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Strategic Information Systems Planning in Large Companies in Australia

Donald Falconer
University of South Australia

Alan Hodgett
University of South Australia

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Donald J. Falconer
School of Information Systems
University of South Australia

R. Alan Hodgett
School of Information Systems
University of South Australia

The role and quality of management is critical to the successful adoption and use of information technology in modern businesses.

Accountants in senior management positions in a sample of large Australian companies were surveyed. Some findings relating to strategic planning for information systems in large companies in Australia are reported and discussed. It is apparent that strategic planning in many organisations is not extensive and in some cases is not fulfilling their own organisational planning objectives.

Some organisations successfully adopt a strategic view of their information systems while others do not capitalize on their recognition of information as a strategic resource. Still other companies appear to do no planning for information needs.

The quality of strategic planning for information systems is evaluated. A diverse range of problems and issues was reported by all respondents. Many information systems problems and issues identified by respondents are really management issues.

1 Introduction

This paper reports on a study of strategic planning for information systems in large companies in Australia. The results obtained and conclusions presented may assist some executives to recognise that management issues, rather than strictly technological issues, often lie at the heart of information technology adoption and diffusion problems.

There is much evidence in Australia and overseas that the selection, design and management of information systems to assist organisations achieve their corporate objectives is one of the most difficult issues facing companies today. The development and maintenance of useful information systems is a major resource issue in most organisations. Financial and human knowledge resources are always at a premium. With the increased competitiveness in most Australian and world markets in the 1980s and early 1990s many organisations are continually searching for ways to provide their goods and services more efficiently and effectively. Increasingly, the cost and effectiveness of organisations' information systems have come under scrutiny. The role and quality of management is critical to the successful adoption and use of information technology in modern businesses.

The content of this paper is part of a larger study exploring the planning, management and use of information systems in Australian businesses. The overall study surveyed three samples of Australian companies chosen to represent the business demographics of Australia.. Some findings relating to strategic planning for information

systems for one of these groups, large companies in Australia, are now reported and discussed in this paper. Some of the organisations surveyed adopt a strategic view of their information systems and devote much energy to planning for effective information systems development while others do not capitalize on their recognition of information as a strategic resource. Still other companies appear not to plan at all for information needs.

Strategic planning began to be applied to organisational information systems in the late 1970s. Strategic information systems planning (SISP) has been defined as ". . . the process of identifying a portfolio of computer-based applications to assist an organization in executing its business plans and realizing its business goals. SISP also entails the specification of databases and systems to support those applications" (Lederer & Sethi, 1991). "SISP may mean the selection of rather prosaic applications, almost as if from a list, that would best fit the current and projected needs of the organization" (Carlson, 1979, Kerner, 1979, in Lederer & Sethi, 1991). SISP can also include the search for applications with a high impact and the ability to create an advantage over competitors (Boynton & Zmud, 1984). McFarlan (1984) wrote that SISP can be used in organisations in innovative ways to build barriers to entry, change the basis of competition, generate new products or build in switching costs to maintain a customer base. Vitale (1986) referred to the SISP process of identifying a portfolio of applications as attempting to "align" information systems objectives with organisational goals. He referred to the innovative use of information systems as attempting to "impact" organisational strategies.

Strategic information systems planning has proved to be one of the most difficult tasks that an organisation undertakes. There is no "right" way to develop plans. The competitive environment of the 1970s and 1980s has seen businesses embrace technology to assist them in meeting their business objectives. Reductions in costs of production and distribution have been pursued vigorously by the commercial and public sectors. Information technology is often seen as the means to achieving these goals.

The topic strategic information systems has maintained a pre-eminent position as one of the critical management issues of the 1980s and into the 1990s (Galliers, 1993). Niederman (1991) reported surveys in the United States which showed that the strategic management of information systems has consistently ranked in the top three information systems concern of executives since 1980, and has usually been the number one concern. Galliers reported that information systems strategy is currently one of the most critical information systems management issues, in terms of its importance and the problems it poses, for British

information technology and non-information technology executives (Galliers, et al 1994). Pervan (1994) reported on a recent Australian survey which showed that information systems strategic planning is currently the main information systems concern for the managers of Australian companies. The importance of SISP as a management issue was part of the motivation for undertaking this study and will be reported for the companies surveyed in this study.

Earl (1993) identified five different approaches: to strategic information systems planning: business led, method driven, administrative, technological and organisational. Earl concluded that the organisational approach is the most preferable. The opportunity was taken to see whether Australian companies identify with the approaches defined by Earl.

King and Raghunathan (1987) reported that it may take at least three years for SISP to have an effect on end users and to accrue identifiable benefits for the business. It is necessary to bear this in mind when appraising the effectiveness of organisations' strategic planning processes and executive attitudes to these processes.

2 The Study

This study was part of a large mail survey of Australian businesses. The survey was designed as a preliminary investigation into several aspects of planning and development of information systems in Australia. A total of 1100 organisations in three samples of Australian companies were surveyed: those with 20 to 100 employees, those with 101 - 500 employees and those with more than 500 employees. The study considers a range of fundamental issues that are a foundation for more advanced research in an Australian context. This paper reports some findings from the survey of the last group.

2.1 Selection of Topic

Strategic planning for information systems is one of the key issues challenging senior management in Australian companies (Pervan, op cit). This paper is part of a project designed to document and evaluate experiences and problems of Australian companies. The demographics of Australian business are quite different to those of countries which have been the subject of much research; for example, Lederer and Mendelow (1988) surveyed companies with up to 125,000 employees and Earl (op cit) surveyed companies having average annual revenues of £4.5 billion. Even the largest Australian companies are small by comparison to these.

2.2 Objectives

The main objective of this paper is to document certain aspects of practices of information systems management in large Australian companies. This will allow later comparison with overseas practices as identified in the literature. The paper addresses the following questions related to large Australian companies:
- Do the organisations undertake strategic planning?
- To what extent is information systems planning part of organisational strategy?

- To what extent do external constraints affect an organisation's ability to develop its own information systems?
- Is information more or less difficult to manage than other resources?
- What are some of the features of these planning processes?
- What have been the main information systems problems organisations have faced in the last three years?
- What are the main information systems issues facing organisations in next three years?

2.3 Identification of Target Population

The aim of the project was to survey a sample of all Australian companies employing more than 500 staff. In Australia, companies of this size are few in number and can be described as being large. The population of such companies includes Australian owned and managed as well as part or completely foreign owned or controlled. This gave rise to specific survey problems which will be dealt with later in this paper.

The Australian Bureau of Statistics (ABS) publishes statistics for a defined business unit which it titles "Management Units". The ABS (1993) records 1198 Management Units in Australia having at least 500 employees. Our survey used a term "organisation" which was defined in the questionnaire and is a close surrogate for the ABS Management Unit.

2.4 Selection of Sample

The writers believed it was essential that the survey booklet be sent to named addressees with a personally addressed introduction letter. This meant that access to a suitable mailing list was essential. We also believed that the addressee should be a senior executive of the target company. The Australian Society of Certified Practising Accountants (ASCPA) provided stratified samples of its membership database. This limited the population of companies surveyed to those with a Society member in an executive position, however, the ubiquitousness of such companies ensures that the survey population is representative of all large Australian companies. A sample size of 200 was chosen to ensure sample validity.

2.5 The Survey Booklet

The survey instrument was designed as part of a preliminary investigation into several issues relating to the planning and development of information systems in Australian companies. The issues were identified from personal experience and findings in international literature. Analysis of these provided a series of questions that required answers. These questions in turn identified data that needed to be collected. The questions in the survey instrument were designed to elicit these data.

A structured questionnaire was developed to focus on essential areas and to maintain consistency of data. The questions were designed so that, for the most part, the respondent could tick an answer box. Most questions were closed, requiring the respondent to choose from a set range

of answers, although in some cases provision was made for respondents to add another category of answer. Closed questions were used to ensure data compatibility between respondents and ensure the survey booklets could be completed within reasonable time limits. A number of open questions were also used in cases where it was considered that a totally unguided answer was necessary. The questionnaire was tested prior to use and some changes in wording resulted from this. Total confidentiality was assured.

2.6 Methodology

A mail survey was the only suitable method for the large sample to be researched. Questionnaire booklets, personally addressed introduction letters and reply-paid envelopes were mailed to ASCPA members. About three weeks later a

Description	Number of Respondents	Percentage
Finance Controller (Director)	23	34.3
Accounting Manager	10	14.9
Divisional Manager	6	9.0
Information Systems Manager	6	8.9
Management Accountant	5	7.5
CEO	3	4.5
Other managerial positions*	14	20.9

* Of the "other" positions, one was titled "data processing manager".

Table 1. Descriptions of Positions Currently Held by Respondents

follow-up letter was posted to non-responders. This was followed by a brief reminder where necessary.

3 Results

The response rate for the survey was 35%. The writers consider this to be reasonable given the nature and size of the questionnaire.

Any survey must necessarily accept that respondent bias will be reflected in the data gathered. The writers believed that organisational executives would have the necessary knowledge to complete the questionnaire and that their answers would be sufficiently homogeneous to allow analysis and reporting in summary form. Table 1 show that all respondents hold senior management or executive positions.

It is also necessary that any sample surveyed be as representative as possible of the population. Table 2 lists the organisations surveyed classified according to ABS (op cit) industry classifications. The respondent sample fits well with the population, except for over-representation of manufacturing and under representation of community services. This is almost certainly explained by manufacturing industries employing a higher percentage of accountants than do community services organisations.

The first part of the questionnaire sought to ascertain whether the companies undertake corporate strategic planning. Of the 67 valid responses, 63 organisations indicated that they undertake strategic planning and 4 responded in the negative. The results of organisations which undertake strategic planning will be presented in this paper.

In order to form an opinion as to the extensiveness of the respondents' strategic planning, respondents were asked to indicate the periodicity of their planning processes and what statements were prepared as part of their strategic planning processes. These results are listed in Tables 3 and 4.

	Number of Respondents	Percentage of Respondents	Percentage of Population*
Manufacturing	30	44.6	27.0
Finance, property and business services	11	16.4	12.8
Mining	4	6.0	2.3
Transport and storage	4	6.0	4.7
Electricity, gas and water	3	4.5	3.1
Wholesale trade	3	4.5	6.7
Retail trade	3	4.5	5.7
Agriculture, forestry or fishing	2	3.0	0.7
Construction	2	3.0	4.3
Communication	2	3.0	0.3
Recreation, personal and other services	2	3.0	7.1
Community services	1	1.5	25.6

* Source: Australian Bureau of Statistics, Profiles of Australian Business 1992. Cumulative percentages for all companies with >500 employees

Table 2. Organisations Surveyed by Industry Type*

Years	Number*	Percentage
1	11	17.5
3	25	39.7
5	23	36.5
Greater than 5	4	6.3
* n = 63		

Table 3. Time Period Covered by the Strategic Plan for Respondents Who Undertake Strategic Planning

Statement	Number*	Percentage
Financial forecasts or budgets	62	98
Organisational objectives	56	89
Economic forecasts	43	68
Competitor business appraisals	41	65
Organisational strengths and weaknesses	40	63
Organisational information requirements	34	54
Environmental issues	26	41
IS security and integrity	14	22
Competitor IS appraisals	5	8
* n = 63		

Table 4. Respondent Companies That Prepare Particular Statements as Part of Organisational Strategy.

One of the objectives of the study was to gauge to what extent information systems planning is considered to be a part of organisational strategy. The survey gathered replies to several questions in order to address this. The results in Table 5 show that the large majority of organisations do consider information systems planning to be part of their strategic planning.

As research shows that information systems issues rank as one of the most difficult areas for managers (Pervan, op cit), a simple indication of the effort required to manage information, as compared with other resources, was obtained by asking respondents to rank a list of resources in order of difficulty of planning and controlling. No weights were attached to these rankings. The results are presented in Table 6. These responses are compared in Table 6 to those given by information systems managers in a recent survey conducted by interview in South Australia.

Information is clearly considered by all information systems managers to be the most difficult resource to manage and control. There is a similar pattern in the average weightings reported in the two studies. This suggests that information management is of concern to managers with diverse backgrounds and employed in a wide variety of management and executive positions.

One of the constraints on an organisation's ability to develop information systems is directives imposed on it from whatever source. Accordingly, this study sought to

	n	Number	Percentage of Respondents
Senior management identify organisational data as a strategic resource	62	47	76%
Planning for the provision of information is a specific part of the organisations' strategic planning processes	59	45	76%

Table 5. Indicators of Extent to Which Information Systems Planning is Considered to be Part of Organisational Strategy

Resource	Weighting*	
	Accounting Background**	IS Managers***
Information	2.5	1.9
Inventory	2.75	3.5
Utilisation of Plant and	2.84	3.2
Equipment		
Personnel	3.06	3.4
Finance	3.6	4.1

* 1 = greatest difficulty, 5 = least difficult
** Respondents in this survey.
*** D Falconer, Strategic Management of Information Systems in Selected South Australian Companies, Unpublished, 1994.

Table 6. Average Weighting of Difficulty of Planning and Control of Resources: Responses by two groups of Business Managers

identify some of the constraints within which organisations operate. At this point the reader is reminded of the definition of "organisation" used in this study. Such a definition does not allow for a full analysis and documenting of the sources of all constraints. Nevertheless, the following was found:

Organisations which reported partial autonomy in developing information systems reported the following restrictions of their autonomy:
* Corporate strategic direction
* Corporate policy
* International corporate guidelines
* Central control over resources
* Government legislation
* Need to cooperate with others in industry
* Industry norms
* Customer requirements

Of all respondent organisations which undertake strategic planning, 10 have no autonomy and therefore did not complete any further part of the survey. There were 53 respondent organisations which undertake strategic planning. These responses are shown categorised by levels of autonomy in Table 8.

	Autonomy			
	n	Total %	Part %	Nil %
Strategic planning organisations	63	46.0	38.0	16.0
Non-strategic planning organisations	4	75.0	25.0	0.0
* Refer to this study's definition of "organisation".				

Table 7. Percentage of Respondent Organisations* Having Total, Part or Nil Autonomy in Developing Information Systems

	n	Number That Prepare an IS Strat Plan	Percentage
All strategic planners	53	29	58
Strategic planners with total autonomy	29	13	45
Strategic planners with part autonomy	24	16	67
* Refer to this study's definition of "organisation".			

Table 8. Strategic Planning Organisations* That Prepare a Strategic Plan for Information Systems

Owing to the small number in the samples, no attempt was made to analyse the difference in the results for the total and part autonomy organisations. It is considered relevant, however, that a large percentage of organisations that undertake strategic planning do not undertake any planning for information systems requirements and that levels of autonomy do not appear to matter.

An attempt was made to gauge the level of diligence with which the organisations carried out their planning. Respondents were asked for how many years they have been planning for information systems, the time period their plans cover, the frequency with which they revise their information systems plans and the frequency with which they review their adherence to the plans: Tables 9, 10, 11 and 12 refer.

Years	Percentage
1	10.3
2	13.8
3	13.8
4	3.4
5	20.7
6-10	27.5
>10	10.2
* Refer to this study's definition of "organisation". n=29	

Table 9. Percentage of Organisations*That Have Been Preparing Strategic Plans for Information Systems for Particular Numbers of Years.

Years	Percentage
1	10.3
3	58.6
5	24.1
>5	6.9
* Refer to this study's definition of "organisation". n=29	

Table 10. Percentages of Organisations * That Prepare Strategic Plans for Information Systems Needs Covering Particular Numbers of Years.

Frequency	Number**	Percentage
One year	21	72%
Two years	2	7%
Three years	2	7%
Five Years	2	7%
Irregular intervals	4	14%
* Refer to this study's definition of "organisation". ** n=29		

Table 11. Frequency With Which Organisations* Revise Their Information Systems Plans

Frequency	Number**	Percentage
1 month	7	24%
2 - 3 months	6	21%
6 months	2	7%
Annually	7	24%
Irregular intervals	6	21%
Unsure	1	3%
* Refer to this study's definition of "organisation". ** n=29		

Table 12. Frequency With Which Organisations* Review Their Adherence to Their Information Systems Plans

In order to learn which staff have roles in strategic planning for information systems (SISP), respondents were also asked to indicate the level of contribution to information systems planning by various categories of persons within their organisations. Table 13 reports the results.

The respondents were provided with descriptions of Earl's five strategic information systems (SIS) approaches (op cit) and were asked if any matched their strategic planning activities. It is worth noting that all respondents were able to identify with one of the five approaches. Table 14 lists the results

One of the expected outcomes of information systems planning is a portfolio of information systems projects. Respondents were asked if their strategic planning

Category	Contribution (n=29)		
	Major	Minor	Nil
IS manager	27 (93%)	2 (7%)	0 (0%)
Senior managers	24 (83%)	5 (17%)	0 (0%)
Accountant (performing all accounting functions)	15 (52%)	9 (31%)	5 (17%)
Managing director*	13 (45%)	6 (21%)	10 (34%)
Management accountant	10 (34%)	13 (45%)	6 (21%)
Chief executive*	9 (31%)	11 (38%)	9 (31%)
Financial accountant	7 (24%)	14 (48%)	8 (28%)
Other managers	7 (24%)	16 (55%)	6 (21%)
Board of directors	5 (17%)	13 (44%)	11 (37%)
Management consultant	3 (10%)	10 (35%)	15 (55%)
External auditor	2 (7%)	12 (41%)	15 (52%)
Staff organisations	2 (7%)	5 (17%)	22 (76%)
External accountant	1 (3%)	11 (38)%	17 (59%)
* No definition of these was supplied.			

Table 13. Level of Contribution of Various Persons to Information Systems Strategic Planning

Approach	Number
1	14
2	0
3	2
4	1
5	12

Table 14. Respondent Organisations Which Identify With One of Earl's SIS Approaches.

processes produce a project portfolio. Twenty-one of the respondents indicated that their organisation's strategic information systems planning results in a portfolio of information systems projects and 8 replied that their strategic processes do not result in such a portfolio.

Participants were asked what have been the major information systems problems in their organisations during the last three years. This question was open-ended with no guidance or prompting provided. Many different problems were advised and these have been summarised in Table 15. All companies were asked to identify the main information systems issues facing them over the next three years. The main issues identified were are also summarised as part of Table 15.

4 Discussion

It was no surprise that almost all the respondent organisations undertake strategic planning. Given that the sample represented the largest business organisations in Australia it was surprising that even a few organisations do not do such planning. Results in Table 5 suggest that most organisations recognise the strategic nature of organisational data and undertake strategic planning for information systems. However, Table 4 show that many organisations fail to identify their own information requirements. A large percentage still do not appraise their competitors, particularly their competitors' uses of information technology. Environmental issues are not considered by even half the respondents. It is apparent that strategic planning in many organisations is not extensive and in some cases is not fulfilling their own organisational planning objectives. The main emphasis is on the traditional areas of financial and organisational objectives. Table 6 showed respondents' ranking of difficulty of planning and controlling various resources and compared this study with another recent unpublished Australian study. The results of both studies were similar, with information ranked as the most difficult to manage in both studies. It is likely that the difficulties associated with this partly explain the failure of many organisations to adequately plan for their information needs. The authors will address the effect of lack of extensiveness of planning in a future paper.

A major difficulty in researching large companies in Australia is caused by cross-ownership, parent-subsidiary and other group relationships as well as overseas ownership and control. The clear identification of sources of control and decision making is impossible in survey-based research. In order to focus on local decision making, the term "organisation" was explained and used in the survey. The writers recognised that many of the respondent "organisations" would have only partial or no autonomy in planning and decision making. Accordingly, the writers attempted to identify the effect of different levels of autonomy on strategic information systems planning. The

Problems	Numbers of Responses		Issues
Existing systems inadequacies	22	20 9 4	Upgrading existing systems Business Process Reengineering Increase decision support
Insufficient non-HR resources	17	8 2	Cost containment Require value for IS expenditure
Lack of planning and coordination	13	-	

Human resources
  Lack of quality IS / project staff
  Lack of IS knowledge in general management
	7
	5
		4
		5
		3
			Human resources
			  Lack of quality IS / project staff,
			  Inappropriate staff culture,
			  Inadequate general management awareness of information technology use and management

Quality of project management	5	2	Quality of project management
Coping with changing technology and complexity of technology	6	6 3 3 3 2 1 1	Software selection and quality Hardware selection LAN development Coping with changing technology Client/server Information technology standards Choosing right system

Table 15. Summary of Reported Information Systems Problems Experienced by Organisations During Last Three Years Compared with Summary of Reported Major Information Systems Issues Facing Organisations Over Next Three Years.

results presented in Tables 7 and 8 suggest that, although there are many restrictions on their planning scope, the level of autonomy appears not to make much difference. This might be explained by companies recognising the need for local planning and decision making.

Only 58% of respondent organisations prepare separate information systems plans, and of those, approximately 38% have been doing so for three years or less. This suggests that strategic information systems planning is by no means universal, but there is a strong trend for organisations to commence such planning. If this trend continues it is likely that SISP will eventually become the norm in most organisations. The majority of information systems plans cover a 3 year horizon, with another 25% planning 5 years ahead. Most (72%) revise their SISPs annually, with 14% at unplanned, irregular intervals. Most organisations conduct quite frequent reviews of their information systems plans. These results suggest that, although in its infancy in many organisations, considerable effort is being expended to plan and control information systems needs.

Table 13 presents the levels of contribution made by various persons to information systems strategic planning. Both "managing director" and "chief executive" were provided as choices in the questionnaire. They have been reported separately, but have been aggregated to investigate patterns of involvement. Only 38% of chief executives have a major involvement in SIS planning. While senior managers generally have a high involvement, accountants, to whom this survey was addressed, have a much lower level of involvement. About two-thirds of boards of directors have some involvement, presumably in a monitoring capacity, with the remaining third having no

involvement at all. With the high levels of expenditure and increasing reliance on information technology in business, all boards of directors should appraise what monitoring activity is prudent. Large organisations appear to make only slight use of external consultants.

As part of an attempt to identify the quality of strategic information systems planning and the processes and methodologies used, the writers sought to verify that the five approaches identified by Earl (op cit) are sufficient to encompass the planning activities of all organisations. This was confirmed as all organisations were clearly able to identify with one of the approaches. It is noteworthy that about half the respondents identified with Earl's first approach (business led) and about half with his fifth approach (organisational). No company identified with the second approach (method driven). The writers will report further on this and related data in a separate paper.

The survey was designed to identify the drivers of decision making leading to the development of new information systems. One of the expected major contributors to these decisions is information systems strategic planning. Only 72% of respondents indicated that their strategic planning processes led to the identification of systems projects. The writers will report extensively on the issue of drivers of project selection in a later paper.

A diverse range of problems and issues was reported by all respondents. These have been summarised and juxtaposed in Table 15. This recognises that many of the problems faced by organisations during the last three years have not been solved and have been reported as important issues for the next three years.

Many organisations reported existing systems inadequacies. Corresponding issues are associated with

replacing or upgrading existing systems, either individually or more extensively through a process of business reengineering. The drivers of systems inadequacy are: organisational change, the desire / need to do business in better ways and technical obsolescence. Of these, the first two are within the scope of management to control, the last derives from changes in the business environment: the means of doing business are constantly changing. This is an external opportunity (or threat) to which management must respond.

There were 19 responses which indicated that new technology (LAN development, for example), or its selection and use, is a key issue. These responses have been summarised into 7 main topics. The breadth of responses reflects the development of new technologies available. Businesses are being inundated with new technologies and are finding it difficult to choose and implement solutions. The successful integration of hardware, software, internal and external communications and data sharing are dependent on the quality of management.

Almost all the remaining problems are related to resources, either financial or human. There was strong concern expressed at the lack of adequate quality and numbers of information systems and project staff. A number of respondents indicated that their information systems staff lacked general business knowledge.

Apart from the technology problems and issues referred to above, the problems and issues identified by the respondents are not really information technology or systems related. They are clearly management issues. Changing technology provides opportunities for new ways to do business, but management must have the knowledge and resources to benefit from the new technologies. There is a strong recognition that management must get value out of information technology expenditure. How this may be done and what are appropriate success indicators are management issues. Clearly, addressing the many management issues raised will go a long way to solving many of the "information technology" problems experienced by Australian businesses.

5 Implications

This study identifies many deficiencies in information systems planning in large Australian businesses. The results of this research have implications for Australian practitioners, researchers and educators. The study has provided a survey of information systems planning issues which can be used by practitioners to better understand the processes and outcomes of their own information systems planning. It has shown that many managers mistake the nature of their information technology problems. Managers should review their information technology problems, often they will be seen to be management issues rather than technology issues. The results presented in this paper, together with the results of the rest of the project, will help to form a foundation for further research in an Australian context. Such research might attempt to identify specific management skills and techniques that will assist Australian businesses to make better use of information technology. Educators should develop strategies for appraising Australia's current and future business managers of these

matters. Modern management courses must identify and address the management issues associated with the planning and development of business information systems.

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