever tools and techniques that allow people to get access to corporate information. I don't believe in 10 years time we will be talking about EIS, I believe we will be talking about information for management" (EIS Vendor, Metapraxis).

How a EIS changes over time of course depends on what senior management want of the new system, and this can only be accomplished by getting feedback from them to the EIS developers, and it is in this area that some of the problems of altering an EIS begin to appear. EIS developers were asked how good was the feedback from the users of the system; more than half (twelve) replied that they simply did not get any, or very little, because they could not get access to the relevant people, the users of the system.

> "The only time we hear from them is when they forget their password and they can't get in and that happens about once a month. But there are never any comments about the content" (EIS Developer, Company L)

The developer respondent from company L for example, replied that the only time he ever got a comment from the EIS users, was when they forgot their password into the system, while the developer interviewee from company F was forced to ask one of the senior manager's secretaries what her manager's opinion of the system was. This was mainly because the EIS at company F is not considered a key information system.

> "There is a willingness to continue with EIS and we haven't had any feedback to suggest EIS is a total failure and we should stop it. Our boss in last years group finance conference put over the message to think EIS - that this is the way forward for looking at information and making decisions, and he was putting the ideas out to all the businesses that they should think about EIS. I asked the CEO's secretary if he was happy with it and she said 'well you would know if he was not' - so nobody says it's good, but equally they don't say it's a load of rubbish." (EIS developer, company F)

However, some developers did report some good feedback from their users with regular meetings with them or their representatives. Despite this lack of feedback EIS users seem to be quite content with the systems they are using, as only seven had made any requests from the developers for alterations to the EIS. This of course could be one of the reasons why developers get so little feedback – the users are quite satisfied with what they have and do not feel a need to comment on what they regard as a satisfactory system, however, another reason may be simple apathy.

> "I think [there is little feedback] because they don't have a great deal of faith in it and they haven't really seen any better - so it's lack of education" (EIS Developer, Company L)

> "Most of them seem content with what they have got and it's IT showing them the potential of other technologies, some of which are exploited and some of which are not. The executives seem content with what they get and not driving it" (EIS Developer, Company R)
> "I think we are the ones that request things! Whether we get anybody to agree to it I don't know. We have no requests from users, that's the simple answer. It doesn't mean to say we haven't thought about it though" (EIS Developer, Company F)

When senior management did ask for improvements it tended to be for more personal information that was, in many instances, only applicable to the individual concerned, for example, specific news stories or suggestions for different display graphics. Requests for a more personalised EIS is an aspect of EIS design that some EIS vendors think should be looked at more closely, for example:

> "One of the areas where people don't perhaps put enough attention and one of the areas where successful EIS do put attention, is that the EIS should be individual to the user who is using the system. So if you are the sales director and I'm the marketing director we might be looking at similar information, but I want to see the numbers, you want to see the graph. So the graph should be your default and the numbers my default and I should be able to switch the other one, so should you. But the way in which we actually look at information and we navigate through the system should be tuned were ever possible to who that user is" (EIS Vendor, Planning Sciences).

There was no temporal aspect to requests for improvements in that there was an equal lack of requests from both new and old EIS. The comment from respondent F is quite revealing because it recognises that the developers themselves have been making improvements, without any suggestions from the EIS user.

Table 17. EIS development

COMPANY	NEW REQUESTS	CHANGES TO EIS OVER TIME	PERCOLATION DOWN OF EIS
A	N	Y	Y
C1	N	Y	N
C2	N	Y	Y
E	N	Y	N
F	N	Y	N
G	N	N	N
H	Y	Y	Y
I	N	N	Y
J	N	N	N
L*	N	N	N
N	Y	Y	N
O1*	Y	Y	Y
O2	Y	Y	Y
P	Y	Y	Y
R	N	Y	Y
S	N	N	Y
T	N	Y	N
U*	N	N	N
X	Y	N	Y
Y	N	N	N
Z	Y	N	Y

* Indicates failed EIS which is no longer in use

Although a small number of requests have been made from the users themselves table seventeen indicates that more than half (twelve) of the EIS have had some enhancements added by the developers since their installation. However, apart from the seven companies who did regularly alter characteristics of their EIS , many of these have evolved naturally without any requests from users, for example, updated hardware, colour graphics, and a more intuitive interface. This lack of interest from senior managers in their EIS does not seem to replicate the findings of Allison (1996), whose survey of twenty-five British organisations found that many of the users 'wanted to see different or new information on their

systems, and improvements in the usability'. However, many of his responses were from middle manager users of the EIS, which may indicate that senior managers are more content with what they have than users of the EIS lower down the corporate hierarchy.

Another accepted factor in the evolution of EIS is their percolation down the corporate organisation to middle management levels (Frollick, 1994; Allison, 1996), with some authors (Rai & Bajwa, 1997) now arguing that EIS are no longer the preserve of senior management. Certainly in the past few years the term 'Executive Information System' seems to have been replaced by names such as 'Everybody's Information System', 'Enterprise Information System', and 'Business Intelligence Systems' to indicate that these systems are no longer the preserve of the upper hierarchy of the organisation.

Both the literature sources and this research suggest that the EIS is now no longer the exclusive asset of the senior manager; of the twenty EIS studied, fifteen had percolated from the top down to the realm of more middle managers. This characteristic of EIS has already been noted in the literature; (Frolick,1994; Nord & Nord ,1995; Allison, 1996). Frolick for example, argued that it was a perfectly natural event in the growth of an EIS for it to percolate not only down to middle managers, but even further down to support staff and below. He also suggested that several factors were responsible for this including: middle managers needing access to the same information as senior managers; the spread of PC's; and the evolution of the EIS software itself. However, within this study although some of these factors may be important to the EIS spreading downwards in the company, the EIS respondents noted that it was first, senior managers asking for their subordinates to have access to the system, in the belief that middle managers could their work better if they were looking at the same information and, second, middle managers themselves requesting access to the EIS. In addition, there was also the belief that unless the EIS did not trickle down the organisational hierarchy it would stagnate and fail:

> "I would like to see more users on it which I think we can do without
> dropping down to the next level. Two of our business units have decided to

put the level below the unit manager on the system which means adding 6-12 people on it, and I think that's been very successful for the business unit to have done that. I think we could put another 20-30 people on the system and reduce the amount of hard copy we do" (Senior Manager, company E).

"Yes we are anticipating quite a change in its usage really, away from executive use and towards more a flat usage for whoever requires it for whatever purpose. (Senior Manager, Divisional EIS, Company C).

"I think its a dead duck if it doesn't [percolate down]because unit costs are going to get higher".(Senior Manager, Board EIS, Company C).

"Yes it's gone right down from station managers only, about 40, to about 120/130. I think it goes all the way down to anybody that wants to look at it now; it's become more of an MIS. Having said that, because it's geared to operations a lot of the other managers are not interested, for example the engineers" (Senior Manager, Company J).

The views of the EIS developers were also replicated by many of the EIS vendors who believed that EIS were now becoming more like MIS, in that they were available to a much larger user base in the organisation:

"I think the successful ones [EIS] are the ones with the drive to percolate down, ones that are built into the functioning of an organisation. The ones that seem to be less successful are the ones that start off at board level tools. I think where the object is to deliver performance monitoring to the people who need it through an EIS, then it happens and is successful, it becomes integrated into an organisation but it is never called an EIS; it's never known as an EIS and we don't use EIS anymore because it doesn't mean anything" (EIS Vendor, Pilot Executive Software).

"There is a definite trend to use by middle managers and below and EIS is now really becoming an MIS" (EIS Vendor, Holistic Systems)

"This [EIS] is an MIS...there is no doubt about it. We are doing departmental MIS, that's what we are doing now and my personal approach to it. However, you can't call it an MIS. Who would buy an MIS? So you have to call it something different. You can't call it an EIS because people will think it's drill down from the top. We have to group them into something...an MSS, a system to support management, with each of them having a managerial application. That's the message that we now give. But the literature says EIS because that's what people want to buy" (EIS Vendor, Comshare).

7.11 EIS Failure

The reasoning that unless an EIS does not expand it will not succeed highlights what can be the result of inadequate management of the growth of an EIS; a stagnant or failed EIS. The literature is quite broad and specific on why EIS fail with no shortage of case studies to illustrate the point (Markus, 1981;Watson & Glover, 1989; Crockett, 1992; Wheeler *et al*, 1993; Black, 1994; Overton *et al*, 1996; Bussen & Myers, 1997). It has already been noted earlier on in this chapter that several EIS suffered from resistance to their implementation, although EIS failure can be attributed to many more factors other than resistance. Watson & Glover's (1989) survey of 21 companies who had suffered EIS failure found that among the 23 reasons given for failure, the most cited were:

- Inadequate or inappropriate technology.
- Lack of executive commitment.
- Failure of the system to meet user needs.
- Executive resistance to technology.

Despite the references to resistance and technology Crockett (1992) argues that it is information problems that are primarily responsible for the failure of EIS. His three basic information problems that 'plague' EIS use are:

1. Systems still do not provide (or provide too late) the data that senior managers consider crucial, even after installation.
2. Collected data are not linked across functions or strategic areas.
3. The data that are available help diagnose problems, but do not help find solutions.

Together with a catalogue of failures cited in the literature, there is also a plethora of measures that EIS developers can take to ensure their EIS does not encounter resistance, or worse, fail altogether. These include setting up specific EIS development groups that meet regularly, shadowing senior executives to see how they work and what information they use, organising political 'games' to

determine responses, including data providers in the development process to give them a stakeholder share, and showing the origin of data. Several of the EIS vendors interviewed for this research also expressed the view that regular updates of information on a daily or weekly basis was essential to keep the attention of EIS users:

> "If you have a small focused team who continue to listen to what the users say and keep feeding back new modules and expanding the client base, it [the EIS] will remain healthy. If you take management attention away from it then it will tend to die, because it becomes a regular tool. It's something to look at like monthly reports" (EIS Vendor, Pilot Executive Software).

> "I have a personal view that if an company looks at monthly organisation the EIS will never take off because the information will be looked at once a month, and after a few weeks they will say 'I'll have the piece of paper anyway'. I think for an EIS to be of value it should have daily information; weekly is getting there but it should be daily" (EIS Vendor, Planning Sciences).

Within this study there were three EIS failures and all were related to the problems of information access.

7.11.1   Company L

This EIS failed because first, there was no information on the system users wanted to look at because it was constantly late, and second, because of this users now rely on getting the data by fax instead of looking at the data on the EIS screen.

> "The flash sales [is always late] - because its by fax. That's a human problem - generally by Wednesday the information is complete but by Wednesday it's a bit late so I think you will find that most users will rely on the faxes they get, and will look at the paper based information rather than look at the screen" (EIS Developer, Company L)

This system has also had no new modules in the last four years of its existence, and is now very rarely accessed. The only reason it is still kept operating is the occasional use by a senior manager and the fact that the system has largely been forgotten, despite still costing the company around £20,000 each year for a site licence. The main reasons cited by the senior manager respondent for the lateness

of information into the system are lack of support from the company directors, and some organisational resistance.

> "I will go in there, generally on a Monday afternoon, to have a look at the sales performance for the previous week and I will drill down to the lowest level possible. But usually I will find that someone has not got the figures in there by then which means that I will have to go back in again on Tuesday/Wednesday" (Senior Manager, Company L)

Even though the data providers were aware that senior managers used the EIS, this did not seem to be enough of an incentive to encourage them to send in their data on time.

> "It should do but they have not been told from a high enough level. I think probably the people who send it are aware but probably their MD aren't quite so aware, as they don't see this as their ball; I think they feel if its not for our benefit but for the group's benefit so maybe there is a bit of resistance there" (Senior Manager, Company L)

This system was therefore only rarely used because it simply did not have the information senior managers wanted in time and as such it has been left to deteriorate.

7.11.2   Company O

This company did have two EIS, one of which only lasted three years before it was scrapped, however, it was decided to interview both EIS development teams to gain some idea of why a company could have both a current and failed EIS. Initially the development of the aborted system went well with more modules being added, an increased user base which improved from 10 to 35, and its development cited as a successful case study by Business Intelligence in 1992 (Harvey & Goodwin, 1992). However, the problem was similar to that of company L in that the information was not on the system when senior managers wanted to see it.

> "One of the biggest problems we came back to all the time was getting the data people wanted. Although the news stories and share pieces were daily,

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competitor analysis was only updated yearly, the financial management accounts only quarterly, so there wasn't anything really to make people turn on every day. So whilst people found it useful, the end of it was were we said the usage is not very high and its costing this amount of money which was funded centrally to start with, and we asked the users will you pay for it? it wasn't that much use that they would pay for it or contribute towards the cost of it" (EIS Developer, Company O)

This lack of timely data was due mainly to corporate gatekeepers and the information culture of the company, together with a lack of will for any managers senior enough to do anything about it. This failure has also had a knock- on effect with only a low take up of the current EIS, because users are now wary of any information system called an EIS.

7.11.3   Company U

This EIS has very few users and is therefore rarely used at all, yet unlike the EIS in company O it has not yet been scrapped because senior managers still think it is a piece of IT they should have:

"I think its partly the in thing to have, something they ought to have. But we have not done any development on it for nine months. I've been actively saying, look you are not using it so why don't we take it away from you, and we will spend the resources on other things? But the answer is always 'No, we still think it's something we ought to have'" (EIS developer, Company U)

Once again the problem is with getting the data into the system on time; information providers in this instance are reluctant to put the data into the system because they like to check it first, and if necessary amend it. The EIS developer respondent also replied that there was a lack of interest in the system by senior managers, and that if he were to start over again with a new EIS he would argue that it should be targeted at more middle managers.

"I think the only way it will move forward is by pitching it at a lower level in the organisation, upper middle managers. Really I think if we had got the chance to start again, we would pitch it at people like the project executives who are reporting to the project director, so that they would have a tool to

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monitor their own project and get them happy with the tool, then once they are happy with it the director might start using it" (EIS Developer, Company U)

The senior manager respondent also complained that the information he wanted was not integrated into the system, and that its technical attributes were somewhat lacking in processing capability.

"When it went live and we switched it on I remember almost immediately there were problems over the currency of the data. What I needed wasn't there. And I think shortly after that it wasn't used on a regular basis
The resources were also limited. You had the situation of could I get the information from the EIS or was I conformable getting a hard copy"

"It's difficult to boot up. When I come in the morning if I want to use it, I switch it on and it doesn't speak to me for ten minutes, it takes that long to load all the software on to the hard disk in the machine. It's just not responsive enough" (Senior Manager, Company U)

The respondent maintains that the problem is not the culture of the company as such, but rather a poor development methodology that did not look closely enough at what and how information was to be put into the EIS:

"It's just too complicated and too long. It meant someone had to collate the data. I rang the manufacture plant in Bristol, and found a guy who was almost employed full time keeping the EIS up-to-date and producing a format for the EIS, getting it to Steveange,etc., ...but the reports he did were a week old by the time they got here. The data has got to be better. The solution to the problem requires a massive investment, but in the end everyone who was involved in the production of the data would have needed to have used the same data, software, machines, etc., and so consequently no investment was made and that was before we said it ought to be loaded automatically - if that had happened it would have been superb" (Senior Manager, Company U)

7.12 EIS Evolution

With these three EIS failures and earlier discussions on the development of systems that are still current, it can be seen that EIS like other IT systems evolve in certain phases such as initial funding, adoption of new modules, etc,. It was therefore decided to use as a base reference, the model of IT organisational

assimilation developed by McKenney &McFarlan (1982), to show where the EIS in this study are in their development phase.

Fig 8. Stages of EIS evolution (after McKenney & McFarlan, 1982)

```
                    ┌─────────────────────┐
                    │  Decision to invest │
              ┌────►│  In EIS and project │
              │     │    initialisation   │
              │     │     (Phase 1)       │
              │     └─────────────────────┘
              │
   ┌──────────────┐      ┌────────────────────────┐
   │ Stagnation:  │      │   Adaptation of EIS to │
   │    Data      │      │   new tasks and learning│
   │   problems   │      │                         │
   │    L & U     │      │     O2, R, S, T, X      │
   └──────────────┘      │       (Phase 2)         │
                         └────────────────────────┘

        ┌───────────────┐      ┌─────────────────────────┐
        │  Stagnation:  │      │  Stable EIS with increasing│
        │   Data & IT   │      │       user base         │
        │   problems    │      │                         │
        │      O1       │      │    C1, E, F, G, Y       │
        └───────────────┘      │      (Phase 3)          │
                               └─────────────────────────┘

                    ┌──────────────┐   ┌──────────────────────────────┐
                    │ Stagnation:  │   │  Mature EIS. Percolation of EIS│
                    │ Lack of new  │   │  down to middle management and │
                    │   Modules    │   │        change to MIS          │
                    │      I       │   │                               │
                    └──────────────┘   │   A, C2, H, J, N, P , Z        │
                                       │        (Phase 4)              │
                                       └──────────────────────────────┘
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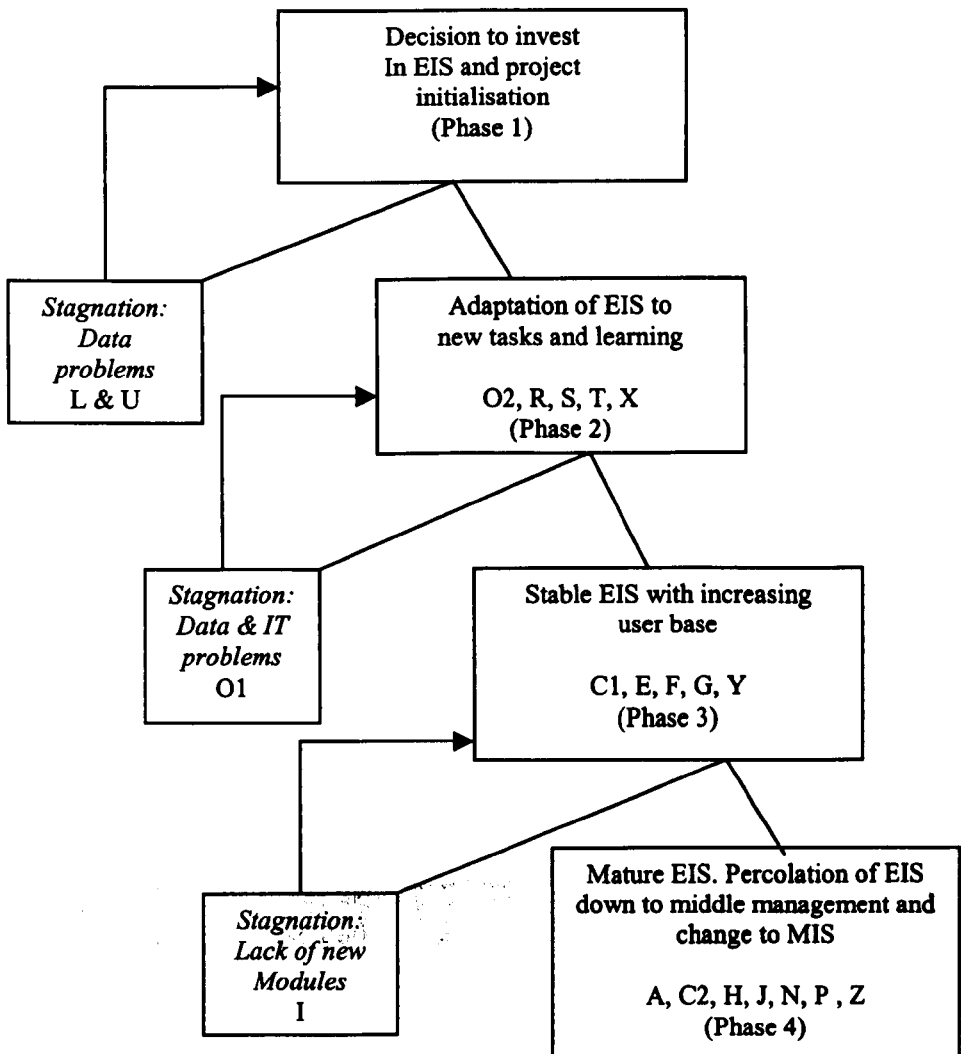
McKenney and McFarlan have argued that IT applications in companies progress through a set of phases, an argument that relates to earlier work undertaken by Nolan and Gibson in 1972. McKenney and McFarlan characterise the four phases of evolution as; investment/ project initiation, technology learning and adaptation, rationalisation and management control, and maturity and widespread technology diffusion. They further contend that the four main phases can themselves be further reduced to just two: the innovation phase (Stages 1 & 2) which is mainly

explority and experimental, and the control phase (Stages 3 & 4) were the emphasis is not on the effectiveness of the system, but on the efficiency of the technology. It is in the control phase for example, that we would expect the EIS to percolate down to middle managers if it was an efficient and successful system.

Looking at the phases of EIS evolution it was thought possible that there may be a relationship between where the companies appeared on the diagram, and how they were developed. However, there proved to be no relationship between any phase of the model and how the EIS was developed. For example, because a EIS was built under the control of a specially convened EIS development group, did not mean it was more likely to progress to the final phase. There was also no relationship between which department developed the EIS and their place in the model; an EIS developed by the finance department was just as likely to become a success and percolate down the company, as one developed by the IT department. Finally, there was no temporal relationship; a recently developed EIS of only a few years or so could be in the final stages of assimilation, while a relatively old EIS could still be trapped in phase two.

CHAPTER EIGHT: CONSLUSIONS – EXECUTIVE INFORMATION SYSTEMS, COMPANY LIBRARIES AND THE FUTURE OF INFORMATION SERVICES IN BUSINESS

This study has sought to investigate what role company libraries played, if any, in the development of corporate EIS. It has also set out to investigate if EIS and other similar information systems will have any bearing on the future of information services in business. In undertaking research into this question it was natural that factors relating to the primary question would also need to be considered, for example, the perception and role of information management in the company, information politics and the function of senior managers in the development of EIS and the developing of new information retrieval systems. All these and other factors help contribute to a picture of how libraries were involved in the development process of EIS, and how they can utilise new technology, such as intranets and the World Wide Web, to their advantage.

8.1 The role of libraries in the development of EIS

The majority of the company librarians in this study were found to be aware of their company's EIS mainly by either chance, for example hearing about system on the company grapevine, or by personally knowing some of the programmers and systems analysts involved in the development of the EIS. The EIS developers, although not hiding the development of the systems, tended not to disclose their existence because such systems, built with open-ended budgets and the support of very senior managers, tended to incur envy and resentment from other system developers who had limited budgets for their own projects. It was also recognised by both the EIS developers and senior managers, that EIS would have political implications within the company because the system would be retrieving data from organisational groups that would perhaps prefer either not discharge their information, or be a party to their 'interpretation' of it.

Despite the fact that all of the EIS development teams knew of the corporate library and the type of work they carried out, only four libraries, from companies

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H, L, R and T, were invited by the developers of the EIS to participate in some way in the development of the system. The four libraries that were thought to have been of some help by the EIS developers were considered for two main reasons; they were perceived to be the company's external data experts and many already had access to external databases. It was also established that EIS which had a substantial need for external information, at least 25%, were more likely to involve their company library. Other factors which became apparent in there being asked to participate included their close involvement with company departments, such as corporate strategy, which took a leading role in the development of the EIS. These four libraries were also more likely to be physically close to the development programmers of the EIS, and to know many of them personally, factors which were absent with the majority of libraries which had not been asked to participate in the development of the EIS. This suggests that environmental factors are important to the collaboration between libraries and EIS programmers in the development of EIS. As only four libraries were initially involved with the development of the EIS, this meant that a large majority of company libraries were not considered for their help. Moreover, although all of these library respondents thought that they could have been of help in some way, for example by reviewing external databases and developing search methods, the EIS developers indicated that the library would be of limited help either at present or in the future.

In most instances the EIS development team's attitude was that the corporate library was simply irrelevant, mainly because of the predominantly internal financial aspect of the EIS and minor external information need, but also because it never occurred to the developers in the first place to ask the library to participate, in what they perceived as an IT project rather than an information project. The librarian's perception of the EIS, on the other hand, was the reverse of the EIS developers; they consider such a system primarily as an information project, not an IT one.

Many librarians professed at not being surprised at their lack of involvement, mainly because they thought that the library was perceived by senior management to be predominantly a collector of historical information, a bit outdated and a

target for cost cutting whenever the company had financial problems. There was also a universal pessimism among nearly all the librarians that being ignored to participate in an information project, was just another indication that they were an undervalued department of the company; indeed it would be fair to say that some of the librarians were bitter about the treatment of their libraries by senior management with regard to cuts in their staff and budgets.

Libraries that were involved with the development of the corporate EIS, either from the beginning or at a later date, were shown to have three main roles to play. First, they can act in purely an advisory capacity by informing the EIS developers which external data sources would be suitable for the EIS, their advantages and disadvantages, cost, structure, reliability, etc. Second, they can act as an external information conduit, in that any external data is passed to the EIS via the library for reasons of cost and reliability. Third, they can feed the EIS with data that is first edited by the library and then passed on to the system in a more concise form. The librarian's role therefore is essentially one of a consultant or facilitator.

The attitudes and perceptions of all three groups of respondents, EIS developers, senior management users of the EIS and librarians, to what they believed was their company's information management (IM) policy and the role information politics played in it, was found to be related to their position in the organisation. IM policy and information politics were perceived to be not only worse as one got further down the corporate hierarchy, but it was rare even for any of the three respondent groups in a company to agree. All these groups in the study said their company's information management policy was predominantly either poor or non-existent. Using Davenport's *et al* (1992) model of information politics which uses the analogy of governments to describe information politics, many senior managers believed their company pursued a model based on monarchist principles, whereas the librarians were more likely to say their company closely mirrored anarchic or feudalistic principles. It became apparent from what respondents said about the information management policy of the company, and the role of information politics and culture, that it is these factors which are responsible for the attitudes and perceptions regarding the library, and the development of the EIS. There was considerable disagreement between the

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respondent groups within each company, as only those groups from one company, (H), could agree to a common information management policy and a perception of information politics.

Information culture was also considered poor, with both the librarians and senior management having difficulty finding the location of internal company information. Although the EIS developers did not complain of this problem, they did have difficulty retrieving internal information for the EIS. This was due to human problems such as late or erroneous data being sent for inclusion in the EIS, that is poor information management, rather than active resistance, despite the fact that these systems and the seniority of their users in the organisation, usually gave them an advantage when it came to retrieving information.

It was clear, therefore, that the reasons why the majority of libraries were not invited to participate in the development of the EIS were not only because most of the systems required little external information, but also because of the attitudes and perceptions of the company's EIS developers and senior managers towards their own libraries. Many EIS developers do not believe that their corporate library has any role to play in the development of what they think of as an IT project rather than an information project; this is perhaps understandable in a way because that the majority of the systems were built and administered from the corporate IT department, as opposed to a minority of departments concerned with finance or business strategy. The perceptions and attitudes exhibited by nearly all of the companies in this study to their own corporate libraries, together with the fact that most EIS do not need the sort of information that the company library uses and stores, are the primary reasons for the lack of any involvement of these libraries in the development of the corporate EIS.

If we take the role of the library in the development of corporate EIS, the information structure of these systems and the attitudes and perceptions of the both the library and EIS respondents, it is possible to derive a model which indicates how these different factors are interrelated with each other. For example, the organisation's information management policy and culture, greatly influence the perceptions and attitudes that that have been found to be one of the

primary reasons for not including libraries in the development of the corporate EIS.

Fig 9. The library's role in the development of EIS

Library consultation and the supply of data (minority)

```
                          ┌──────────┐
                          │   EIS    │
┌──────────────┐         │          │        ┌──────────────┐     ┌───┐
│ Internal Data│────────►│   EIS    │◄────────│ External Data│◄────│ L │
│  (75-100%)   │         │          │         │   (0-25%)    │◄────│ I │
└──────────────┘         └──────────┘         └──────────────┘     │ B │
        ▲                                                          │ R │
        │                                                          │ A │
        │                                                          │ R │
        │                                                          │ Y │
                                                                   └───┘

  Company                    EIS sources              Library ignored (majority)
  Financial
  Systems
```

```
        ┌─────────────┐           ┌─────────────┐
        │  IM Policy, │           │ Perceptions │
        │  Politics & │──────────►│      &      │
        │   Culture   │           │  Attitudes  │
        └─────────────┘           └─────────────┘
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Influences in the development of corporate EIS
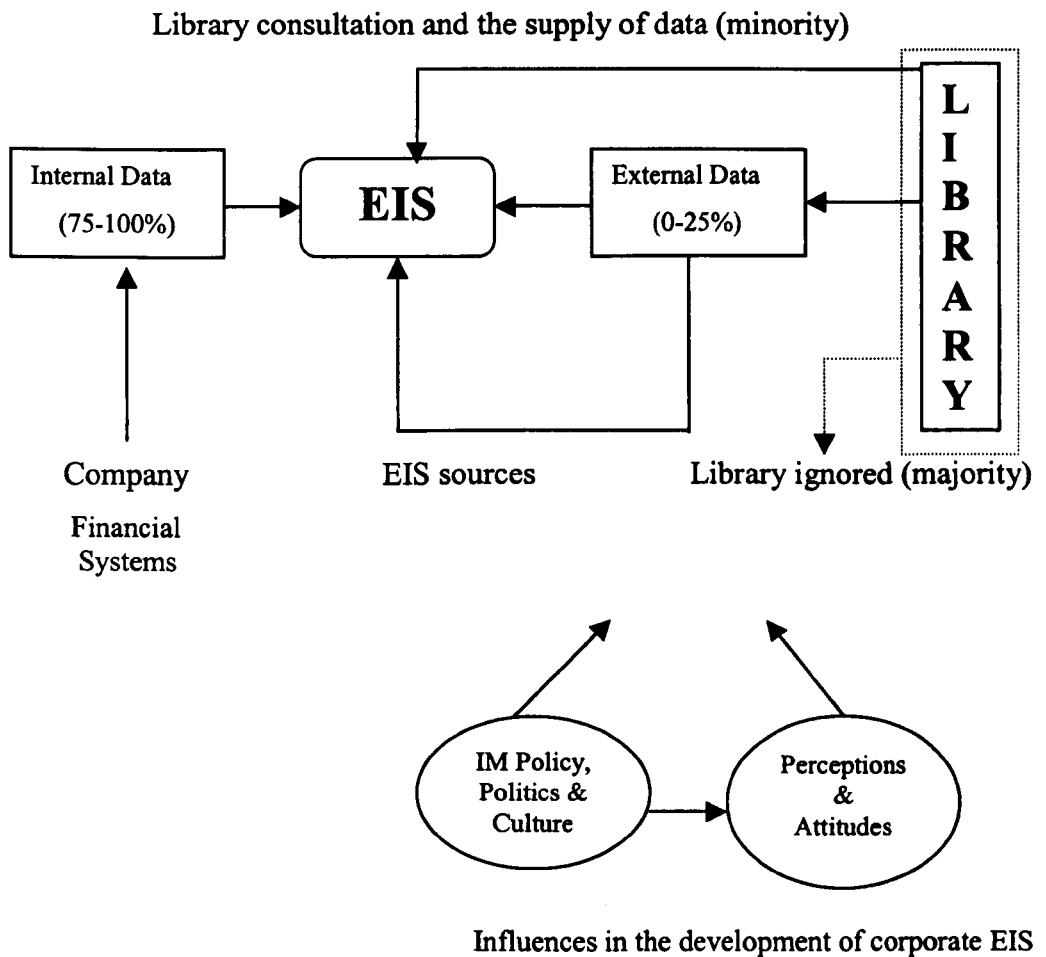
Figure nine above shows how libraries are involved in the development of corporate EIS. Information management policy, politics and culture plays a important role in the attitudes and perceptions of corporate staff, which in turn influences the way in which two different information systems, the library and EIS, are perceived. The majority of libraries are simply ignored in the development of EIS, but a minority act as consultants particularly when EIS have a relatively high external information content. However, most EIS rely on internal financial data which precludes the involvement of the library although some EIS bypass the library completely if they do wish to assimilate external data.

8. 2 The development and use of EIS

There was a general preference shown for certain methodologies in developing the EIS in this study. The majority of the companies undertook their EIS

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development using either the prototyping method, or the Critical Success Factors methodology pioneered by John Rockart (1979). This development was generally carried out by the company IT department, without any reference to a framework or strategic business plan, and sometimes with a less than co-operative attitude from the very users they were built for, the senior management. Despite this there was little user resistance to the introduction of EIS into the organisation, although several senior managers did profess some scepticism towards these type of information systems claiming they were just a temporary technological fad.

EIS were established to have been developed due both to internal pressures in the company and a push from the IT department, as it was recognised by IT managers that these type of systems were an excellent way of persuading the senior management of the company to use computers. It would appear that the primary use of the EIS in this study was for operational use, in particular the monitoring and analysis of business performance. Although EIS have been considered as strategic tools and are often marketed as such by EIS vendors, their use in this context was limited even though eight companies said they used their systems for both operational and strategic reasons. Within their role as a management tool, the EIS was seen as providing faster, new and better information, as well as acting as a catalyst for cultural change in the organisation. One of the most vital changes was that the EIS was seen not only as helping senior management become more familiar with the concept of a computer on their desk, but the actual way EIS retrieved information from many other systems, its reliance on a single agreed set of data, and the necessity of many departments in the company having to release information, meant that the very notion of having an EIS in the company created a change in some areas of information culture. In particular, this was improved information access and sharing, and the appreciation by the senior management of the company that information was a valuable corporate asset.

However, there was also an awareness among many senior managers that, although they used their EIS, they were by no means reliant on it, with many indicating that their information needs were still not being met. Yet despite this sometimes lack of appreciation of their EIS, many senior managers had not requested any improvements to the system, with EIS developers reporting that

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most of the users were either content with what they had, or exhibited an apathetic attitude towards the EIS. This apathy and contentment, together with the lack of any real impact of the EIS, may also account for the continued use of other information systems, particularly financial systems, by senior managers.

As a piece of IT used by the most senior managers of the company, the impact of these systems has been less than expected either by the EIS developers or the users themselves. Perhaps too much colloquial hype has been taken literally by the companies who invested in these systems, because although they were seen by most managers as providing some personal information benefits, the impact on the company has been little with many of the systems failing to live up to expectations suggested in the literature, for example, in the removal of management layers in the company. This was a result of both senior management expecting too much of the systems, but who were unwilling to give the time necessary to the EIS developers to build the system, and too much promised by the developers themselves who do not have sufficient understanding of the way their senior managers operate. However, despite this lack of impact, all of the senior managers wanted to retain their EIS and indeed many, though not all, wanted them to percolate further down the corporate hierarchy to middle management groups. This was largely due both to senior managers wanting their subordinates and assistants to have access to the same information they were investigating, and these people themselves requesting access to the EIS. Nearly half of the senior managers also expressed the view that even though the EIS were not considered as corporate strategic systems, they believed that they did give their company a competitive advantage.

8. 3 The future of information services in business

8.3.1 The decline of the traditional company library

From the perceptions and attitudes towards the company library exhibited by many EIS developers and senior managers in this study, it is apparent that a considerable number of them still have the traditional library in mind when

discussing this department. According to Ercegovac (1997) this should not come as a surprise:

> "We view libraries as agencies which have traditionally been involved in selecting, acquiring, organising, preserving, and providing access to documents on behalf of people who seek information. This traditional model sees the library with well-defined spatial and temporal attributes: with regard to space, the library's documents are locally selected and organised for the purpose of information retrieval by library patrons; with regard to time, the documents are continuously systematically, and purposefully collected into a single homogeneous library collection, containing both archival and the most current items". (Ercegovac, 1997)

Views similar to that expressed by Ercegovac above are echoed by Davenport and Prusak (1993) who argue that corporate libraries are based on an outdated and obsolete model, that they are not well understood by their managers, and that hardly any report to a person with any professional experience of running a library. They further add that little has changed even though computers are now regularly used in libraries.

> "There has also been little integration or even co-operation between libraries and other information-orientated functions. Librarians collect, categorise and store largely textual information; information systems groups focus are largely quantitative or transactional information, and rarely do the twain meet" (Davenport and Prusak, 1993).

It was clear from interviewing the company librarians within this study that many of them are concerned about the outlook of their libraries, one of the reasons being that they believe they are perceived as a typical library; several indeed see no future at all and anticipate their closure in a few years. Hence, in general, most of the libraries in this study have suffered a declining staff over the years to an average of about five, and a reduced budget in real terms to a mean of £87,000. They have also seen the way they conduct their business change from being a supplier of hard copy books and journals to a supplier of electronic data; much of the libraries budgets therefore went on the cost of subscribing to on-line databases such as Dialog and FT Profile.

The picture that arises from this study, from the viewpoint of the librarians, is that of a deep pessimism and concern from nearly all of them. The few librarians that

could be described as having an optimistic view of their future, for example in libraries E and T, see themselves as becoming even more linked to the electronic retrieval and distribution of data, and the disappearance of printed matter. These libraries, and a few others, see this electronic distribution factor as a way of becoming much more than the traditional model of a corporate library; they see themselves less as passive collectors of information and more as active facilitators, network operators, and centres for business research. However, the majority see the library either closing in the near future, the threat of closure, or the fragmentation of the library, with other company departments such as marketing forming their own information research cells. Although nearly all of the library respondents thought that EIS or their further development would prove no threat to them in the future, almost an equal number of EIS developers replied that they could think of no aspects of the library that were of value to the EIS at present. However, nearly half (nine) of the developers did say that the library may be of some use in the future when EIS made more use of external information.

An extraordinary feature of the librarians in this study was the reluctance of almost all of them actively to promote their departments within their companies, which at the time of interviewing, was certainly apparent would continue in the near future. The primary reason for this reluctance was that many of the librarians, although under-staffed, had more than enough work to do with what they regarded as an inadequate number of personnel. However, despite the view of the librarians that they were overwhelmed with work, mainly from specific groups in the company like economists and marketing managers, in general, and considering the number of different departments in what are very large companies, there was a distinct non-use of the library in most instances. Librarians seemed to be quite certain of this even though only twelve of them kept any statistics on the users of the library. Although it seems hardly a surprise if many of the libraries do not promote themselves that they are under-used, many of them would like to market their facilities to a wider audience, but are concerned that they could not cope with the extra demand made of them, with the perception that in many cases they would not receive extra funding to serve an increased user base.

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This non-use of company libraries is not new, as studies by Slater (Slater 1980; 1984) in 1980 and 1984 found that non-use of British industrial libraries was widespread. An updated survey undertaken by Brick (1999) in 1999 of British business libraries saw little change in this non-use of the corporate library. The most commonly perceived cause of this non-use was a lack of awareness of the library's services, while the main reason that library managers thought they were not being used was 'lack of promotion' within the company. Yet the library's self-promotion was the most popular method, both in Slater's 1980 study and Brick's 1999 survey, of trying to increase the use of the library. Brick also concludes that the biggest group of non-users were the senior management of the company, a finding which was replicated in this study. When the senior manager respondents were asked if they knew of the library in their company, all but one (X) replied that they did indeed know of the existence of the library. However, when asked if they could give an example of when they had last used it, nearly 90% could not; what was also perhaps indicative of their use was that the majority could not name the head of the library, or indicate where in the company it was physically situated.

Although EIS developers have in some cases bypassed the library by arranging for their own external information sources, or even, in the instance of company A, made redundant a set task of information retrieval previously undertaken by the library, it has become apparent that the role of the traditional company library is slowly being eroded despite their presence. It should therefore come as no surprise to find librarians are becoming concerned at what role the library has in the company, even though many now see the role of the traditional company library shifting from a passive collector of hard copy data, to an active distributor of electronic information. The very fact that most of the requests of the libraries in this study were for competitor and business information, indicates that they are much more closely linked with users that need information which impinges more closely on the business objectives of the company. Some of the librarians in this study actively seek information on their employer's competitors without being tasked to do so, because they know such information may become important or that they will be asked for it in the future; they are therefore ceasing to become mere passive collectors of books, periodicals and newspapers. Moreover,

Davenport (1997) argues that any library which still maintains an attitude of passive collector can no longer survive. He maintains this is because:

- As passive collectors of data libraries tend to wait until a request is made to release the data. They need to make corporate users much more aware of what they have even before they are asked for it.
- Libraries are too preoccupied with preserving their collections to the extent that they sometimes regard a request for information as an intrusion.
- Libraries do not create or add value to the information they have. Although data does need to be correctly classified, it is done so without any thought on how it could be reconfigured to create new information.
- The traditional library model equals shelves of printed matter for easy access. Electronic media has made many previously hard copy texts obsolete, while many users no longer need to leave their desk to retrieve information they need. (Davenport, 1997)

However, Davenport offers little evidence for these claims; libraries are not always passive collectors, which is shown by the fact that some of the libraries in this study often sought out information in anticipation that it would be useful in the future. The only libraries that may be preoccupied with preserving collections are those who have specialist collections such as medieval manuscripts, however, even in these libraries it is hard to imagine they would regard a request as an intrusion. Davenport's view that libraries do not create or add value is difficult to prove without looking at specific example where they may have done so, however, he is assuming they do not. There would also many different applications and perceptions of what is and is not, value. Finally, although some texts have been made redundant by their electronic counterparts, for example, the *Encyclopaedia Britannica,* which is no longer produced in hard copy format except by request. Many texts are still available in both formats and users still generally prefer to read from a printed page rather than a VDU, therefore, it will be some time yet before printed matter is no longer carried by a library.

Instead of the traditional library model Davenport suggests a more suitable example for imitation should be that of the television industry, because it is 'high on customer orientation, high on innovation, and low on technological focus'. It is also an industry were the managers are 'obsessed' with the usage and users of information, which itself is disseminated far more efficiently. Television companies are certainly preoccupied with attracting more viewers and ratings, but Davenport's argument, that an industry which is advocating a digital widescreen format, interactive television, etc., and is ever more dependent on computers and satellite technology, is 'low on technological focus' is questionable. However, he is correct that such a model of information support would be resisted by the 'powers-that-be', presumably a reference to gatekeepers and other personnel in the organisation who would lose influence by a broader access to information. In this category he also includes traditional library staff themselves, as they to are perceived as not embracing new methods as well as they could. Librarians in this respect are like any other corporate group; if they feel threatened by a new technology or method of working they will try to resist being pushed in that direction. There was no resistance or reluctance from the librarians in this study to EIS, mainly because their input into the systems was minor and its impact on them was minimal; also, few librarians thought this sort of technology threatened the library in any way.

However, many librarians and companies do realise that the model of the traditional library is no longer valid and are starting to move towards other designs, perhaps the most noted of which is the virtual digital library where there is a minimum of hard-copy material. Within this type of library the main task is to collect and transmit information rather than store it, and the role of librarian revolves around information management rather that simply information retrieval.

Digital libraries began to appear in a simple form in the 1970/1980s with the electronic indexing of online publishing catalogues (OPAC) that were made available to other libraries and, during the 1990s, the general public. For example, the British Library's OPAC system became available in public libraries in 1993 and was later was accessible to all universities through the Joint Academic Network (JANET) in 1994 and then to any internet user in 1997. Since

the introduction of the CD-ROM in 1985 and fall in the cost of other digital media such as Digital Audio Tape (DAT) and Digital Versatile Disk (DVD), many books, patents, sound and video archives, journals, catalogues, etc., have been increasingly digitised to such an extent that many libraries now have numerous juke boxes full of them. Other advances in digital libraries include content creation, storage management, access and distribution and document imaging. However, the process of digitising older hard copy and analogue data is still a lengthy process and it will be many years yet before libraries convert all their data. Many old manuscripts, such as the Saxon epic *Beowulf* have also been digitised and made available to the public through the internet, while programmes such as the British Library's *Initiatives for Access* which began in 1994 have sought to exploit IT in ways to make collections more widely available. Libraries have also increasingly made use of the WWW to allow access to their catalogues and digital data, with the result that most major libraries can now be accessed via the internet.

A particular good example of how a traditional corporate library has progressed to a virtual digital library, is that of the Toshiba Business Information Centre. In this information centre, which was created from several of the company's internal libraries, information media is shifting from paper to optical disks, on-line databases, CD-ROM, and videotapes (Mori, 1994). All the information is customised by the staff and an extensive electronic scanning procedure is carried out every day. Unlike the previous incarnation of the library the Information Centre is not available to everyone, nor is it free, as management believe that if users have to pay to access the centre, they will constantly review the quality of the information and service the centre is providing. However, some of the services of the Centre are available to a wider audience in the company for the purpose of promoting the Centre and attracting new customers.

Although none of the libraries in this study approached the level of sophistication of the Toshiba Business Information Centre, many are moving towards a more digital model; just over half of the libraries spent most of their budgets (>75%) on electronic data while the remaining libraries spent approximately half; only two of the libraries said they still purchased mainly hard copy data such as books and

magazines. It is however, notable that such as digital library as the Toshiba model relies heavily both on technology and personnel who are more familiar with information management rather than just information retrieval; the Centre is also part of the corporate planning division rather than just another administrative function. However, given the long term vision of Japanese companies compared to their western counterparts it may be rather expensive initially to develop such a library; Mori (1994) does not indicate the cost or total number of personnel that work in the Centre but if there are six reference staff alone, it is likely that the size and investment in such a library is far greater than the libraries in this study.

8.3.2 EIS: The migration to a new technology

One of the reasons that EIS can retrieve information that would have previously been carried out by the corporate library, is the techniques that developers of such systems use to integrate other databases into the EIS. These can range from straightforward search and retrieve parameters that search on a number of key words at a specific time, to more complex intelligent agents that make use of the users previous retrievals to determine future information needs. However, although the EIS may be helping eradicate the role of the traditional library, these systems themselves are undergoing a change, and in some instances being eradicated. Furthermore, EIS have generally now ceased to be tagged 'Executive Information Systems' except in academic literature as by the mid 1990s the term EIS had become synonymous with technology for an elite few senior managers, despite the fact that many of these systems had percolated down to lower levels of the corporate hierarchy so much, that they soon became known as 'Everybody's Information System'. Companies began to question why they should pay for expensive information systems when they could get nearly the same capabilities from packages such as Excel and Powerbuilder. EIS vendors also realised that they could sell more systems if they were perceived to be no longer just for a few senior managers in the company; Pilot Software, for example, altered the name of their flagship EIS product to 'Enterprise Information System', while at the same time offering software designed to run on client/server systems and PCs, in addition to mainframe architecture. Business Intelligence Ltd, a company

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specialising in business information research and conferences, ceased marketing its annual conference as 'EIS 95, EIS 96' etc., and started prefacing the date with the title 'Business Intelligence' to reflect what they thought EIS had become (i.e., business intelligence tools rather than their company name)

It was noted in chapter seven that many of the EIS developers thought that their systems had not performed as well as expected; understandably the future of EIS varied considerably in the companies within this study. In general three options were thought likely by the EIS developers; these were, in rank order:

1. That EIS will die a natural death if they are not used more by senior management, or do not percolate further down the company hierarchy to other users.
2. An evolution of the EIS to systems such as Lotus Notes.
3. A relaunch of the EIS with more features and information.

It was also clear from interviewing the EIS developers that they thought, despite the non-use of EIS and their less than successful impact, it was unlikely the EIS in their companies would be axed. Two thirds said their systems would remain because the senior managers still wanted to say they had an EIS, or because too much money had already been invested in the system; company L is a good example of this 'logic' in that the EIS developer admits the system is rarely used or updated, yet the company still pays a considerable site licence fee every year for the 'use' of the software. This sometimes lacklustre regard of the EIS by their developers is mirrored by the users themselves, the senior management of the company. Nearly half of them (nine respondents) replied that they thought the EIS had not fulfilled its original specifications, with seven respondents stating that they had, while the remaining four could not say. As we have seen in chapter five, some of the blame for this disappointment can be laid squarely at the door of the users themselves, who often could or would not provide the time necessary for a thorough investigation of what they wanted of the system. However, some of the blame also lies with EIS developers who do not understand how senior managers operate, and vendors who hype systems to the point were they are seen as a panacea for everything. Senior managers, however, were in no doubt what

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was needed to ensure the future of the EIS; this included more users, better competitor information, more investment and greater flexibility. But the future of EIS is not assured, particularly as there are other information systems coming onto the market that have many of the features of EIS without the development expense.

As has already been mentioned, one of the options of a waning EIS is to substitute it with another similar information system so that EIS become just one of a number of decision-support related technologies at senior management's disposal, forming part of a much larger group of 'business intelligence' products such as SQL tools, OLAP, (On-line Analytical Processing), data-mining, and in particular intranets and groupware such as Lotus Notes. Although internal company Local Area Networks (LAN), have been in use for many years, it is the use of the technology derived from the World Wide Web (WWW), in particular the web browser and use of Hypertext Mark-up Language (HTML), that has caused many organisations to invest in intranets from about the mid 1990s. It is not known how many of the companies in this study now have corporate intranets as they did not exist when the respondents were interviewed in 1994; however, a search was recently conducted on the WWW in 1999 to determine how many had public web sites, as it was thought that this would give a good indication because many companies who have external public sites also have an internal corporate intranet. Only company S did not have a public site on the WWW although this of course does not preclude it having an intranet. As an information retrieval technology, intranets have some of the business benefits associated with EIS and some that are not, in particular, according to Fishenden, (1997) they can:

- Improve communications;
- Reduce geographical constraints and share information;
- Increase the easy access to information;
- Reduce the cost of doing business;
- Reduce the cost of IT as most of the software is cheap or even free;
- Increase the organisations' profile by a pubic interface to the intranet.

To many of the benefits cited by Fishenden (1997) might also be added several
others including; a far great ability to access different data formats with ease
through the use of many standard plug-ins like Real Network's music/video
player, and access to legacy data on mainframes with out the need for any
terminal emulation software. The web browser interface, such as Netscape
Navigator or Microsoft Explorer, already in use by many companies, is also fast
becoming the *de facto* standard used to access data. However, because the
software is easy to use and intranets are comparatively simple to develop, some
authors advise caution. Lynch (1997) for example, notes that more resources are
needed than for simply setting up a few web pages and that the impact of the
intranet must be considered.

> "This includes determining the capacity of the current network to support an
> intranet environment, and the cost of doing this. Decisions must also be
> made about the fate of existing legacy systems: should they be replaced, or
> can they all be integrated into a single interface? If they can, is this really
> necessary? Also, it will be necessary to provide sufficient desktop hardware
> to support the high-quality graphics and multimedia applications needed by
> intranet users" (Lynch, 1997)

The one area which intranets are, at the moment, inferior to EIS, is in their poor
ability to be reconfigured and display information according the preference of the
user. Although many EIS rely on predetermined templates for displaying
information, many different display type of the same format can be loaded from a
collection previously programmed by the EIS developer. This is often
accomplished by a single click of the mouse, as the macros which determine the
sequence of loading a format and type have already been constructed. Browser
software can display different formats like JPEG, GIF, TXT, etc., but they cannot
switch between different types of display quite so easily.

However, intranets also suffer from similar problems to those encumbered by EIS
when it comes to the issue of accessing and sharing information. Intranets can
threaten hierarchies of power just as much as EIS, perhaps even more so, as the
former can be accessed by almost anyone in the organisation, given the authority,
without the need for anything more sophisticated than a browser. Many
departments will naturally be wary of everyone else in the company having easy

assess to information they had previously controlled, and could resist the transition. The development of an intranet, therefore, has to be viewed in the context of company culture and politics. A recent report in *IT Week* (Charlesworth, 1999b) of a survey undertaken by Cranfield University into intranet use in British companies, found that at least two-thirds of company intranets are falling into disuse despite the many perceived benefits of such systems. It was also reported that the much-lauded notion that employees will start sharing company information as soon as the intranet is built, is wrong. The solution, according to the authors of the report, is to take control of the intranets away from finance departments who dominate their development, and involve users more and plan ahead. As the sponsors of the survey, Cap Gemeni, noted, *'The technology is the easy bit, the difficult bit is the culture'*. This is view echoed by Davenport (1997) who has reasoned that a more open culture in organisations increases both productivity and performance, and also is more liable to increase innovation. Yet most companies have taken few steps to change their employees attitudes to information, and none seem to have emphasised the human aspects of information use.

There appears to be a distinction between the roles of control between intranets found within the Cranfield survey and the EIS within this study: less than a quarter of the EIS were developed and administered from within the finance department, despite that fact that the vast majority of EIS have financial information at their core. If Cranfield's report is correct and many intranets have fallen into disuse, the developers of the system must take some of the blame for not having approached the project with enough preparation, just as some of the EIS in this study failed because there was a lack of planning in determining what the users wanted or expected of the system. There is no shortage of literature or expertise on the subject of building corporate intranets, from academic articles to advice found on the World Wide Web. To minimise this decline in use managers must clearly identify who is going to use the intranet, and assign some accountability throughout each phase of the project. In addition to the use of the intranet as an information access tool, more consideration must be given to what it can specifically be used for; for example, Sridhar (1998) envisages the intranet as

being a valuable support mechanism for decision support, a function that is presently provided in areas by DSS/EIS.

Besides the development of a corporate intranet to replace the EIS, another form of technology which could supplant EIS is so called groupware, particularly Lotus Notes, which was developed in 1988 and is now in its fifth release. Groupware can be used as either part of an EIS, for example as in company R, as a separate piece of software complimenting an EIS, or as an alternative to the EIS itself. Lotus Notes has proved immensely popular with companies because it is perceived as the ideal tool for sharing information, particularly in its use as an electronic bulletin board for the organisation. However, Notes is also a powerful piece of software which can provide many of the capabilities associated with EIS. These include:

- Text handling for supporting soft information.
- Presentation of graphical, tabular and textual information.
- External electronic news gathering from on-line databases such as Reuters.
- E-mail.
- Status and trend analysis through pre-determined templates.
- The extraction and tracking of critical information.

Notes also has some functions that EIS do not have, for example, the ability for several people to work on a single document at once; it is also considerably cheaper to purchase than an EIS. However, Notes has its limitations and there are some aspects of it that make EIS a superior choice. Halley and Watson (1996), for example, observe that the analysis and display capabilities of Notes are not advanced as those in a typical EIS, and neither is it as simple to access mainframe databases or construct applications that run on multiple platforms. However, according to Watson, O'Hara et al (1996) there is no doubt that Notes will make further inroads into the realm of EIS; two companies (M & R) are already using Notes in parallel with their EIS, while a total of nine companies in this study mentioned that Notes could well prove to be a product than undermined the continued existence of their EIS, mainly because of its cost and ease of

development. Watson, O'Hara *et al,* (1996) claim that several EIS vendors are already going beyond simply providing an interface to Notes, and are making it an integral part of their EIS software.

8.3.3 A new role for information services

We have already seen that some traditional corporate libraries have been effected by the development of information systems like EIS, but that these systems themselves could be replaced by the introduction of intranets and groupware. Although senior management may in the future be using intranets and other technology for their information needs, it is more than likely they would be less concerned with what type of systems they used, so long as they were fast and easy to use. However, unlike EIS, technology such as intranets and groupware can offer the corporate library new opportunities and a new role in the company, because they are less likely to concentrate on internal financial data and offer the organisation several ways to cut costs and share information. It has previously been noted that two of the libraries involved in this study are already using Notes; the library in company M uses Notes for library requests, while in company R it is used by the librarian to process and edit external information before it is sent to the EIS. The company which developed Notes, Lotus (now a subsidiary of IBM), used their own software to create a 'virtual library' in the organisation because, according to Bates and Allen (1994), they discovered that:

> "A valuable side benefit is the increased perception, within the organisation using Notes, of the value of information professionals in organising, managing, and disseminating information" (Bates & Allen, 1994)

Like company M, Lotus Corp also uses Notes for library requests and acquisitions. Users of the system can see if their book is available or has been ordered or even put in a request for the book to be purchased. However, unlike company M, the librarians also provide the expertise for developing internal company databases using Notes. Bates and Allen (1994) observe that because Notes has become more important for information acquisition and storage in companies, so too has the role of the corporate librarian:

"In some organisations, librarians have become 'information trustees', overseeing the establishment and maintenance of databases on Notes. They set standards for databases construction and documentation, ensure consistency among databases, and identify the person responsible for regularly updating the databases. They review all databases before they are made available to users, ensuring that the information is up-to-date and can be adequately managed by the participating organisation". (Bates & Allen, 1994)

However, the subject of whether Notes or intranets may supersede EIS may be academic in the long term as both these products are themselves starting to converge. Since IBM purchased Lotus Corp, it has been incorporating WWW capability into Notes in the belief that more and more software will become web-orientated; likewise, Netscape has acquired a groupware developer, Collabra, and now includes it with their Communicator browser suite.

The new roles of librarians observed by Bates and Allen (1994) above are also envisaged by Davenport (1997) who believes that the traditional skills of the librarian, such as cataloguing, will eventually be outsourced to external companies specialising in this sort of work. New staff skills will be required by the corporate librarian that revolve more around information and content issues of technology like intranets, therefore instead of having librarians and information officers dealing with book requests, indexing, etc., there will instead be 'information innovators, content editors, content directors, information producers and chief content officers'. The content of databases is certainly important, particularly with products that seek to involve the contribution and access from a large proportion of the organisation. For example, the IT department of Company P installed Notes in the belief that it would benefit from the input of its employees on issues that were of concern to the company, and that information could be easily shared and disseminated. Unfortunately, no one person or group was tasked with overseeing the content of the system, with the result that in less than a year it was inundated with irrelevant data, rumours, gossip and hearsay. This was not what the management of the company had envisaged when it commissioned the system and the project was later terminated. Although there is no easy way of filtering out non-relevant data, had some of the librarians in the organisation been

involved with the rollout and maintenance of Notes the outcome of the project may have been different. Like many information projects, too much focus was put on the IT aspect of the design rather than information content.

Intranets and groupware are often marketed as cost-saving technology, but this can only happen if serious consideration in the design meets the needs of users, and is constantly updated and amended. One of the benefits of this new technology is in the area of organisational publications, that is the vast array of paperwork that is usually produced by an company. Examples of published documentation that can now be sent via an intranet or Notes include corporate telephone directories, training manuals and personnel structure. Wen and Anandarajan (1998) have shown that is possible to save more than 80% on the publishing costs of such documentation, as once the IT has been purchased and training given to new employees, there is no added production costs such as printing and mailing. Amendments and updates can be done far easier and can be immediate; it is also more convenient for staff to move from one part of a document to another in intranet publications as they have the use of hypertext (the linking of related pieces of data).

Easier access to information however, does not necessarily mean that users will get better information. We have already seen that some of this new technology can be unsuccessful because of a lack of control over information content; intranets and groupware, like all information systems, depended heavily on the old adage 'garbage in, garbage out'. Even if the company intranet or groupware project has a reasonably balanced and pertinent content, retrieving the information one needs can still be frustrating, as anybody who has used the Internet can testify. Search engines and hypertext are certainly a very user-friendly method of retrieving information from databases, but Wolfram and Dimitroff (1998) have demonstrated that a Boolean-based approach, even for novice searchers, is by far the most productive for retrieving relevant documentation. Consequently, just because information retrieval has become easier through the introduction of intranets and groupware, it does not necessarily follow that information retrieval is better. Librarians, through their use of commercial on-line database, are trained in the application of more accurate search techniques like Boolean logic, so it is

possible that these skills will become even more in demand despite the appearance of more user-friendly search techniques and company staff undertaking their own on-line searches.

McMurdo (1998) and others believe that information professionals have a significant role to play in the actual design and maintenance of intranets and groupware projects, and the arrangements that must be carried out before such technology is implemented, for example, in the area of company information audits. An information audit is a systematic process in which an organisation implements to fully understand its information flows and needs, with the intention of producing an 'information map' of the whole company. Such a map can underlay the structure of the company intranet or serve as an template for the use of groupware. Because an information audit has to look at how people create, use and share information it relies heavily on combination of interviews, questionnaires and discussion groups. This is an area where the company library can help in drafting and conducting detailed questionnaires, chairing focus groups,etc., to build up the information audit. Librarian training now equips librarians and information professionals with a wide variety of information skills, many of which are not used in the company library; these can include determining information policy and strategy, user-interface design, information systems modelling and database design. Many of these skills are necessary to build up an accurate information audit, which in turn is essential for the successful management of intranets and groupware projects.

8.3.4 New labels for old: the concept of knowledge management

Many of the information systems discussed in this thesis – EIS, DSS, MIS, intranets and groupware, now seem to be grouped under a single heading of 'knowledge management'. The development of knowledge systems has taken place in the context of a new information environment which has come about because of the developments in business management theory and IT for managing IT, for example, SQL, data-mining, EIS/DSS/MIS, groupware, etc,. This new information culture also focuses on the 'learning or knowledge organisation'

which in turn is fixed on the information flows of the company and the 'knowledge' of its employees. However, there is a problem with many of the descriptions offered above; to begin with, there is no agreed accepted definition of what 'knowledge' actually is. The *Oxford English Dictionary* (1992) has sixteen separate definitions for the word (noun) 'knowledge' many of which could equally apply to the word 'information', so where does this leave the concept of knowledge management and knowledge management tools? Everyone has their own opinion of what constitutes a knowledge management system but there is no accepted definition of what they are.

However, knowledge management, rather than knowledge management tools, to many is just another label for the term information management; one only has to look at employment adverts to see that 'information managers' have given way to 'knowledge managers' and 'knowledge workers'. In fact, many of the concepts advocated in knowledge management can equally be bracketed into the area of conventional library and information management; that is, there is still the same underlying notion that it is the management of information by another name.

Knowledge management is also, according to Holtham (1990) and many other academics, just a management consultancy fad that, like all fads, are temporary and have a limited shelf life in which they are hyped beyond all common sense only for them to be dropped in favour of a new panacea several years later (Streatfeald & Wilson, 1999). Just as many products in the 1980s were touted by marketing departments as EIS or 'Business Intelligence' software, so to have vendors and management consultants sought to push knowledge management products onto organisations. For example, IBM now has a Institute of Knowledge Management and Rank Xerox is well known for having a knowledge management system in place for its field engineers. However, many of the knowledge management products are just old software repackaged with catchy new marketing clichés designed to attract marketing and IS departments. In fact, it could be argued that there are no such products as knowledge management applications. Even Lotus, the designer of one of the more successful 'knowledge management' tools, Lotus Notes, admits there is no such thing as a knowledge

management product (Charlesworth, 1999a) although it does address the notion of knowledge from three perspectives:

- Explicit knowledge which is prearranged in documents;
- Embedded knowledge which is the processes of the organisation;
- Tacit knowledge which is contained in people's head and which is determined by their interactions and observable by the judgements they make.

Given this definition of knowledge, it is apparent that the vast majority of it is going to be in the final category, in peoples' heads. If one accepts this definition then it is obviously going to be extremely difficult to organise and manage what is in heads of the organisation's employees. One only has to look at the development of expert systems to see the inherent problems in retrieving knowledge from a person, to make it both intelligible and in a form that can be structured for use in an information system. Unfortunately, with 90% of knowledge in an organisation being classed as tacit, and most explicit knowledge in organisational documents also unstructured information, this means successful knowledge management systems are difficult to develop. Zisman (1999) of IBM has identified five categories of technologies used in KM systems:

1. Business intelligence tools, for example, DSS/EIS, that identify hidden data relationships.
2. Collaboration systems, like Notes and Exchange, for the sharing of tacit knowledge.
3. Knowledge transfer and distance learning technologies like the Internet/Intranet.
4. Knowledge dissemination tools such as document management products.
5. 'Affinity Identification' systems that embody expertise. These are not expert systems but project management software which aims to capture and track an employees knowledge and expertise. Lotus is currently working on such a product called Expert Network which attempts to produce a sort of Yellow Pages of the organisation expertise.

Many of the above technologies, for example EIS and goupware and even 'Affinity Indentation' software, have existed for many years in one form or another; some are already in use by the company library for sharing information, setting up electronic libraries, etc., to solve business problems. It appears therefore that librarians, among others, have been doing many of the things that knowledge management involves for years, only it was not called knowledge management at the time.

Because most knowledge is in peoples heads it naturally follows that KM should be more about people than technology. For that reason, to ensure any knowledge management project is successful and that the maximum potential is made of the associated technology, it is first often necessary to change the internal culture of the organisational to make it more of an environment where people naturally share information. As we have seen from the preceding chapters in this study, many companies are perceived not to have an information management policy, much less a wish to alter their corporate culture. Streatfield and Wilson (1999) have argued that not only should librarians be considered information managers – every crucial member of staff in the organisational should reflect on the attitude that they to are also information managers:

> "The essence of knowledge awareness management is that all key staff should be treated as information managers, even if one of them assumes overall responsibility for the strategy. This does not disqualify the information professional from taking a key role in the organisational attempt at developing knowledge awareness strategies; nor does it assume any pre-defined role as proper for the informational professional" (Streatfield & Wilson,1999)

8.3.5 The advance of information management and the remodelling of the company library

Despite the increasing pressure on companies to maintain a competitive edge (Porter & Millar, 1985), it is only in the 1990s that the role of information management (or knowledge management) has acquired a higher profile in the

organisation. This is due to both the recognition of the value of information as a strategic asset and an increasing number of applications such as EIS, intranets, groupware and PDAs, that facilitate the management of information. The increasing importance of information management has meant that several companies have highlighted and applied this part of their strategy so successfully, to the extent that some have become examples for others to try and replicate. Some of the most cited include:

- Chase Manhattan Bank's CIX (Chase Information Exchange) system based on the integration of internal and external data, and the use of Notes, e-mail and search tools to produce a single information retrieval and dissemination application.
- McKinsey management consultancy's Rapid Response Network, which comprises both consultants and librarians, to produce information from previous projects and external sources for consultants engaged on new commissions.
- Bank of Montreal's NewsEDGE service which aims to provide 250 users with information access to news sources from around the world at any place or time.

Despite the higher profile of information management, nearly all of the libraries in this research project report that their budgets have declined over the years, with many of them also stating that their departments were under constant review. Accordingly, it would appear that the management of the companies in this study, for the moment at least, do not believe that their corporate libraries are instrumental in developing further the role of information management. This may be largely due, as has already been noted earlier on in this chapter, to their perception of what the library does, that is, it is a passive collector of largely historical information. This perception however, is also due in some part, to the attitude of the library in regards to promoting itself within the company; keeping a low profile is not always the best course of action if one is trying to stave off cutbacks in budgets and staff. To use a military metaphor, 'attack is sometimes the best form of defence', that is, it may be more prudent for librarians to become

far more proactive and show what the library can, given the chance, offer the organisation.

Some authors (Davenport, 1997; Streatfield & Wilson, 1999) have argued that information management is now beginning to follow a more holistic path, that is, the library should function as a part of the whole organisation, and in particular as part of an integrated key strategic initiative. Davenport (1997) terms this holistic approach as 'Information Ecology' where the emphasis is not on information technology, but on *how* people create, share and use information. However, to take advantage of information ecology Davenport also warns that it will involve new management frameworks, incentives, attitudes and a division of resources; in short, a paradigm shift and a complete restructuring of the organisation, including of course, the company library. Lancaster and Loescher (1994) also stresses the importance of the library becoming more integrated with the company's strategic plan by using their expertise in issues management; this is the tracking of the diffusion of ideas to recognise any potential threats or opportunities that the company may incur. Essentially, it is the exploitation and analysis of bibliographic on-line databases, a skill which most corporate librarians are unusually good at as they tend to spend far more time on-line that other types of librarians, for example, those employed by public libraries.

There is no shortage of ideas and views of how to restructure or re-engineer the corporate library; these vary, from ideas that revolve around promoting the library more in the company, for example, the 'Roving Librarian' program described by Commings (1997) in which the library is brought to the customer, by way of a roving library team demonstrating with laptops and lectures, what the library has to offer company staff who may not even be aware of the library's existence. A more radical view is that of Agada (1996) who believes, using Porter's (1985) value chain analysis, that corporate libraries can only survive by outsourcing the more routine transactional aspects of their work, specifically, the selection, processing and maintenance of library materials, and concentrating more on the diagnostic characteristics of their work such as information analysis. He also argues that librarians should be part of organisational cross-functional teams who constantly learn each other's skills to solve problems. This is an idea similar to

that put forward by Streatfield and Wilson (1999) who envisage librarians being part of a team located in the CEOs office, and Bauwen's (1993) 'cybrarian', all of whom cultivate close relationships with their clients.

A different vision is offered by Adams (1995) who proposes the 'Corporate Memory' concept whereby the corporate library collects and maintains all active and historical information that is worth sharing and preserving, which could include even intellectual property like ideas. This would seem however, to be taking on too much of a challenge for the library, given the inordinate amount of IT needed to capture and retrieve this information. Also no mention is made of how, and more importantly, *who* exactly decides *what* information is worth collecting and keeping. Managers are already suffering from information overload and more information means a longer decision process; sometimes it is necessary to heed the axiom 'less is more'.

Much of the remodelling of the company library will of course also rely on the adoption of new technology; we have already seen earlier on in this thesis that WWW and groupware technology is making great inroads into the management of information, even at the expense of expensive systems like EIS. Although much of this technology is adequate for storing structured information, lack of planning and poor management of them can lead to even worse information problems for the company than they had before their installation. Managing this blossoming information network in all its variances – internet, intranet and extranet, is an opportunity for the company library to make a substantial impact. Watson (1999) advocates that librarians, as the company's information professionals, must be at the very centre of this new technology to avoid intranet anarchy and chaos. This view is echoed by Knowles (1999) whose focus is more on librarians using the increasingly sophisticated underlying technology of intranet/information retrieval software, such as neural nets and genetic algorithms.

A great deal of the information collected by the company libraries in this study revolves around the company's competitors. Some of this information collection is also, as noted earlier, replicated by other departments in the company, most notably marketing departments, some of whom have their own libraries

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independent of the primary one. Even more esoteric titles have been given to departments which replicate a lot of the work of the corporate library; usually they are known as 'corporate intelligence'. Many companies do have departments that deal with gleaning 'intelligence', specifically information regarding their competitors, but they are usually part of marketing or corporate strategy departments and not the company library.

> "Typically the collection, interpretation, analysis and communication of competitor information has been assigned to specialised intra-organisational intelligence or competitor analysis units in order to exploit the synergy created by centralisation" (Pirttila, 1998)

As company libraries already capture computer information and systems such as DSS and EIS have accelerated the acceptance of the collection of information on competitors, some authors (Davenport &Prusak, 1993; Hohhof, 1994; Pirttlia, 1998.) are suggesting that the company library could benefit by offering skills that lie in the direction of corporate intelligence support. Not only does corporate intelligence now use some of the intranet and groupware software discussed in this study, for example, the automatic collection of news items when their competitors names is mentioned, but it also requires, according to Hohhof (1994), a shift in information culture and a complete company-wide information audit for it to be truly successful, a process the library could actively take part in. Although corporate intelligence relies heavily on the personal collection of information from primary sources and, like EIS, needs the support of senior managers, the authors conclude that the library's role may lie more in the realm of searching, summarising, analysis, synthesis, and interpretation.

However, only some of the above corporate intelligence skills, for example searching, are taught in library schools; to learn other skills such as analysis, therefore, would necessitate a modification of most forms of library training. In the opinion of some authors (Hohhof,1994; Piggot, 1995; Davenport,1997; Pirttlia, 1998.), the remodelling of the company library not only means changing the library's role to meet new challenges from technology and an increasingly competitive information environment, but also changing the way librarians are trained and perceived:

"Librarians have a tendency to want to be all things to all people, a tendency which dilutes the effect of mission-critical work. The corporate librarian needs to get rid of much of what he or she does, become expert in the tasks that are valued and expand those services that are really mission-critical. It is also imperative that library educators make the shift by adjusting the curriculum to meet this challenge. If we do not make the shift – at least in the corporate environment- we are likely to hear the statement 'Who really needs libraries these days? Hardly anyone'" (Piggot, 1995)

There is no doubt that librarians have an image problem, even the term 'library' still often brings forth the vision of libraries from the 1950s rather than the 21^{st} century. Although many library schools have altered their department titles to include the word 'information', and librarians often consider themselves 'information professionals', this still has not altered the perception of librarians or more importantly, the status of them, in the eyes of senior managers who run companies. Agada (1996) and Piggot (1995) both take the view that librarians need to be better educated, at least to the level of a second masters degree or of other professionals, such as lawyers and accountants, before they can be accepted and attain a similar status and salary. They believe only when librarians are perceived to be in the same mould as these other professions, will their work and occupation be viewed on as a professional endeavour rather than just a simple service.

8.4 Future research recommendations

The established research boundaries of this study were the corporate library, the company EIS and the future of business information services, however, some areas were omitted on purpose. First, although it is known that there are several popular methods of developing an EIS, for example, prototyping, there is no evidence that any one is better than another. There are also no formal structures to these methods; a EIS developer may use the critical success factor method (CSF) devised by Rockart (1979) but there are no guidelines exactly how this should be carried out. A developer could either spend one day or one month building up the CSF for an EIS (Fitzgerald, 1992). It is also unclear why some CSF, such as a

committed operating sponsor, are missing from successful EIS or why, given that all CSF are present, senior managers will still not use an EIS? Fisher (1995) believes that accountants are more likely to be enthusiastic users of EIS, however, there has been no research yet done on if the background of an EIS user is related to their resistance to the systems. More research also needs to be undertaken on both interface design and why, given that senior managers are supposed to rely more on external information than other groups, does this type of information account for such a small proportion of the total information available in most EIS?

Much of the literature sees each factor in the development of an EIS as an independent variable but could there be some interaction between them? For, example, is there a social context to developing such systems? Some systems in this study were developed by a specifically convened group composed of many different areas of personnel; IS staff, librarians, users, accountants, marketing staff, etc., whereas others were the result of the inclusion only of potential senior managers users and IS staff.

As strategic planing is now seen as a crucial factor for competitive advantage it remains to be seen if the EIS has any affect on its success, in the various stages of environmental scanning that senior mangers undertake to stay ahead of the competition. Many of the systems in this study were not used for strategic planning despite being initially developed for that exact purpose; this also brings us back to the question of why external information is viewed less favourably by senior managers if it is in electronic form (Watson , 1990; Flolrick *et al*, 1997).

Based on the findings of this study it is clear that a clear majority of company libraries are viewed as unnecessary in the development of EIS, despite the fact that they are a department that specialises in information. Much of this indifference shown by the EIS developers was in part due to their perception that the corporate library was old fashioned and a collector of mainly historical information. Not only do librarians need to change this perception quickly, they also need to show senior managers that they are an important strategic asset to the company, by promoting themselves and their department. Too many of the librarians in this study were anxiously wondering when the axe would next fall on

their department. Research needs to be done on why, at the beginning of the 21st Century, the perception most people have of librarians is still that of a person who issues books, and why they have such a low status compared to an accountant or lawyer despite generally spending more time at university than either (Davenport, 1997).

This study has shown that EIS have had little impact on the corporate library and that most librarians do not regard them as a threat. The same cannot yet be said of intranets or groupware; investigation is necessary to evaluate the impact and influence this technology may have on the corporate library. Intranet technology is far more accessible and easy to use than EIS but it is more likely to grow to be an unstructured mass of largely irrelevant information if not managed properly. This is a possible role for librarians envisaged by some authors.

> "When all the pieces are in place [of the intranet], the trained information professional's main value will be in selecting, evaluating, and acquiring information required to do business and providing the training necessary to access and filter the information to achieve precision retrieval in a fast, accurate, and effective manner" (Piggot, 1995)

The development of intranets and groupware could herald a new organisational role for the company library. It is therefore necessary to determine where the skills of the information professional are best suited in this new technological arena.

APPENDIX A: FACTS AND FIGURES ON LIBRARIES AND EIS

Company: A

Company business: Gas and oil exploration.

Library title : Library, central, with one satellite library

Establishment date: 1980

Main stock: Oil and gas technical/business data, British standards, government publications and general reference works

Budget: £24,000

No of staff: 1, reduction from 2

Library reports to: Head of administration

Title of interview subject: Librarian

EIS: In house developed system using VB, formally EIS Track

Inception date: 1996

No of users: 20

Sponsor: IT director

Capability: Text/graphics

Administration: IT department

External data content: 10%

Title of interview subject: Technical support supervisor

EIS user title: Group computer services manager.

Company: C

Company business: Gas and oil exploration, retail sales.

Library title: Library, Central, with three satellite libraries

Establishment date: 1986

Main stock: Oil and gas technical/business data, general reference works., engineering, competitor data

Budget: £150,000

No of staff: 8, reduction from 11 in 1993

Library reports to: Company secretary's office

Title of interview subject: Head Librarian

EIS: Two major systems. Main board (MB) – EIS Track. Divisional (DIV). Holos

Inception date: MB – 1990, DIV - 1988

No of users: MB – 15, DIV - 40

Sponsor: MB – Chairman, DIV – MD of division

Capability: MB – Multimedia, DIV -Text/graphics

Administration: IT department for both

External data content: MB – 70%, DIV - 20%

Title of interview subject: Management information managers for both.

EIS user title: MB – Controller of chairman's office. DIV – Head of management information.

Company: E

Company business: Provision of goods and services for imaging applications.

Library title: Business information centre (BIC) and research library (RES)

Establishment date: BIC – 1993, RES 1920s

Main stock: BIC - business information, management, and technical reports. RES - photography, engineering and chemicals

Budget: BIC - £50-60,000, RES - £125,000

No of staff: BIC – 3, RES – 3, decline from 13 in 1993.

Library reports to: BIC – Communications and public affairs. RES – Head of research division

Title of interview subject: BIC – Business research librarian, RES – Information librarian

EIS: Comshare Commander

Inception date: 1990

No of users: 50

Sponsor: CEO

Capability: Text/graphics

Administration: Finance department

External data content: 0%

Title of interview subject: Business financial services manager

EIS user title: manager of business reporting services.

Company: F

Company business: Retailing and drug manufacture.

Library title: Research library

Establishment date: 1992

Main stock: pharmaceuticals, administration and management

Budget: £800,000

No of staff: 21, decline from 24 in 1992.

Library reports to: head of regulating services

Title of interview subject: Head research librarian

EIS: Comshare Commander

Inception date: 1988

No of users: 48

Sponsor: CEO

Capability: Text/graphics

Administration: Finance department

External data content: 10%

Title of interview subject: Controller of group financial systems

EIS user title: Director of investor relations

Company: G

Company business: Computer and information systems manufacture

Library title: Business Intelligence, central, with one satellite

Establishment date: 1992

Main stock: business, marketing and IT, government standards

Budget: £90,000

No of staff: 1, decline 4 in 1993.

Library reports to: financial and business services

Title of interview subject: Business intelligence officer

EIS: Comshare Commander

Inception date: 1988/9

No of users: 13

Sponsor: Divisional MD

Capability: Text/graphics

Administration: IT department

External data content: 0%

Title of interview subject: Divisional systems manager

EIS user title: Director customer services division

Company: H

Company business: Chemicals, paints, explosives

Library title: Information services, central HQ , numerous satellites

Establishment date: 1920s

Main stock: business, marketing and IT, competitor data

Budget: £480,000

No of staff: 14 decline from 20 in 1993.

Library reports to: HQ Services manager

Title of interview subject: manager information services

EIS: Pilot Command Centre

Inception date: 1985

No of users: 60

Sponsor: CEO

Capability: Text/graphics

Administration: IT department

External data content: 75%

Title of interview subject: Head of HQ IT

EIS user title: Group Planning manager

Company: I

Company business: Information media, printers, imaging

Library title: Information services, central, several satellites

Establishment date: 1972

Main stock: business, engineering, computing, IT

Budget: £45,000

No of staff: 2.5, decline from 18 in 1980.

Library reports to: Business management and strategy.

Title of interview subject: Librarian

EIS: Cognos Powerplay

Inception date: 1990

No of users: 60

Sponsor: Divisional MD

Capability: Text/graphics

Administration: Information Centre and individual sponsor

External data content: 0%

Title of interview subject: Information centre manager

EIS user title: Regional marketing manager

Company: J

Company business: Energy production

Library title: Information centre, central,

Establishment date: 1993

Main stock: business, technical

Budget: £220,000

No of staff: 7, decline from 17 in 1980.

Library reports to: Personnel.

Title of interview subject: Librarian

EIS: Cognos Powerplay

Inception date: 1990

No of users: 60

Sponsor: Divisional MD

Capability: Text/graphics

Administration: Information Centre and individual sponsor

External data content: 0%

Title of interview subject: Information centre manager

EIS user title: Regional marketing manager

Company: L

Company business: Publishing, distribution, retailing,

Library title: Library, central, one satellite

Establishment date: 1970

Main stock: Marketing, management, publishing, music

Budget: £100,000

No of staff: 4, increase from 3 in 1992.

Library reports to: Group business planning and strategy

Title of interview subject: Information librarian

EIS: Pilot Command Centre

Inception date: 1988

No of users: 8

Sponsor: Group financial controller

Capability: Text/graphics

Administration: Finance department

External data content: 0%

Title of interview subject: Groups finance manager

EIS user title: Group finance manager

Company: M

Company business: Management consultancy

Library title: Information resource centre

Establishment date: 1986

Main stock: management, business, IT

Budget: £100,000

No of staff: 4, increase from 2 in 1990

Library reports to: Research and strategy

Title of interview subject: Head of library services

EIS: Comshare Commander

Inception date: n/k

No of users: n/k

Sponsor: n/k

Capability: n/k

Administration: n/k

External data content: n/k

Title of interview subject: n/a

EIS user title: n/a

Company: N

Company business: Software & hardware development

Library title: Library, central,

Establishment date: 1970

Main stock: IT, networking, communications, reference

Budget: £150,000

No of staff: 4, decrease from 13 in 1990.

Library reports to: Networking systems development

Title of interview subject: Library manager

EIS: In-house developed systems

Inception date: 1993

No of users: 300

Sponsor: Senior manager, IT

Capability: Text/graphics

Administration: IT

External data content: 10%

Title of interview subject: EIS Development manager

EIS user title: Software development operations manger

Company: O

Company business: Banking & finance

Library title: Economics library, central, one satellite

Establishment date: 1974

Main stock: Economics, banking, finance

Budget: £1 Million

No of staff: 8, increase from 5 in 1990.

Library reports to: Group business planning and strategy

Title of interview subject: Information manager

EIS: 2 systems. Financial department (FIN) and IT services division (ITS)

Inception date: FIN – 1991 (deactivated in 1994), ITS - 1992

No of users: FIN – 35, ITS - 10

Sponsor: FIN – Director of overseas operations, ITS – MD of IT division

Capability: Text/graphics (both)

Administration: FIN –Finance department, ITS – Network services.

External data content: FIN – 20%, FIN – 10%

Title of interview subject: FIN - EIS Project manager, ITS – Systems development manager

EIS user title: ITS – Assistant to the director of global services

Company: P

Company business: Oil and lubricants, chemicals

Library title: Library, central, one satellite

Establishment date: 1975

Main stock: Lubricants, chemicals, transportation, business

Budget: £250,000

No of staff: 4, increase from 3 in 1980.

Library reports to: Public/corporate affairs

Title of interview subject: Librarian

EIS: Metapraxis Resolve 2000

Inception date: 1987

No of users: 40

Sponsor: Divisional financial director

Capability: graphics/tables – no text

Administration: Finance department

External data content: 0%

Title of interview subject: Systems accounts manager

EIS user title: Financial controller, Asia.

Company: R

Company business: Foods, detergents, personal products, chemicals

Library title: Information Services, HQ central, three satellites

Establishment date: 1945

Main stock: Management, food products, business.

Budget: £260,000

No of staff: 1 decline from 5 in 1991.

Library reports to: Corporate Strategy.

Title of interview subject: Information Services Manager.

EIS: Pilot: Command Centre

Inception date: 1992

No of users: 30-40

Sponsor: Director of personal products division (PPD)

Capability: Text/graphics

Administration: IT

External data content: 20%

Title of interview subject: EIS manager

EIS user title: Information manager, personal products division.

Company: S

Company business: Investment management

Library title: Library, central, one satellite

Establishment date: 1970

Main stock: Financial, Corporate profiles

Budget: All costs paid for by departments who use it

No of staff: 1.5, decrease from 2 in 1992

Library reports to: UK Institutions groups

Title of interview subject: librarian

EIS: Metapraxis Empower

Inception date: 1994

No of users: 3

Sponsor: CEO

Capability: Text/graphics

Administration: Quality information department

External data content: 0%

Title of interview subject: Quality information manager

EIS user title: CEO

Company: T

Company business: Airline management, freight, holidays

Library title: Economics library, central, 3 satellites

Establishment date: 1926

Main stock: Economics, airlines, travel, business

Budget: £20,000

No of staff: 1 static since 1985

Library reports to: Corporate strategy

Title of interview subject: Head of Library

EIS: Pilot Lightship

Inception date: 1992

No of users: 70

Sponsor: Information management group

Capability: Text/graphics

Administration: Information management group

External data content: 20%

Title of interview subject: Manager, operational performance

EIS user title: Personnel director, global communications division

Company: U

Company business: Munitions

Library title: Documentation service, central

Establishment date: 1956

Main stock: Internal company documents and plans, technical, business

Budget: £170,000

No of staff: 1, decline from 12 since 1985

Library reports to: Administration

Title of interview subject: Head of documentation

EIS: EIS Track

Inception date: 1992

No of users: 9

Sponsor: Operations director

Capability: Multimedia

Administration: IT

External data content: 5%

Title of interview subject: Systems manager

EIS user title: Site manager

Company: X

Company business: Telecommunications, IT

Library title: Information resource centre, central, 3 satellites

Establishment date: 1977

Main stock: Telecommunications, business

Budget: £1.8 Million

No of staff: 9, decline from 17 since 1984

Library reports to: Products and service management division

Title of interview subject: Information resource centre manager

EIS: Pilot Command Centre Plus

Inception date: 1991

No of users: 10

Sponsor: Divisional MD

Capability: Multimedia

Administration: Special projects officer, Buildings/Administration

External data content: 20%

Title of interview subject: EIS project manager

EIS user title: Personnel director, global communications division

Company: Y

Company business: Water utilities, environmental management

Library title: Library, central, 1 satellite

Establishment date: 1970s

Main stock: Business, water industry, computing, science

Budget: £50,000

No of staff: 3, decline from 5 since 1990

Library reports to: Management services

Title of interview subject: Library manager

EIS: Command Centre

Inception date: 1991

No of users: 40

Sponsor: CEO

Capability: Text and graphics

Administration: Management services division

External data content: 15%

Title of interview subject: Project leader, business information section

EIS user title: CEO

Company: Z

Company business: Energy generation

Library title: Library and Information centre, central, and 1 satellite

Establishment date: 1974

Main stock: Energy, management, business

Budget: £30,000

No of staff: 11, decline from 15 since 1992

Library reports to: Administration

Title of interview subject: Information resource officer

EIS: Pilot Command Centre

Inception date: 1991

No of users: 60

Sponsor: Chairman

Capability: Text/graphics

Administration: IT

External data content: 10%

Title of interview subject: Systems payment manager

EIS user title: Station manager

APPENDIX B: Letters to research participants

(EIS Vendors)

1st May, 1993

Mr I. Hype,
Marketing Director,
Megalopolis Corp Inc
22 Threadneedle Street
The City
London EC2 7TR

Dear Mr Hype,

CORPORATE USE OF EIS IN GREAT BRITAIN

I am currently engaged upon a research project examining the corporate use of EIS in Great
Britain. I am therefore writing to you to ask if you would be willing to see me, so I can
benefit from your opinion and knowledge regarding corporate EIS users in Great Britain.

This area of study is being conducted by me as a Ph.D research student under the supervision
of Professor Tom Wilson and Dr David Ellis at Sheffield University's Department of
Information Studies.

I am particularly interested in how you view the current and future state of use by senior
managers of EIS, and I would envisage that no more than ½ - 1 hour or so of your time will
be taken up.

I shall contact you again in the next few weeks to see if you would be willing to talk to me. It
would then also be possible for me to answer any questions you may have about my research
project.

Yours sincerely,

Neil McClemens.

(Librarians)

Mr N. Atoz
Library and Information Services,
Cyberdyne Ltd,
Turing House,
Eaton Square,
London SW1.

Dear Mr Atoz,

I am currently engaged upon research that is examining the role of library/information centres
in British companies which have Executive Information Systems. I am therefore writing to
you to ask if you would be willing to see me, so I can benefit from your opinion and
knowledge regarding the administration and use of the library/information service within
Cyberdyne Ltd.

Should you be inclined to assist me with my research I envisage that no more than 45 minutes
to an hour of your time will be taken up, and that our discussion will naturally be treated in
the strictest confidence. The research will eventually be written up and in return for your co-
operation I would be willing to send you a copy of results should you be interested in reading
them.

I shall contact you again in the next few days to see if you would be willing to talk to me. It
would then also be possible for me to answer any questions you may have about my research.

Yours sincerely,

Neil McClemens.

(EIS Developers)

Mr. I. Format,
Systems Manager,
Cyberdyne Ltd,
Turing House,
Belgravia,
London SW1.

Dear Mr Format,

I am currently engaged upon research that is examining the role of information centres/information systems in British companies that also have Executive Information Systems. I am therefore writing to you to ask if you would be willing to see me, so I can benefit from your opinion and knowledge regarding the administration and use of the EIS within Cyberdyne Ltd.

I have already had some very informative meetings with both Atoz of the library and information centre at corporate headquarters and Alan Turing Pilot Executive Software. The case study data sheet on Cyberdyne Ltd I obtained from Pilot suggested you would be the most appropriate person to contact regarding a discussion of the EIS.

Should you be inclined to assist me with my research I envisage that no more than 45 minutes of your time will be taken up, and that our discussion will naturally be treated in the strictest confidence. The research will eventually be written up and in return for your co-operation I would be willing to send you a copy of the results that may be of interest to you and your company.

I shall contact you again in the next few days to see if you would be willing to talk to me. It would then also be possible for me to answer any questions you may have about my research.

Yours sincerely,

Neil McClemens.

(EIS users - senior managers)

Mr C.Hief,
Managing Director,
Cyberdyne Ltd,
Eaton Square,
London SW1

Dear Mr Hief,

I am currently engaged upon some research into the impact of Executive Information Systems in British Companies. I am therefore writing to you in the hope that you can to spare some time to see me so I may benefit from your knowledge and experience as a user of the Executive Information System (Commander) at Cyberdyne Ltd. As part of this case study I have already spoken to several people involved with the EIS and other information systems at Cyberdyne Ltd including: Mr I.Hype at Comshare and Mr Format of Information Systems. To complete this company case study (which is one of twenty I am studying), I feel that the contribution of a senior manager is very important to gaining an overall perspective of exactly what has been the impact of the EIS, both on the company as a whole and other information systems at Cyberdyne Ltd.

Any information you care to relate to me will of course be treated in the strictest confidence with your company remaining anonymous if you so wish. I might also add that I hope my research may prove to be of some benefit to the companies who have kindly co-operated with me in my endeavour. Some of the companies that have already undertaken to help me with my research include: Turing Machines Ltd, Newtonian Mechanics PLC, Faraday Motors PLC and Von Neuman Information Systems PLC.

Should you be inclined to assist me with my research I envisage that no more than thirty to forty minutes of your time will be taken up at a time that is convenient to you. I shall contact you again in a few weeks to ascertain your response or alternatively you may wish to write to me to give me your answer. I realise that you are an extremely busy man, however, I hope you can find some time in your schedule to assist me with my thesis and to complete my study of Cyberdyne Ltd.

Yours sincerely,

Neil McClemens

APPENDIX C

QUESTIONS FOR RESEARCH PARTICPANTS

EIS VENDORS

Explain format of the questions: *I'm going to ask you several questions that should take no more than about 40 mins depending on how comprehensive your response is. They are designed to give me some idea of how the developers of EIS view , amongst other things, the attributes, use, and design of the system from both the designers and users perspective. I might also add that your opinions will remain anonymous if you so wish.*

If the company has sent some information on their systems then explain: *part of the answers to my questions may be covered in the literature I received but I would appreciate it if you could expand and clarify some of them. I also have to ask the same questions of everybody to ensure the accuracy of the exercise irrespective of what information I have read.*

Q.1 I would like to begin by asking you if you could give me the main reasons your customers give you for their purchase of an EIS, and what in your opinion are the prime characteristics of an EIS which attract such a purchase?

Probes: no access to right information, too much data, directors who want IT, growing use, USA/Europe, easy connections, interface, ability to modify system, real time data possible

Q.2 When a customer has decided to purchase an EIS what are the main criteria that are considered regarding the installation of the system?

Probes: External IT links, prime data sources, site of system, admin and maintenance, backup, remote sites at home, number of users/terminals, time of installation and prototyping, fine tuning, problems and delays. Security.

Q.3 Judging by the number of past installations of EIS can you tell me what in general is the type of data accessed that the customer regards as vital, and how much data has an external source?

Probes:Qualitative and Quantitative, edited data, data withheld, bottlenecks, accounts, Reuters dow jones.

Q.4 Given that you have successfully installed an EIS can you give me some indication of what is involved in upgrading the system, and what further developments in EIS you envisage in the near future?

Probes: upgraded every time new application, expense, user demands downtime, new features, more power/faster, added users to same system, voice recognition, multimedia, wireless remote connections, AI, growing as fast as possible

Q.5 Can you try and give some idea of what Senior Managers (SM) expect from an EIS once they are familiar with it, and has their use of it do you think altered their behaviour in any way?

Probes: expectations increase, new technology, lack of use/strategy to increase, increasing reliance, too much reliance on accuracy, quicker decisions and less consultations with others, misinterpretation of data, greater awareness of company information management, use by middle managers

Q.6 I would like to conclude by firstly asking you if you know of any significant new application of an EIS, and secondly, if you could direct me to some reference sites which you consider as prime examples of a successful EIS and who may be willing to participate in the research I am undertaking?

Probes: current research, future research

Thank you for your time. Are there any questions you would like to ask me or is there anything you think I should have touched upon which I didn't. Does he want his views to remain anonymous?

Mention reference sites again if not brought up and possible personnel to contact and the possibility of sharing my research findings with him. Would he mind if I used his name or is there somebody else at the company I could speak to who would know the company contact.

THE LIBRARY/INFORMATION CENTRE

Part1. The LIC and Senior Management

Q1. I would like to begin by asking you how the LIC meets the information needs of SM in the company by detailing what services you are able to offer them. By information I mean textual data, graphs, tables, maps, photos, video, etc.

PROBES: what facilities are there - in LIC and for SM, Journals, CD -ROM, SDI AND Scanning, how much internal info is collected, how info delivered- is it edited?, reactive or proactive to these needs of SM and in general, is LIC well know within the company, policy of LIC use (charge other dept's?).

Q2. Can you give me some idea of the procedures involved when a SM makes a request for some information from the LIC and an example of what sort of information this can be?

PROBES: how info asked for , what do they ask for/priority for SM?- internal info only, do SM express their needs effectively, types of managers- any heavy users , No of info requests (increasing? why).

Q3. Excluding the purchase of books and journals, do you ever have to go outside the organisation (inc on-line dB) to seek information that is requested by SM as opposed to collecting information internally?

PROBES: why info demand, what sources used: OLDB, contract bureaux, external libraries, reciprocal arrangements with other LICs,what sort of info derived external sources, printed v electronic, any info that is hard to collect externally?

Q4. Could you try and describe to me firstly the company's information management policy if it has one and, secondly, think of any situation when you have ever had any difficulties in obtaining information from within the company?

PROBES: info flow within the org and info exchange, informal network and corp culture,barriers to info flow, duplication of info collection, any contradictions of info occurred and why?

Q5. Can you tell me what you know about Management Information Systems/EIS and if there are any that you are aware of within the company?
PROBES: LIC knowledge of MIS/EIS/ESS , their operation, how, where ? Does company possess an EIS - what is known as, where is it based, who uses it.

IF INTERVIEWEE UNAWARE OF PRESENCE OF EIS IN THEIR COMPANY THEN ASK THE FOLLOWING QUESTION AFTER GIVING DEFINITION OF AN EIS:

An EIS is a set of tools designed to provide executives and managers with accurate, timely information about their organisation and products. An EIS organises data into categories and reports. Because its primary focus is information, an EIS differs from a decision support system (DSS), which is primarily designed to help with analysis and decision making. The interface of an EIS permits a very intuitive and easy access to information primarily through the use of a mouse or touch screen.

Q5a Firstly given this definition of an EIS, do you think an EIS could be useful to a SM and if so how, and secondly do you think such a system would have any bearing on the company library?

Part 2. The LIC and EIS (Librarians who know of EIS only)

Q6. Setting aside the present operation of the EIS, was the LIC consulted in any way with the development and installation of the system?

PROBES: LIC input on info needs of SM, info searching, etc why LIC was consulted and at what stage or why not, what help was the LIC or how could the LIC have been of help?

Q7. Could you tell me firstly if you are aware of what sort of information the EIS can access and secondly, are there currently any operational links or liaison between the LIC and the EIS?

PROBES: internal and external information for the EIS: does LIC play any role in supplying such info (ie: SDI), LIC info skills taught? any duplication of info sources, how regular is LIC input if there is one.

Q8. Do you think that the emergence of a corporate EIS has affected both the flow and management of information to and from the LIC in any way?

PROBES: Specific EIS effects if any (ie: alteration/editing of information/busier LIC), any uncertainties within EIS, LIC perception of EIS as efficient information retrieval software, security of information, any increased demand of services, has the LIC ever provided critical info?, how good is feedback to LIC?

Q9. Using your knowledge on the information needs of SM and the functions of Silcion (name the company EIS), could you tell me if you think system has proved to be of benefit to SM and if so, how?

PROBES: Do SM now have new perception of information management? more aware of the information world that is the remit of the LIC, hindsight and the LIC, are SM using the EIS to its best advantage.

Q10. Do you think that the introduction of an EIS has provided any new opportunities for the LIC or will the technology of such systems prove to be a threat in any way to the continued existence of the company LIC?

PROBES: what new opportunities/any weaknesses in the EIS? - need for special skills of LIC versus increasing sophistication of EIS ie: AI, Voice interface. Greater demand for more information by company and gov/reg bodies? Will role of LIC significantly change.

1. Thank the interviewee
2. Ask if he/she has any questions or if they thought the interview should have covered an item which was missing
3. Ask the interviewee if they know of any one involved in EIS admin who may be willing to discuss the EIS.
4. Show them card on information politics
5.Collect any documentation on the LIC

EIS ADMINISTRATORS

Part 1. The EIS and the LIC/Information Systems

Q1. I would like to begin by asking you if you could give me a brief outline of how the system (insert name if known) was developed and installed and tell me what role, if any, the LIC played in this phase of the project?

PROBES: Who involved in stages of development and installation, date EIS became live, reasons for the need of such a system, how was LIC involved ie. research into EIS and dBs, searching, etc, site of EIS admin, if no LIC involvement why not?

Q2. Could you tell me what are the core modules of the system and if they, or even the complete system, have changed to any extent over the period since installation?

PROBES: main features/modules of system ie. accounts, press, sales, etc. What features have changed over time and why. How many users of the system - declining/increasing?

Q3. Can you tell me firstly what are the main sources of information that the system examines and what type of information a user can access and display, and secondly, is the LIC involved in any way with identifying and retrieving this information for the system?

PROBES: main internal and external sources:internal info systems (accounts, legal, LCI) and external systems - what are main ones,what type of info can be displayed ie: text, graphics, pictures, video, sound ?how are they accessed and why and also by whom? benefits of these sources, is origin of information shown, any LIC role in routing of information ie. SDI?

Q4. Do you have any regular occurrences whereby you find it difficult to obtain information and do you find that particular categories of information are difficult to assimilate in to the system?

PROBES: info flow in org, flow of info from other systems - any computability problems, gatekeepers, hostility towards the system. Qualitative info, gossip or unverified info, competitor.

Q5. Given that the work of the LIC primarily revolves around the storage, searching, and dissemination of information, are there any aspects of the LICs knowledge and training that are of particular value at present to the operation of the EIS, or which could be in the future?

PROBES: aside from id and retrieving info what other work does LIC do ie. training in search techniques, analysis, info management, SDI, research, work in the future with new IT - less or more for the LIC?, what are these EIS links to LIC?

Part 2. The EIS and Senior Management

Q6. To what extent and in what capacity were the intended users (SM) of the system consulted during the research and implementation of the EIS?

PROBES: What were SM asked and what did they request re the EIS, what technical aspects of the system were considered the most important ie. user interface, speed, integration, information access?, were all the wishes of the SM implemented?

Q7. We have already discussed what forms and types of information the EIS can access. I would now like to ask you firstly is there any category of information that is regarded as essential by most SM and secondly, do you think the information requirements of SM have altered in any respect since the system was introduced?

PROBES: what info essential and why is it, has the nature of info used by SM changed - do they prefer to see info presented in a different way (versus orally, written, etc), has origin of vital info altered? are normal info systems used as much?

Q8. You have already explained the key features and modules of the EIS. I would now like to know firstly, if there are any features of the EIS that are regarded as a particularly significant application of the system by the SM of the company and, secondly, have there been any requests for improvements or new and innovative applications of the system since it came on-line?

PROBES: what are key features most in demand - drill down, warnings, tracking, e-mail, quick changes, various modules such as sales, accounts, external info, links to other internal info systems, etc. Is there a wish list from SM, new applications - AI, Video conferencing, new data bases, etc. How good is present feedback from users.

Q9. I would finally like to ask you if you could give me some idea of what you think has been the impact of the system on firstly the SM who use it and also the company as a whole. And secondly, has the system performed as well as had been anticipated in the beginning and what are your thoughts on the future of the system?

PROBES: impact via increased awareness of SM, do they now want more info, increased reliance, quicker decisions. Company: cost effective, would it be sacrificed, more access to right info, what areas/managers been most affected by the system, percolation down through the company.

1. Thank the interviewee
2. Ask if he/she has any questions or if they thought the interview should have covered an item which was missing
3. Ask the interviewee if they know of any senior manager who may be willing to discuss their use of the EIS.
4. Show them card on information politics
5. Collect any documentation on the EIS

SENIOR MANAGERS AND USERS OF EIS

Q1. I would like to begin by firstly asking you why and when the company decided it need an EIS and secondly if you could briefly outline some of the technical attributes of the system you find particularly useful?

PROBES: too little info, wrong info, need to answer questions, more analysis, were other IS inadequate in any way, when was EIS introduced, who suggested it, how involved were SM and were all their wishes implemented, how flexible is EIS, what is the most important ability (trend analysis, exception reporting, drill down, external links, etc), storage of qualitative info.

Q2. It is often said that the information needs of senior mangers differ from those of other managers. Can you tell me if you agree with this and then explain why this is so and what sort of information you require for the day-to-day running of the company?

PROBES: What sort of info do SM need, where does it come from;other IS sources, the LIC , any critical info reached you from the LIC, (do you know what sort of info the LIC holds?), written, verbal, have you a preferred mode or receiving info, the paperless office?(feasible or even desirable), any particular info need that is difficult to meet (from within and outside the company), does the company have IM policy both for SM and the company.

Q3. Could you give me some idea of when and how you use the EIS and what sort of information it can retrieve for you?

PROBES: when does SM use an EIS- to confirm info, to elicit info, to question, to gain insight into a problem, do you do any constructive searching or just explore the info, how much external info do you use, accounts, strategic V operational info, ever use it to confirm info from other sources.

Q4. To the best of your knowledge has your use of the EIS changed in any aspect the way you use information?

PROBES: has it changed the way you make decision (quicker or more deeper), how do you use it differently, do you consult people more or less, how reliant are you on the EIS (too reliant?), do you use other IS sources more or less, has it made you aware of how information can be used or , does info reach you in a different structure than it did in previous systems (graphs/tables), any info altered its value since appearing via the EIS (time?), has EIS given you a preference for how info presented.

Q5. I would finally like to finish by firstly asking you if could try and give me some idea of what you think the impact has been of the EIS on your company and, secondly, tell me what further developments you would like to see of these systems in the near future?

PROBES: What would you describe as the core benefits of the EIS, given you any new insights into how the company should operate, any new opportunities for the company

discovered, has the EIS changed the nature of the management structure in the company, do you think it gives you a competitive advantage - how. has use of EIS percolated down the management hierarchy, How far has it eclipsed other IS systems, Is the EIS continually changing -how, has it fulfilled its original expectations- any weaknesses apparent/any surpassed, how would you like to see EIS progress in the future - voice, AI, Multimedia, etc. Could you run the company as efficiently and as efficiently without the EIS?

1. Thank the interviewee
2. Ask if he/she has any questions or if they thought the interview should have covered an item which was missing
3. Show them card on information politics

APPENDIX D

Interview Schedule

COMPANY	LIBRARIAN	EIS DEVELP	SENIOR MAN
A	January, 94	January, 94	January, 94
C (Div EIS)	January, 94	February, 94	July, 94
C (Board EIS)		March, 94	March, 94
E (Resear lib)	February, 94	April, 94	May,94
E (Bus lib)	May, 94		
F	February, 94	June, 94	July, 94
G	February, 94	June, 94	July, 94
H	February, 94	April, 94	August, 94
I	February, 94	March, 94	August, 94
J	January, 94	February, 94	April, 94
L	February, 94	August, 94	August, 94
M	June, 94	Refused	N/a
N	February, 94	February, 94	May, 94
O (Axed EIS)	February, 94	April, 94	May, 94
O (Div EIS)		March, 94	
P	March, 94	March, 94	April, 94
R	March, 94	March, 94	July, 94
S	April, 94	April, 94	September, 94
T	May, 94	May, 94	July, 94
U	February, 94	February, 94	April, 94
X	February, 94	March, 94	November, 94
Y	February, 94	March, 94	April, 94
Z	February, 94	March, 94	April, 94

EIS Vendors:

1. Cognos   June, 93
2. Comshare   April, 93
3. Dun & Bradstreet   May, 93
4. European Software Publishing   April, 93
5. Holistic Systems   April, 93
6. Intelligent Office Systems   June, 93
7. Metapraxis   May, 93
8. Pilot Executive Software   April, 93
9. Planning Sciences   April, 93

Appendix E. Library provision of information to senior managers

COMP	MAIN DATA REQUESTS FROM SENIOR MANAGERS	I/E DATA	MOST FREQUENT SENIOR MANAGER USER GROUPS	METHOD OF REQUEST	CRITICAL DATA TO SENIOR M	PRIORITY TO SM	REQ I/D/S
A	Stats, Business, Competitor, Oil & Gas	E	Engineers, Economists, Legal	Phone, Sec	Yes	Yes	D
C	Competitor data, Business	E	Economists	Phone, Sec	Yes	Yes	I
E1	Competitor data	I/E	Patent department	Phone	Don't know	Yes	Static
E2	Competitor data	E	Developing markets	Phone	Don't know	Yes	I
F	Tech & Scientific, Strategic, Business	I/E	R&D, Marketing, Legal	Varied	Yes	Yes	I
G	Company, Competitor, Equipment	E	None	Em, phone, P	No	No	D
H	Everything	E	Legal, Economics, Planning	Ph,Em,Sec,P	Many times	No	D
I	Internal/Annual reports	I/E	Chemists	Ph, Sec, P	Yes	No	?
J	Business data	E	Research, Marketing	Em, Ass, Sec	Don't know	No	I
L	Financial, Competitor data	E	Economics, Legal, Marketing	Phone, W	Yes	Yes	I
M	Very broad	E	Strategic services, Business devlp	Ph, Em, Ass	Don't know	Yes	I
N	Competitor, Briefing data	E	None	Sec, Em	Don't know	No	D
O	Anything, Exchange Rates	I/E	Finance	Ph, P, Em	No	Yes	I
P	Company data, Marketing	I/E	Health & Safety, Technical	Sec, Ph, P	Don't know	Yes	I
R	Anything, Competitor, Marketing	I/E	None	Ph, Em, Sec	Yes	Yes	?
S	Finance, Business, Press releases	E	UK Group	Ph, Sec	Don't know	No	Static
T	Current news, Market share, Facts	I	Corp development, Economics	Ass, Ph	No	Yes	Static
U	Competitor, Business, Products	I/E	None	Ph, Sec	Don't know	Yes	I
X	Competitors, Anything	E	Marketing, Sales, Communications	Sec, Ph	Don't know	No	I
Y	Competitor data, Marketing	I/E	Marketing, Engineers, International	Ph, Sec	Yes	Yes	I
Z	Management, Company, Technical	I/E	None	P, Sec, Ph	Yes	Yes	I

KEY: Comp=Company, Em=mail, Sec= Secretary, P= Personal, Ph=Phone, Ass= Assistants, W=Written, I/E=Internal/External information, Req=Requests, I=Increasing, D=Decreasing, S=Static, ?=Don't know.

Appendix F. Library services available to senior managers

COM	SDI	CA	BKS	JRNL	OLDB/OPAC	CDR	NEW	BULL	STAD	REPS	SCAN	COM/ANA	ABS	TRAN	RES	LIB GDE
A	*	*	*	*	*		*				*	*				*
C	*	*	*	*	*	*										
E1			*	*	*	*	*	*			*	*				
E2	*	*	*	*	*	*	*				*	*				*
F	*	*		*	*	*	*				*	*				
G				*	*	*			*		*	*				
H	*	*	*	*	*	*			*	*	*	*				
I	*	*	*	*	*	*			*		*	*			*	
J	*		*	*	*	*				*	*			*		
L	*	*	*	*	*	*					*	*		*		*
M	*	*	*	*	*	*			*	*	*					*
N			*	*	*	*				*	*		*		*	*
O			*	*	*	*				*	*	*			*	*
P	*		*	*	*	*			*	*		*				*
R			*	*	*	*				*						
S				*	*								*			
T		*	*	*	*					*						
U		*	*	*	*	*				*	*					
X	*	*		*	*	*			*	*	*				*	*
Y		*	*	*	*	*			*		*					*
Z	*		*	*	*						*					*

KEY: Com=Company, SDI=Selected Dissemination of Information, CA=Current Awareness, BKS=Books, JRNLS=Journals, OLDB=Online Databases (Includes access to Online Public Access Catalogues (OPAC) via Internet, CDR=CD-ROM, NEW=Newspapers, BULL=Bullitins, STAD=Standards, REPS=Reports, SCAN=Scanning, COM/ANA=Competitor Analysis, ABS=Abstracts, TRAN=Translations, RES=Research, LIBGDE=Library Guide

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