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Paul Cragg  
*University of Canterbury*

Annette Mills  
*University of Canterbury*

Theekshana Suraweera  
*University of Canterbury*

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## Measurement of IT Management Sophistication in Small Firms

Dr Theekshana Suraweera  
Dr Paul Cragg  
Dr Annette Mills  
University of Canterbury  
New Zealand  
Email:theek.suraweera@canterbury.ac.nz

### Abstract

*This study developed an instrument to measure IT management sophistication in small firms. Multiple-case studies were used to explore the concept of IT management sophistication in small firms and provide a pool of indicators representing IT management sophistication. Small chartered accountancy firms in New Zealand were surveyed and the data was analysed using PLS. The final model of IT management sophistication included three dimensions: IT planning, IT controlling and IT leading. The validity and reliability of the measurement instrument was examined thoroughly. The results provide a significant foundation for researchers of IT management in small firms.*

### Keywords

IT management, small firms, IT leading, IT planning, IT controlling, IT organising, IT external expertise.

### INTRODUCTION

Information systems researchers have emphasised the importance of managing the IT resource in small businesses in an effective manner (Raymond & Pare, 1992; El Louadi, 1998). This study aimed to characterise 'IT management' for small firms and then explore the concept of 'IT management sophistication', i.e. of some firms being more sophisticated than others in their approach to IT management. A multi-method approach comprising both case study and survey methods was adopted in this research. A pool of potential indicators that characterise IT management sophistication was derived first in the case study phase. Then an instrument to measure these IT management sophistication construct was created on the basis of the indicators.

In the survey phase of the study, data was used to test the validity and reliability of the measurement instrument. In particular, this paper focuses on the quantitative phase of the research devoted to the development and testing of the measurement instrument. The survey population comprised small chartered accountancy (CA) firms in New Zealand. Partial least square modelling (PLS), a second generation data analysis technique, was used for model development and reliability and validity assessment.

### LITERATURE REVIEW

Table 1 summarises indicators of IT management used by other researchers. These frameworks provided useful insights for investigating the concept of IT management sophistication in small business. The diversity of IT management dimensions identified above suggests that there is no commonly accepted characterisation of the term 'IT management'. However, planning, organising and control 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 and Hayne, 1998). The significance of external expertise in IT management and implementation, is of special relevance to small firms. (e.g. Fink, 1998; Gable, 1996; Thong et al., 1996).

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. On the other hand, Cragg et al.(1993) found that only minor changes have been observed in the management of IT in small firms while many small firms have experienced growth with respect to the number and type of IT applications. Analysis of two small firm studies (Pollard and

Hayne, 1988 and Raymond and Pare, 1992) also showed little agreement with respect to the characterisation of IT management (see table 1).

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

Table 1: Key Aspects of IT Management

Raymond and Pare (1992) characterise the overall IT sophistication under two major dimensions, IT usage and IT management. According to this model, IT management consists of two dimensions, functional sophistication and managerial sophistication (see figure 1).

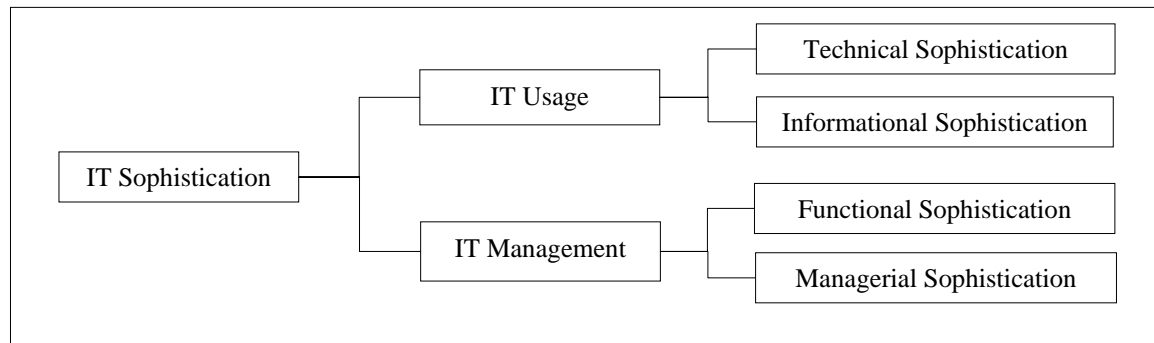


Figure 1: Dimensions of IT sophistication (Raymond & Pare 1992, p. 7)

This study focused on these two IT management dimensions to better understand the concept of IT management as it applies to small firms. Although there are certain commonalities in characterisations of IT management, it was evident that a commonly accepted means to define IT management in small firms has not evolved. Thus a multiple-case study approach was used to explore IT management sophistication in small firms. Data was collected from four small chartered accountancy firms plus three firms that provided IT consulting services to small chartered accountancy firms. The case data analysed in the light of literature review findings provided 30 individual indicators of IT management sophistication. A sorting analysis of these 30 items suggested five underlying dimensions characterising IT management sophistication: *IT planning*, *IT controlling*, *IT organising*, *IT leading* and *IT external expertise*.

The definitions of first four of these factors have been adopted from general management literature. [i.e. (a) Planning: determining what is to be achieved, setting goals, and identifying appropriate action steps; (b) Organising: allocating and arranging human and material resources in appropriate combinations to implement plans; (c) Leading: guiding the work efforts of other people in directions appropriate to action plans; (d) Controlling: monitoring performance, comparing results to goals, and taking corrective action (Bedeian, 1989; Schermerhorn, 1989).]. The activities related to each of these functions as particularly applicable in managing IT in small firms define these four dimensions. The activities associated with employing external experts in managing IT in the firm and their contributions define the IT external expertise.

A detailed account of the process of deriving the five underlying dimensions that represent 30 items indicated using case study research can be found in Suraweera et al. (2004). These findings provided the foundation for a questionnaire survey, which is described in the next section of the paper.

## SURVEY

The study population comprised of small and medium sized chartered accountancy (CA) firms in New Zealand. Intensive use of IT for information processing in their main business activity as well as producing information for business and strategic purposes, and the similarity of technology used were the major reasons for choosing the CA firms for this study. Based on the practices of previous studies of small firms in New Zealand (Cragg, 1986; Zinatelli, 1994). independently functioning CA firms having up to 50 employees were considered to be *small* firms and were therefore targeted in this study.

A comprehensive mailing list of 1,516 CA firms in New Zealand was derived using Telecom New Zealand Yellow Pages telephone directory-2000. The initial list was verified record-by-record and updated where necessary with the information in NZ Business Directory (2000).

In this study, the total population of CA firms in New Zealand was enumerated aiming to secure sufficient responses for a comprehensive statistical analysis. Also, a number of strategies (Dillman, 2000) were adopted with the view to obtaining a higher response rate. They included a comprehensive pre-test, designing the questionnaire with a professional look, provision of pre-paid self-addressed envelopes to return completed questionnaires and the use of a pre-printed reminder post card.

The IT management sophistication instrument was created using the measures derived through the exploratory case studies and a comprehensive literature review, as indicated above. It consisted of 30 item statements structured as seven point Likert scale questions. In addition, the respondents were asked to rate the overall level of IT management in their respective firms on a Likert scale (i.e. PLS variable MGT99-see appendix 1). Finally the draft questionnaire was subjected to rigorous pilot testing and a review process involving CA practitioners and IT professionals.

### Data Preparation and Sample Characteristics

421 completed questionnaires were returned, giving a response rate of 29%. Non-response bias was examined by comparing early and late responses with respect to characteristics of CA firms, such as the number of billing clients and the number of full time staff. Chi-square analysis gave no indication that the sample suffered from non-response bias.

The total number of full-time employees was used as the basis for selection of the data set for PLS analysis. The firms with between 3 and 20 full-time staff members (median number of staff being seven) were selected for the PLS data analysis. This data set consisted of 254 records. Although firms up to 50 employees were surveyed initially, this data set (between 3-20 full-time employees) was observed to be representing small accounting firms in the New Zealand context, based on further detail analysis.

The median length of IT use by the firms was between 11 and 15 years. Over 30% of the firms had used IT for more than 15 years. Most firms (86%) spent less than \$25,000 annually for IT maintenance. In nearly 70% of the firms, at least one senior manager had overall responsibility for IT (e.g. partners, directors, associates and shareholders). About 15% of the firms had at least one employee with formal IT training.

Cross-validation using split-samples was adopted to reduce the likelihood of error due to chance during scale purification (e.g. Straub and Carlson, 1989, DeVellis, 1991). Use of split-samples for data analysis is desirable in PLS analyses (Chin, 1988; Cadogan et al., 1999; Diamantopoulos and Souchon, 1999). Accordingly, two split-samples comprising 127 responses each were created and statistical tests confirmed that there were no significant differences in mean values and variability in the two split-samples A and B.

### PLS MODELS

The development of the measurement and PLS structural models, and their assessment, were guided by the recommendations of and procedures adopted by Barclay et al. (1995), Chin et al. (1999), Chin (1998), Duxbury et al. (1991), Hair et al. (1998), Igbaria et al. (1998), Wold (1981), Wold (1985) and Yi and Davis (2003).

The PLS model representing IT management sophistication in small firms was constructed based on the findings of the qualitative phase of the study, which suggested the construct to be multi-dimensional. The major dimensions identified mirrored the four sub-functions of management: planning, organising, controlling and leading, but related to information technology management in small firms, and external expertise.

Initially, split-sample A was used to build and refine the PLS model. The variables used in the PLS analyses corresponded to questions in the survey form, and were labelled MGT01 through to MGT30. The variable MGT99 was derived from question 31 of the survey and was used as the overall indicator of IT management sophistication (see Appendix 1). The variables MGT01 through MGT30 were linked to the model as formative indicators, following the practices of past researchers (Cohen and Cohen, 1990; Barclay et al., 1995; Chin et al., 1996; Chin, 1998).

This PLS model was analysed for validity and reliability of the respective measures and the significance of structural relationships. Subsequently, the refined model was re-created using the data set of split-sample B for re-validation of the findings from split-sample A.

During the model development process, initially the model was constructed using split-sample A (referred to as PLS-A) with all measures. It was then refined on the basis of the factor loadings and path coefficients and their practical significance. Thereby certain items were eliminated to arrive at the refined model. Then the refined model was reconstructed using the split-sample B data set, which is referred in the following sections as PLS-B.

For example, in PLS-A the factor related to *IT leading* consisted of seven measures of which six were above 0.5 and were significant. They appeared to be coherent, lying within a close range of values. Somewhat higher loadings were associated with measures MGT13 and MGT21 and MGT22. These measures seem to be directly addressing the leadership characteristics of managers towards achieving IT objectives of the firm. Although the factor loading of MGT24 was within the acceptable range (i.e. greater than 0.3), this did not appear to be consistent with the other measures. The item statement of MGT24 referred to “top management playing an active role in addressing IT issues”. In most CA firms, the senior accountants hold the top management positions. Their IT skills (both managerial and technical) may be perceived as somewhat poor by the staff working with computers and information systems. Therefore, the survey respondents may not have seen the top management playing an “active” role. Considering these factors, it was suggested that MGT24 be dropped to improve the model.

Similarly, in the *external expertise* factor, the measure MGT26 appeared to be weak and did not match with the loadings of the other two measures. This inconsistency of MGT26 may have been caused due to poor wording of the item statement. MGT26 referred to reliance or dependence on *external expertise* in IT management in small firms. It read: “Our firm relies heavily on external expertise”. Although use of external expertise was an important managerial concern for small firms, the phrasing “relies heavily” may have created a negative impression on the respondents. The intended objective of this statement was to gain an understanding on how far the firm relies on external expertise. Improved presentation of this statement may have resulted in a different rating. Considering the above, MGT26 was also identified as a candidate for elimination at the next stage of model refinement.

The refined models PLS-A and PLS-B are graphically shown in Figure 2. The associated factor loadings of PLS\_A model are given in Table 2.

### Model Assessment

In the refined model (PLS-A) the path coefficients of three factors, namely *IT leading*, *IT planning* and *IT controlling*, were significantly high and the R<sup>2</sup> value of 0.409 was also accepted as substantial. The factor loadings of these latent variables were high and found to be coherent.

The path coefficients of the *IT organising* and *external expertise* factors in the improved model fell below the acceptable level of 0.1. This suggests that the influence of *IT organising* and *external expertise* in shaping IT management sophistication in small business appear to be rather low. In the case of the *IT organising* factor, it can be seen that the loadings of two factors MGT20 and MGT25 are reasonably high, but the other two are low and not consistent with the highly loaded measures. This may be an indication that the lower path coefficient (0.073) of *IT organising* can be attributed to poor design of measures rather than the effect of the factor.

Factors	Measures	Loadings	Path Coefficients	R <sup>2</sup>
IT leading - Inward			0.291	<b>0.409</b>
	MGT13	0.870		
	MGT21	0.809		
	MGT22	0.774		
	MGT16	0.684		
	MGT23	0.635		
	MGT29	0.554		
Planning-Inward			0.180	
	MGT04	0.885		
	MGT06	0.836		
	MGT08	0.731		
	MGT02	0.692		
	MGT07	0.665		
	MGT01	0.588		
	MGT05	0.575		
IT organising- Inward			0.073	
	MGT20	0.742		
	MGT25	0.730		
	MGT11	0.535		
	MGT30	0.410		
IT controlling – Inward			0.216	
	MGT28	0.773		
	MGT14	0.738		
	MGT15	0.694		
	MGT17	0.608		
	MGT18	0.600		
	MGT19	0.564		
External Expertise- Inward			-0.032	
	MGT10	0.768		
	MGT09	0.855		

Table 2: PLS Estimates of Refined PLS-A Model

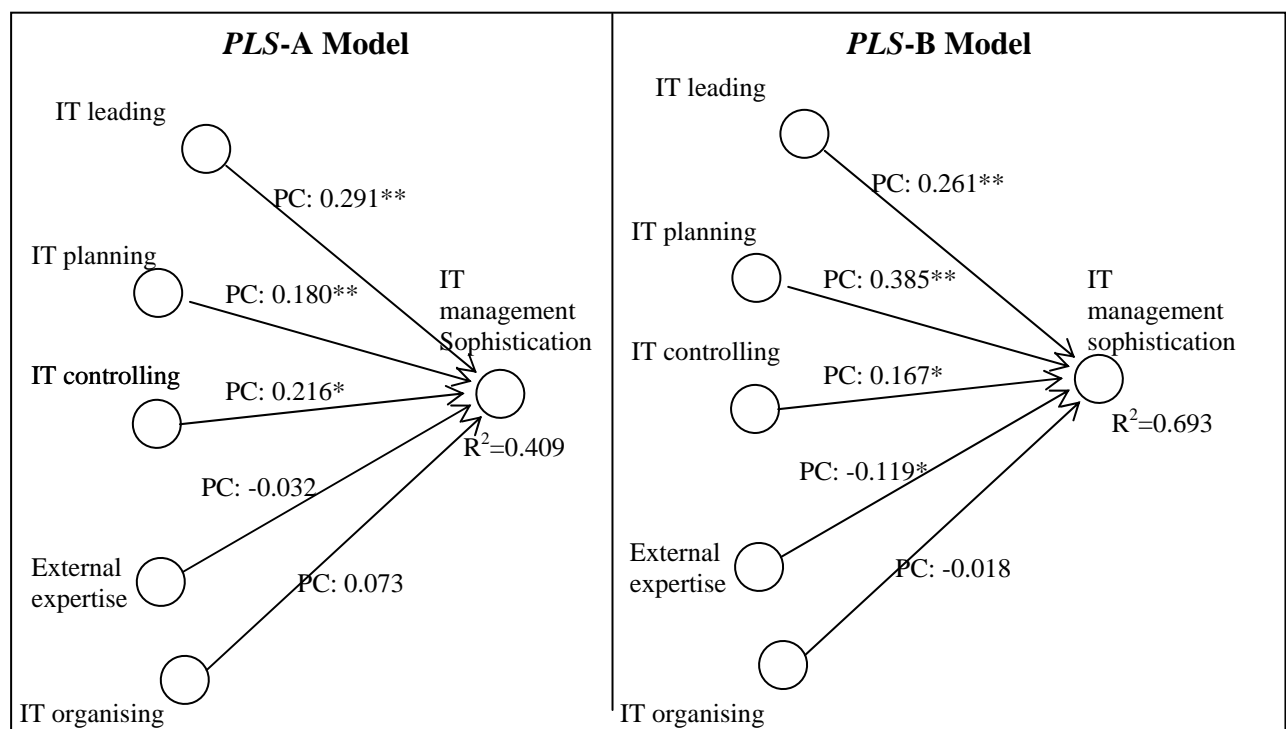
However, since the results of the survey did not support that the *IT organising* has substantial influence on shaping the IT management sophistication, this factor was identified to be a candidate for elimination.

Accordingly, the improved model comprised of three substantially valid factors (i.e. *IT leading*, *IT planning* and *IT controlling*), plus two weaker factors (*IT organising* and *external expertise*). This finding was confirmed by the validity and reliability of the measures and the predictive power of the model constructed using the dataset of the split-sample B. The  $R^2$  value of the IT management sophistication latent variable of PLS-B model was 0.693. This was a significantly high value which indicated over 69% of the variance has been explained by the underlying factors. The comparative  $R^2$  of PLS-A was 0.409 and this re-assessment thoroughly confirmed the previous finding with respect to the predictive power of the model. The path coefficients of PLS-B model are compared with PLS-A model estimates in Figure 2. The statistical significance of the path coefficients of these models was estimated using bootstrap method, and are indicated in these two figures.

Results of the verification exercise confirmed that *IT planning*, *IT leading* and *IT controlling* are factors that substantially explain the IT management sophistication in small business construct. The *external expertise* factor emerged as statistically significant in the PLS-B model, but not in PLS-A. The factor related to *IT organising* was not statistically significant in both samples.

### Individual Item Reliability

The factor loadings of all measures in both models were statistically significant at the 0.001 probability level. These results reconfirmed that the measures fall within the acceptable limits and they substantially capture the variability of latent variables.



(Notes: \*\*\* $p < 0.001$ , \*\* $p < 0.01$ , \* $p < 0.05$ ; PC: path Coefficient)

Figure 2: Path Coefficients of PLS-A and PLS-B models

### Internal Consistency

The composite reliability of the five factors investigated in the PLS-A model were computed with PLS-B Model in order to examine their internal consistency. Table 3 shows the composite reliability of the respective factors for the two models. These results confirmed the previous finding that the five factors – *IT leading*, *IT planning*, *IT controlling*, *IT organising* and *external expertise* - demonstrated internal consistency. The composite reliability of all factors exceeded the acceptable level of 0.7.

Factor	Composite Reliability	
	PLS-A	PLS-B
IT leading	0.8693	0.8690
IT planning	0.8795	0.8779
IT controlling	0.8262	0.8373
IT organising	0.7037	0.7318
External expertise	0.7945	0.7942

Table 3: Composite Reliability of Significant Factors

### Discriminant Validity

The discriminant validity of the measures of the *PLS-B* model was assessed using three approaches: examining the magnitude of average variance extracted (AVE), comparison of factors loadings and comparison of AVE with the variance shared between the construct in question and the other constructs. However, only the ‘correlation matrix’ of *PLS-B* which compares the square root of AVE and the variance shared between factors is given in Table 4 due to space limitations. It was observed that average variance shared between a construct and its measures (i.e. diagonal elements) were greater than the variance shared between the construct and its measures (i.e. off diagonal elements). These results confirm that the measures of the major factors of IT management sophistication demonstrate discriminant validity.

	IT leading	IT planning	IT Organising	IT Controlling	External expertise
IT leading	<b>0.727</b>				
IT planning	0.697	<b>0.716</b>			
IT organising	0.460	0.419	<b>0.644</b>		
IT controlling	0.534	0.540	0.375	<b>0.695</b>	
External expertise	0.310	0.262	0.297	0.195	<b>0.812</b>

(Note: Square root of AVE in diagonal elements )

Table 4: Correlations of Constructs of *PLS-B* Model

## DISCUSSION AND CONCLUSIONS

Although the case study analysis suggested five factors as potential dimensions of the IT management sophistication in small business construct, analysis of the survey data confirmed the relevance and validity of only three of those factors: *IT leading*, *IT planning* and *IT controlling*. The significance of *IT organising* and *external expertise* was not strongly supported by the results of the survey analysis. The path coefficients of these two factors remained substantially weak. Further investigation of these factors and the associated measures may be required, if these two factors are to be included in a model that characterises IT management sophistication in small business.

The path coefficients of the three factors *IT planning*, *IT leading* and *IT controlling* were confirmed to be substantially high and statistically significant. The  $R^2$  values derived using both split-sample data sets remained substantially high (i.e. 0.409 and 0.693). These results confirmed that the three significant factors explain to a large extent the variability of the IT management sophistication in small business construct.

It must be noted that although the terms *IT planning*, *IT controlling* and *IT leading* have been used in IT/IS literature in both the small and large business contexts, they do not necessarily refer to the same attributes in the two perspectives. For example, Feeny and Willcocks (1998), referring to core IS capabilities in large UK based companies, identified *business systems thinking* and *architecture planning* as an indicator of *IT planning*. However, according to Raymond and Pare (1992) user *participation in budgeting* and *formalisation of IT planning process* were some of the underlying factors of *IT planning* in small firms. Similarly, this research pointed to more ground level practical issues related to *IT planning* such as *having detailed plans*, and the *recognition of IT planning as an important part in the overall business panning process*.



Four out of seven indicators of *IT leading* (MGT13, MGT22, MGT24 and MGT29 in Appendix 1) derived as a result of this research have been regarded as relevant by past researchers. Feeny and Willcocks (1998) made a direct reference to *IS/IT leading* as a major factor of core IT capability in large UK based companies. The item statement MGT13 was closely related to this factor. The *EDP manager being placed at a higher position in the management hierarchy* (Nolan, 1973; Gibson & Nolan, 1974) would help them in taking an effective leadership role. The factors representing *IT leading* identified by Boynton et al. (1994) on large firms and, Pollard and Hayne (1998) on small firms, closely resemble the indicator MGT22. *Securing top management support for IT functions* has been identified by Earl (1989), Raymond and Pare (1992), Sabherval and Kris (1994), and Guptha et al. (1997) as a means of recognising the strength *IT leading*. MGT24 of the current characterisation dealt with the same factor. The indicator MGT29 is similar to Earl's (1989) conception of leadership relating to IT management.

Three indicators pertaining to *IT leading* that were not recognised by past researchers were MGT16, MGT21 and MGT23. Creating vision among staff and inspiring staff commitment toward achieving IT objectives (MGT16 and MGT21) are usual leadership characteristics described in general management (Schermerhorn, 1989; Daft, 1988). MGT23 refers to influence of leadership over IT related training. Employing highly skilled IT/IS qualified staff is not feasible in small firms. Therefore, the commitment of top management to provide the relevant training for IT staff is a pertinent characteristic of *IT leading* in small firms. It can be concluded that results of this research adequately characterise the *IT leading* sub-dimension of IT management sophistication in small business.

Past researchers have identified controlling of IT resources as a factor that has a major influence on IT management, both in large firms and small businesses (e.g. *large businesses* – Guptha et al., 1997; Earl, 1989; Nolan, 1973; Gibson & Nolan, 1974) and *small firms* – Raymond & Pare, 1992). However, in the context of small businesses these studies have not characterised *IT controlling* as an explicit sub-dimension of IT management sophistication. Also, this research determined the underlying indicators that characterise the *IT controlling* sub-dimension of IT management sophistication in small business.

Since IT management sophistication in small business was characterised as a multi-dimensional construct, its measurement basically represents the assessment of the sophistication of individual sub-dimensions. The relative importance of each sub-dimension could be further examined depending on the purpose of the measurement and the depth of analysis envisaged.

It was evident that the respective measures of the three sub-dimensions determined by this research were quite comprehensive and adequately covered the relevant practical issues. The validity and reliability coefficients derived in PLS analysis using the two split-samples and the total data set were high. This instrument viewed IT management sophistication in a wider perspective and dealt with more operational features common to contemporary small firms. It addressed the ground level day-to-day managerial activities rather than looking at conceptual themes.

The major limitations of this research includes the use of small CA firms as the study population. Somewhat unique characteristics of this industry restrict the generalisability of findings. The validity of the findings of this research could have been further improved, if a couple of more case studies had been conducted. For example, such investigations could be directed to explore the relevance of the two factors, *IT organising* and *external expertise*, that were eliminated on the basis of survey data analysis.

The outcomes of this research will be of interest to both practitioners and IS researchers. IS researchers can use the instrument, or parts of it, to explore the relationship between IT management sophistication and other associated variables, such as organisational performance and competitive advantage. Practitioners can use this instrument to determine strengths and weaknesses of IT management processes in their small firms, with the aim of formulating appropriate information management strategies for organisational success.

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**APPENDIX 1**

Factor	Indicators of IT Management Sophistication in Small Business
Planning	<p>MGT01 –Our firm recognises IT planning as an important part of the overall business planning process.</p> <p>MGT02 –Our IT plans are very detailed.</p> <p>MGT03 –Mostly, our IT plans are written.</p> <p>MGT04 –We use a rigorous IT planning process within our firm.</p> <p>MGT05 –Our IT system is designed to be closely aligned with the overall objectives of the firm.</p> <p>MGT06 –Our IT plans are frequently reviewed to accommodate the changing needs of the firm.</p> <p>MGT07 –Our firm is continuously searching for and evaluating new IT developments for their potential use in the firm.</p> <p>MGT08 –In our firm IT is used to improve the firm's competitive position.</p>
Organising	<p>MGT11 –In our firm, staff participates in making major IT decisions.</p> <p>MGT12 –Our firm has a flexible approach to organising IT operations and maintenance.</p> <p>MGT20 –We have one or more staff members who spend most of their time managing our firm's IT resources.</p> <p>MGT25 –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>).</p> <p>MGT30 –We select the most suitable package based on proven success, when it comes to software acquisition.</p>
Controlling	<p>MGT14 –We closely monitor the progress of our IT projects.</p> <p>MGT15 –We closely monitor the performance of our IT systems.</p> <p>MGT17 –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>).</p> <p>MGT18 –We have comprehensive procedures in place for maintaining the security of information stored in our computers.</p> <p>MGT19 –In our firm the roles and responsibilities for IT direction and development are clearly defined.</p> <p>MGT27 –In our firm the roles and responsibilities for IT operations are clearly defined.</p> <p>MGT28 –We have formal procedures for the acquisition and development of new IT systems.</p>
Leading	<p>MGT13 –IT management in our firm is characterised by strong leadership.</p> <p>MGT16 –Our managers have created a vision among the staff for achieving IT objectives.</p> <p>MGT21 –Our managers have inspired staff commitment towards achieving IT objectives.</p> <p>MGT22 –Our managers have directed the efforts of staff towards achieving IT objectives.</p> <p>MGT23 –Our firm is committed to providing staff with appropriate IT training.</p> <p>MGT24 –Our top management plays an active role in addressing the firm's IT issues.</p> <p>MGT29 –Our top management perceives as IT is critical to our business success.</p>
External Expertise	<p>MGT09 –We have very effective working relationships with our IT vendors and/or external consultants.</p> <p>MGT10 –We gather IT information from others in the industry.</p> <p>MGT26 –Our firm relies heavily on external IT expertise.</p>
Overall IT management	<p>MGT99 –Considering the managerial functions (such as planning, organising, controlling and leadership) how do you rate the overall level of IT management in your firm?</p>

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