Benchmarking for information systems management using issues framework studies: content and methodology

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Keywords *Information systems, Benchmarking, Management*

Abstract *As a means of benchmarking their position and assisting with anticipating an uncertain future, the identification of critical information systems (IS) management issues frameworks is becoming an increasingly important research task for both academics and industrialists. This paper provides a description and summary of previous work on identifying IS issues frameworks by reviewing 20 research investigations in terms of what they studied and how they were conducted. It also suggests some possible directions and methodologies for future research. The summary and suggestions for further work are applicable for issues framework research in the IS management field as well as in other business and management areas.*

Introduction

The *Oxford English Dictionary* defines an "issue" as something under discussion. In recent years issues have become the subject of study in their own right and the use of frameworks by researchers to organise issues into a logical and coherent structure has become a popular means whereby issues can be analysed. Where issues framework investigations are carried out longitudinally over time, or between contexts, such as in different countries, they can be a useful means of benchmarking issues in terms of their current and future importance within such contexts.

In this paper a particular type of framework is considered, namely that which relates to information systems (IS) issues. Because of the fast moving nature of information systems a great deal of research effort has been spent in identifying the critical IS management issues, in estimating their importance, and in integrating the identified issues into IS management issues frameworks according to the level of importance that has been assigned. A more focused type of framework, a critical (or key) IS management issues framework, includes the most important issues only and is the type given further consideration in this paper. Some issues framework studies have been more general, while others have dealt with specific areas, such as the international arena, the public sector, and the academic. Another aspect is to identify the similarities and differences among various issues frameworks perceived by IS professionals of different regions or groups. Thus, some studies have focused

Benchmarking: An International Journal, Vol. 8 No. 5, 2001, pp. 358-375. © MCB University Press, 1463-5771

on benchmark comparisons between two, or among various, issues frameworks, based on the frameworks identified in their own surveys. Yet another research direction is cause-effect examination – testing which factors will influence the key IS management issues, and how strong these factors impact on the judgement of IS professionals.

According to the main purposes of these studies, the frameworks themselves can be classified into four types as follows:

(1) *frameworks for identification*, i.e. for the purpose of identifying IS management issues in different contexts;

(2) *frameworks for comparison*, i.e. for the purpose of comparing the critical IS management issues frameworks perceived by various groups of IS personnel in different studies or the same study;

(3) *frameworks that are used to analyse trends*, i.e. for the purpose of analysing key issues and historical trends regarding their increasing or decreasing importance; and

(4) *frameworks for examination*, i.e. for the purpose of examining particular factors and attempting to understand the influences these factors have on the perceptions of the critical IS management issues among the IS personnel studied.

Critical IS management issues frameworks

A critical (or key) IS management issues framework refers to a structure comprising the most critical IS management issues ranked according to their importance. In today's fast moving world, especially in the information systems field, organisations and individuals wanting to compete effectively must move their managerial paradigms from being largely reactive to predominantly anticipatory (Barker, 1992). One typical area of anticipatory management behaviour, that of issues identification and management, helps organisations to become active participants in shaping the future, rather than merely reacting to it (Coates *et al.*, 1986). Although issues identification has become an increasingly important activity it is not yet generally practised in small to medium-sized organisations because the early identification of emerging problems can be an extremely complex process (Coates *et al.*, 1986). To help the whole IS community, therefore, there has been increased interest in conducting research into the critical issues facing IS practitioners (Nolan and Wetherbe, 1980). Since the early of 1980s, researchers have conducted many studies to identify critical IS management issues (see for example Ball and Harris, 1982; Brancheau and Wetherbe, 1987; Brancheau *et al.*, 1996; Caudle *et al.*, 1991; Deans *et al.*, 1991; Dickson *et al.*, 1984; Harrison and Farn, 1990; Hartog and Herbert, 1986; Hirschheim *et al.*, 1988; Mata, 1993; Moynihan, 1990; Niederman *et al.*, 1991; Rao *et al.*, 1987; Wang, 1994; Watson, 1989).

Most of these previous research efforts were aimed at identifying the key IS management issues, on estimating the importance of each issue, and to compose these issues into IS management issues frameworks according to their

importance. These issues frameworks benefit the IS community by suggesting some general directions and concerns in the IS management area for practice, research and education. Issues frameworks are more useful than the identification of particular issues in isolation because IS activities will continue in many directions, so technology, strategies, organisation structure, individuals and their roles, and management processes can be developed as a whole (Earl, 1992; Somogyi and Galliers, 1987).

With the identification of critical issues becoming an important research task, a better understanding is required concerning how to conduct such a study and what needs to be researched further. In order to provide information and guidance for further research this paper reviews 20 previous IS management issues framework studies that have been published since 1980. These studies have been conducted in the USA, Europe, the Asia Pacific region, and Latin America. Some studies have been more general, while others have dealt with specific areas, such as the international arena, the public sector, and the academic perspective. Some have gone further by focusing on comparisons between two or more issues frameworks and/or cause-effect examination – i.e. testing which factors will influence the issues identification. Based on its evaluative literature review, this paper suggests some possible research directions and methodologies for future investigations. Although the authors have only discussed issues framework studies in the IS management field, in many respects the results are also applicable for issues framework research in other business and management areas.

Literature scope

An appropriate way to obtain an understanding to guide future research is to review related published studies. Journals and periodicals are a major part of the formal communication system for exchanging information (Boyer and Carlson, 1989). Their content will normally be judged more critically for theoretical content and will see more efforts channelled towards theory building in the IS context (Straub *et al.*, 1994). However, there are hundreds of journals addressing issues in the IS field, so an analysis of every one of them would be prohibitive (Boyer and Carlson, 1989; Szajna, 1994), but analysing a number of leading journals would provide a good understanding of the priorities and concerns of the IS community (Alavi and Carlson, 1992). A number of studies have been conducted to rank the leading journals in the IS field (e.g. Holsapple *et al.*, 1993, 1994; Nord and Nord, 1995). As a result, a two tier list that includes the 17 top IS journals has been suggested (see Appendix 1).

The authors used the two tiers to guide the early stages of the literature search, although in practice the search was not confined solely to these journals. In fact, although most of the 20 studies reviewed in this paper were reported in journals within the two tiers, some of them were derived from other journals, conferences, and doctoral dissertations. If they are aware of the normal publication outlets researchers will know which journals and communities are more interested in such studies in their own area, whom they

can correspond with, and where the study reports are usually sent. Table I shows where and when these studies were published.

This paper does not include those studies about critical success factors (CSFs), although certain CSFs were also key issues in some of the studies (Boynton and Zmud, 1987; Martin, 1982; Rockart, 1987). In this paper, the definitions of CSFs and issues are different. In general, factors refer to facts or circumstances that help to bring about or influence a result, while issues refer to questions that arise for discussion. CSFs are necessary and sufficient to ensure success (Williams and Ramaprasad, 1996), while issues suggest general directions that senior executives can take to assist in the formulation of strategic plans (Brancheau *et al.*, 1996).

Some issues may not be so vital for an organisation's success until their potential implications and corresponding solutions have been clarified through in-depth and sufficient discussions and studies. While the number of CSFs is often limited from four to seven, the number of issues can be more (from 16 to 37 in the studies reviewed in this paper).

This paper also does not include many of the previous studies that have focused on investigating and understanding one or more particular IS management issues. This is because they are, strictly speaking, not IS management issues framework studies according to the definition given earlier.

Which areas have been studied?

Overview of previous studies

Based on the 20 papers reviewed, the preliminary purposes of these studies have been classified into the four types identified earlier, i.e:

Publication sources	Number	Studies
MIS Quarterly	9	Ball and Harris, 1982; Dickson *et al.*, 1984; Hartog and Herbert, 1986; Brancheau and Wetherbe, 1987; Moynihan, 1990; Watson, 1990; Caudle *et al.*, 1991; Niederman *et al.*, 1991; Brancheau *et al.*, 1996.
Information & Management	3	Harrison and Farn, 1990; Watson and Brancheau, 1991; Wang, 1994
Doctoral dissertation	3	Jackson, 1990; Mata, 1993; Shi, 1998
Datamation	1	Herbert and Hartog, 1986
Journal of Management Information Systems	1	Deans *et al.*, 1991
Information Technology – Journal of SCS	1	Rao *et al.*, 1987
Australia Computer Journal	1	Watson, 1989
Conference	1	Hirschheim *et al.*, 1988

Table I.
Publication sources of the identified IS management issues framework studies

(1) frameworks for identification;
(2) frameworks for comparison;
(3) frameworks for trend analysis; and
(4) frameworks for examination.

Table II lists the 20 studies with a brief description in terms of the researchers, when and where they were conducted and what were the key results. The studies are presented in chronological order because subsequent studies are often influenced by and/or related to prior studies.

"Who" refers to the researchers that carried out the study, "When" indicates the year the report was published. "Where" is the region in which the study took place, and "What" refers to the main results included in the relevant papers. These IS management issues frameworks have consisted of between 15 and 37 issues, while the key issues frameworks generally comprise the top ten issues. The following sections discuss the four research directions.

Issues identification

As an applied field, IS research needs to be relevant to practitioners by addressing the issues that are of concern to them. The identification of a key IS

Who (researchers)	When	Where	What (key results/benefits)
Ball, Harris	1982	USA	18 issues, pioneer study
Dickson *et al.*	1984	USA	19 issues, first Delphi study
Hartog, Herbert	1986	USA	21 industry issues
Herbert, Hartog	1986	USA	23 industry issues
Brancheau, Wetherbe	1987	USA	26 issues, CEO vs CIO comparison, trend
Rao *et al.*	1987	Singapore	22 Singapore issues, comparison vs USA
Hirschheim *et al.*	1988	UK	22 issues in UK
Watson	1989	Australian	36 Australian issues, comparison vs USA
Harrison, Farn	1990	Taiwan, USA	16 Taiwan and US issues, regions comparison
Jackson	1990	USA	31 Academic and Industry issues, sectors comparison
Moynihan	1990	Ireland	17 issues, CEO, CIO and SFM comparisons
Watson	1990	Australian	Conceptual model examination
Caudle *et al.*	1991	USA, public	37 public sector issues, sector comparison
Deans *et al.*	1991	USA	32 multinational firm's issues, industry comparison
Niederman *et al.*	1991	USA	25 issues, sectors, position comparisons, trend
Watson, Brancheau	1991	International	15 universal issues, regions comparison
Mata	1993	Latin America	33 issues, countries comparison, conceptual model examination
Wang	1994	Taiwan	30 Taiwan issues, industry comparison
Brancheau *et al.*	1996	USA	20 issues, comparison with the 1991 study, trend
Shi	1998	Singapore	20 issues, comparison, model examination

Table II.
Who, when (year published), where and what in previous studies

management issues framework helps IS personnel to become aware of current and future trends. Although the issues frameworks may change somewhat from one study to the next, suggesting that nothing is static in this field, the IS community benefits from the assessments obtained from different sample groups of IS professionals.

The basic purpose of an issues identification study is to gather and analyse IS professionals' perceptions in order to construct a framework for critical IS management issues frameworks. An early study (Dickson *et al.*, 1984) identified the three essential IS study questions as being:

(1) What are the critical IS management issues perceived by IS professionals?

(2) What is the order of importance of these issues?

(3) How much agreement do the IS professionals have about these issues?

Most of the 20 studies have adopted these three essential questions within different contexts. The issues frameworks can be classified according to their sample or geographical area covered. Table III categorises these frameworks by their sample, while Table IV groups them by their geographical coverage.

Comparison

After several IS management issues frameworks had been identified, the question could be asked as to the similarities and differences among the various issues frameworks perceived by various IS professional groups. Thus, some later studies focused on the comparisons between two or more issues frameworks. The various types of comparison in these studies are briefly presented in Table V.

Trend analysis

Historical trend analysis is a particular comparison that has been made. Such an analysis focuses on examining which issues had increased in importance

Samples	Studies
SIM (US) members	Ball and Harris, 1982; Dickson *et al.*, 1984; Brancheau and Wetherbe, 1987; Niederman *et al.*, 1991; Brancheau *et al.*, 1996
SIM (Singapore) members	Shi, 1998
General	Hartog and Herbert, 1986; Herbert and Hartog, 1986; Rao *et al.*, 1987; Hirschheim *et al.*, 1988; Watson, 1989; Harrison and Farn, 1990; Watson and Brancheau, 1991; Moynihan, 1990; Mata, 1993; Wang, 1994
Academic	Jackson, 1990
Public sector	Caudle *et al.*, 1991
Multinational firm	Deans *et al.* 1991

Table III. Sample of the identified issues frameworks

and which issues had declined in importance. This analysis needs to draw on a series of related studies conducted at different times.

Among the 20 studies, the most significant ones are four continuing and related studies (Dickson *et al.*, 1984; Brancheau and Wetherbe, 1987; Niederman *et al.*, 1991; Brancheau *et al.*, 1996). These are the so-called SIM/MISRC series of studies because they were all sponsored by the Society for Information Management (SIM) United States Chapter and conducted by the MIS Research Center (MISRC) at the University of Minnesota. The series employed the same methodology (Delphi study) and data source (SIM members) in the same geographical area. In the SIM/MISRC series, the issues identified in previous studies were used as the basis for the subsequent study. A historical trend analysis was therefore carried out in the second, third and fourth SIM/MISRC studies. The trend analysis indicated that many management issues had increased in importance, while some technology issues had steadily declined in importance. However, certain technology issues concerning IT infrastructure and architecture had also increased in importance in the 1990s. In addition,

Table IV.
The broad geographical coverage of the identified issues frameworks

Geographical coverage	Studies
Developed countries	Ball and Harris, 1982; Dickson *et al.*, 1984; Hartog and Herbert, 1986; Herbert and Hartog, 1986; Brancheau and Wetherbe, 1987; Hirschheim *et al.*, 1988; Watson, 1989; Harrison and Farn, 1990; Jackson, 1990; Moynihan, 1990; Caudle *et al.*, 1991; Niederman *et al.*, 1991; Brancheau *et al.*, 1996
Developing countries	Rao *et al.*, 1987; Harrison and Farn, 1990; Mata, 1993; Wang, 1994; Shi, 1998
International	Deans *et al.* 1991; Watson and Brancheau, 1991

Table V.
Types of comparison in previous IS issues framework studies

Groups	Studies
Academic vs industry	Jackson, 1990
Public vs private	Caudle *et al.*, 1991
Industry types	Deans *et al.*, 1991; Niederman *et al.*, 1991; Mata, 1993; Wang, 1994
IS vs non-IS managers	Brancheau and Wetherbe, 1987; Moynihan, 1990; Wang, 1994
Practitioners vs observers	Niederman *et al.*, 1991
Developed vs developed regions	Moynihan, 1990; Watson and Brancheau, 1991
Developing vs developing regions	Mata, 1993
Developing vs developed regions	Rao *et al.*, 1987; Harrison and Farn, 1990; Watson and Brancheau, 1991; Mata, 1993; Shi, 1998
Current vs future views	Wang, 1994

many narrow, specific issues had evolved from the broader and global issues. Some other studies also analysed the trends by comparing issues identified in their findings and those of previous studies.

Examination

An "examination study" focuses on establishing a conceptual model to test which factors will influence IS professionals' judgements in identifying critical issues. Three studies reported such examinations. One research model (Watson, 1990) suggests that two factors will influence issues identification. The two factors are the IS manager's scanning behaviour and the relationship between CEOs and CIOs in the same firm. Another conceptual model (Mata, 1993) proposes that issues identification will be influenced by industry type, firm size (income/budget, and number of employees), the IS manager's position, and the importance of IT in the firm. A more recent study (Shi, 1998) suggests a conceptual model to test the influence of several factors on issues framework identification. These factors are organisational IT environment, IT use, managerial IT knowledge, individual information scanning behaviour, education, experience, and IS management knowledge and skills construct. The three models were statistically tested and correspondingly validated in three studies.

How the studies were conducted

Knowing what has been previously studied is necessary to shape future research directions and understanding how previous studies were conducted provides valuable information for research design. This section discusses the methodologies employed in these issues studies.

Methodology

As their common basis the 20 studies adopted an empirical, quantitative, research strategy, including various methodologies like postal questionnaire surveys, Delphi techniques, interviews and secondary data collection. Case study analysis, one of the qualitative methodologies, was combined with a questionnaire survey in one study. Table VI shows the methodologies used.

Twelve of the 20 studies used postal questionnaires since they could be used to collect data in a shorter time and cover a wider population than other methodologies. The major shortcomings of this methodology are the lack of interaction with participants and the uncertainty of response rate.

Five studies employed the Delphi technique, which is a series of linked surveys or questionnaires. Starting with an open-ended questionnaire, succeeding questionnaires feed back group responses to preceding questionnaires and ask respondents for further information. The process stops when consensus has been reached or sufficient information has been exchanged. The Delphi methodology is an appropriate way of identifying and ranking issues in the field of information management. However, it needs more

Study	Methodology			
	Postal questionnaire survey	Interview or case study	Delphi	Secondary data
Ball and Harris, 1982	×			
Dickson *et al.*, 1984			× (4 rounds)	
Hartog and Herbert, 1986	×	×		
Herbert and Hartog, 1986	×			
Brancheau and Wetherbe, 1987			× (3 rounds)	
Rao *et al.*, 1987	×			
Hirschheim *et al.*, 1988		×		
Watson, 1989			× (3 rounds)	
Harrison and Farn, 1990	× (2 surveys)	×		
Jackson, 1990	× (2 surveys)			
Moynihan, 1990		×		
Watson, 1990	×			
Caudle *et al.*, 1991	×	×		
Deans *et al.*, 1991	×	×		
Niederman *et al.*, 1991			× (3 rounds)	
Watson and Brancheau, 1991				×
Mata, 1993	× (3 surveys)	×		
Wang, 1994	×			
Brancheau *et al.*, 1996		×	× (3 rounds)	
Shi, 1998	×	× (case study)		
Total	12	9	5	1

Table VI. Data collection methods used in the issues studies

effort and a longer time to carry out and the response rate may become progressively lower in the round-by-round procedure.

Interviews can offer interaction with participants and can obtain better quality responses. On the other hand they need a lot of time and good co-operation from interviewees. Only two studies used interviews alone to collect data.

Six studies used a postal survey and follow-up interviews. The interviews focused on why the interviewees had rated the issues in the way they did. Moreover, one study combined a postal survey and multi-case studies to increase the robustness of results.

Data analysis

Most of the studies collected quantitative data from their subjects and statistically analysed these data to identify IS management issues frameworks using means and standard deviations (SD). The order of any issues in a framework is normally determined by the obtained statistical means. The higher the value of means, the more importance the issue assumes. The observed SD for an individual issue, on the other hand, quantifies the level of agreement among the participants. The lower the value of the SD, the higher the level of agreement assumed for that issue.

Various statistics were employed by these studies for different purposes. The following are some examples. Pearson's chi-square statistic was used for data analysis to determine the existence of relationships between two groups on the level of importance of issues (Caudle *et al.*, 1991; Jackson, 1990). Kendall's tau-b correlation statistic was used to measure the agreement of issues rankings across different regions or groups, the degree of correlation between the current and future rankings, and issues rankings yielded in prior studies (Brancheau and Wetherbe, 1987; Mata, 1993; Wang, 1994; Watson and Brancheau, 1991). ANOVA and MANOVA were used to test for differences among groups of firms (Deans *et al.*, 1991). The difference in means scores were examined using ANOVA and Scheff tests (Wang, 1994).

Hypotheses or linear relationships between variables were tested using correlation analysis (Shi, 1998; Watson, 1990). Whenever summary measures are used there is a risk of masking important details, while scatter diagrams can reduce the level of error (Burns, 1997; Cryer and Miller, 1994; Norusis, 1991). Scatter diagrams, including scatter plots on two variables and regression lines, were used to display statistical relationships between the variables (Shi, 1998).

Measurement techniques

Measurement is defined as the assignment of a number indicating the quantity or quality of some object that the researcher seeks to assess. Measurement techniques are a means of achieving two important objectives:

(1) to communicate scientific findings; and

(2) to achieve interpersonal agreement as to the validity of those finding (Roscoe, 1975).

In addition, the type of statistics used to analyse the data will depend on the type of measurement used (Andrews *et al.*, 1981; Norusis, 1991).

As was mentioned earlier, the statistical means and SDs for key issues were obtained by analysing the data provided by participants. To gather the participants' perceptions either a rating or a ranking was employed. Ranking asks the participants to prioritise together all the issues in a questionnaire or an interview, while rating requests the participants to rate the importance of each issue in a questionnaire individually.

Practically, rating is less taxing mentally since the simultaneous assessment of several issues may distort the ranking. The respondents can also evaluate one issue at a time rather than simultaneously considering all top critical issues and can attach the same importance among more than one issue (Niederman *et al.*, 1991). Among the survey-based studies, 14 employed rating but only two used ranking. In the two pure interview studies ranking was used in the sense that interviewees were asked to order the important issues.

Theoretically, rating is more powerful than ranking based on the following arguments. A scale is a critical mechanism to measure or distinguish the

variables since measurement involves the systematic representation of the data by numbers. As shown in Appendix 2, there are four basic forms of scale:

(1) nominal;

(2) ordinal;

(3) interval; and

(4) ratio (Aczel, 1993; Burns, 1997; Emory, 1980; Roscoe, 1975; Sekaran, 1992).

Ranking belongs to the ordinal scale, while rating belongs to the interval scale. In short, the nominal and ordinal scales can categorise variables and identify the differences between the groups, while the interval and ratio scales can obtain some idea of the quantitative differences in the variables. The degree of sophistication and power of the scale increases as the investigator moves from the nominal to the ratio scale. With more powerful scales the more detailed information can be obtained on the variables of interest, and increasingly sophisticated data analyses can be performed to obtain more meaningful outcomes.

Scale points

If an interval scale or rating is used the number of points has to be decided. Table VII shows how the 14 studies applied different points for measuring the key issues.

There are several choices according to the needs of the research. Using a seven-point scale or above, may give respondents more choices, particularly when many issues are being identified and rated. Adopting a scale of five-points or fewer, on the other hand, may make a questionnaire appear more concise and simpler. In fact it has been shown that a five-point scale is just as good as any and that an increase from five to seven or nine points on a rating scale does not improve the reliability of the ratings (Elmore and Beggs, 1975; Sekaran, 1992).

Response and influencing factors

The number of responses and rate of response are critical for a management study. The data collection methods and the relationships between investigators

Table VII.
Rating points used in previous studies

Rating point	Studies
Ten-point	Harrison and Farn, 1990; Mata, 1993; Niederman *et al.*, 1991; Watson, 1989; Brancheau *et al.*, 1996
Seven-point	Deans *et al.*, 1991; Wang, 1994
Six-point	Ball and Harris, 1982
Five-point	Caudle *et al.*, 1991; Jackson, 1990; Rao *et al.*, 1987; Shi, 1998
Four-point	Hartog and Herbert, 1986; Herbert and Hartog, 1986

and participants may affect the response rate. Studies sponsored by appropriate organisations may yield a higher response rate. Table VIII presents the studies with the associated number of responses, the response rate, data collection methodology and sponsors.

Issues category schemes

To facilitate discussion, most IS management issues can be classified into different groups according to their dominant attributes using the following schemes:

Study	Number of responses	Rate (%)	Methodology	Sponsor
Ball and Harris, 1982	417	29.8	Survey	SIM
Dickson *et al.*, 1984	52; 102; 62; 54		4 rounds Delphi	SIM/MISRC
Hartog and Herbert, 1986	63	58.8	Survey, interview	CSDP
Herbert and Hartog, 1986	600	30	Survey	CSDP/ *Datamation*
Brancheau/Wetherbe, 1987	90; 54; 68	50; 60; 76	3 rounds Delphi	SIM/MISRC
Rao *et al.*, 1987	19	18	Survey	NUS
Hirschheim *et al.*, 1988	10	100	Interview	IBM UK
Watson, 1989	52; 55; 48	26; 27; 24	3 rounds Delphi	
Harrison and Farn, 1990	94; 116	39, 10	2 surveys, interview	
Jackson, 1990	94; 155	25; 45	2 surveys	OSU
Moynihan, 1990	49	100	Interview	DCU
Watson, 1990	43	21.5	Survey	
Caudle *et al.*, 1991	354	33.6	Survey, interview	NAS
Deans *et al.*, 1991	183	31.1	Survey, interview	
Niederman *et al.*, 1991	114; 126; 104		3 rounds Delphi	SIM/MISRC
Mata, 1993	99; 39; 12	69; 15; 17	3 surveys, interview	TU
Wang, 1994	297	32	Survey	
Brancheau *et al.*, 1996	78; 87; 83	36; 40; 38	3 rounds Delphi	SIM/MISRC
Shi, 1998	54	21.6	Survey	SIM Singapore

Notes: There are two blank spaces in the response rate column since the two corresponding papers did not provide this information. CSDP: Center for the Study of Data Processing, Washington University; DCU: Dublin City University; NAS: National Association of Schools of Public Affairs and Administration; NUS: National University of Singapore; MISRC: MIS Research Center at University of Minnesota; OSU: Oklahoma State University; SIM: Society for Information Management; TU: Texas A&M University

Table VIII. Response, methodology and sponsor

- management or technology (Dickson *et al.*, 1984; Hartog and Herbert, 1986; Herbert and Hartog, 1986; Wang, 1994);
- management or enterprises, and technology or applications (Brancheau and Wetherbe, 1987; Deans *et al.*, 1991);
- management or technical, planning or control, internal or external (Rao *et al.*, 1987; Watson, 1989; Niederman *et al.*, 1991; Watson and Brancheau, 1991; Mata, 1993).

There is little fundamental difference among these schemes. Distinguishing issues by different dimensions according to the issues' dominant aspect means the category schemes are not presented as a rigid formula but as a guide for discussion and understanding. Management issues tend to deal with organisational factors, such as policy, strategy and structure, while technology issues tend to deal with the specification, acquisition, development, use, and protection of IT. Planning issues tend to take a long-range strategic view of problems, while control issues tend to take a mid-range tactical view. External issues are concerned with management of the business as a whole and affect the functioning of other departments within an organisation, while internal issues are concerned with the management of the IS organisation and related technologies.

Discussion

What needs to be studied further?

A number of IS management issues frameworks have been identified in various contexts and many comparisons among these frameworks have also been carried out. For both issues identification and comparison the most feasible directions for further study are replications in order to offer more up to date findings to the IS community. Such studies are necessary since a key issues framework is based on a three to five year projection and it is difficult to predict what would be the key issues beyond this period. Moreover, the replicated studies make possible a historical trend analysis. While nobody can accurately predict the future, examination of current trends provides some useful indicators. Such a trend analysis only makes sense if a series of consistent studies is conducted regularly, and in the long term, with the same methodology and investigation sources, like SIM/MISRC series. A better understanding of historical trends can be obtained in such a series of studies, in which any subsequent study compares its findings with those of the previous, related, studies.

Three conceptual models were proposed, explicitly aimed at examining some of the influencing factors. There are many factors connected with anticipatory behaviour regarding issues although their influences have not yet been examined. The tendency of IS researchers should focus on replication, refinement and development of models after conducting a number of studies on a special topic (Adams *et al.*, 1992). Conceptual models help the researcher to postulate and examine certain relationships in order to improve the

understanding of the dynamics of a situation (Sekaran, 1992). Now should be the time to apply greater research effort towards exploring the variables, cause-effect relationships and processes behind the phenomena of issues identification.

A possible future approach

The strategy for an issues framework study is based on a empirical paradigm using qualitative and/or quantitative methods. A survey is the most common quantitative method used in social science and IS management research (Bennett, 1983; Goyder, 1985; Kraemer and Dutton, 1991; McGaw and Watson, 1976). As one of qualitative methods the case study is becoming increasingly accepted as a scientific tool in the IS field (Benbasat *et al.*, 1987; Burns, 1997; Gable, 1994; Gummesson, 1991; Yin, 1989; Walsham, 1995). However, both surveys and case studies have inherent advantages and disadvantages when used in management research. A survey is not well suited to identifying the nuances and subtle patterns of human behaviour, while a case study is not well suited to capturing the role played by organisational factors which might moderate the relationship between technological and organisational change (Kraemer and Dutton, 1991). Sophisticated investigators thus should try to integrate multiple research methods in order to increase the robustness of results (Aldag and Stearns, 1988; Burns, 1997; Sekaran, 1992; Yin, 1989). Combining both a survey and case study approach can generate more outcomes. While surveys can gather quantitative data for statistical analysis to establish key issues frameworks and test hypotheses, case studies can provide rich evidence to shed some light on how and why participants judge issues to be important. The Delphi technique is a sophisticated quantitative method of issues identification. However, both Delphi and combined studies need more resources, such as time, budget, commitment and support from organisations and individuals.

Various statistical techniques, like chi-square, Kendall's tau, correlation coefficient and scatter diagrams, have been shown to be effective for different purposes. Researchers can select any of these techniques according to their research purposes.

In future comparison and examination studies the need is to focus on issues frameworks rather than individual issues and use an issues framework as a single structure variable (Shi and Bennett, 1998). IS roles reflect a rectification of past weaknesses and the creation of future capabilities (Venkatraman, 1997). As a structure, a key IS management issues framework reflects the predominant future IS organisational challenges in both the rectification and creation roles (Shi and Bennett, 1998). To senior executives, such issues frameworks are more useful than a particular issue since they should focus time and energy on the highest value-adding responsibilities (Rockart *et al.*, 1996).

Conclusions

Identifying critical IS management issues frameworks is an increasingly important area for both academic research and industry. By examining 20 previous studies, this paper has presented a summary of these studies and suggested the directions and methodologies for future issues research. The summary presented and suggestions made, even though they are driven from issues framework studies in the IS management area, are applicable to all those who are interested in carrying out issues framework studies, not only in the IS management area but also in other business and management fields.

References

Aczel, A.D. (1993), *Complete Business Statistics*, 2nd ed., Irwin, Homewood, IL.

Adams, D.A., Nelson, R.R. and Todd, P.A. (1992), "Perceived usefulness, ease of use, and usage of information technology: a replication", *MIS Quarterly*, June, pp. 227-47.

Alavi, M. and Carlson, P. (1992), "A review of MIS research and disciplinary development", *Journal of Management Information Systems*, Spring, Vol. 8 No. 4, pp. 45-62.

Aldag, R.J. and Stearns, T.M. (1988), "Issues in research methodology", *Journal of Management*, Vol. 14 No. 2, p. 253.

Andrews, F.M., Klem, L., Davidson, T.N., O'Malley, P.M. and Rodgers, W.L. (1981), *A Guide for Selecting Statistical Techniques for Analyzing Social Science Data*, 2nd ed., Survey Research Center Institute for Social Research, University of Michigan, Ann Arbor, IL.

Ball, L. and Harris, R. (1982), "SMIS members: a membership analysis", *MIS Quarterly*, March, pp. 19-38.

Barker, J.A. (1992), *Future Edge: Discovering the New Paradigms of Success*, William Morrow and Company, Inc., New York, NY.

Benbasat, I., Goldstein, D.K. and Mead, M. (1987), "The case research strategy in studies of information systems", *MIS Quarterly*, September, pp. 369-86.

Bennett, R. (1983), *Management Research: Guide for Institutions and Professionals*, International Labour Office, Geneva.

Boyer, G.L. and Carlson, G. (1989), "Characteristics of periodical literature for the potential reader or author in information management", *MIS Quarterly*, June, pp. 221-9.

Boynton, A.C. and Zmud, R.W. (1987), "An assessment of critical success factors", in Madnick, S.E. (Ed.), *The Strategic Use of Information Technology*, Oxford University Press, Oxford, pp. 84-98.

Brancheau, J.C. and Wetherbe, J.C. (1987) "Key issues in information systems management", *MIS Quarterly*, March, pp. 23-45.

Brancheau, J.C., Janz, B.D. and Wetherbe, J.C. (1996), "Key issues in information systems management: 1994-95 SIM Delphi results", *MIS Quarterly*, June, pp. 225-42.

Burns, R.B. (1997), *Introduction to Research Methods*, 3rd ed., Longman, White Plains, NY.

Caudle, S.L., Gorr, W.L. and Newcomer, K.E. (1991), "Key information systems management issues for the public sector", *MIS Quarterly*, June, pp. 171-88.

Coates, J.F., Coates, V.T., Jarratt, J. and Heinz, L. (1986) *Issues Management: How You Can Plan, Organize and Manage for The Future*, Lomond.

Cryer, J.D. and Miller, R.B. (1994), *Statistics for Business: Data Analysis and Modeling*, 2nd ed., International Thomson Publishing, Washington, DC.

Deans, P.C., Karwan, K.R., Goslar, M.D., Ricks, D.A. and Toyne, B. (1991), "Identification of key international information systems issues in US-based multinational corporations", *Journal of Management Information Systems*, Spring, Vol. 7 No. 4, pp. 27-50.

Dickson, G.W., Leitheiser, R.L., Wetherbe, J.C. and Nechis, M. (1984), "Key information systems issues for the 1980s", *MIS Quarterly*, September, pp. 135-59.

Earl, M.J. (1992), "Putting information technology in its place: a polemic for the nineties", *Journal of Information Technology*, Vol. 7, pp. 100-8.

Elmore, P.E. and Beggs, D.L. (1975), "Salience of concepts and commitment to extreme judgements in response pattern of teachers", *Education*, Vol. 4, pp. 325-34.

Emory, C.W. (1980), *Business Research Methods*, revised edition, Richard. D. Irwin, Homewood, IL.

Gable, G.G. (1994), "Integrating case study and survey research methods: an example in information systems", *European Journal of Information Systems*, Vol. 3 No. 2, pp. 112-26.

Gummesson, E. (1991), *Qualitative Methods in Management Research*, revised edition, Sage, London.

Goyder, J. (1985), "Face-to-face interviews and mailed questionnaires: the net difference in response rate", *Public Opinion Quarterly*, Vol. 49, pp. 234-352.

Harrison, W.L. and Farn, C. (1990), "A comparison of information management issues in the United States of America and the Republic of China", *Information & Management*, Vol. 18, pp. 177-88.

Hartog, C. and Herbert, M. (1986), "1985 opinion survey of MIS managers: key issues", *MIS Quarterly*, December, pp. 351-61.

Herbert, M. and Hartog, C. (1986), "MIS rates the issues", *Datamation*, Vol. 32 No. 22, November, pp. 79-86.

Hirschheim, R., Earl, M., Feeny, D. and Lockett, M. (1988), "An exploration into the management of the information systems function: key issues and an evolutionary model", Information Technology Management for Productivity and Strategic Advantage: An IFIP TC-8 (Information Processing) open conference, March, Singapore.

Holsapple, C.W., Johnson, L.E. and Tanner, J. (1993), "A citation analysis of business computing research journals", *Information & Management*, Vol. 25, pp. 231-44.

Holsapple, C.W., Johnson, L.E., Manakyan, H. and Tanner, J. (1994), "Business computing research journals: a normalized citation analysis", *Journal of Management Information Systems*, Summer, Vol. 11 No. 1, pp. 131-40.

Jackson, P. (1990), "The importance of selected critical issues in the field of management information systems as perceived by MIS managers and MIS faculty", doctoral dissertation, Oklahoma State University, UMI.

Kraemer, K.L. and Dutton, W.H. (1991) "Survey research in the study of management information systems", in Kraemer, K.L. (Ed.), *The Information Systems Research Challenge: Survey Research Methods*, Vol. 3, Harvard Business School Research Colloquium, pp. 3-57.

Martin, E.W. (1982), "Critical success factors of chief MIS/DP executives", *MIS Quarterly*, June, pp. 1-9.

Mata, F.J. (1993), "Information systems management issues in Central America: a multinational and comparative study (Costa Rica, Guatemala, Panama)", PhD dissertation, Texas A&M University, UMI.

McGaw, D. and Watson, G. (1976), *Political and Social Inquiry*, John Wiley & Sons, New York, NY.

Moynihan, T. (1990), "What chief executives and senior managers want from their IT departments", *MIS Quarterly*, March, pp. 15-25.

Niederman, F., Brancheau, J.C. and Wetherbe, J.C. (1991), "Information systems management issues for the 1990s", *MIS Quarterly*, December, pp. 475-500.

Nolan, R.L. and Wetherbe, J.C. (1980), "Toward a comprehensive framework for MIS research", *MIS Quarterly*, June, pp. 1-19.

Nord, J.H. and Nord, G.D. (1995), "MIS research: journal status assessment and analysis", *Information & Management*, Vol. 29, pp. 29-42.

Norusis, M.J. (1991), *The SPSS Guide to Data Analysis for SPSS/PC+*, 2nd ed., SPSS Inc.

Rao, K.V., Huff, F.P. and Davis, G.B. (1987), "Critical issues in management of information systems: a comparison of Singapore and the USA", *Information Technology: Journal of the Singapore Computer Society*, May, Vol. 1 No. 3, pp. 11-19.

Rockart, J.F. (1987), "The changing role of the information systems executives: a critical success factors perspective", in Madnick, S.E. (Ed.), *The Strategic Use of Information Technology*, Oxford University Press, Oxford, pp. 69-83.

Rockart, J.F., Earl, M.J. and Ross, J.W. (1996), "Eight imperatives for the new IT organization", *Sloan Management Review*, Fall, pp. 43-55.

Roscoe, J.T. (1975), *Fundamental Research Statistics for the Behavioral Sciences*, 2nd ed., Holt, Rinehart and Winston, New York, NY.

Sekaran, U. (1992), *Research Methods for Business, A Skill Building Approach*, 2nd ed., John Wiley & Sons, New York, NY.

Shi, N. (1998), "Critical information systems management issues frameworks and relationships with individual IS executives and organizational environments: a study in Singapore", PhD dissertation, University of South Australia.

Shi, N.S. and Bennett, D.J. (1998), "A key IS management issues framework for Singapore", in Khosrowpour, M. (Ed.), *The Effective Utilization and Management of Emerging Information Technology*, Idea Group Publishing, Henshey, PA.

Somogyi, E.K. and Galliers, R.D. (1987), "Applied information technology: from data processing to strategic information systems", *Journal of Information Technology*, Vol. 2 No. 1, March, pp. 30-41.

Straub, D.W., Ang, S. and Evaristo, R. (1994), "Normative standards for IS research", *Data Base*, February, Vol. 25 No. 1, pp. 21-34.

Szajna, B. (1994), "How much is information systems research addressing key practitioner concerns", *Data Base*, May, Vol. 25 No. 2, pp. 49-59.

Venkatraman, N. (1997), "Beyond outsourcing: managing IT resources as a value center", *Sloan Management Review*, Spring, pp. 51-64.

Walsham, G. (1995), "Interpretive case studies in IS research: nature and method", *European Journal of Information Systems*, Vol. 4 No. 2, pp. 74-81.

Wang, P. (1994), "Information systems management issues in the Republic of China for the 1990s", *Information & Management*, Vol. 26, pp. 341-52.

Watson, R.T. (1989), "Key issues in information systems management: an Australian perspective – 1988", *Australian Computer Journal*, Vol. 21 No. 3, pp. 118-29.

Watson, R.T. (1990), "Influences on the IS manager's perceptions of key issues: information scanning and the relationship with the CEO", *MIS Quarterly*, June, pp. 217-31.

Watson, R.T. and Brancheau, J.C. (1991), "Key issues in information systems management: an international perspective", *Information & Management*, Vol. 20, pp. 213-23.

Williams, J. and Ramaprasad, A. (1996), "A taxonomy of critical success factors", *European Journal of Information Systems*, Vol. 5 No. 4, pp. 250-60.

Yin, R.K. (1989), *Case Study Research, Design and Methods*, revised edition, Applied Social Research Methods Series, Volume 5, Sage Publications, Newbury Park, CA.

Appendix 1. Two tiers of top IS journals

Nord and Nord (1995) suggest two tiers of top IS journals based on their ranking methodology. The first tier comprises nine journals:

(1) *Communications of the ACM*;

(2) *Decision Sciences*;
(3) *Information and Management*;
(4) *Information Systems Management*;
(5) *Journal of Computer Information Systems*;
(6) *Journal of Management Information Systems*;
(7) *Journal of Systems Management*;
(8) *Management Science*; and
(9) *MIS Quarterly*.

The second tier includes another eight journals:

(1) *ACM Computer Surveys*;
(2) *ACM Transactions on Database Systems*;
(3) *ACM Transactions on Office Information Systems*;
(4) *Data Management*;
(5) *Harvard Business Review*;
(6) *IEEE Transactions on Software Engineering*;
(7) *Interfaces*; and
(8) *Sloan Management Review*.

Appendix 2. Four forms of scale

Nominal scale

A nominal scale allows the investigator to assign subjects to certain categories or groups. The code numbers, however, serve as simple and convenient group labels with no intrinsic value.

Ordinal scale

An ordinal scale not only categorises the variables in such a way to denote qualitative differences among the various groups, it also rank-orders the categories in some meaningful way. When variables should be ordered according to some preference, the ordinal scale would be used. The preferences would be ranked and numbered 1, 2, and so on. By using the form of ordinal scale, more information can be gathered. However, the ordinal scale does not give any indication of the magnitude of the differences among the ranks.

Interval scale

An interval scale has higher degree of sophistication than the nominal scale and ordinal scale. Interval scale makes it possible for a researcher to perform certain arithmetical operations on the data collected. The interval scale can be used to tap the difference, the order, and the equality of the magnitude of the differences in the variable.

Ratio scale

A ratio scale is the most powerful in the four scale forms because it has a unique zero origin and subsumes all the properties of the other three scales (Sekaran, 1992). A ratio scale overcomes the deficiency of the arbitrary origin point given to the interval scale. Thus the ratio scale can measure the magnitude of the differences between points on the scale and tap the proportions in the differences.