This chapter aimed to identify the broad conceptual bases for this study of organizational information services strategies and practices. These bases are drawn from the literatures of organizational design and information science and particular streams of theory, research and practice within those areas. Chapter Three focuses more directly on the specific areas and works which are most closely related to the study of business and information strategies in organizations, within the conceptual framework of organizational design and information science.
3. LITERATURE REVIEW AND ANALYSIS

3.1 Scope of the Review

This study explores the nature and extent of alignment of business and information services strategies, and organizational factors which might contribute to that alignment. Information strategy should aim to support and stimulate business strategy and, thus, provide an organization with an information based advantage over competitors. Information strategy is evident in the pattern of decisions related to 'information actions' or the 'praxis of information provision'.

In information intensive organizations, evidence for alignment can be seen in the uses of information and information technology which have provided a firm with some information based advantage over competitors. This information-based comparative advantage (IBCA) encompasses the range and nature of information-based products and services and the conduit for and the content of information processing in organizations. Thus, this might include, for example, information-based products and services to clients and potential clients, information systems and services at different levels within organizations, and the organizational arrangements for the management of a firm's information resources.

The phenomena of concern articulated in the linking of business and information strategy is of relatively recent origin. However, it has emerged from a cluster of organizational, information-based and strategy-oriented literatures. In order to provide an informed framework for the present study, a number of different, though related, literatures focusing on the management of information and information technology by organizations were examined. The analysis of these literatures sought to extract organizational factors which might be related to business and information strategy alignment.

In reviewing the literature of organizational information requirements, Yadav (1983) observed that the area spanned 'two isolated territories' that were rarely linked. The first was that of 'organization and management' while the second belonged to 'technicians'. Yadav was correct up to a point, though his analysis did not adequately acknowledge the hybrid territory of 'information management' as defined by Marchand (1982). The past five years have seen the emergence of an expanded vision of, and an interest in the management of information and information technology by both 'territories', together with re-examinations, such as
that of Swanson (1987), aimed at placing information systems in the context of organization theory.

While the broad disciplinary areas providing conceptual bases for this study are organizational design, information science and strategy development, the specific literatures and research of relevance are drawn from a number of paradigms which are intersecting sets or subsets of these:

1. Management and planning of information systems;
2. Strategic uses of information technology
3. Information for strategic management and planning;
4. Information management as it has evolved from Information Resources Management (IRM).

These areas present a web for the evolution and consideration of information services, information strategy and the use of information for competitive advantage and are represent diagrammatically in Figure 3.1.

Figure 3.1 Information Services Management Literatures
These areas share some other common characteristics: boundaries are blurred, terminology is poorly defined, and the literatures are largely practice-oriented with little cumulative research base due to their relatively recent emergence and volatility. In each area, it is possible to discern three phases: prophetic and polemical works, followed by conceptual frameworks seeking to provide interpretations of events; and, finally, evidence of beginning systematic enquiries which provide potential for the eventual development of a firmer theoretical base. The Management of Information Systems area is the most advanced of those listed above, while Information Resources Management is the least well developed in terms of systematic enquiries.

The review which follows, then, includes all three types of literatures - general, conceptual and research-based - from several different, but related, areas with the aim of building a literature-based framework of organizational characteristics which might be important in the alignment of business and information strategy. This framework was derived and then examined empirically commencing with the trial organization in mid-1988. The literature which formed the basis for this framework is that published up to mid-1988. Later substantive literature is considered with the outcomes of the case study investigations in Chapter 11, and as input to the revision of the framework.

There is also a largely separate literature on the development of strategy and the role of senior managers in the strategy formation process. Relevant works from this literature are selectively reviewed.

This literature analysis begins with a short section on perspectives of information services from the information processing model of organizations, as several of these works are frequently cited and used as the conceptual basis in the subsequent literatures.

Sections 3.3 to 3.6 review the development and the critical research-based studies in each of the four information-oriented literatures depicted in Figure 3.1. This approach gives a context for the limited number of research studies reported and provides a more substantive base for indicating directions for further research than would otherwise be the case. Key strategy and strategic planning literature is reviewed in Section 3.7.
The major themes emerging from the literature analysis are summarised in Section 3.8. A cluster of literature-based organizational factors which might be related to business and information strategy alignment are drawn together in a preliminary conceptual framework of alignment in Section 3.9. Section 3.10 summarises the chapter and identifies possible methodological problems and approaches in gathering evidence to investigate the appropriateness and utility of the framework.
3.2 Organizational literature perspectives on information services

The information processing model of organizations reviewed in Chapter Two takes as its starting point the need for organizations to process information and overtly link information processing in organizations with decision making processes (Galbraith, 1977; Tushman and Nadler, 1978).

The multiplicity of levels and types of decision making and information processing within organizations has long been acknowledged in the organization and management literature. The groundwork for developing stratified approaches to organizational information services was laid in the 1960s by Anthony (1965) in a work which is still quoted as a basis for classifying information systems to meet different levels and types of information requirements. (See for example Ahituv and Neumann, 1986; Goodyear, 1986.)

In Anthony's framework, 'strategic planning' involved 'big plans, important plans, plans with major consequences' (p16); 'management control' was associated with the 'ongoing administration of the enterprise'; 'operational control' related to the performance of specified tasks. Information handling was a separate process whereby the 'data generated' was used at all levels and types of planning and control processes. The 'information specialist' needed to have a good understanding of the uses that would be made of the information that flowed through the system.

In his seminal work on information technology in organizations, Simon (1973) argued that information most important to top managers came mainly from external sources and not from the internal records that were immediately accessible for 'mechanized processing' (p271). For information systems to provide real support for decision making, they needed to be structured to conserve the scarce resource - attention. In Simon's view, the key to successful design of information systems laid in matching the technology to the limits of the 'attentional resources'.

Feldman and March (1981) added a different perspective to organizational information services in their extensive review and re-interpretation of research on decision making and information use in organizations. Feldman and March make the valid and well founded observation that organizations deal with information in a different way from that anticipated from a simple reading of decision theory: individuals and organizations invest in information and information systems, but
their investments do not seem to make decision-theory sense; people in organizations gather information and do not use it and ask for reports and do not read them, acting first and receiving requested information later.

Rather than concluding that 'organizations and the people in them lack intelligence', Feldman and March suggested four broad explanations: firstly, that organizations provide incentives for gathering extra information; that much of the information in organizations is gathered and treated in a 'surveillance mode' rather than a 'decision mode'; thirdly, much of the information in organizations is subject to 'strategic misrepresentation'; and, finally, that information use symbolizes a commitment to rational choice. For these reasons, Feldman and March argued for 'decoupling information from decision' and viewing information as 'a symbol and a signal'. The gathering of information provides a 'ritualistic assurance that appropriate attitudes about decision making exist' (Feldman and March, 1981:177).

In reviewing the literature on the performance and behaviour of organizational information processing systems, Huber (1982) linked Yadav's 'isolated territories' in focusing on the importance of the concept of information to both designers of information systems and management scientists whose interests are in organization theory, organizational behaviour and organization design. Huber defined information 'in the lay sense' as 'that which is received by the senses, such as words and numbers'. His review of 'organizational information processing' focussed on intrapersonal and interpersonal activities and informal networks and concluded with a statement on the need for applied research linking the behavioural research with the development and testing of normative guidelines for the design and management of information systems.

The literature on organizational information requirements emanating from organizational theorists emphasises the multiplicity of purposes of information services in organizations, the need to look at different types of requirements at different levels within organizations and different types of requirements for service provision between different organizations. Acknowledgement of the diverse and complex nature of organizational information requirements has been an evolutionary feature of the planning and management of information systems and services, and is examined in the next section.
3.3 Management of Information Systems

3.3.1 Introduction

Though the theoretical base of business and information strategy alignment is limited, information strategy alignment draws on the more substantive literature base and evolution of the management of information systems.

This section will review significant and relevant contributions to the literature on the planning and management of automated organizational information systems, particularly management information systems. Management information systems (MIS) have as their central concern the 'effective design, implementation, and use of computer-based systems in organizations' (Markus and Robey, 1983:203). This was the territory primarily belonging to Yadav’s 'technicians' (Yadav, 1983). However, the evolution of this field shows a progressive appreciation of management-related issues: the levels and types of organizational information needs; the interactions between information systems and technology and organizational change; concerns to embed information systems into organizational planning and strategy requirements; and a variety of factors related to the design of organizational arrangements for information services. Each of these areas is covered in turn in this section, though there is considerable overlap between them and with other parts of Chapter Three.

3.3.2 Differentiation of Information Systems

In criticising designers of management information systems more than twenty years ago, Ackoff (1967) claimed that managers suffered more from an 'overabundance of irrelevant information' than a 'lack of relevant information'; that information systems should be seen as subsystems of control systems and should be constructed and tested only after the development of an explanatory model of the decision process; and that 'no MIS should ever be installed unless the managers for whom it is intended are trained to evaluate and hence control it rather than be controlled by it' (Ackoff, 1967:149). Zani (1970) made similar points in outlining a 'blueprint for MIS' which described a general scheme for relating systems to 'the jobs they are really supposed to do' (Zani, 1970:95).

While Ackoff argued for the active collaboration of information systems specialists, operations researchers, and managers, his work showed less than a full appreciation of the fact that automated information systems cannot necessarily
'answer' the full range of 'questions' which need to be answered by managers. In his own suggested solutions, he overestimated the role of management information systems in the decision making process and did not give due recognition to the diffuse nature of managerial problems and activities such as those identified by Simon (1965). Later research on the nature of managerial work and decision making (see for example Mintzberg, 1973; Kurke and Aldrich, 1983) reinforced the 'support' role of formal information services, including management information systems.

Throughout the 1970s, a number of key writer sought to span Yadav's 'isolated territories' (Yadav, 1983) by attempting to embed automated information systems firmly into frameworks that more overtly acknowledged the range and nature of organizational requirements.

Gorry and Scott Morton's (1971) work met some of Ackoff's criticisms by providing a basis for linking different organizational levels with different information requirements. In focusing concurrently on computer technology and human problem solving approaches, they provided a framework for viewing management information systems which would guide management and systems planners in their work. Gorry and Scott Morton acknowledged that planning for information systems had resulted in a heavy concentration in the area of operational control, with a consequent lack of attention given to ill-structured and unstructured decisions requirements. In this way their work made a significant contribution in linking the developments in the information systems area with some of the parallel developments in organizational theory and decision making paradigms.

In 1974, Davis published the first edition of Management information systems: conceptual foundations, structure, and development. This work was a conceptual study of information systems in organizations which can be seen to have met some of Ackoff's concerns. In the preface to the second edition, Davis and Olson (1985) claimed that the scope of their text was 'an organizational information system as broadly defined' (Davis and Olson, 1985:vii) and incorporated standard operational information systems, information systems for management control, information systems for strategic management, decision support systems, office information systems, and knowledge work support systems under one broad conceptual umbrella. The emphasis on the 'support' nature of information systems resulted in a realistic analysis and conceptualization of information systems operating in a number of different organizational contexts.
In the 1985 edition of their work, Davis and Olson clearly identified the shift in emphasis in organizations from computers and data-based information processing to information as a strategic resource and to an expanded role for information technology. They named this expanded role 'information resources management' (IRM) and the term was meant to include related activities of data processing, data communications, and office automation.

Tricker (1977) stressed the inter-dependence of information systems and organizations and claimed that the organization could be perceived in terms of its uses and needs for information. He distinguished three different levels of system within an organization, each of which could be given the term 'information system': organizational, operational, and technical. Tricker's work is important in pointing out the interdependence between information systems, organizational structures and management styles.

In a later work, Tricker and Boland (1982) questioned the applicability of the hierarchical view of management decision as portrayed by Anthony (1965) and now 'enshrined in most books on strategy' (Tricker and Boland, 1982:50). They argued that in modern complex organizations this 'neat, militaristic, configuration' seldom fits the reality and suggested that a more suitable model might be of a 'barrel of resources' controlled by the policy guidelines of corporate strategy. Their work was important for stressing the organizational context of information systems and introducing the notion of the strategic significance of information systems.

Keen and Scott Morton provided a sound organizational perspective to decision support systems in their 1978 text (Keen and Scott Morton, 1978) when they acknowledged that decision support systems required a detailed understanding of decision making in organizations. They argued that the fields of management information systems and management science, with their analytical and technical approaches, had almost entirely ignored descriptive models of the decision process.

The field of 'decision support' was seen by Keen and Stabell (1978) as having evolved from the two areas of organizational decision making and technical work on interactive computer systems. They saw essential differences between management information systems and the area of decision support: the MIS field was 'technical and prescriptive' while decision support required a 'behavioural and descriptive grounding' (Keen and Stabell, 1978:vii). Keen and Stabell saw the
main emphasis in the decision support area as meshing description (how are decisions made?) and prescription (where can computer technology be applied to improve how they are made?), and claimed decision support to be a distinctive concept and methodology for developing computer-based decision aids.

Keen and Stabell's description of the field of 'decision support' supported claims for the primacy of the organizational context of decision making and provided considerable overt recognition of the difficulties in providing computer-aided support in the managerial environment of complex and nonprogrammable activities. While some MIS theorists would disagree with the distinctions indicated, those who have consistently sought to place MIS in a realistic organizational framework (for example, Davis and Olson) have indicated that the upper levels of strategic management place different demands on information systems than do other levels and types of information requirements.

Keen (1981) later stressed the pluralistic nature of organizations when he argued that information systems development was an intensely political as well as a technical process. This has been taken up by later researchers such as Weill and Olson (1989) and Markus (1983). Keen saw a need for MIS managers to have a much better understanding of strategies for information system implementation which took into account the 'politics of data'. Keen listed a series of studies which emphasised the gap between descriptive and prescriptive notions of decision making. Formal information systems had been seen as 'an intrusion into the world of users, who see these unfamiliar and irrelevant techniques as criticism of themselves' (Keen, 1981:25).

Dumas (1980) made a timely contribution to information systems perspectives on organizational information requirements when he attempted to embed management information systems into the information processing model of organizations. Dumas used the work of Mason and Mitroff (1973) to emphasise what is basically a contingency approach to the design and operation of management information systems. In arguing for a more balanced relationship between MIS users and designers Dumas stressed the need to recognize that any organizational structure not only imposed requirements on information processing systems, but also possessed inherent capabilities for information processing.

Davis (1982) sought to 'bring order' into the information requirements determination process when he proposed that there are two levels at which
information requirements need to be established: firstly, at the level of the whole organization so that an overall information system architecture can be defined and a portfolio of applications and data bases specified; secondly, detailed information requirements are needed for particular applications. In outlining different approaches to determining information requirements, Davis stressed the limitations of humans as information processors and problem solvers. He proposed a ‘contingency theory’ for selecting the most appropriate strategy (or combination of strategies) for identifying information requirements.

Davis presented a complex case which took the notion of 'fit' one step back in the process of designing organizational information systems. He argued that there needed to be a 'fit' between the characteristics of 'object systems' (in this case, organizations), the users, the information analysts, and the strategies used to determine information requirements. Davis' contribution is useful in clarifying the distinction between overall organizational information requirements and particular application requirements. The present study is concerned with overall information requirements with the 'object system' being the firm.

Ackoff's (1967) concerns seem to be echoed in Earl and Hopwood's (1980) assessment, 13 years later, of the need for a broader framework for the consideration of information processing in organizations, and an understanding of its implications for the design of automated information systems. In their view, many MIS specialists overemphasized formal and systematic approaches, and adopted a partial and rather idiosyncratic view of the role which information processing did and could serve in organizations.

Olson and Chervany (1980) took as their goal the understanding of the relationship between organizational structure and how the information systems function was structured in a study of 43 organizations. They distinguished between 'systems operators', 'systems development' and 'systems management'. 'Systems management' included the administrative aspects of planning, developing and controlling information systems resources. At this level, companies that were highly formalized tended to utilize steering committees for project selection, and to have some facilities for user control over project management. Companies that charged back fully for computer services tended to have decentralized decision making authority. Those companies which perceived the information services function to be low relative to their own power, employed mechanisms that ensured decentralized control. While this study examined characteristics related to
organizational structure, the focus was on the way that the information systems function is managed internally, rather than on the information-based outputs of the organization.

In their discussion of a paradigm for management information systems, Ein-Dor and Segev (1981) presented a very thoughtful and well argued series of propositions which incorporated much of the knowledge available in the field of MIS research at that time and built on their own earlier research (Ein-Dor and Segev, 1978). Ein-Dor and Segev concluded that the large number of variables involved in their analysis of relevant research, and the difficulty in reducing these variables to simple terms, made the concept of 'fit' of an information system particularly useful. They distinguished between 'individual' and 'organizational' fit. 'Individual fit' referred to the extent to which different people need different information and the ability of a given system to meet those varying needs, while 'organizational fit' dealt with the extent to which an information system was adapted to the particular organization in which it is used. This concept of fit emphasised the contingent nature of management information systems. Information systems that are highly successful in one organization might be very ineffective in another because a structure that fits one situation might be a poor fit for another.

The extent to which organizational context variables of size, structure, timeframe and climate were related to aspects of MIS structure was examined in a study of 53 organizations by Ein-Dor and Segev (1982). MIS variables of particular relevance to this study were degree of integration, place within the organizational hierarchy and the integration of data from different areas of the organization by means of a database.

Ein-Dor and Segev reported that MIS structure was at least partly determined by size; that MIS structure is affected by organizational structure; that the introduction of MIS affected organizational structure; and that the degree of MIS integration was higher in less centralised organizations. The propensity to pioneer was also associated with less centralised organizations. These researchers then argued that their findings indicated that there was no one way to structure a successful MIS. Success depended on the extent to which the particular values 'fit the organizational environment' such that 'a system that is successful in one situation may be unacceptable in another' (Ein-Dor and Segev, 1982:66).
The concept of 'organizational validity', as described by Markus and Robey (1983), is consistent with 'organizational fit' notions of Ein-Dor and Segev (1981). Markus and Robey claimed that accumulating research indicated that while technical attributes might be necessary for systems success, they were not sufficient for success. There was a need to increase 'organizational validity', which was a qualitative concept of the match or fit between systems and the organization of which they were a part. The concept of 'fit' was multi-dimensional and had been inadequately defined.

Markus and Robey identified four dimensions of fit: the fit between 'the system' and users' cognitive styles, the structural dimensions of the organization, the distribution of power in the organization, and the interface between the organization and its environment. Evaluation at these levels may yield different assessments of organizational validity. They proposed a systems development process which took into account conditions which could foster potentially invalid systems: the individual attributes of users and designers, organizational structural conditions and societal factors could be negative fit factors which should become the focus of attempts at integration of differences and negotiation amongst interests. The outcome sought from this process was a higher degree of organizational validity on the four dimensions of 'fit' outlined above.

In examining the organizational and structural role of MIS, Morden (1985) suggested that the success with which MIS can be integrated, both as a concept and as a function, may depend on the degree to which MIS planners and policy formulators have roles which 'fit' characteristics noted by Handy (1981) and Lawrence and Lorsch (1967; 1969). Morden contrasted MIS with 'data processing systems', with the latter being concerned with the collection and storage of data and its direct application to operating procedures and administration tasks. MIS, on the other hand, focussed on enabling organization members to access and transform stored data 'so as to produce information that will support and assist the management process of planning, organising, directing and controlling the activities of the business' (Morden, 1985:83). The emphasis here was on producing information to assist policy formulation and decision making and, thus, MIS personnel themselves needed to comprehend and be part of decision-making processes.

Parker (1982, 1985) described a 'new' methodology, 'enterprise-wide information management' (EwIM), in a series of papers aimed at assisting information system
managers to identify organizational information requirements. This work for IBM resulted in the renaming of IBM's 'business systems planning' methodology to 'enterprise information analysis' and now 'enterprise-wide information management'. Parker saw the purpose of EwIM as providing 'an enterprise model which will identify critical information elements necessary to support the various long and short term enterprise strategies' (Parker, 1985:2-2). The strength of this work is in its recognition of the importance of the business domain to information systems planning.

Parker drew on the work of Anthony (1965) and Nolan (1979) to highlight the need to provide 'top management with a means of using the computer to aid in the strategic planning of the enterprise' (Parker, 1985:2-21). However, the aim she identified for formal information systems ('normalization' of the operational procedures of an enterprise) appeared to be a naïve one if she was serious in invoking the work of Anthony. In stressing a need for 'new methodologies', Parker acknowledged the wide gap in communication between top level management and data processing. However, while her work made some valid diagnoses, it did not overcome the gap, in that it did not take sufficient account of the diverse scope and nature of information needs at the strategic planning level.

Parker concluded with a plea to align information systems with the strategic goals and objectives of the enterprise. This plea is echoed in many discursive papers on information systems from 1982 onwards. In 1985, Treacy identified 70 papers published from 1982 to 1985 which addressed in some way the link between information, information technology and the strategic concerns of organizations. Some of the more significant of these papers, and those published since 1985, are reviewed in Section 3.5.

In reviewing the intellectual development of management information systems, Culnan's (1986) conclusions reinforced those of Ein-Dor and Segev that research efforts in the MIS area lack a common theoretical framework. The lack of such a framework hinders the 'orderly and cumulative acquisition of knowledge in the area' (Ein-Dor and Segev, 1981:227). Culnan suggested that the concept of 'organizational effectiveness' could be developed as the link between MIS and organizational theory. This had been earlier identified by Marchand (1982) as the purpose of 'information management' (See Section 3.6).
The foundational base of MIS was further explored in Culnan and Swanson's (1986) analysis of the progress of MIS as a field of study from 1980 to 1984. Using bibliographical citation analysis of MIS research publications as the basis of their study they concluded that MIS is emerging as a distinct field of study from its foundational base of 'computer science', 'management science' and 'organization science'. This same foundational base was also identified by Hamilton and Ives (1982) in their study of knowledge utilization by MIS researchers published between 1970 and 1979.

In their descriptions of these three foundational areas, Culnan and Swanson made some interesting points on the perspective of 'information' and 'data' inherent in each. Culnan and Swanson saw computer science as focussing on 'data, hardware and software as the basic elements of study'; management science as relating to 'problems, models and solvers' where 'information is classically understood to be of relevance only in a problem context'; and organization science as the study of individuals, organizations and institutions. They saw the link between information and organization science in the study of individual behaviour and attitudes for information systems usage, and organizational and institutional study as a foundation for the design of information systems which are understood, accepted and used.

Gould (1986) drew on Jacques' work (1976) to develop a case for using stratified systems theory in the design of organization-wide information systems. Gould claimed that the design of typical organizational-based information systems had not served the information needs of higher levels and that those needs were both quantitatively and qualitatively different. The task of information systems varied because of the varying nature of different levels and location of work within organizational structures. Gould saw the dilemma of management information systems design as its inability to translate information systems design which may have been appropriate at the lower, operational levels into useful information systems at the higher, strategic levels. Although the focus was intended to be the whole organization, in reality MIS was oriented toward 'facts and data, not information...internal as opposed to external sources' (Gould, 1986:15).

Though Gould's work is flawed by its lack of acknowledgement to work of theorists such as Anthony (1965), his major thrust would appear to support the work of researchers such as Culnan (1986).
In discussing the findings of a study of information use and needs in manufacturing organizations, White (1986) contested the view that information requirements can be defined 'by models based on differential information needs dictated by the functional role that an individual performs within an organization' (White, 1986:157). White ascribed this position to Keen and Scott Morton (1978) and Gould (1986). However, in this researcher's view, this is an oversimplified summary of their positions.

White's study explored the information needs of manufacturing companies by compiling a series of case studies based on interviews. All the companies had clearly identifiable individual functions and roles in five main areas: production (works management), sales, marketing, finance and personnel. Gould found that 'an easy correlation' between functional role and particular information needs was not supported. Any requirements for information, of whatever nature, were prompted by the immediate problem. Information-need and information-seeking behaviour was based more on contingent reality and immediate problem-solving than on some notion of set functional roles and responsibilities.

While White's work did not result in ready support for a stratified or 'hierarchy-of-needs' model of information need in work organizations, it did give support to the need for a degree of 'fit' between information systems and the nature of work in organizations. White concluded that his findings provided support for the view that 'contextualist research' was the most appropriate methodology to advance the study and practice of information system design.

Goodyear (1986) and Koenig (1986) have each presented simple and useful diagrammatic representations depicting the relationships between levels of organizational decision making and the type of information strategy and support required. Goodyear's work focused on computer-based information support while Koenig's depicted the source and scope of information required. In Koenig's pyramidal structure for management decision making, information sources for decision making at the long range and strategic planning levels were more likely to be predominantly external, while those at transactional and operational levels were more likely to be predominantly internal. The scope of information required was likely to exhibit the same pattern: diverse sources required at the upper levels with more narrow sources required at lower levels.
IBM's change from BSP to EwIM was seen by Koenig as a 'bellwether . . . of the importance of external information' and recognition of the importance of 'information, not data, as a critical, perhaps the most critical, organizational resource'. While applauding these changes however, Koenig rightly claimed that there is still 'an egregious lack of awareness of the importance of external data . . . and the consequent inadequacy of systems based primarily on internal data' (Koenig, 1986:29,30).

Koenig's perceptions are supported by recent literature in the computer-based decision support systems area. While some works clearly identified the limitations of decision support systems and the role of human judgements, expectations from those working in the area remain high, and have been raised even further by developments in artificial intelligence and expert systems. However, the literature of computer-based information systems is still lamenting the lack of recognition of the different processes which comprise the decision making task (Carlson, 1983) and the need for 'effective decision support systems' (for example Brookes, 1986).

A major strand of the management of information systems literature has progressively emphasised the need to differentiate between different types and levels of information systems, and the contingent nature of the multi-dimensional concept of 'fit' between information systems, the people who use them and their organizational purposes. Corporate needs for and uses of information are varied and complex (Beaumont, 1988). One aspect of 'fit' which is integral to the alignment of business and information strategies is that of 'information systems planning'.

3.3.3 Information Systems Planning

Recent systematic studies on automated information systems planning and management have shown a greater awareness of, need for, and interest in linking information systems planning with corporate or strategic planning (McFarlan, 1984a).

From 1982 to 1985, a team of Australian researchers conducted a series of largely questionnaire-based studies of the information systems planning and management practices of users of large IBM installations in Australia and New Zealand (Dampney and others, 1982; Dampney and others, 1984; Hansell and others, 1985; Gilmour and others, 1985; Hansell and others, 1986; Gilmour and others, 1986.
Note: these will be referred to as the 'Macquarie University studies' for ease of reference. The value of these studies is that they have used a relatively stable core of respondents over a period of time.

Over these four years, information systems managers reported a marked change in executive management's awareness of the use of information technology to remain competitive from an operational viewpoint, though they lacked an appreciation of the potential of information technology in the planning and development strategy. In the 1987-88 study, using the same sample group, with a 62% response rate, the highest ranked concern of information systems managers was 'Alignment of IS and business goals' (Broadbent and others, 1989:15). Watson's Delphi study of the key issues of Australian information systems managers (Watson, 1988) found similar results with 'improving IS strategic planning' as the issue of most concern.

Somewhat parallel, though more extensive, studies have been reported by Galliers (1986a; 1986b; 1987a; 1987b; 1987c; 1988b) on information systems planning practices in the United Kingdom and Australia. Galliers concluded that despite the heightened interest in the potential of information systems and technology, there was only limited evidence to suggest that competitive considerations were, in fact, incorporated into information systems planning approaches. This was consistent with the findings of Butler Cox's UK-based study findings that few organizations appeared to take account of competitive factors in systems planning, and few of the competitive application ideas implemented were the result of systems planning activity (Butler Cox, 1987).

Galliers' work, undertaken in 1985 and 1986, surveyed 129 companies in the UK and 80 in Australia using an extensive and detailed questionnaire. Of interest to the present study were the questions concerning the linking of information systems planning to corporate planning. Organizations were asked to indicate whether information systems planning was undertaken 'in response to', 'as a basis for' or 'as part and parcel of' corporate planning or 'in isolation from' it. In addition, respondents were asked to rate the strength of linkage between the two processes. Results from both countries indicated that approximately 70% of those surveyed claimed some form of linkage, though only about 40% were ready to claim that the linkage was anything more than tenuous. The majority of approaches to information systems planning focused on matters of efficiency, and in some cases, effectiveness, with little or no concern (or awareness at senior management levels) for the role of information systems in improving competitiveness. Information
systems planning at the senior management level was seen as tactical rather than strategic.

Some of the variations evident in Gallier's work can be attributed to its cross-sectoral sample. This resulted in different perspectives of 'information systems planning', particularly by information systems managers in different industries with varying levels of information intensity, and in firms of varying size.

In an interview-based study of the most senior information systems managers of 32 major companies or public sector organizations in the United States, Levinson and Holley (1987) found that in only 13 organizations was the information systems planning linked to the strategic plan of the organization. Seven reported no such link, while another eight had no MIS plan and four no strategic plan. It is difficult to see how information systems plans, and eventually information strategies, can be linked to business strategies in large organizations, if those organizations do not have a documented strategic plan of some kind.

The relatively high percentage (30%) of Information Systems and Technology managers reporting directly to the presidents or chief executive officers of organizations was seen as reflecting growing recognition of the strategic importance of the MIS function. (Similar data in the Macquarie University studies revealed a figure of 21% in 1982 rising to 43% in the 1985 survey.) At the same time, Levinson and Holley found that the 32 IS/T Managers exhibited a plethora of reporting structures and position titles, indicating a considerable state of flux and complexity in information technology strategy and structures.

Levinson and Holley reported consistent concerns focusing on the lack of organizational support and prioritization, and the lack of real long range information systems planning. However the movement from a 'budget-based financial applications orientation' to a 'planning-driven, competitive edge orientation' was underway.

In a questionnaire-based study of the information systems strategies (ISS) of the UK's 'Times 500' companies, together with 47 financial services companies, Wilson (1988) sought to determine the extent to which the idea of 'information systems strategies' was recognised, and how they were related to business aims and barriers to the design and implementation of the strategies. An 'information systems strategy' was defined for participants as bringing together 'the business
aims of the company, an understanding of the information needed to support those aims, and the implementation of computer systems to provide that information . . . a plan for the development of systems towards some future vision of the role of information systems in the organization' (Wilson, 1989:246). Over 75% of the respondents claimed that they had such a strategy. However, when a stricter definition of strategy was applied, only 13% of the firms qualified. Financial services firms were well represented amongst those which had a strategy in both definitional groups.

The main feature of the strategies identified in Wilson's study was the evolutionary development of systems towards more effective management information systems with an architecture of common standards. Strong 'Board level' involvement was an important factor in the development of these strategies.

However, Wilson observed that many firms were still thinking in terms of the strategic uses of technology, rather than the information component of strategies. The information needs of management had not yet been a prime determinant of the form in which information was delivered. Readily available external information (particularly online databases) was much underutilised in the development both of company strategies, and as input to satisfying the information needs of management.

Wilson noted that a number of information interviews were undertaken prior to the questionnaire development and that these were very informative (Wilson, 1989). Few of the questionnaire respondents who indicated that their firms had 'highly successful' information systems strategies were able or willing to provide informative comments on why they believed that their plans were such a success. Wilson's study provides valuable background to the existence of information systems strategies, noting that the prevalence is somewhat circumscribed by definitions. He highlighted the importance of examining the field of strategy from several dimensions, some of the limitations of questionnaire-based methods in identifying why strategies are successful, and the greater maturity of the financial services sector in information systems strategy development.

The participation of MIS managers in the formulation of strategy assisted understanding of top management objectives (Lederer and Mendelow, 1987). This study, based on 20 structured interviews with MIS executives, found that communication of the firm's strategy after it had been formulated was not as
satisfactory a source of knowledge as participation in that planning process. In a further questionnaire-based study of MIS executives, where 26% of the sample responded, Lederer and Burky (1988) verified that understanding top management objectives remained a concern for MIS executives, with only 19.2% of respondents indicating that their understanding was 'very satisfactory'. Communication of strategy after it had been formulated was again found to be an inadequate means of promoting its understanding. Major impediments were the confidentiality of those objectives and the insufficient MIS understanding of senior managers. Lederer and Burky suggested that including senior business managers, in addition to MIS executives, in a study of the understanding of strategy would be a fruitful area for research.

In a survey of 80 organizations, Lederer and Sethi (1988) examined the problems faced by information systems managers when they attempted to implement some form of 'strategic information systems planning' (SISP), based on frequently reported and applied methodologies. SISP was described by Lederer and Sethi as the process of deciding the objectives for organizational computing and identifying potential computer applications which the organization should implement. The most severe problems in implementing SISP were the failure to secure top management commitment for carrying out the final plan, the requirement for substantial further analysis after the completion of the final plan, and the lack of resources. Thus, the development of lengthy and complex SISP may be of limited value.

Lederer and Sethi suggested a series of factors which might potentially be related to problem areas in information systems planning: the degree of sophistication in business planning; participation by the IS department in business planning; reporting arrangements for the IS/T Manager, the location of the initiation of SISP, the organizational scope of SISP, the lack of a specified planning horizon and the more severe problems of public sector organizations. With the exception of the last factor, each of the other factors were built into the empirical component of this study.

Thus, from the information systems management literatures, there has been a growing acknowledgement of the importance of 'information systems planning', and a number of studies have reported on whether or not such planning takes place and which factors hinder its implementation. Top management involvement is usually seen as an important factor in the success of information systems planning and implementation, and there is some evidence to suggest that the nature and
specificity of business strategies themselves may be a factor in coordinating information with business strategies.

The studies reported above take as their point of reference the views of IS/T Managers, usually without acknowledging other personnel within the organizations. They have generally been cross-sectoral, with results focussing on the range of responses and variations between industries. These studies indicate a need to examine 'leading edge' or the more 'mature' information-based industries in order to identify the organizational contexts which encourage successful planning, and its subsequent implementation, and the form that this takes.

3.3.4 Organizational Arrangements for Information Services

The ways in which an organization's information systems and services functions can be structured and managed and its interaction with other parts of the organization is referred to in this study, as the 'organizational arrangements for information services'. There is a plethora of information systems management literature in this area (see for example, the review in J. King, 1983). However, much of this literature is narrowly focused on the limited dimension of whether or not firms should centralise or decentralise their information systems function. Earlier studies about information systems planning and design often assume the existence of one information systems department, take an inward looking approach at the information systems management function, and do not acknowledge the diversity of information inputs and units throughout organizations. Technology would not solve the organizational arrangements issue because the most important factors in the debate were grounded in constant reassessment of where control of organizational activities should reside (King, 1983).

Developments in information and communications technologies have both changed the type of arrangements which might be appropriate in many firms and have had an interactive effect on the evolution of subsequent organizational forms. This includes an increase in the dispersal of responsibility for information systems development and management, together with the need for the effective management of interdependence across units within firms (Rockart, 1988; Rockart and Short, 1989). As King predicted, they have not 'solved' the problem of organizational arrangements, merely expanded the options.
This section will review key recent works which have tackled the area of organizational arrangements for information services in the light of developments in information technology and, thus, inform a study of the organizational factors which might be related to business and information strategy alignment. These works tend to be consistent with the organizational design literature reviewed in Chapter Two, and this conceptual base is sometimes acknowledged.

Lucas and Turner (1982) identified the need for senior management to have an appropriate strategy for controlling information processing in their organizations. While existing information technology offered considerable flexibility in developing patterns for the structure of the information systems function, firms must evaluate various patterns for computer services, choosing the most effective with a policy which balances coordination costs and local autonomy. Lucas and Turner argued that in the early 1980s, most firms had developed systems that were basically independent of the firm's strategy.

In reviewing design alternatives for organizing information systems to meet changing organizational forms and requirements, Zmud (1984) made a useful point in identifying critical issues to be recognised and confronted: as information resources can be owned, operated and managed by all of an organization's work units, information systems specialists and managers need to demonstrate an organizational as well as technical expertise. An implication that Zmud saw from this and other aspects he reviewed was that the appropriateness of 'a particular organization form for a specific information systems activity will be contingent upon a variety of factors' (Zmud, 1984:91). Thus Zmud saw an increasing need for research projects aimed at developing a contingency theory for organizing information system activities.

Zmud later referred to the notion of 'the information economy' of a business (Zmud, Boynton and Jacobs, 1986), acknowledging that automated information systems departments no longer had the sole prerogative to plan, build and run information systems. Information technology was bringing about fundamental changes in organizational operations and strategies, such that information-based activities were now present throughout businesses, and, together, these made up an enterprise's 'information economy'. In this study's terms, any part of this 'information economy' could develop uses of information or information technology which provide a firm with an advantage over their competitors.
An organization's information systems management practices are contingent upon both the role of information systems within the organization and the manner by which information systems and services are made available to users (Boynton and Zmud, 1987). Thus, as their environment changes, so too should information systems management practices. Boynton and Zmud saw the IS management dilemma as 'simultaneously providing centralized direction and control while recognizing the value of increased discretion regarding information technology decision-making on the part of managers throughout the organization' (Boynton and Zmud, 1987:61). However, they noted that the consequent need to have key organizational members 'buy into the information technology planning effort' had attracted little attention within the literature. This was despite the strategy formulation literature that suggested such involvement was crucial to successful planning efforts (see for example Quinn, 1977, 1980, and the literature reviewed in Section 3.7).

The organizational arrangements for information services include the existence of a myriad of reporting arrangements, titles, and functional units for information personnel (Debons and others, 1981; Haughan and Levin, 1984; Levinson and Holley, 1987), though more information systems managers than previously now report directly to chief executive officers (Broadbent and others, 1989; Hansell and others, 1985; Levinson and Holley, 1987). The reporting level of the IS/T Manager is often seen as a key variable in the effectiveness of organizational efforts (Brumm, 1988; Broadbent and others, 1989).

Forgione's conceptual work (Forgione, 1988) suggested that mature organizations will evolve structures which take into account the need for corporate level information policy setting, together with operational delivery at the business unit level. This stressed the importance of business manager control over computing requirements as this was the management level which most fully understood the business, its operations and its problems. In future, the information systems function would assume a role analogous to that of a federal government in coordinating dispersed IS resources and management responsibility within an information economy (Boynton and Zmud, 1987).

The work of Feeny and his Oxford colleagues has focused on the organizational arrangements for information systems to suit complex organizations. These studies, embracing Feeny, Edwards and Earl (1987), and Feeny, Earl and Edwards (1989a; 1989b) emanated from the Oxford Institute of Information Management and will be
referred to as the Feeny studies. Only the preliminary research report (Feeny, Edwards and Earl, 1987) was available during the time the framework for the empirical component of this study was developed.

Feeny's interview-based study was of thirteen complex organizations (Feeny, Edwards and Earl, 1987) which comprised multiple business units, but with varying forms of IS structure. They concluded that the design of arrangements for information systems should be based on an understanding of the organization's 'IS heritage and experience'. For complex organizations, the most stable organizational form for information systems was a federal, or mixed, structure which balanced devolution with control and which could accommodate structural change without excessive disruption.

The Oxford researchers used their data to classify 'situations' into levels of high, medium and low integration between 'IS and the business'. Each of the five situations in the 'high' integration group had the following features, relevant to this study, which were not present in any of those classified as 'low': business unit management perceived the future exploitation of IT as of strategic importance; the IS/T Manager was part of the Executive team/Board; there was ongoing education for business unit management in IT capacity; and there was a top down planning process for linking IS application strategy to business needs.

The role of executive management in supporting and championing information systems developments is consistently seen as a key factor in the effective management of information resources and technology (See for example: Haughan and Levin, 1984; Runge, 1985; Feeny, Earl and Edwards, 1987; Galliers, 1988a; Wilson, 1988; Jarvenpaa and Ives, 1989).

In exploring key issues in the management of the information systems function, Hirschheim and others (1988) indicated that the extent and nature of investment in educational experiences for senior management, both IS and non-IS, was seen as positively associated with the more advanced evolutionary stages of IS management. The IS executives interviewed as part of the study had concluded that a major requirement for advancement in the strategic use of IS was a 'creative vision of where the company should be headed, and how IS could support such a vision' (Hirschheim and others, 1988:[75]).
3.3.5 Summary

In summary, if information technology is perceived by a firm to be strategic, it cannot be managed as a support or service activity and its profile and management needs to become an integral part of the firm's planning, control and operations (Lucas and Turner, 1982; Earl, 1987a).

This section of the review has clearly identified the gradual evolution of concerns in the design, organization and management of automated information systems from a narrow and operationally oriented base, to a more complex and organizationally embedded base. A few writers (Keen and Scott Morton, 1978; Dumas, 1980; Ein-Dor and Segev, 1981,1982; Olson and Chervany, 1980) have drawn on organizational theory and theorists to reinforce the contextual and interdependent nature of information systems and services.

Though, with hindsight, they can be seen as complementary and compatible, the literature of the management of automated information systems represents a different track to that of the study of organizations as information processing systems. Prior to the 1980s, only a few writers made more than a cursory acknowledgement of, and conceptually linked these areas. The works of Ackoff (1967), Keen and Scott Morton (1978) and Davis (1974) were particularly significant in this regard either by stimulating debate on the gulf between the two areas, or by providing some conceptual links with which to anchor information systems.

Recent research studies have provided a considerable thrust in examining the extent to which information systems are embedded in corporate and strategic processes. However, these studies generally view 'information systems' in the narrow sense, that is, those which are supported by internal computing services, and do not encompass the wider view of information services taken in this study. Wilson's consideration of 'information', as well as 'technology' is an exception (Wilson, 1988, 1989).

The next sections review the strategic uses of information and information technology and then the type of information services seen as relevant for strategic management and planning functions in organizations. In some ways, these areas can be seen as a further outgrowth of the automated information systems area when linked with strategic concerns of organizations.
3.4 Strategic Uses of Information Technology

The underlying forces driving the development of strategic uses of information technology derive from new forms of process and functional integration made possible by developments in information technology, particularly interconnectivity and data accessibility (Benjamin and Scott Morton, 1986). There is increasing recognition that every value activity performed by a firm creates and uses information and may be exploited within and outside the firm to create competitive advantage (Davenport and Cronin, 1988).

Mainstream management and business literatures as well as information systems literatures have seen enormous growth of, and interest in, the strategic uses of information technology. The whole area is still at a pre-theoretical stage because the phenomenon under study is new and changing (Treacy, 1985). Interest in this area has not yet been matched by the development of a sound research base, though its substance has increased considerably in the past four years.

The conceptual and practice oriented works referred to in this section are only a small percentage of the exploratory and explanatory publications in this area, but include the more significant contributions to the evolution of discourse of relevance to this study's perspective on business and information strategy alignment. This section aims to identify developing issues and relevant research in an area which broadly seeks to link information sources, systems and strategies to corporate strategies, with particular emphasis on the utilization of information technology. In this there will be some inevitable overlap with the previous and subsequent sections.

In identifying the strategic potential of computer technology, Gerstein and Reisman (1982) identified the strategic potential of computer technology but expressed puzzlement at the underutilization of data processing as a strategic resource. Gerstein and Reisman identified one major reason for this underutilization as the different orientations of business managers and DP specialists. The value differences, and subsequent communication breakdowns, which they identified do help to explain the tenor, and thrust of developments reviewed in Section 3.3. Gerstein and Reisman suggested that the evolution of data processing, and the increasing societal recognition of the importance of information, should assist in highlighting the need for a closer interdependence between DP planning and strategic planning.
The language used in articles in the journal *Computer decisions* in 1983 signalled that at least some of the automated systems literature then recognised the possible synergy between information and competitive strategies. Kull's (1983) report of a round table on strategic planning is headed 'Information's role in the battle plan' and leads with the advice that 'a corporation and its information services groups must march into the future together by sharing a strategic vision' (Kull, 1983:55). Roman (1983) gave examples of companies deploying information technology to capture markets.

In two much-quoted *Harvard business review* articles McKenney and McFarlan (1982) and McFarlan, McKenney and Pyburn (1983) used the term 'information archipelago' to denote the 'islands' that made up the 'archipelago of information' in organizations: office automation, telecommunications, and data processing. The authors saw a need for changes to the organization structures for information services which should be managed in a coordinated, and, in many companies, an integrated manner. The first of the articles emphasised the need for 'organizational fit' in the operation and management of information services, and the need to integrate technological developments with matters of corporate policy.

In the second of the articles, the authors urged companies to use knowledge of their strengths and weaknesses to plot an appropriate course for information systems developments. A 'safe course', according to McFarlan, McKenney and Pyburn, required a new planning approach, for which the guideposts are the company's familiarity with any one technology, the importance of the technology to corporate strategy and certain business characteristics such as size, complexity of product lines, and the organization's general approach to corporate planning.

McFarlan, McKenney and Pyburn identified four different information systems environments in a grid based on the strategic impact of existing operations plotted against the strategic impact of an application development portfolio. These different environments, which they named 'strategic', 'turnaround', 'factory' and 'support', each required different planning approaches and could have a considerable impact on the role played by information systems in corporate strategy. The same grid is outlined in McFarlan and McKenney's 1983 text, *Corporate information systems management: the issues facing senior executives* (McFarlan and McKenney, 1983).

The 'information archipelago' articles provided a lucid analysis of some of the issues facing organizations in the management of information and technological
'islands', and in the strategic significance of information systems. However, their omissions detract from the framework which they might have provided for depicting the role of information services in organizations. In the 1982 article, McKenney and McFarlan do not provide a complete picture of the 'information islands' which make up the archipelago because their frame of reference is limited to particular information services. Their neglect of other potential 'information islands' such as records management, library services and possibly decision support systems, and the value of information resources produced within the organization, indicated a narrow conception of information and information technology.

The second article is more overtly narrow in reverting from the term 'information services' to the term 'information systems'. While the archipelago notion provided a good basis for beginning consideration in the general management literature of the links between different types of information services in organizations, it could have been more effectively utilised to present a much more complete analysis.

A continuing emphasis on the importance of information technology and competitive strategy can be seen in informative and thoughtful contributions by Black (1983), Parsons (1983), Wiseman and MacMillan (1984), McFarlan (1984b), Benjamin, Rockart, Scott Morton and Wyman (1984), Otten (1984a), Walde (1984), Powers (1985), Burch (1986) and Millar (1986). Porter's (1980) work on industry analysis and competitive strategy and Rockart's (1979) elaboration of the critical success factors technique were invoked in a number of these contributions to assist in identifying industry and organizational characteristics and purposes. Situational factors such as differences between organizational structures, stage of technological assimilations, management understanding of technological developments, and industry base were all seen as important in identifying the most appropriate information strategy and services.

Parsons' (1983) identified three different levels of information technology impact and some of his examples from industry further emphasised the real potential of information technology to change the natures of industries. Parsons suggested that the impacts of information technology may be viewed at industry, firm or organizational strategy levels. He quoted publishing as an example of the fundamental change in the products and services of an industry which could be brought about by information technology.
While Ives and Learmonth (1984) commended the Harvard studies in highlighting the differential strategic potential of information systems technologies (ISTs), they commented quite correctly that the work done to date had not offered adequate assistance in identifying new opportunities for the strategic application of information system technologies. Ives and Learmonth developed the Customer Resource Life Cycle (CRLC) to provide such assistance and identified eight areas for potential IST investment for direct benefits to customers or to the corporation. Their work marked a further and important stage in the development of tools for identifying strategic applications of information technology.

In one of the more complete conceptual models of technology impact, Rockart and Scott Morton (1984) identified the ways in which technology drives corporate strategy. The fact that the terms 'information services' or 'information technology' were replacing 'data processing' or 'MIS' in organizations was seen as recognition of the power and expanding character of the technology and critical metamorphosis in organizations.

Following the tradition of grounded theory-building, Huff and Munro (1984) sought to understand 'what is there' concerning the information technology assessment and adoption process in a field study of a sample of ten large Canadian firms. Huff and Munro found that two fundamental forces, technology emphasis and issue emphasis, underlaid the way in which an organization assessed and adopted information technology. They classified 'information technology assessment and adoption behaviour (ITAA) into one of four 'driving force' models: technology-driven, opportunistic, issues driven and the normative ideal. (The last mentioned was included based on research by Lientz and Chen published in 1981; however Huff and Munro did not find any examples of such a model amongst the ten Canadian organizations).

In an issues driven environment the ITAA process is closely geared to the corporate and systems planning processes. In the technology-driven organization, thorough corporate planning is not an important activity. The ITAA sequence generally progressed from an identification of an interesting technology to the location of an organizational problem to which it could be applied. Organizations operating in the opportunistic mode were those which were not purposefully comprehensive with respect either to their issue identification procedures (planning process) or to their technology identification procedure. In a later publication the same authors (Munro and Huff, 1985) speculated that strategic applications of information technology
were much more likely to emerge from organizations which were 'issues-driven' rather than 'technology-driven'. This later article also provides one of the best state-of-the-art summaries of the development of interest in, and tools to identify the integration of information technology with corporate strategy.

Although theirs was a relatively small study, investigating ten firms, Huff and Munro have made a valuable contribution to the embryonic literature and research in identifying some of the organizational characteristics which might impact on strategic uses of information technology. It is one of the few empirical studies which examined the strategy and mechanisms used by major companies for the identification, assessment and adoption of new technology. In a discussion of their further intended research, the authors were intending to gather additional data from the companies studied to assess whether there was any significant relationship between the main ITAA driving force and the strategic importance of the information systems functions (based on the work of McFarlan and McKenney [1983] reported above).

Huff and Beattie (1985) provided a timely distinction between two relatively new concepts which were becoming confused in the business literature: strategic information systems and information technology for competitive advantage. The two areas have the same basic goal of aligning information strategy with organizational strategy. Huff and Beattie recognised the 'problematic' nature of the two areas, but provided useful conceptual frameworks for developing both types of systems. However, their distinction did not include a third and related area: information for competitive advantage. As previously stressed, the term, information, does not always mean computer-based information or automated information systems. The dimension of the 'content' of the information was again overlooked.

In an outline of the 'new strategic business resource - information', King (1984a; 1984b) continued his interest in the strategic planning area and developed the notion of comparative business advantage through information referred to in The logic of strategic planning (Grant and King, 1982). King argued that 'organizational planning' was required for the use of 'information as a resource, not just a service function' (p27). King described a circular planning process for achieving information-based comparative advantage which linked business strategy set, strategic planning for information resources (SPIR), the development of an information resource strategy set, supported by information and decision-support
systems, which were in turn linked to the business strategy set by means of information resource assessment (IRA). The SPIR process was based on the premise that there must be a match between a company's business strategy and its information strategy. The IRA process required an assessment of existing information resources so that they could be used to influence strategy.

In a later article, King (1985) developed the process a little further with the focus on linking information technology and corporate growth. 'Business strategy set' in that process was renamed 'organizational/strategy set'. King identified a number of examples of the utilization of information technology for corporate growth, and claimed that these indicated fundamental changes to the way in which some firms will grow and prosper. Two years later, King (1987) argued that the changing role of information technology in business plans, and the notion of information as a strategic resource was only beginning to achieve a degree of reality in organizations.

The need for information systems plans to be informed by corporate or business strategies has been emphasised in recent contributions to the journal Long Range Planning, such as that of King (1988), and in special issues of journals such as Planning Review (October, 1988). Ward (1987) suggested that more effective integration of information systems and business strategies was likely to result from employing the techniques of business strategy formulation in the IS field rather than from extending systems techniques into business analysis. Despite a decade long discussion on the existence of the notion of 'strategic planning for information systems', King (1988) claimed that there was no conclusive evidence to demonstrate that such processes would have an impact on business performance or would survive a critical cost-benefit analysis.

As indicated above, a number of writers have used Porter's (1980) work on competitive strategy as a framework for analysing aspects of strategic applications of information resources. In his more recent work Porter (1985) elaborated on the notion of the value chain as a basic tool for examining all of the activities a firm performs, and the way in which those activities interacted. This work provided the basis for Porter and Millar's (1985) analysis of information intensity in the value chain and product to illuminate differences in the role and intensity of information among various industries. Different points in the value chain required different amounts and types of informational input. Organizations with an information intensive value chain could be expected to make greater demands on information
resources than those where the value was less information intensive. Porter and Miller's framework represented a major, though as yet untested, development in the conceptualization of the area of strategic significance of information technology. Oil exploration and banking were given as industries which were information intensive in the value chain of production; however, of these two, only banking was seen as information intensive in its products as well. Similar distinctions were drawn by Brumm (1988) in referring to the information intensive nature of the services sector, in which she included insurance and banking.

In his book *Strategy and computers: information systems as competitive weapons*, Wiseman (1985) used the phrase 'strategic information systems' (SIS) in a different sense to that of Turner and Lucas (1985) outlined in Section 3.5. In his preface, Wiseman explained that his research had led him to conclude that SIS, with their strategic perspective on information systems, were radically different from other applications of computer technology such as management information systems and management support systems (and their subsets decision support systems and executive information systems). While acknowledging the contribution of Anthony's (1965) paradigm to the development of the 'information management discipline', Wiseman argued strongly that the further development of the discipline required a new conceptual foundation. The conventional perspective, based on the planning and control model, did not account for SIS opportunities. This requires a 'strategic' perspective on information systems. A similar viewpoint is put by Rackoff, Wiseman and Ullrich (1985) in outlining a planning and implementation process for using information systems to reap competitive advantage.

The tone and style of Wiseman's book may lead to an initial impression that his work is superficial. However, his clear exposition of a framework for illuminating the significance of the strategic perspective on information systems, his descriptions of many SIS examples, and his analyses of other frameworks has made a useful contribution to the development and understanding of an emerging and different perspective on information systems in organizations.

Runge (1985) focused on the enabling factors for 35 telecommunications based information systems linking firms with customers in the United Kingdom. Using a multiple case study approach, Runge identified five key enabling factors for these systems which were seen to give the companies a competitive advantage: a product champion, customer involvement in the development process, extensive marketing efforts, an internal system on which an interorganizational system could
'piggyback', and a clear avoidance of the company's usual information systems planning and selection processes. The availability of multiple technologies required enhanced planning processes. Runge's work also supported Wiseman's contention that Anthony's framework constrains the understanding and development of strategic information systems. The rapid development of information processing technologies since Runge's data was collected reinforces the need to view information systems and services in organizations from a broad perspective.

Clemens and McFarlan (1986) used Porter's (1985) value chain to identify the profound effect telecommunications could have in each area of a firm's activities. Clemens and McFarlan concluded that in a wide variety of industrial settings, every element of the value chain is subject to a major impact from telecommunications.

Diebold (1986) outlined three case study examples of how some large companies in the United States were using information technology in a strategic way that was quite distinct from its value as a support function. Diebold observed that the difference between those that 'are leading and those that are lagging' in deploying information technology was how the issue was handled organizationally. Diebold identified six fundamental ways in which information technology was changing the 'competitive environment': products and services enhancement with computer capability; cost displacement; enhanced decision support; revised enterprise mission or objectives; new business interrelationship; and the creation of new products, services, and industries. While Diebold's work appears to have a consulting rather than a research base, his propositions in this article are well supported by examples, and are consistent with the research findings of Munro and Huff (1985) and the analytical work of Parsons (1983).

In charting guidelines for managers in the utilization of information technology, Lucas' recommendations (Lucas, 1986b) recalled, for this researcher, some of the work referred to earlier on conceptual frameworks and on information systems perspectives on organizational information requirements. Lucas recommended that management must design a structure for information processing, and that organizations need to develop an architecture of hardware and software and plans for communications.

While these (and the other) recommendations are very sound, the fact that they still need to be formulated and expressed is perhaps an indication of little progress in the real embedding of information systems into the framework and requirements of
organizational concerns. What is different, however, is that, in the period since 1982, there appears to have been a considerable upsurge of interest in the more effective utilization of information and information technology in mainstream management and business literature. Sloan management review, Harvard business review, Business quarterly, Columbia journal of world business, Journal of business strategy and Business and economic review all feature as publications in which the works cited in this section have appeared.

In some extensive quantitative analyses of the use of information technology in improving efficiency and managerial effectiveness (Strategic Planning Institute, 1984; Strassman, 1985) the results were generally inconclusive. Both these United States based studies and a study of information technology opportunities in the United Kingdom (Kearney, 1984) indicated that good managers will use information technology effectively, while poor managers will gain little for their organizations by investment in information technology. Few companies attempted to align their business and information technology strategies and most relegated information technology to providing reactive service to middle management. These findings have been queried by other researchers who found that the use of information systems as a competitive resource was becoming an accepted fact (Butler Cox, 1987).

In the manufacturing sector, Weill (1988) identified four 'conversion' factors which he linked to effective investment in information technology: user satisfaction, senior management support, a low level of political turbulence and more experience with information technology. These conversion factors together moderated the relationship between information technology investment and firm performance in the US valve manufacturing sector.

Vitale (1986) acknowledged the 'use of information systems to gain competitive advantage' as one of the major business stories of the 1980s, but provided a timely warning about the risks of information systems successes. Vitale identified some negative, unintended and unanticipated organizational and competitive consequences of technical successes which had been catastrophic. He suggested a sound framework for assessing the risks of using technological change for competitive advantage. Lovell gave similar warnings from an organizational development viewpoint when he argued that 'information technology strategic planning' activities must be approached from an organizational development perspective, linked with other major change activities (Lovell, 1988).
While the 'imaginative deployment' of information technology can create cost savings, provide 'strategic positioning and competitive posture', the advantages are often ephemeral as innovation breeds imitation and 'fresh opportunities' need to be identified (Cronin, Cavaye and Davenport, 1988:179). Strategic investments and expenditures have often not created sustained competitive advantage (Weill, 1988; Cecil and Hall, 1988). 'Success' does not necessarily mean creating an information technology based advantage where none existed before. Rather, an impact on firm performance is more likely to eventuate where information technology is used to 'leverage already existing strengths, to maintain existing competitiveness or to avoid inappropriate technology investments' (Cecil and Hall, 1988:5). This is consistent with Weill's research in that a firm's experience with information technology was found to be positively related to gaining greater benefit from information technology investments (Weill, 1988).

Certain types of 'competitive-edge applications', which were identified and pursued by line management rather than the Information Systems department, were found to have evolved through the incremental extension of in-house systems, (Butler Cox, 1987). The ability to sustain a competitive information technology application has been seen as a function of three elements: generic lead time, competitive symmetry and pre-emptive potential (Feeny and Ives, 1988). Each of these are affected by specific organizational factors and are supported by the arguments of Clemons and Row (1987). They state that innovative applications of information technology can be more readily defended if they have two features: firstly, that they are so closely tied to the strategy of the organization that competitors would not want to follow them; and, secondly, that these applications exploit unique structural characteristics so that competitors do not benefit from copying them.

The attempts by large corporations to utilize information technology for competitive advantage were the focus of Johnston and Carrico's study of eleven firms covering different industries (Johnston and Carrico, 1988). They identified three areas of findings: competitive environmental factors, differences between companies concerning the extent of integration of information technology and strategy, and some internal conditions which appear to support strategic utilisation of information technology. Environmental factors influence the direction and pace of strategic deployment of information technology. 'Leading' industries are those which have significant information content in their key relationships, where products and
services have a limited life, and where there is increased competitive pressure due to factors such as deregulation and the entry of competitors.

Johnston and Carrico developed a three level typology of the extent to which information technology was integrated into strategy: in 'Traditional' or Type 1 companies IT supported operations but was not strategy-related; in 'Evolving' or Type 2 companies IT supported strategy, while in 'Integrated' or Type 3 companies, IT was integral to strategy. Although the researchers were cautious about drawing firm conclusions, they found amongst the executives interviewed a consistency of opinion about certain internal conditions which appeared to be related to past strategic IT successes. These focused on leadership (particularly senior line management leadership), the integration of IT and strategy functions, direct contact between the IS function and line divisions, the capability of the IS, and mechanisms for line influence of IT.

The findings of the Johnston and Carrico study suggest that examination of a cluster of large firms in an area with increased competitive pressures and significant information content might support or further amplify the evidence for internal conditions, which lead to examples of business and information strategy alignment. The financial services area is such an industry area, where firms would generally be expected to be in the 'Type 3' category.

The work of Earl and others, from the Oxford group, has added significantly to the literature of the strategic uses of information technology (Earl, 1987a; 1987b; 1988a; 1988b). Earl questioned the efficacy of formalised planning processes in creating competitive and strategic systems, and noted the importance of line manager involvement in the initiation and promotion of such systems (Earl, 1988a).

Five related studies resulted in a series of findings where the 'cornerstone of the argument' was that the process of creating competitive advantage with information technology was as much one of 'innovation' as a 'matter of adopting analytical methods' (Earl, 1988a:21). The 'centralized, functional and structural leaning of traditional information systems management frameworks and paradigms' were 'inappropriate' in such a strategic management environment (Earl, 1987b). If a firm's business was technology-based, it 'probably required some of the management practices found in hi-tech companies'. These included business focus, adaptability, organizational cohesion, entrepreneurial culture and 'hands on' top management (Earl, 1987b:174).
In identifying a research agenda for information systems strategy formulation, Earl emphasised the need for research strategies which included 'interpretive casework, longitudinal investigations and change process studies' (Earl, 1987b:17). Strategic management research needs to identify new questions as much as to seek immediate answers. One form of research which would assist would be organizational level studies to plot or enquire how strategies actually evolve and how strategic initiatives were identified and pursued.

The burgeoning literature on strategic uses and implications of information and information technology highlights the importance of the strategic aspect of organizational information requirements. The fact that Wiseman (1985) was able to claim that his book was the first solely devoted to the use of information systems as competitive weapons and to the relation between strategy and computers emphasises the recency of the strategic perspective on information and also serves to highlight the scant research base in existence for this perspective. More recent books by Keen (1986) and Synnott (1987b), have established the area of information technology for competitive advantage as a field with a substantial experiential base, and texts seeking to link information technology and business performance were beginning to emerge in 1988 (See for example, Parker and Benson, 1988). The contribution of substantive later works, such as Earl's Management strategies for information technology (1989) and Parker, Trainor and Benson's Information strategies and economics (1989) will be referred to in Chapter 11.

Synnott (1987b) specifically sought to 'bridge the gap' between corporate strategy and information technology in order to 'realise the vision of competitive technology'. Strategic planning involved the integration of business and information technology planning through technology architecture. Four forces needed to be in place to create the 'information weapon': vision, strategy, architecture and change. While most works in this section and genre focused solely on information technology, Synnott distinguished between information content, as the business concern, and the conduit, which is the technical concern. He used the term 'information management' to refer to the process of identifying, defining, collecting, storing, processing, protecting and distributing information, while 'information resource management' referred to building and managing the technological infrastructure of the firm. In this he included computers, communications, networks and office systems. While his list was far from
complete in this study's terms, Synnott identified and recognised the importance of the synergy required between internal information systems and external information sources and services in order to provide 'value-added' information services utilising competitive technology, which was well embedded in the business of the organization.

Developments in computing and telecommunications technology are in the process of changing the perceived and actual role of information services in organizations and in identifying more clearly the wide range of information functions and services which could and should operate within organizations. There is still a marked lack of understanding of the impact of information systems in organizations and of the processes that enhance a smooth coordination of information technology and business strategy. This study seeks to identify factors which might be related to the nature and extent of alignment of business and information strategy in organizations. Automated information systems are an integral part of that information strategy.

The next section analyses the the type of information services which provide information inputs to strategic management and planning functions.
3.5 Information Services for Strategic Management and Planning

In both the organizational and automated information systems conceptual and research literatures discussed, a clear trend is evident: some organizational theorists now see information as an integrating concept in organizational design; information systems designers have placed increased importance on the organizational context of information systems and the different levels and types of information services required in organizations. Information strategies of firms encompass the informational support required and provided to senior management for strategic management and planning. This is an area where recognition of the opportunities for information-based advantage, through the better use both of information content and of information technology, is just emerging. There has been very little integration of critical developments in the two areas of strategic analysis and information technology based decision tools (Fredericks and Venkatraman, 1988; Senn and Wilkes, 1988).

The information support which may be required for Simon's 'nonprogrammable tasks' (Simon, 1965), Ackoff's 'messy problems' (Ackoff, 1974) or the ill-structured decision problems referred to by Mintzberg, Raisinghani and Theoret (1976) and Mitroff and Emshoff (1979) do not readily lend themselves to 'normalization' in a computerized information system. The evolution of the area of decision support as outlined by Keen and Stabell (1978) is an acknowledgment of the need for 'decision support and interactive decision aids for managers in judgement and decision making situations' (Samson and Thomas, 1984:328). While some works clearly identify the limitations of decision support systems and the role of human judgements, expectations from those working in the area remain high, and have been raised even further by developments in artificial intelligence and expert systems.

The analytic and diagnostic work of Goodyear (1986) and Koenig (1986) discussed in Section 3.3 provides a useful framework for reviewing work on information services and strategies at the strategic level of management. The focus in this section will be the nature of the information services required for decisions of strategic importance. This informational support is not limited to computer-based information, a point which can be drawn from DeCarbonnel and Dorrance's discussions of information sources for what they call 'planning decisions' published back in 1973 (DeCarbonnel and Dorrance, 1973).
Throughout the 1960s and 1970s the published output of King and Cleland was significantly in advance of their contemporaries in recognising the interrelationships of various organizational dimensions including management systems and procedures, information systems and organizational structures.

In 1975, King and Cleland described a methodology for management information systems design which employed a formalized framework for 'incorporating managers into those aspects of the design process which are typically left to technical analysis' (King and Cleland, 1975:296). In 1977, the same authors suggested a 'participative process' for the development of strategic data bases. Such data bases were 'concise statements of the organizational and environmental situation which define the organization's most salient problems, opportunities and constraints' (King and Cleland, 1977:59)

King and Cleland's *Strategic planning and policy* (1978) devoted a chapter to 'information for strategic planning' and clearly identifies the importance of external information in initiating the planning process. Unlike some of their contemporaries writing on management information systems, King and Cleland make it quite explicit that the development of strategic planning MISs should not be taken to refer exclusively to computerized information systems. In the same year, King (1978) drew attention to the need for strategic planning in the area of management information systems.

The importance of external information services and 'extroverted' information services was highlighted by the work of Young (1981) and Methlie and Tverstol (1982). Both focused on the availability and importance of external sources of information and their integration into the information services strategies of organizations. Young places particular importance on the role of aggressive corporate library services and personnel to promote and manage 'extroverted data'.

The area of corporate and competitor intelligence has for many years been one aspect, albeit often overlooked, of the uses of information for strategic management and planning, particularly external information. Perelman (1983) saw 'business intelligence' (BI) as the industrial equivalent of military intelligence and an essential input for strategic management. Business competitor intelligence (Sammon, Kurland and Spitalnic, 1984) and Competitor intelligence: how to get it; how to use it (Fuld, 1985) both provide solid recent examples of sources of external
information for different types of organizations, and ways to locate information of particular interest to strategic concerns of management.

Environmental intelligence has been increasing in its importance due to trends in global competition, the volatility of the business environment and the diffusion of managerial capabilities (Ghoshal and Kim, 1986). However, the performance of formal units established to monitor and interpret the environment and provide business intelligence had been disappointing. Ghoshal and Kim reported on an earlier study by Ghoshal (1985) which found that there were two distinct, though overlapping, kinds of information required of the intelligence function: the first for monitoring the specific business situations which affected the immediate business environment; and the second for analyzing the overall business climate. The latter information was utilized primarily for long-term planning and strategy making. The packaging and presentation of information, and the balance needed between information wants and needs were seen as key factors in determining the success of information services support for the strategic planning level activities.

Turner and Lucas (1985) used the term 'strategic information systems' (SISs) to describe information systems which 'serve the information needs of management'. These could be computer based or manual, and formal or informal. Turner and Lucas made a number of claims about the nature of strategic information systems which drew on, and are consistent with, the work of contingency organizational theorists analysed in Chapter Two. These concluded that the importance of SISs to a firm largely depended on the nature of the firm's business and on its industry structure and its size; firms engaged in dynamic industries with high rates of technological change frequently needed more information about their environment than firms in more stagnant industries; and, in more static industries, with mature technology, stable markets and stable competitive dynamics, knowledge about the environment is less important. Large organizations needed strategic information systems more than small ones because of their need to gather data from a wide variety of external and internal sources, and the need to communicate this to a relatively large number of players.

Shuman (1982) questioned whether strategic planning was an area in which less information might mean better decision making, and made valid points regarding the need to link strategic planning information gathering to basic sets of goals and objectives. He argued that strategic planning information systems ought to be limited 'and automated only with the greatest care' (Shuman, 1982:23). Shuman
was critical of information specialists whom he saw as accustomed to thinking of information as technical in nature and largely limited to operational applications.

Top executives benefit from 'receiving strategic information based on strategic success factors and key performance indicators' (Millar, 1984:161). Like Shuman, Millar's case study data supported the view that an information structure should be developed following on from corporate management's selection and definition of strategic success factors. The information plan should familiarize users and information processing professionals with the range of internal and external business information available to them. A firm's ability to develop an appropriate competitive strategy and sustained competitive advantage was seen by Cronin as greatly dependent on the intrinsic quality and perceived value of 'intelligence funelled to the strategic apex of the organization' (Cronin, 1988:9). The strategic apex was often under or mis-capitalised in terms of its information management requirements.

King (1983) questioned the distinctive nature of decision support systems (DSS) in the sense propounded by Keen and Stabell (1978) when he drew attention to the fact that much of what was being written about the goals of DSS was similar to what had been espoused as the purposes of MIS a decade previously. He cited Davis (1974) in this context and on most accounts his observations were very pertinent. King then recommended that an organizational 'systems strategy set' be developed in the light of articulation of an organizational strategy set (including organizational clientele analysis, mission objectives and business strategies).

Perhaps what has developed since the earlier times to which King referred, is a more sophisticated appreciation of the many different types and levels of information services which might be required within a particular business or organizational setting. This is at the heart of Reimann's (1985) eloquent exposition of decision support systems as strategic management tools for the 1980s, and is reinforced by the special issue on the strategic management of technology in the second volume of the journal Long range planning for 1986.

In a subsequent issue of Long range planning, Hohn (1986) provided a comprehensive and very detailed explanation of the use of information and information technology at different levels in the planning and control systems of an automobile company. Hohn outlined the need to utilize both internal and external information of both quantitative and qualitative kinds. In his depiction of the
technological information infrastructure' he stressed the need to identify an appropriate level of integration for data processing, communications and office technology.

One of the few well planned and executed recent research studies which has examined the relationship between corporate-level planning and information systems was Rhyne's (1985) empirical work on large organizations. Rhyne's research combined a field study of eight manufacturing firms and a questionnaire survey of 89 firms (42.4% of the number in the sample). In addition to finding little practice of strategic planning (two of the eight companies), Rhyne commented that one of the most striking findings of the field study was the lack of formal environmental information systems. The results of the questionnaire survey indicated strong support for the importance of external and environmental information to higher levels of planning. Future-oriented, external and environmental types of information were found to be strongly correlated with increased planning sophistication.

Tozer (1986) drew on his background in planning projects in a variety of industries to propose a formal four phase approach to the development of an information systems strategy. As part of his second phase, the development of a conceptual architecture for systems and data, Tozer described 'information architecture' as the foundation upon which all the more detailed analysis and eventual analysis must be based if information systems were really to support different levels of business activity. Tozer provides a very useful outline of the concept 'information architecture' as the information view of a business independent of any computing, data handling or other technologies, and, thus, was not necessarily technology based. This may be seen as similar to the 'information economy of a business' (Zmud, Boynton and Jacobs, 1986) and the notion of information services as defined in this study.

The work reviewed in this section provides support for the view that information systems and services designed and developed to serve strategic management and planning organizational levels need to be tailored to the specific strategic concerns of the organization. Information to support strategy formulation is a vital ingredient in the value chain of strategic information management (Davenport and Cronin, 1988). Organizations with business and information strategy in alignment would be expected to have information services in place to meet strategic planning information needs.
The following section reviews what has developed as the field of 'information management' from 'information resources management'.
3.6 Information Resources Management

The literature reviewed in Sections 3.2 to 3.5 is mainly from the bases Yadav (1983) identified as 'organization and management' or the 'technicians'. As indicated earlier, Yadav omitted a third category, that of 'information management' as it has developed from the field of 'information resources management' (IRM), where the literature is now focusing on the organizational requirements for 'strategic information management'. This can be seen as a hybrid area with its genesis in the late 1970s, which draws on the 'organization and management' literature as well as the 'technician' literature. Its orientation and focus is at least initially attractive as its proponents suggest more management embedded approaches to organizational information problems. Thus, literature of information resources management is examined here for its possible contribution to informing factors which might contribute to the alignment of business and information strategy.

In a relatively early overview of information management, Marchand (1982) saw the aims of information management in terms of organizational effectiveness and identified two different dimensions to the concept of information management: management of the data resources and management of the information process. The major focus of the literature reviewed in Section 3.3, and to a lesser extent 3.4 and 3.5, is management of the data resources, despite the fact that much of it uses the term 'information'; Section 3.2 is focused more on the management of the information process.

Information management, or information resources management (IRM) as it was then termed, emerged as a distinct area of study from the work of the United States Commission on Federal Paperwork (White, 1982; Cronin, 1984a; Horton, 1985a, 1985b; Estabrook, 1986). The Commission ran from 1975 to 1977 and resulted in the passing of the Paperwork Reduction Act in 1980. The Commission came to the conclusion that information was a resource and should be subjected to the same functional management disciplines, techniques, controls, and approaches used in other resource management areas (Horton, 1985a). Berry and Cook (1976) had earlier proposed that 'knowledge' (as opposed to data or information) was the basic resource of departments of the United States Federal government. The Paperwork Reduction Act of 1980 required the preparation of IRM plans by federal agencies.
From his position as Director of the Commission's Information Management Study, Horton saw a need to bring together the then 'disparate facets' of related information management principles 'currently dispersed and diffused among many different disciplines and bodies of knowledge' into an 'integrated theoretical and applied framework' (Horton, 1977:8-9). The IRM framework then, sought to update and integrate these related information management principles. The convergence of information handling technologies and the subsequent convergence of information functions and fields of specialization were seen by Horton (1979) as leading organizations and governments towards a need for a more integrated approach to managing data resources.

While in this text Horton did not adequately accommodate the 'process' side of information management, he articulated the notion that information resources resided in many different forms in organizations and that effective utilization of these resources required a broader approach than any one of the individual information-related disciplines had so far developed. Horton's 'information resources' came in many forms and formats, including correspondence files, microform records, library holdings, statistical data, word processing systems, and computer databanks. As Daniel's later work echoed, form and format differences might be less important than basic functional similarities in processing information and mobilizing information resources when, where and in the style and packaging required (Daniel, 1983).

A key theme in Horton's work was the need to formalize the treatment of information and deal with data as a manageable resource, in the same way that organizations must deal with human, physical, financial, and natural resources. This theme was also taken up in a general way by discursive works which use the term information resources management, including those by Diebold (1979), Synnott and Gruber (1981), Meltzer (1981) and Martin (1984) and in Daniel's more substantive essay (Daniel, 1981).

Marchand and Tyler (1979) took a more analytical approach and suggested some alternative ways of budgeting for information resources. After evaluating the usefulness of input-oriented models, Marchand and Tyler drew on some of McDonough's (1963) work to recommend the output oriented value/use mode. The key problem in this approach was assessing whether information collected was used and whether what was used was of value to individuals in the organization. This approach involved identifying the demands or needs for information in the
organization, and the suppliers of 'information/data' in the the organization, and then closing the gap between the demands or needs for information and the supply of 'information/data' resources.

Marchand and Tyler made a useful contribution to identifying ways of budgeting 'information resources'. However, as with Horton's (1974) early work on 'harnessing information resources', their approach was very much data-driven (or content-driven in Taylor's terminology) and did not reflect the more holistic approach that Marchand would seem to be advocating for information management (Marchand, 1982).

In the early 1980s, information resources management was seen by its proponents as a new way of thinking about information, by managing information as a resource in much the same way that other corporate resources are managed (Diebold, 1980: reprinted in Diebold, 1985). Developments in information technology were necessitating the development of a corporate information policy, particularly in large organizations. IRM was a new field which was concerned with solutions which increased the capacity of organizations to process information (Daniel, 1981). At the same time, it was important to focus on the content of the information itself, rather than just the technology, for 'without the requirements for the information there is no need for the tools' (Brinberg, 1983:6).

Diebold (1982) saw essential differences between management information systems and IRM. The latter was a more 'direction-setting concept' at the corporate policy level with the emphasis on information, while MIS was more departmentally and technology oriented. As with a later work of Diebold's reviewed in Section 3.4 above, Diebold's published work on IRM was rhetorical in nature, but is included in this review as it was seen, in its time, to provide important contributions to the shape of information resources management.

Petersohn (1981a; 1981b; 1981c) outlined basic concepts and principles involved in information resources management identifying three ways of viewing information functions in organizations: by flow, by process and by organizational function. Petersohn suggested a five step process for establishing information resources management in any organization. These five steps were differently expressed from ideas found in most of the previous literature on identifying organizational information requirements and emphasized the value of information to the organization. (Some parallels can be drawn here with Huff and Munro's 'issues'
driven approach to information technology assessment and adoption (Huff and Munro, 1984).

The first of Petersohn's steps involved establishing a management philosophy on what constitutes useful information and the objectives to be met in its use; identifying all the functional groups currently involved in information processing and determining the existing interfaces between these groups, specifying the nature of the information flows. The later steps involved developing a set of coordinated objectives for each of these groups, and finally identification of ways to insure cost-effective performance of each functional group. While Petersohn's articles are basic and descriptive in approach, they nonetheless represent a useful progression in the development of information resources management, with their articulation of the need to establish management philosophy on what constitutes 'useful information', and for their analysis of some information functional areas within organizations.

In one of a series of articles on information management, Otten (1984b) saw information resources management as a management approach for a period of transition which would come to an end as soon as management in general has become 'information conscious' and 'information resource oriented'. This was consistent with Marchand's work, reviewed below, on stages of information management.

Cronin (1984a, 1985), Gillman (1985) and Vickers (1984, 1985a, 1985b) have provided a United Kingdom perspective on information management as outcomes of their research and consulting work. Their writings indicated a very wide brief for information management which Gillman expressed as 'a set of techniques rooted in the disciplines of systems analysis, information science, data-processing, education, and even public relations' (Gillman, 1985:58). Central to information management was the realization that the processing of information had become beset by a multitude of choices, so that only a multi-disciplinary approach could be appropriate.

Cronin (1985) cited new or renamed journals in the area, the new job titles and descriptions and the growth of new professional associations such as AIM (Associated Information Managers) and AFFIRM (Association for Federal Information Resources Management) as evidence of information management as an 'emergent discipline'. The substance of the readings in Information management: