

COMPUTER-BASED ACCOUNTING SYSTEMS: THE CASE OF MANUFACTURING-BASED SMALL AND MEDIUM ENTERPRISES IN THE NORTHERN REGION OF PENINSULAR MALAYSIA

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Abstract. This study investigates the status of computer-based accounting systems (CBAS) adoption among small and medium manufacturing firms (SMEs) in the northern region of Peninsular Malaysia. Results show that over ninety percent of the firms have adopted CBAS. The adoption of CBAS, however, is still at the beginning stage as majority of the firms only adopted CBAS in the last six years or less and the depth of the CBAS system adopted is behind that of industrialized countries. The results showed that years of adoption are positively correlated with the overall quality of the CBAS adopted. Further investigations on the relationships between CBAS use items and factors that were expected to affect CBAS use indicate that the maturity stage of CBAS adoption was significantly positively correlated with age of business. However, the results did not find evidence supporting previous research that argued age and size of the firms as well as the type of ownership influence the adoption of CBAS.

Keywords: Adoption of computerized accounting systems, information technology, small and medium enterprises

Abstrak. Kajian ini menguji status penggunaan sistem perakaunan berkomputer (CBAS) di kalangan industri kecil dan sederhana di Wilayah Utara Semenanjung Malaysia. Dapatan kajian menunjukkan bahawa tahap penggunaan CBAS adalah melebihi sembilan puluh peratus. Walau bagaimanapun, CBAS yang digunakan pada umumnya adalah di peringkat asas yang mana majoriti syarikat hanya menggunakan CBAS untuk tempoh enam tahun atau kurang. Dapatan kajian menunjukkan bahawa tempoh penggunaan CBAS berhubung langsung secara positif dengan kualiti keseluruhan CBAS. Hasil kajian juga mendapati hubungan di antara kematangan kepenggunaan CBAS dan usia sesebuah syarikat adalah berkait rapat pada arah positif. Walau bagaimanapun, dapatan kajian tidak menemui kesan positif usia dan saiz perniagaan dengan bentuk pemilikan ke atas penggunaan CBAS.

Kata kunci: Penggunaan sistem perakaunan berkomputer, teknologi maklumat, industri kecil dan sederhana

1.0 INTRODUCTION

The revolution in information technology has significantly changed the nature of business (Elliot, 1992) and created competitive advantages for those who appreciate its effects (Porter & Millar, 1985). The advent of IT has affected the form and substance

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of information, accounting not excepted. The emergence of e-commerce has made possible voluminous and cross-border transactions being carried out. This development therefore behooves a firm to change its accounting systems in order to ensure that outputs from the accounting systems could be prepared in a more timely manner. Therefore, the need for on-line and real-time processing systems will naturally arise. With proper systems, new and updated financial information could be readily available for purposes of, among others, making decisions. Moreover, the accounting systems need also be able to capture the non-financial information to support the financial information for better decision-making (Brecht & Martin, 1996). Thus, the accounting systems should be able to produce relevant, accurate, reliable, and timely information to users in the information age.

For the small and medium sized enterprises (SMEs), an adoption of computer-based accounting system (CBAS), therefore, becomes vital and may well be the determining factor for the survival and success of an organization. The reason is that SMEs need to enhance the quality and price competitiveness of their products and services in order to compete with large-sized firms. To this end, SMEs are expected require more information, as they are exposed to uncertainty in their environment compared to larger firms (El Louadi, 1998). Information, be it financial or non-financial, is one of the key factors for success in this global-economy era (Brecht & Martin, 1996). Further, the SMEs have seen high failure rate (Ballantine *et al.*, 1998) due to their inability to influence market price by altering the output levels (Storey & Cressy, 1995). They also have small market shares, are unable to mount barriers to entry to their industry and are heavily dependent on a small number of customers (Storey & Cressy, 1995). Thus, in order to be able to compete successfully, a firm of SME category needs to have an information system that would enable it to prepare current reports for more timely and informed decisions.

The importance of SMEs in economic development is a subject that has received great attention in the literature. SMEs play a vital role as they contribute significantly in terms of employment and income distribution in many countries (Seyal *et al.*, 2000). The important contribution of SMEs in spearheading Malaysia's economy was evident by SMEs accounting for more than ninety percent of the companies in the manufacturing sector (FMM, 2000). The establishment of the Small and Medium Industries Development Corporation (SMIDEC) in 1996, for example, was reflective of the Government's recognition of the need for a special body to further promote the development of SMEs through the provision of advisory services, fiscal and financial assistance, infrastructural facilities, technologies enhancement, human resource development, market access and other support programs to SMEs. The importance of IT to businesses has also been recognized; and its importance is clearly stated in Chapter 11 (*i.e.* Strategic Directions and Initiatives) of the Malaysia's Second Industrial Master Plan (IMP2) 1996-2005.

Published works show that a number of studies have been conducted to identify factors affecting the use of IT among SMEs (*e.g.* DeLone, 1981; Raymond, 1985; Lees,

1987; Montazemi, 1988; Davis, 1989; Kagan *et al.*, 1990; Chan & Kelvin, 1990; DeLone & McLean, 1992; Adam *et al.*, 1992; Wilson and Sangster, 1992; Yap *et al.*, 1992; Cragg and King, 1993; Shahrum *et al.*, 1996; Igbaria *et al.*, 1997; Foong, 1999; Thong, 1999, 2001). Several factors identified is having influenced IT adoption among SMEs included organizational characteristics such as size and age of business, CEO characteristics, employees IT knowledge, consultants support, government support, information intensity and external pressure. Most of these studies, however, examined the use and implementation of IT in organizations. Few studies, however, have attempted to specifically identify the use of IT in accounting by SMEs. Examples of such studies include studies by Duschinsky and Dunn (1988), Wilson and Sangster (1992) and Chen and Williams (1993). Findings from these studies, however, are largely descriptive, and thus did not examine relationships among the indicators of the adoption and sophistication of IT use in accounting and the factors that affect its usage.

Therefore, given the importance of SMEs in the Malaysian economy, this study aims at investigating the following questions: What is the extent of CBAS adoption among SMEs in Malaysia? What is the quality of CBAS adopted by the SMEs? And finally, what are the factors that influence the extent of CBAS adoption? To this end, this study attempts to achieve several objectives, which are as follows. First, it attempts to identify the status of CBAS adoption among SMEs in Malaysia. Second, it seeks to determine the extent or sophistication of the CBAS adopted among SMEs. Third, it aims to determine the quality of the CBAS adopted by the firms. Finally, it intends to investigate the relationship among the indicators of the extent of CBAS use, and also the factors associated with the depth of CBAS. Findings of this study will serve as important indicators as to Malaysia's SMEs readiness to face future challenges by adopting IT, which could expedite the preparation of timely financial reports. Not only that, a comprehensive computerized accounting system should enable the management to make better forecasts, which are essential to compete in the global economy. Thus, the findings of this study should provide guidance as to the extent to which IT has been adopted and used in preparing the various accounting reports, making prediction and decisions.

2.0 THE NEED FOR COMPUTERISED ACCOUNTING SYSTEMS BY SMEs

SMEs, like any other profit-seeking organizations, are expected to strive to achieve profitability through quality and price competitiveness of their products and services. With the globalization of trade and investment, as well as dynamic technological changes taking place, the SMEs need to gear themselves to face stiffer competition in the future. This is only possible when financial resources and use of relevant technology, among other factors, are available and adequate, cost effective and properly utilized (El Louadi, 1998). In today's competitive market, SMEs need to recognize that IT has the potential to improve productivity, quality and performance - areas that are essential

for their survival and success. In addition to the basic financial reports, SMEs also need non-financial information such as price changes, market trends, and customer behaviors to survive and grow (Chenhall & Morris, 1986). The constantly changing environment requires more timely information be made available. The opening of the previously closed economies of countries including China and Vietnam that offer lower labor costs will further intensify the already intense global competitive environment for Malaysia's SMEs. Therefore, it is believed that for the owners/managers of the SMEs it is becoming extremely difficult to make good decisions without the use of IT.

In spite of the various government programs and incentives, including technology acquisition and skill-building programs, the adoption and effectiveness of technology adoption among SMEs is still an issue of great concern to the government. Shahrum *et al.*, (1996), for example, found that IT adoption among SMEs in the Northern Region of Peninsular Malaysia was only fifty-one percent. They further found that only fifty-three percent of the firms used computers for financial and accounting purposes. The percentage is fairly low compared to the IT adoption among SMEs in developed countries. Duschinsky and Dunn (1988), for example, found that eighty-six percent of the established small firms in the UK had computerized their accounting systems. This slow adoption is a critical issue because SMEs constitute the vast majority of the total manufacturing establishments in Malaysia.

One possible explanation for the low adoption level is that most of SMEs owners are apprehensive of IT (Peter, 1999) due to their unfamiliarity of the technology (Soon, 1990) or they are not aware of the incentives offered by the supporting agencies. In this regard, Raman and Yap (1996) argued that the lack of a coherent national IT plan and disintegration of IT training at various levels of agencies might contribute to the slow adoption rate of IT among SMEs in Malaysia. The government of Singapore, in contrast, has introduced The Small Enterprise Computerization Programme (SECP) to encourage and assist small businesses to become more competitive through the application of IT in their operations (Gable & Raman, 1992). Thus, this initiative manifests the Singaporean government being more organized in promoting the use of IT by SMEs than it Malaysian counterpart.

Honig (1999) classified CBAS into two major categories, namely the low-end and the high-end systems. Among the characteristics that distinguished the low-end and high-end systems are ease and speed with which information is extracted from the accounting database, quantity of information that can be stored in the database, intensity of use, and easiness of modification and customization (Spivak & Honig, 1997). However, the advancement of IT has created a new breed of computerized accounting systems beyond the high-end, *i.e.* enterprise resource planning (ERP). ERP systems are integrated software packages designed to provide complete integration of an organization's business information processing systems and all related data (Everdingen *et al.*, 2000). The ERP system would further strengthen a firm's strategic position with

the availability of information that could support the management decision-making processes.

Despite the availability of a number of fully integrated softwares, empirical evidence thus far, however, revealed that SMEs tend to use computers mainly to support operational or administrative tasks, rather than for strategic decision making purposes (Raymond & Thalman-Magnenat, 1982; Duschinsky & Dunn, 1988; Yap *et al.*, 1992; Wilson & Sangster, 1992; Chen & Williams, 1993; Foong, 1999). Accounting was found to be the most important and widely used applications. Among the popular modules used by SMEs are the basic accounting modules such as general ledger, accounts payable, accounts receivables, and payroll. The findings thus suggest that SMEs have not fully utilized the available technology offered by the latest accounting system software to produce strategic information.

Powell and Xiao (1996) surveyed major UK companies to determine the extent of IT use in accounting. Among the indicators used include the extent of computerization, types of IT-based systems in use, types of IT applied, workstation to staff ratio, and years of IT use. Results showed that over ninety-four percent of the companies have fully or largely computerized their accounting system, whilst fifty percent of the companies have at least partly integrated their IT applications in accounting. They also found that the extent of computerization is greater in larger companies than small and medium companies.

Powell and Xiao's (1996) results confirmed earlier findings in other studies that argued firm's size as the determinants of the sophistication of IT (DeLone, 1981; Lees, 1987; Thong, 1999) but contradicted the ones found by Hunton and Flowers (1997). Hunton and Flowers (1997) found that company size was significantly negatively correlated, though weak, with the extent of IT use in accounting. They suggested that the differences might be attributed to the lower capital and risk barriers due to dramatic decrease of IT cost at which firms of all sizes can benefit from the latest IT development. Another possible explanation is that medium companies may have expanded from small companies but their managers may have limited abilities, i.e. time and education to appreciate the benefits of using integrated accounting systems. Powell and Xiao (1996) further found that nearly eighty percent of companies are almost or fully satisfied with their IT based accounting systems. Nearly ninety percent claim that their objectives of IT applications have been fully or almost satisfied. The findings confirmed the ones found by Shahrum *et al.*, (1995).

In another related study, Duschinsky and Dunn (1988) surveyed 800 successful and established small firms in the UK. Results revealed that eighty-six percent of the firms had computerized their accounting systems; The same percentage of the firms use IT for invoicing; seventy-three percent for management reporting; sixty-six percent for payroll and fifty-eight percent for marketing. Another survey conducted by Chen and Williams (1993), however, offered results in different directions. They found that only fifty-five percent of small companies of a craft or agriculture nature located in a rural

county in Eastern England had used microcomputer systems. This evidence could suggest that geographical location and the type of business sector might have a significant impact on the use of IT among SMEs. Furthermore, the decline in computer hardware and software costs, availability of more powerful and user-friendly computers; and better software packages, might result in an increase in the number of computerized accounting installations in smaller and medium organizations (Zarowin, 1998; Thong, 1999).

Evidence on the use of IT among SMEs is conflicting. Even small businesses in the same country do not show similar pattern of adoption. Perhaps, this is due to the fact that SMEs are not regulated and the need for timely financial reports is not very pressing compared with large businesses, IT adoption depends on the type of business and the management awareness on IT and its benefits. In addition, due to the nature of business being less complex, SMEs show a greater tendency to purchase commercialized (off-the shelf) accounting packages that are much cheaper than internally or externally custom-tailored packages (Gray, 1991). Shahrum *et al.*, (1996) later reconfirmed this finding among Malaysian SMEs. They found that fifty-two percent of SMEs in Malaysia used ready made accounting packages; nineteen percent internally developed their packages; and only nine percent modified the externally acquired packages. Another interesting finding is the tendency of smaller businesses to seek external experts to assist them in choosing the appropriate accounting packages (DeLone, 1981). This may be due to their inadequate knowledge in information systems. Yap *et al.*, (1992) suggested that successful computer-based information systems implementation in SMEs requires the combination of both computer system expertise and knowledge about the business. Generally, SMEs are well versed in running their business but lack knowledge in information system. Hence, most of SMEs always turn to external experts for assistance. Unfortunately, these external experts may have very little understanding about the nature of the firm's business. Yap *et al.*, (1992) proposed a concerted effort to increase the cooperation between the SMEs and external expertise to assist the SMEs in acquiring the transfer of technology.

3.0 METHODOLOGY

3.1 Data Collection

The manufacturing sector is considered information-intensive (Chan *et al.*, 1997) and thus is expected to provide the widest usage of IT due to the presence of all major business functions (Raymond and Magnenat-Thalman, 1982). Chan *et al.*, (1997) argued that manufacturing firms generally process high volumes of data and rely heavily on computer-related technologies for information handling. Further, developing economies like Malaysia rely heavily on manufacturing industries and also are very different from developed countries particularly in terms of IT development (Raman & Yap, 1996).

SMEs could be defined using either one of the following: number of employees, annual sales, and fixed assets (Ibrahim and Goodwin, 1986). However, the number of employees is the most common size criterion used by researchers (*e.g.* Raymond, 1985; Montazemi, 1988; Raymond & Pare, 1992; Raymond *et al.*, 1995; Cragg and King, 1993; El Louadi, 1998). The reason is that most SMEs are often less willing to disclose their annual sales/revenues data (Montazemi, 1988). This could be explained by Robinson and Pearce's (1984) claims which argued that SMEs owners-managers were lack of trust and openness. They are highly sensitive and guarded about their business and decisions which affect them. Thus most researchers chose the number of employees as a criterion to differentiate between SMEs and large businesses. In this study, the definition of SMEs adopted by the SMIDEC was used. Because the SMIDEC does not make a clear demarcation between small-sized firms and medium-sized firms, this study proceeded by defining a small-sized firm as a company with full-time employees not exceeding 50 or annual sales turnover of not exceeding RM10 million. The reason for this demarcation was to study the impact of firm size on the adoption of CBAS.

In deciding the sample companies, this study utilized the list of SMEs located in the Northern Region of Peninsular Malaysia covering the states of Perlis, Kedah and Penang as listed in the FMM Directory 2000. Kedah and Penang were chosen because the former has Kulim high-tech park, while the latter is considered as one of the most advanced states in Malaysia. Perlis is moving towards bringing in more foreign investors into the state. Thus, these three states fairly represented three distinct levels of industrial stage, *i.e.* advance, medium and beginner. However, it was anticipated that there would be problems in identifying the sampling frame since there is no convenient source, which contains a complete list of the above companies. The FMM Directory provides addresses, names of the respective firms' Chief Executive Officers (CEOs), and the number of employees. In the FMM's 2000 Directory, a total of 110 companies met the definition of SMEs.

3.2 Data Collection Instrument

The questionnaire developed was divided into three major sections. The first section of the questionnaire was on the general backgrounds of the company: company background and ownership, legal status, industry type, year established, number of full time employees, and total revenue for the previous fiscal year. The second section investigated the adoption and extent of CBAS used. Five indicators were included: types of accounting systems (TAS), *i.e.* manual accounting systems, combination of manual and computerized accounting systems, fully computerized accounting systems, and fully computerized accounting systems with links to web-based applications; types of processing (TOP), *i.e.* batch, on-line batch, and on-line and real-time; number of modules (NOM), *i.e.* general ledger, accounts receivable, accounts payable, inventory

management, payroll etc; use of network (UON), *i.e.* multi-user systems using wide area network, multi-user systems using local area network, and stand-alone systems; and years of adoption (YOA). Responses on the first four indicators (*i.e.* TAS, TOP, NOM and UON) relate to the extent of CBAS being used. The last indicator, *i.e.* YOA, indicates the maturity stage of CBAS. These indicators were adopted from the Powell and Xiao's (1996) study and from a number of accounting information systems textbooks. For the purpose of this study, SMEs are considered as CBAS adopters if they computerized at least one of their accounting modules such as general ledger.

The third section gauged respondent's perception towards the quality of the computerized accounting systems adopted with respect to content, accuracy, format, and timeliness. These dimensions would provide evidence on the extent to which outputs from CBAS were perceived to be useful to the end users. These dimensions of quality were adopted from Doll and Torkzadeh's study (1988). This instrument has been commonly used to measure end-user satisfaction (Mirani & Lederer, 1998). In this study, the end-users were CEOs of the sample companies who used the outputs of the accounting systems to make business decisions. Responses to the items were recorded on a five-point Likert scale.

4.0 FINDINGS

4.1 Profile of Respondents

Out of a total of 110 questionnaires, only thirty-six sets were complete for analysis. This represents a response rate of thirty-four percent. An analysis indicates that eight (*i.e.* twenty-two percent) of the respondents have fifty or less employees with total annual revenues less than RM10 million (USD2.63 million). Therefore, these companies were considered as small firms. The remaining of the respondents was classified as medium-sized firms. The frequency analysis also revealed that almost two-thirds of companies were owned by the non-indigenous. Twenty-five percent were joint-venture type firms, and only one (*i.e.* three percent) owned by indigenous.

4.2 Adoption of Computer-Based Accounting System

Almost ninety-two percent of the SMES have adopted CBAS at various stages of implementation. Over thirty percent of the respondents have adopted fully computerized accounting system, while about half use a combination of manual and computerized processes. Only six percent of the respondents linked their CBAS to web-based applications, *i.e.* e-commerce. This may suggest that e-business concept, whether business-to-business or business-to-customer is still new in Malaysia. Further the cross-tabulation analysis reveals the following findings relating to the CBAS adopters. First, sixty-four percent of CBAS adopters were non-indigenous firms and thirty percent were joint-venture firms. The only indigenous firm that replied our questionnaire was

found to adopt CBAS. However, we are not able to conclude the relationship between the status of CBAS adoption and the status of the firms because we had only one firm that fell into the indigenous category. Second, fifty-nine percent of CBAS adopters were non-family-owned firms and forty-one percent were family-owned firms. This evidence suggests that the pattern of ownership does not have significant influence on CBAS adoption. Third, thirty-six percent of CBAS adopters were small size firms, while sixty-four percent were medium size firms. This finding may suggest that CBAS adoption is affected by the size of the firm. Finally, the analysis also reveals that fifty percent of firms established for a period of ten years and above have adopted CBAS, while the remaining CBAS adopters were established for a period of nine years or less. Thus, age of firm does not have significant influence on CBAS adoption.

4.3 Extent of Computer-Based Accounting System

The frequency analysis indicates that seventy-nine percent of CBAS-adopters had only implemented CBAS for a period of six years or less. This evidence, therefore, suggests that CBAS is still at the early stage of adoption. Majority or eighty-five percent of respondents use either batch or on-line batch processing systems. Only fifteen percent of the firms use on-line and real-time processing. Further analysis reveals that only thirty-three percent of respondents that adopted batch or on-line batch systems processed their data on a daily basis, while another fifty-nine percent processed their data either weekly or monthly. Our analysis also reveals that more than sixty percent of the respondents use network systems, either multi-user system using WAN or multi-user system using LAN, while the remaining firms use stand-alone personal computers.

Twelve percent of the respondents developed their CBAS internally. Eighty-eight percent purchased their system from outside vendors, where almost half or forty-five percent of the purchased packages were modified to suit the information needs of the firms. The finding suggests that the most popular method of implementation is by utilizing ready-made packages. This may be due to the simplicity of the required applications that are sufficient to fulfill the requirements of SMEs. The customization, if required, can be done with minimum training or with the support of the vendors. Furthermore, most of the SMEs do not have their own IT personnel to fully develop the systems (Thong & Yap 1995; Thong 1999).

Nearly all firms maintain the basic accounting modules such as general ledger, sales/accounts receivable, and purchases/accounts payable modules. Other widely used modules are inventory management and control, and payroll. However, the utilization of more advanced modules such as manufacturing, production planning and scheduling, financial planning, and forecasting was very low. Lack of technical expertise and limited financial resources might explain the findings as SMEs cannot take the risks of adopting sophisticated IT since they cannot afford to have their IT project either fail or cost significantly over budget (Thong, 1999).

Our analysis also shows that majority of respondents had installed various security control measures in their computerized systems. Over ninety percent of respondents use password and backup procedures, while seventy-six percent use anti-virus software to protect accounting data. We also found that almost forty percent of the respondents changed the password every year, and fifty-five percent of the respondents backup accounting data every day. Over seventy percent of respondents use anti-virus software to protect accounting data, and almost seventy percent update their anti-virus software on a monthly basis. This evidence suggests the CBAS implemented is well protected to ensure the security of the systems.

4.4 Quality of Computer-Based Accounting Systems

Multiple items were used to measure each of the four constructs of information quality (Doll & Torkzadeh, 1988). Reliability estimates were then obtained for multiple items; the Pearson's correlation was used for two-item measures while the Cronbach's alpha was used for three or more item measures (Hunton & Flowers, 1997). The highest and the lowest reliability measures were ninety-five (*i.e.* content dimension) and seventy-six percent (format dimension). Table 1 presents the mean score of each measure used to indicate the information quality of CBAS.

Table 1 Information quality

Quality measures	Mean	Standard deviation
Accuracy	3.74	.5488
Content	3.84	.7174
Format	3.68	.6037
Timeliness	3.73	.7915
Total quality	3.75	.5471

*Note: All items are measured on a 5-point scale

Based on a 5-point scale, the average value of 3.75 could suggest a relatively high user satisfaction with the existing CBAS in the firms. Content of the information produced was given the highest score compared to other dimensions. On the other hand, format of information has the least. This implies that the substance of the reports was more important than the form, which is typical of accounting that stresses "substance over form". Nonetheless, it could be deduced that users were generally satisfied with the existing CBAS.

4.5 Relationship Among the Extent of CBAS Items

Previous studies on the impact of IT on accounting paid little attention on the relationships among the identified variables that measured the extent of CBAS use.

Investigating the relationship could provide a clearer picture on IT or CBAS use which cannot be gained from univariate analysis. Therefore, the authors performed a Spearman correlation analysis involving items that measured the extent of CBAS use. Among the five items measuring the extent of CBAS use, the largest coefficients are 0.533 between years of adoption and use of network, and 0.429 between types of processing and use of network. This evidence suggests that firms with longer history of CBAS adoption and better types of processing tend to use networked systems than stand-alone systems. This could indicate that CBAS complexity increases the longer the systems had been adopted. Thus, it is implied that the evolution of the CBAS depends on the acceptance among users in the respective firms and the needs of the systems. This could be due to the fact that investing in CBAS requires substantial funds and therefore adopting a comprehensive and sophisticated CBAS depends on the success of the simple CBAS.

It is also of interest to know whether the quality of CBAS has significant bearing on the extent of CBAS use. Table 2 show that years of adoption were positively correlated with the overall quality of CBAS adopted. Thus, the longer the firms have adopted CBAS the more satisfied they are with their CBAS. This therefore confirms the contention on the evolution of the CBAS in a firm (*e.g.* Nolan, 1973; Hussin *et al.*, 2002).

Table 2 Spearman correlation coefficients among indicators of the extent of CBAS

	TAS	YOA	TOP	NOM	UON	Quality
TAS	1	-.287	.061	.118	-.244	-.168
YOA	-.287	1	.165	-.020	.533**	.463**
TOP	.061	.165	1	-.063	.429*	-.290
NOM	.118	-.020	-.063	1	.125	.109
UON	-.244	.533**	.429*	.125	1	.047
Quality	-.168	.463**	-.290	.109	.047	1

*Correlation is significant at the 0.05 level

**Correlation is significant at the 0.01 level

TAS : Type of Accounting System

YOA : Years of adoptions

TOP : Type of processing

NOM : Number of module

UON : Use of network

4.6 Factors Associated with the Extent of CBAS

Factors such as age of business, size, type of business and ownership might influence IT use in accounting. While Wilson and Sangster (1992) considered internal constraints,

namely IT skills, funding, resistance to change, IT policy and equipment, Powell and Xiao (1996) argued that it is also possible that IT use may be affected by other factors. The relationships between CBAS use variables and factors that are considered to affect CBAS use are therefore worthy examination. To this end, a contingency table analysis is prepared for the nominal factors (*i.e.* ownership and business status) while the Spearman correlation analysis was carried out for the ordinal factors (*i.e.* age of business and size). Results are shown in Table 3.

Table 3 Spearman correlation coefficients between CBAS use items and factors

	Age	Size
TAS	-.228	-.108
YOA	.368*	-.023
TOP	.018	-.123
UON	-.067	-.028
NOM	.239	-.040
EXTENT	.015	-.023

*Correlations are significant at the 0.05 level

Table 3 contains correlations between CBAS use items and the ordinal factors. The last row displays the correlations between the factors and aggregated CBAS use items (*i.e.* EXTENT), being the sums of all CBAS use items. Results show that neither age nor size of a business correlates significantly with the extent of CBAS use. Nonetheless, only years of adoption, *i.e.* the maturity stage of CBAS adoption is positively correlated with age of business. This evidence suggests that the longer the number of years in business the higher the adoption rate of CBAS. The number of years in the business could imply the company's growth and business complexity. Thus, the adoption of CBAS becomes crucial for the business survival. The variables business ownership and business status are nominal. Therefore, a contingency table analysis was performed using Cramer's V, as shown in Table 4.

Table 4 Cramer's v measure of association between CBAS use items and nominal factors

	Ownership	Status
TAS	.788	.598
YOA	.708	.260
TOP	.335	.103
UON	.936	.645
NOM	.792	.034
EXTENT	.762	.343

Results in Table 4 show that neither ownership nor business status significantly correlated with the extent of CBAS use. Thus, these factors are not important in determining the extent of CBAS use. One explanation is that the type of ownership (family versus non-family) and the business status (indigenous versus non-indigenous) do not reflect the need for timely financial reports produced by computers. However, the finding with respect to the type of business should be interpreted with caution as only one firm was owned by the indigenous while the remaining were owned by non-indigenous.

5.0 SUMMARY AND CONCLUSIONS

This study reveal that the CBAS adoption rate of ninety-two percent among the SMEs in the northern region of Peninsular Malaysia may be considered as very high. The high adoption rate may be attributed to the high awareness level of the need for an IT based systems among the SMEs. This evidence shows a significant increase in IT adoption rate in accounting since the period of study in the same region (*i.e.* northern region) by Shahrum *et al.*, (1996). However, it should be noted that sample size and the responses that were included in the analysis between these two studies were very different. The sample size in Shahrum *et al.*, (1996) was much bigger compared to the sample size in the present study. Thus, comparing the findings of this study to that by Shahrum *et al.*, (1996), which also covered a wider range of industries, might not be appropriate because this study focused only on manufacturing firms. Nevertheless, evidence from this study might be useful in gauging the extent of accounting computerization among SMEs in the northern region of Malaysia as it is argued that accounting provides useful information for making business decisions.

Though the adoption rate increased significantly, the CBAS adoption is considered at the infancy stage as majority of the firms only adopted CBAS for a period of six years or less. The contention that the CBAS adopted is at rudimentary stage is supported by the types of accounting modules used by the CBAS adopters where almost all maintained basic accounting modules such as general ledger, accounts receivable and accounts payable.

The study also reveal that about half of the firms' accounting systems use a combination of manual and computerized processes. Eighty-seven percent of the respondents' CBAS use batch or on-line batch processing, while only fifteen percent use on-line and real-time processing systems. Over sixty percent of the respondents use networked or multi-user systems, while the rest are still using stand alone systems. Based on this evidence, it could be deduced that although the use of CBAS has increased significantly, the extent of CBAS adopted by Malaysian firms are still lagged those in the industrialized nations such as the United Kingdom and United States [*e.g.* see Duchinsky and Dunn (1998); Powell and Xiao (1996); Henry (1997); and Everdingen *et al.*, (2000)]. Results also revealed that only six percent of CBAS adopters link their systems to web based applications, which is considered the most sophisticated CBAS.

The most popular method of implementation is found to be through the purchase of ready-made packages. This may be due to the simplicity of these applications and the costs are low and yet these ready-made packages satisfy the needs of individual companies. Nearly half of the adopters purchased ready-made packages. However, most of these purchased packages were modified to suit their business needs. Only twelve percent of respondents developed their own packages. This may be due to the fact that most of the SMEs do not have their own IT personnel to fully develop the systems. The evidence is consistent with the earlier findings by Gray (1991) and Shahrum *et al.*, (1996) who found that majority of the respondents in their study used ready made accounting packages.

Almost all firms in our study maintain general ledger, sales/accounts receivable, and purchases/accounts payable modules. These three basic modules are standard modules that come with any accounting packages. Other widely used modules are inventory management and control and payroll. Only a small number of firms use manufacturing and production planning and scheduling which is considered important modules for manufacturing firms. These modules would help the firms to plan for their manufacturing and scheduling which are vital to manufacturing based firms. The percentages of adoption of these modules are eighteen percent and nine percent respectively. The use of financial planning and forecasting systems is also very low, whereby use of the sales forecast and budgeting/consolidation modules was found to be only twenty-one and fifteen percent respectively. Based on this evidence, it can be concluded that majority of the firms are still running basic transaction-based systems, where the use of more complicated systems such as enterprise resource planning and financial modeling are still very rare compared to larger firms. The finding is consistent with those found in earlier studies (Duchinsky & Dunn, 1988; Yap *et al.*, 1992; Chen & Williams, 1993; Shahrum *et al.*, 1996; Powell & Xiao, 1996; Foong, 1999).

In terms of security, the finding is consistent with Henry (1997) where majority of respondents has installed satisfactory security control measures in their computerized systems. Over ninety percent of respondents use password and backup procedures. Almost forty percent of the respondents changed the password every year, and fifty-five percent of the respondents backup accounting data every day. Over seventy percent of respondents use anti-virus software to protect accounting data, and almost seventy percent update their anti-virus software on a monthly basis.

Finally, this paper investigated the relationship among the variables identified with the extent of CBAS. The findings indicate that the maturity stage of CBAS adoption (*i.e.* years of adoption) and use of network, and types of data processing and use of network are significantly positively correlated. This evidence suggests that firms with longer history of CBAS adoption and better types of data processing tend to use network than stand-alone systems. Results also indicate that the maturity stage of CBAS adoption is positively correlated with the overall quality of CBAS adopted. Therefore, it can be deduced that the longer the firms have adopted CBAS, the more satisfied

they are with their CBAS. Finally, the study has also investigated the factors that affect the extent of CBAS use. The findings however do not support the conclusions by previous researchers (DeLone, 1981; Lees, 1987; Thong, 1999) that cited age and size of business influence the adoption of IT. Only years of adoption were found to be positively correlated with the age of the business.

6.0 RECOMMENDATIONS AND LIMITATIONS

The study portrays the status of CBAS adoption among the SMEs located in the Northern Region of Malaysia. Although the rate of CBAS adoption among SMEs is high, our results show the use of CBAS is limited to basic accounting modules compared to the CBAS adopted by UK companies, as shown by Powell and Xiao (1996) and Duchinsky and Dunn (1998). Thus, our evidence suggests that SMEs do not fully utilize the available technology offered by accounting systems software to their advantage. The study exposed the need to educate the SMEs in this region to the benefits of using a comprehensive CBAS since the CBAS offers benefits more than those offered by the basic accounting modules. For instance, Powell and Xiao (1996) found that SMEs in the UK extensively used decision support tools and about one-third of the companies used the executive information systems. These systems if they could be incorporated into the Malaysian SMEs, CBAS would offer great help in making better decisions as they provide reports that contain information about future scenarios.

Given the limited use of IT in accounting among the Malaysia's SMEs, it is proposed that the Government should provide appropriate incentives to encourage the use of CBAS. Tax incentives, for instance, could be introduced by the Government to encourage the purchase of IT equipments and accounting softwares. A fully integrated accounting software is usually very expensive to acquire and tax relieves from these acquisitions by the Government would reduce the financial burden of the SMEs. The Small Enterprise Computerization Programme introduced by Singapore Small Enterprise Computerization Board may also be used as a model in monitoring and coordinating the implementation of the policies regarding IT.

In the information age and the globalization of the world economy, the question of CBAS adoption is not about "when it should be adopted", but rather "how the system would help the management in making better decisions". Without relevant and real time information at hand, correct decisions cannot be reached by the Malaysia's SMEs. This can be a disadvantage to the country's economy.

Another important aspect about computerization of accounting systems is the issue of data security. Though our evidence shows that majority of the respondents have implemented various security measures, there is a need to further strengthen the security measures especially among the minority companies. The recent events about banks' clients losing their money in their accounts should signal the needs to tighten up the world of an accounting system.

Briefly, a number of limitations of this study include: the lack of full representation of the overall status of CBAS adoption among SMEs in Malaysia. Second, the study may not represent the overall status of CBAS adoption among SMEs even in the northern region since there are manufacturing-based SMEs which do not register with the FMM and thus in the directory. Third, there are other potential variable such as owner's knowledge in IT and accounting and the type of industrial sectors, which are not included in this study. These variables could affect our findings and thus our conclusions if they had been included. It is suggested that they are to be investigated in future studies. Finally, the small number of respondents that are categorized as small size limits our conclusion to the roles of size on the adoption and extent of CBAS.

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