

Towards a Definition of IT Management Sophistication in Small Firms

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ABSTRACT

This paper reports the results of a study aimed at understanding and characterising IT management sophistication in small businesses. A multiple-case study approach was therefore used to explore the IT management practices of small businesses. Data collection involved four small-medium chartered accountancy (CA) firms and three IT firms closely associated with the CA industry. The case results combined with past research suggested 30 individual indicators of IT management sophistication. Further investigation of these 30 indicators yielded five underlying factors characterising IT management sophistication, namely *planning*, *controlling*, *organising*, *leading* and *external expertise*. The results provided a useful foundation for examining the impact of IT management sophistication on organisational performance and developing appropriate improvement strategies. Directions for future research are also discussed.

Keywords: small businesses, IT management, IT management sophistication, accounting firms

1. INTRODUCTION

The significance of the small business sector in national economies has been well documented (e.g. Vos & Nyamori, 1997). Computer based information systems have grown in importance to small firms (Fuller, 1996), and are now being used increasingly to help them compete (Mata, Fuerst, & Barney 1995). IS researchers have also emphasised the importance of managing the IT resource in small businesses in an effective manner (Raymond & Pare, 1992; El Louadi, 1998). Although the significance of IT management in the context of small businesses has been emphasised in the IS literature, so far a consensus has not been reached with respect to the definition of this construct. Further, a valid instrument to measure the 'IT management sophistication in small firms' construct is yet to be developed.

This study aimed to characterise 'IT management' in the context of small firms with a view to exploring the concept of 'IT management sophistication', that is, of some firms being more sophisticated than others in their approach to IT management. This objective was addressed using case study research of four small chartered accountancy firms in New Zealand. The case studies explored the practical and operational issues related to IT management in small businesses, to derive a pool of indicators that can be used to measure IT management sophistication. This paper reports the results of the case studies, suggesting a pool of operational indicators that can be used to characterise the construct of IT management sophistication in small business.

This paper is organised under five sections. The literature review is presented next and the research approach is outlined in section 3. This is followed by a discussion of the case study data and the resultant pool of indicators that characterise IT management

sophistication in small businesses. Research conclusions and limitations are presented in section 5.

2. LITERATURE REVIEW

Table [1] summarises the existing frameworks that suggest key aspects of IT management. These frameworks provide useful insights for identifying potential areas and sub-functions of IT management that could be adapted for this study.

The diversity of IT management dimensions identified in Table [1] shows that there is no commonly accepted definition of the term 'IT management'. Planning, organising and controlling are common to many of the frameworks characterising IT management, although some include aspects not shared by the others. For example Feeny & Willcocks (1998) identify IS/IT leadership, relationship building and business systems thinking as core IS capabilities, but not Earl (1989), Nolan (1973) and Guptha et al., (1997). Furthermore, while large firms are concerned with IT management issues such as architecture planning, contract monitoring and IS function management (Feeny & Willcocks, 1998), small firms deal with issues such as educating the users, involvement of external consultants and implications of top management (Pollard & Hayne, 1998). The importance of external expertise in the management and implementation of information systems, especially in the small business sector, has been highlighted by several researchers (e.g. Fink, 1998; Gable, 1996; Thong et al., 1996).

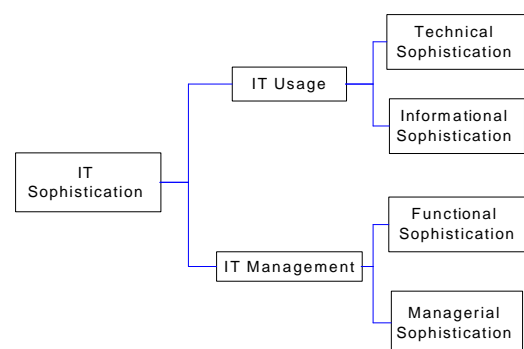
Table [1] Key Aspects of IT Management

Earl (1989)	Nolan (1973)	Boynton et al. (1994)	Galliers & Sutherland (1991)	Davis et al. (1995)
<ul style="list-style-type: none"> • Planning • Organising • Control 	<ul style="list-style-type: none"> • Planning • Organising • Control 	<ul style="list-style-type: none"> • Project management • Strategic Management • Service Control • Service Planning • Resource Planning • IS services • IS Function Management • Development Maintenance 	<ul style="list-style-type: none"> • Strategy • Structure • Systems • Staff • Style • Skills • Super-ordinate goals 	<ul style="list-style-type: none"> • IS and business alignment • IS staff skills • Competitive advantage • End-user computing • Telecommunications • Security and control • Identifying projects • Measuring IS effectiveness • Open systems • Application proliferation
Feeny & Willcocks (1998)	Sabherwal & Kris (1994)	Guptha et al. (1997)	Pollard & Hayne (1998)	Raymond & Pare (1992)
<ul style="list-style-type: none"> • IS/IT Leadership • Business systems thinking • Relationship building • Architecture planning • Making technology work • Informed buying • Contract facilitation • Contract monitoring • Vendor development 	<ul style="list-style-type: none"> • IS planning • Top management involvement (in planning) • IS performance evaluation • IS manager's knowledge of business plans • Top management's knowledge of IT 	<ul style="list-style-type: none"> • IT planning mode • IT control mode • IT organisation • IT integration 	<ul style="list-style-type: none"> • IS for competitive advantage • IS project management • Software development • Responsive IT infrastructure • Aligning IS • Technological change • Communication networks • Business process redesign • Educating users • IS human resource 	<ul style="list-style-type: none"> • Organisational objectives • Top management implications • IT investment • IT adoption • Presence of consultants • IT planning • IT control • IT evaluation • IS personnel • Role of IS function • Decision level • Type of development • Position of IS

Although Fink (1998) asserted that the management effort towards IT in small firms is negligible compared to large firms, it is not proper to infer that small businesses have absolutely no practices to manage their IT. For example, Rodwel & Shadur (1997) confirmed that the practices related to human resources management are more sophisticated than one may be led to believe. However, Cragg & King (1993) found that with the maturity of small firms, only minor changes had been observed in the management of IT while many small firms had experienced growth with respect to the number and type of IT applications.

Raymond & Pare (1992) asserted that IT sophistication may be characterised under two major dimensions: IT usage and IT management (See Figure [1]). This paper focuses on the IT management dimensions to better understand the concept of IT management as it applies to small firms. Although there are certain commonalities in the characterisations of IT management, it is evident that a commonly accepted means to define IT management in small firms has not evolved. Examination of two small firm studies, that is, Pollard & Hayne (1988) and Raymond & Pare (1992) cited in

Table [1] showed little agreement with respect to major issues contributing to the characterisation of IT management.



**Figure [1] Dimensions of IT sophistication
(Raymond & Pare, 1992, p. 7)**

Table [1] also suggests that the general management sub-themes, *planning, organising, controlling and leading* (Daft, 1988, Earl, 1989, Nolan, 1973, Schermerhorn, 1989) with respect to IT management

may provide a useful basis for characterisation of this concept in broad terms.

3. RESEARCH APPROACH

As indicated above, this research relied on the case study method. This method found to be useful in small firm studies and also in IS research leading to theory development (Ramano, 1989, Yin, 1994, Zinatelli & Cavaye, 1994). Case studies were conducted in four small and medium sized chartered accountancy (CA) firms in Christchurch, New Zealand.

Chartered accounting firms offer accounting and other services to individuals and other firms. For example, many CA firms help other small firms create their annual accounts. They also offer business advice, for example, on the structure of a firm, tax liability, and employment issues. The intensive use of IT by CA firms for information processing in their main business activity and in producing information for clients, and the similarity of technology used across the firms in the industry, were the major reasons for choosing CA firms for this study.

Case study interviews were conducted between February to May 1999. Number of partners in this sample of firms ranged from 1 to 9 and the full-time accounting staff ranged from 3 to 50. Two of these firms were using APS accounting software, and one used CA systems (MYOB Office Systems). Three of these firms employed external IT consultants. (The case study firms are identified as CAF1, CAF2, CAF3 and CAF4 in this paper).

The case studies were aimed at identifying the issues representing the key IT management practices in small firms to explore the concept of IT management. The information gathered from the case studies was supplemented with comprehensive discussions with two IT consultants, who were closely associated with CA firms, and the general manager of a major software supplier to the chartered accountancy industry in New Zealand and Australia. (They are identified as CON1, CON2 and CON3 in this paper).

4. DATA ANALYSIS AND DISCUSSION

The case study data comprised mainly of transcribed interviews. There were two major phases to the case study data analysis process. Firstly, the case study data were scrutinised to identify the issues, concerns and important points that were indicators of IT management practices in small firms. The preliminary pool of likely indicators so derived was examined in the light of past research findings. Consideration was given in this review process to examining if a particular issue was actually IT management related. Emphasis was placed on those issues which were identified in more than one case and which have also been dealt with by past

researchers. Also, a few items were added to this pool of indicators to reflect certain critical IT management issues that were strongly supported by past researchers, although not brought to light through the case studies. Table [2] lists four draft item statements derived in this phase of the analysis. (Due to page restrictions, the full set of 30 items is not provided here but is available from the first author).

The second phase of the case study analysis focused on assessing the content validity and to determine the potential sub-dimensions of IT management sophistication represented by the 30 indicator statements. Similar to the approach adopted by Chan et al. (1992), the item statements were reviewed by nine experts in this phase of the study. These experts represented academics/researchers and technical staff from the IT/IS and Management disciplines. In the review process each expert was provided with a set of cards on which one item statement was printed. They were asked to sort the cards into a number of piles representing the likely dimensions of IT management. The four major sub-functions of management (i.e. planning, organising, controlling and leading) were suggested as a basis for investigation. However, the experts were encouraged to present their own views about the factors that may represent IT management sophistication. The sorting exercise was followed by detail discussions with the experts.

All participants of the expert opinion review agreed that these 30 statements, in general, would reflect the important issues of IT management in small firms. They also agreed that examination of these issues would provide a sufficient understanding of IT management in small firms, which in turn could be used to measure the level of IT management sophistication.

Participants generally agreed that the concepts underlining the statements presented can be categorised into the four broader factors of planning, controlling, organising and leading, and most statements were classified under the four factors accordingly. However, the participants were not always unanimous in their classification decisions with respect to certain statements. For example, the item "*We use a rigorous IT planning process within our firm*" was classified under planning by seven participants; whereas one participant placed this item under controlling and another under organising. Such issues were resolved by reviewing them in the light of past research references (e.g. definitions of planning, organising, controlling and leading by Schermerhorn, 1989).

At the end of the review process, there were three items that did not appear to fit into any of the four factors identified above. All three item statements were related to obtaining support from external expertise and gathering information from parties external to the firm. Presence

Table [2] Draft Item Statements, Case Study Evidence and References (a Sample)

<p>Item #1</p> <ul style="list-style-type: none"> • We have comprehensive procedures for maintaining the security of information stored on the computer. (<i>Davis et al., 1995 and Raymond et al., 1992</i>) <hr/> <ul style="list-style-type: none"> • It's amazing how much faith you're putting in your staff in small businesses and how little security; ...[of] the most valuable part of the business; the data you have... (CON2) • [A] lot of firms are not backing-up [their data]. Quite recently we had a major problem with our product. ... [Due to some unforeseen problem] the data were corrupted [when the new system was up and running for the first time]. About twenty firms around the country got affected by it. ...and still believe that a lot of firms have very very poor security. (CON3) • At the moment internally we don't really have much [internal] security. (CAF4) • We're trying to convince most people to take care of their data. The importance of security of data. (CON1)
<p>Item #2</p> <ul style="list-style-type: none"> • We have comprehensive procedures for managing the use of IT resources. (<i>Raymond et al., 1992</i>) <hr/> <ul style="list-style-type: none"> • No, there's no procedure written down; it's really just casual knowledge.(CAF3) • ..no we don't write too much [procedures] down.. Because by the time you write it down, it would have changed.. Personally I don't believing in writing things down too much. (CAF4) • There is no control over what software has been loaded on the PCs...; there is often different versions of all software on all the PCs depending on when they brought them. (CON2)
<p>Item # 3 and # 4:</p> <ul style="list-style-type: none"> • We closely monitor the progress of our IT projects. • We closely monitor the performance of the IT function. <p>(<i>Raymond et al., 1992; Sabherwal & Kris, 1994; Boynton et al. 1994; Pollard & Hayne., 1998; Feeny & Willcocks., 1998; Guptha et al., 1997</i>)</p> <hr/> <ul style="list-style-type: none"> • We've got meetings with all the staff every fortnightProbably our monitoring is based on identifying how many problems we have. (CAF1) • We monitor obviously the profitability of the firm and we could tell that really within six months [whether] we have actually recovered [the cost of a particular IT investment] (CAF1). • Probably in three months down the track they [CA firms/software users] should ask for some consultation and review from the supplier. (CON3)

of IT consultants (Raymond et al., 1992) and obtaining advice from external experts (Thong et al., 1996, Yap et al., 1992, yap et al., 1994) have been identified as significant feature in IT management in small business. Cragg & King (1993) also identified the consultant's support as a factor that encourage IT growth. Referring back to the case studies, it could be seen that the CA firms gather external information from other means such as involving in the software user groups, mostly for purposes related to managing IT, and not for other operational activities of CA firms. Research shows that SMEs also value information about IT provided by external sources (e.g. vendors and consultants) for successful IT adoption (Fink 1998). Fann & Smeltzer (1989) have shown that suppliers/vendors and competitors are important sources of information for operational decision making in small firms. Accordingly, a fifth factor, namely *external expertise*, was proposed for characterising IT management sophistication in small business. The finalised list of item statements classified under the likely major factors (i.e. sub-dimensions) of IT management sophistication in small firms is given in Table [3].

5. CONCLUSIONS

This case study research examined IT management

within small businesses. The study identified 30 item statements/indicators of IT management sophistication. These 30 items were then classified into five factors: planning, organising, controlling, leading, and external expertise. These results fit well with the findings from past research. Many of the indicators relating to planning, controlling and organising have been used in prior research to characterise IT management sophistication. Leading emerged as a relevant factor of IT management sophistication in small business according to the current study. Past research and the case study evidence also supported the inclusion of indicators pertaining to *external expertise*.

The development of 30 items statements representing, and identifying the associated five major factors/sub-dimensions are the major contributions of this research. IS researchers can use them to characterise the 'IT management sophistication in small business' construct and further explore the relationships between this and other related constructs, such as IS success, IT enabled organisational performance and competitive advantage. Practitioners could use the results to help them determine strengths and weaknesses of IT management in small firms, and then formulate appropriate strategies aiming at achieving organisational success and to gain competitive advantage.

A major limitation of this research was the restriction of the study to four small and medium sized chartered accountancy firms in New Zealand. Given the diversity within the small business sector, this element restricts the generalisation of findings. Further investigation, by way of additional case studies, may be directed towards clarifying the role of external expertise in IT management sophistication in small business. Ascertaining the validity of the derived item statements as measures IT management sophistication in small business construct is another direction for further research. Survey research using the derived measures

(the 30 item statements in table [3]) of IT management sophistication in small firms and data analysis aiming at instrument development and validation are suggested to peruse this end.

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Table [3] Factors and Indicators of IT Management Sophistication in Small Business

Factors /Item Statements
IT Planning <ul style="list-style-type: none"> • Our firm is continuously searching for and evaluating new IT developments for their potential use in the firm • We use a rigorous IT planning process within our firm. • Mostly, our IT plans are written. • Our IT plans are very detailed. • Our IT plans are frequently reviewed to accommodate the changing needs of the firm. • Our firm recognises IT planning as an important part of the overall business planning process. • Our IT system is designed to be closely aligned with the overall objectives of the firm. • In our firm IT is used to improve the firm's competitive position.
IT Organising <ul style="list-style-type: none"> • We have one or more staff members who spend most of their time managing our firm's IT resources. • We select our IT vendors and external consultants according to formal criteria (<i>eg based on a combination of their proven success, IT expertise, familiarity with our own line of business</i>). • In our firm, staff participates in making major IT decisions. • Our firm has a flexible approach to organising IT operations and maintenance. • We select the most suitable package based on proven success, when it comes to software acquisition.
IT Controlling <ul style="list-style-type: none"> • We closely monitor the performance of our IT systems. • We closely monitor the progress of our IT projects. • We have comprehensive procedures in place for maintaining the security of information stored in our computers. • We have comprehensive procedures in place for controlling the use of IT resources (<i>eg who can use specific software, who has access to specific databases</i>). • In our firm the roles and responsibilities for IT direction and development are clearly defined. • In our firm the roles and responsibilities for IT operations are clearly defined. • We have formal procedures for the acquisition and development of new IT systems.
IT Leading <ul style="list-style-type: none"> • IT management in our firm is characterised by strong leadership. • Our top management plays an active role in addressing the firm's IT issues. • Our top management perceives as IT is critical to our business success. • Our managers have created a vision among the staff for achieving IT objectives. • Our managers have inspired staff commitment towards achieving IT objectives. • Our managers have directed the efforts of staff towards achieving IT objectives. • Our firm is committed to providing staff with appropriate IT training.
External IT Expertise <ul style="list-style-type: none"> • We have very effective working relationships with our IT vendors and/or external consultants. • We gather IT information from others in the industry. • Our firm relies heavily on external IT expertise.

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