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Organizational Characteristics, Computer Literacy and Attitudes of CEOs' toward the Use of Information Technology: A Study of Bruneian Small & Medium Business Enterprises.

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ABSTRACT

The overwhelming dependency on the organizational use of Information Technology (IT) during the last two decades of twentieth century has dramatically changed the way of working for the most of the business organizations. IT not only holds benefits for organizations and for their chief executives officers' (CEOs) but has also caused difficulties for CEOs to optimize the computing resources. In order to get a deeper insight into the subject a survey of seventy-four small and medium business organizations were conducted to investigate the degree of IT usage in Brunei Darussalam. The study attempts to assess the depth and breadth of IT usage in business. Moreover, parameters such as organizational (size, sale or profitability and type of business) and chief executives (computer literacy and computer attitudes) are studied. The study highlights characteristics: Sales, type of business, and computer attitudes of the chief executives significantly contribute toward the use of IT. None of the other organizational and CEOs variables were found to be significant. The results are discussed, and some suggestions are offered for further studies.

Keywords: *Information Technology, Chief Executive Officers, Computer Literacy, Computer attitudes,*

Introduction

Last decade of twentieth century has brought a radical change in the organizational use of Information Technology (IT). More and more advancements in the technology has not only increased the investment opportunities but has also affected the overall working of the organizational data processing needs. IT plays a vital role in the sustained growth of business organizations. The term IT is defined in a broad sense as “technologies dedicated to information storage, processing, and communications” (Ang and Koh, 1997). This notion of IT focuses on a combination of hardware, software, telecommunications, and office equipment that transform raw data into useful information for speedy retrieval. Increasing investment in IT and the strategic role played by information systems make IT implementation an important research issues within MIS discipline (Bostrom and Heinen, 1977). While the strategic importance of IT is established and progress has been made in understanding it, less is known about how to use IT effectively for achieving general organizational goals. Much research, especially in the MIS discipline, has been undertaken to develop a better understanding of IT implementation in improving organizational efficiency and effectiveness mainly in the context of small to medium business organizations. As such the size of business in these organizations is smaller in magnitude. It is sometimes known as having centralized structure and often “resource poor” in term of human, financial and material resources and has less control of external factors (Lesjak *et al.* 1995). There are several version of small and medium organizations exist in MIS discipline. We therefore use for this study the firms with less than 50 employees as small organizations and more than 50 employees to 250 employees as medium sized organizations (Yap *et al.* 1992). Interestingly, besides smaller in size, the small organizations are highly dependent on information technology in promoting their business (Lesjak *et al.*). The use of IT among the individuals and organizations is synonymous with the End-user Computing (EUC), and is characterized by the control that users have over the choice as to when and how to use a computer (Kasper and Cerverny, 1985).

A formidable body of literature exists in the EUC on the usage, adoption, and implementation of IT. Several other researches shed lights on the success factors of IT along with main issues concerning IT. Additionally, some studies have developed User’s Satisfaction Model and conducted empirical studies in measuring construct (Delone, 1988) in IT. None of the existing literature, up to the best of our knowledge has studied the use of IT in a broader sense of definition of IT as defined by Ang & Koh (1997). Most of the existing studies have focused on microcomputer usage and few has tasked the IS usage. Most of these studies were conducted in early 1980s’ in the western countries and in the United States. Comparatively, very little has been researched in the Asia-Pacific countries. Unfortunately, not a single study was undertaken in Brunei Darussalam till 1998. However, a development in the IT and the tremendous benefits of using technology in the business organizations, has prompted to conduct a pilot study in early 1998 among the selected business organizations in Brunei Darussalam. Brunei Darussalam is a small sultanate located on the northwest coast of Borneo with a total population of nearly 0.3 million. After achieving its independence in 1984, the government has

recognized the need for broader use of computer technology in the public sector. The heavy reliance of public sector organizations on IT has created awareness and established technologically oriented culture among the business entities. More and more private sector organizations have started getting the benefits of IT in their daily business.

The results of pilot study were very effective in determining the usage of IT. That has led us to undertake an empirical study in October 1998 with the main emphasis to find out the extent of IT usage. The present study was conducted in December 1999, with increased samples size and with the addition of more variables to examine the practice of IT use among business organizations with broader perspective. The inclusion of the attitudinal parameters of the Chief Executive has further changed the previous findings. This paper presents the results of this study.

Objectives of Study

The central theme of this study is to examine the organizational and Chief Executive computer literacy and attitudes parameters toward the use of IT between various small and medium business organizations in Brunei Darussalam. This has been further classified into following three sub-sections:

- (a) To identify and to examine the size, nature of business and sales or profitability of the organizations toward the use of IT within small and medium business organizations
- (b) To identify the Chief Executives' computer literacy such as computer experience, in-house training, outside training and self-taught computer skill that may have influence on IT use within the small and medium organizations.
- (c) To identify the Chief Executives' computer attitude that may have influence on IT use within the small and medium organizations.

Review of Literature

The subject was widely studied under the EUC platform. The extent of business use of information technology is actually related to the number of factors and environments. In EUC environment, the user interacts directly with the computer through application software (Palvi *et al.* 1994). In EUC, the user is supported by professional consultant or vendor support program or through education/training firms who act as intermediate between the computer and the user.

A wealth of study has contributed to the adoption diffusion and usage of IT within EUC. The subject has been discussed in various previous studies from different perspective considering several approaches, such as microcomputer adoption, user satisfaction, determinant of factors relating to the success of computer and impact of various organizational variables in the use and also in the success of EUC. Table 1 highlights the various factors and variables that have been studied by various researchers in the use of IT. Further studies have suggested the different segments of business organizations have different level

of IT usage. Raymond and Magnenet (1982) reported that the concentration of IT in big organizations was more on supporting managerial functions, whereas, in small organizations the concentration on IT was more on operational functions.

In the Asia-Pacific region Valida *et al.* (1994) studied the IT utilization among 230 business organizations in Malaysia. They concluded the use of IT in Malaysian organizations was strategic in order to gain competitive advantage. Thong and Yap (1995) developed an IT adoption model for small businesses. They concluded that small business that had innovative CEOs possessed more positive attitudes toward IT adoption. Another study at Singapore by Ang & Koh (1997) explored the relationship between user information satisfaction and job satisfaction by developing two constructs to measure the relationship and found to be correlated. In Hong Kong, Burn (1990) studied the strategic use of IT in Hong Kong small and medium sized organizations. They surveyed three medium sized organizations and found that IT strategy was related to Porter's model of competitive advantage (Porter and Miller, 1985).

In Australia Sohal and Lionel (1998) studied the role and impact of IT in 530 Australian Business Organizations and found IT usage was positively related to organizational performance. Another study by Fink (1998) studied 280 small and medium business organizations and identified ten IT adoption factors in the business firms. Table 1 lists the important factors studied by various researchers facilitating IT usage in business firms (Fink, 1998).

Table 1

Authors	Factors Studied
Yap et al., (1992)	Consultant Effectiveness, Vendor Support IS Experience, Financial Resources CEO Support, User Participation
Cragg & King (1993)	Relative Advantage, Competitive Pressure Consultant Support, Managerial Enthusiasm
Iacovou et al., (1995)	Organizational Readiness External Pressure to Adopt, Perceived Benefit
Thong & Yap (1995)	Organizational Size, CEO Attitude to IT CEO Innovativeness, CEO Knowledge of IT
Ang & Koh (1997)	Age, Education, Organizational level Frequency of Computer use, Computer literacy and User training

Research Model and Development of Hypotheses

Relevant literature was reviewed in order to develop a model and to propose various hypotheses based upon it. For this study we have decided to develop a one-stage model (Figure 1) relating to various variables for this study. As more experience is gained this model can be refined. The various independent variables that contribute in the use of IT is further classified into:

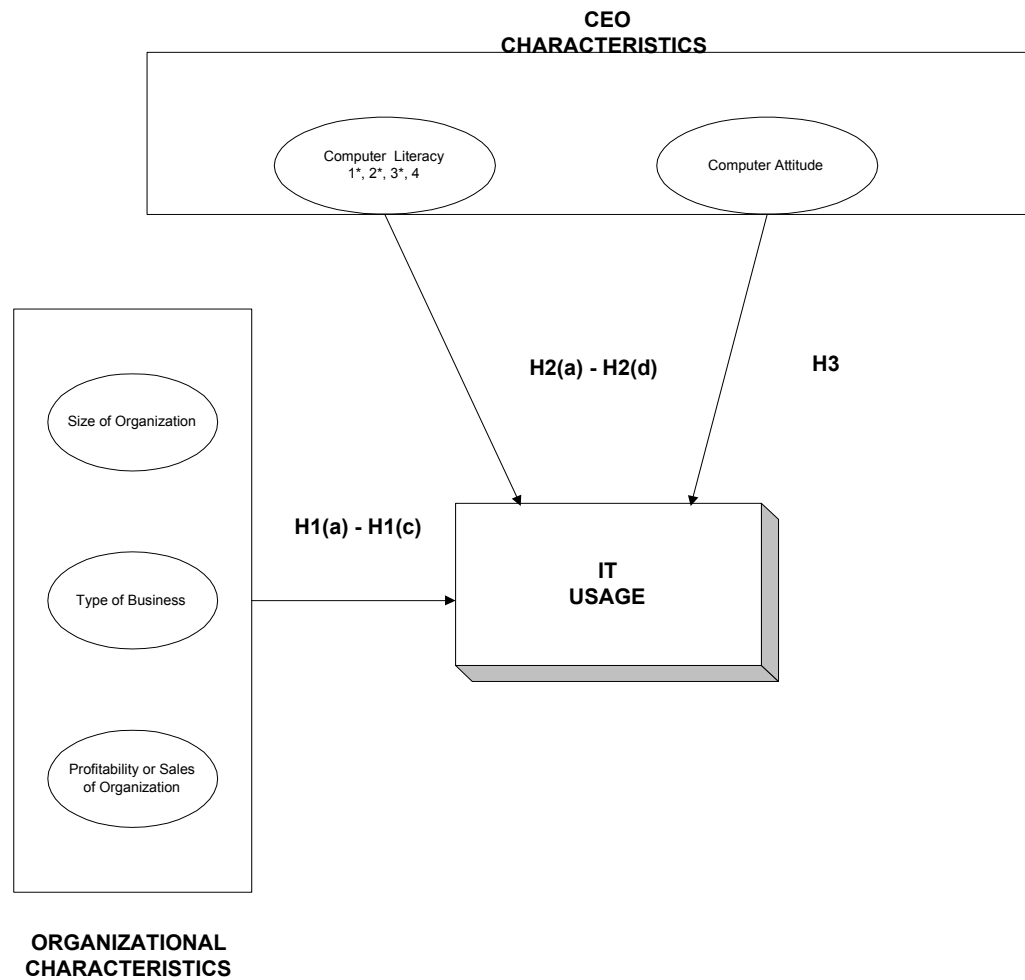
Organizational Parameters

The role of the organizational parameters such as size, structure, profitability was considered as vital in the microcomputer usage. As pointed out in the introduction, several researchers has discussed this variable for different prospective from adoption of microcomputer, use of PC, to studying end-user satisfaction. Lind *et al.* (1989) concluded the size and structure of the organization had a significant impact in the adoption of microcomputer. Ein-Dor & Segev (1978) correlated the size and age of the business with the use of microcomputer.

The larger, an organization, the more likely and extensive was such use. Raymond and Magnenet (1982) has done one step further and studied this variable with the end-user satisfaction. He did not find any significant association between organizational size (no of employees) and end-user level of satisfaction. This is mainly due to reason that he has measured organization size based upon number of employee whereas Ein-Dor & Segev (op cit) measured on the basis of annual sale turnover.

However, Gremillion (1994) found little significant in the relationship between the size of organization and use of microcomputer. Lind *et al.* (1989) studied the size of the organization and were viewed as a predictor of the adoption of administrative, innovation, and information system use. Similarly, type of business was found to be relevant in various studies. Galbraith (1973) concentrated on the processes through which information processing environment influences a business' action. The businesses in different sectors have different information processing needs and those in more information intensive sectors are more likely to use IT than those in less information intensive sectors (Yap *et al.* 1992).

The findings were in line with Valida *et al.* (1994) in their study of Malaysian business organizations. They concluded that IT usage and integration were higher among organizations involved in providing goods and services comparative to manufacturing and distribution.



Note:
 1* - computer experience
 2* - in-house computer training
 3* - outside computer training
 4* - self-taught computer skill

Figure 1 Showing Normative Model of IT Use

It is also noticed that greater the information intensity, the greater the potential for strategic use of IT in a business (Porter and Miller, 1985). Currie (1996) also suggested that business types have considerable influence on the structure of IS activities of the organization. Premkumar (1992) claimed that financial sectors organizations have greater stake in IS use. Rahim *et al.* (1998) in his Brunei based study found the relationship between type of business sectors and use of IS methods. It is evident from the previous studies that organizational parameters were given due consideration but in different context such as microcomputer use and IS use. However, keeping in line with these studies and to find out the relevancy of these variables we have used the same organizational parameter to study the current practice of IT in our study.

Based upon the relevant research that supports our model, the following hypotheses are postulated.

H1 (a) *Size of business exerts a positive effect on the organizational use of IT.*

H1 (b) *Type of business exerts a positive effect on the organizational use of IT.*

H1 (c) *Scale of business exerts a positive effect on the organizational use of IT.*

Chief Executives' Parameters

The demographic variables are the most widely studied factors (Fuerst & Cheney, 1982). The variables include age, education, organizational level and ownership of computer. Of these variables organizational position is perhaps the most researched one because of its relative importance in organization theory. As the success of IT within organization have impact on power relations and decision -making processes (Ang and Pavri, 1994). That is why; Chief Executive Officers (CEO) parameters have been commonly investigated by various researchers under the umbrella of end-users computer literacy and study of computer attitudes.

Computer Literacy: Most of the definitions of computer literacy are either too narrow or too broad. Loyd and Gressard (1984) viewed computer literacy as the amount of time spent on the computer, ownership of a home computer and number of computer related courses taken and/or computer training received. Jones and Clark (1994) focused on computer experience and use, programming skills and ability to use software. Most researchers use different areas to test computer literacy in accordance with technological progress in IT as more PC are being used and application software become more user friendly in addition to the advancement in electronic communication. Kay (1993) developed a practical multi-component computer ability measure comprised of all four areas of computer use or sub-scales; software ability, awareness, perceived control and programming skill. Simonson *et al.* (1987) defines computer literacy as “understanding of computer characteristics, capabilities, and applications as well as an ability to implement this knowledge in the skillful productive use of computer applications suitable to individual roles in society.

To meet the growing need of computer literacy researchers have studied various areas of computer use. Geissler and Horidge (1993) and Smith and Necessary (1996) found that variables such as computer experience, computer familiarity and use, personnel computer ownership influences self-reported levels of computer literacy. Ang and Koh (1997) defines computer literacy as no of years workers have used IS on the job. Montazemi (1988), on the other hand, finds that the level of an end-user's computer literacy correlates with the user's participation in the systems development process. Effective organizational support and comprehensive user education are dominant concern when introducing end-users computing (Henderson & Treacey, 1993). It is widely acknowledged that appropriate end-user training is critical to implementing IT in general, and to promote the productive use of information systems in particular. Howard & Mendelow (1991) reported an increase in the use of computers with computer training. Rockart and Flannery (1983) noted

that the user education is important and that different types of users need different types of training. Igarria & Nachman (1990) contended that prior computer background is essential in promoting end-user satisfaction. Montazemi (1988) found end-user computer literacy positively correlated with user satisfaction in context of small business environments.

The Chief Executive computer experience and training has a direct relationship with their decision to use computer (Palvi, 1997). Nickell and Seado (1986) have concluded that CEO that takes a computer class and training, possesses a PC, have a more positive attitude towards the use of computer. In another study by Delone (1988), several end-user success factors were studied that included the level of computer literacy in which he had positively associated the end-user satisfaction with his level of computer literacy. However, he has defined computer literacy in term of computer experience through training or prior use. He has also pointed out that CEO's knowledge of computers and involvement in computerization leads to more successful computer use. O'Brien & Wilde (1996) described in the implication of Pacific Rim exercise that change in chief executives' attitude toward IT can be achieved by the method of training adopted. He also stressed the structure of training as of great importance in developing positive attitudes of the users. Training can provide better understand IT and produce positive effects in attitudes toward microcomputers and a significant reduction in computer anxiety (Igarria & Chakrobari, 1990). Kasper and Cervený(1985) concluded that greater end-user experience increased the likelihood of end-user computing success. However, the work of Ang & Koh (1997) provided a framework in which they classified computer literacy with user training, frequency to use and user computer background. The more comfortable people are with the technology, the more likely they are to use it (Ives *et al.* 1983). Gutek *et al.* (1991) found the association in between individuals' frequency and duration of use of computer with the increase in computer literacy. The executive's computer skills should have a direct relationship with their desire to use computer (Palvi *et al.* 1994). As pointed, this factor has been used in various studies of end-user computing. Palvi *et al.* (op cit) described the following variables in order to assess skill of the chief executive; a) self taught computer skill, b) formal education of the executive, c) executive's computer experience d) ownership of computer, and e) executive in-house and outside training. For our study, we stick to the definition of Palvi *et al.* that various levels of computer experience, and training are considered as computer literacy; however, Seyal *et al.* (1999) have confirmed that overall percentage of PC ownership is very high (68%) among the CEOs, so we have excluded this variable from our definition of computer literacy.

Based upon this theoretical background and model, we therefore propose the following four hypotheses:

- H2 (a)** *Computer experience of CEO exerts a positive effect on the use of IT.*
- H2 (b)** *Computer in-house training of CEO exerts a positive effect on the use of IT.*
- H2 (c)** *Computer out-side training of CEO exerts a positive effect on the use of IT.*

H2 (d) *Computer self-taught skill of CEO exerts a positive effect on the use of IT.*

Computer Attitudes: The theoretical background of the attitudinal studies is based upon the Fishbein and Ajzen (1975) theory of reasoned action that individuals' attitudes towards an object play an important role in influencing their subsequent actual behavior. Fishbein and Ajzen (1975) describe attitudes as a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to an object. Another underpinning of attitudinal theories are based upon Technology Acceptance Model (TAM) of Davis (1986) is one of the most influential research models in studying the determinants of IT usage. Precisely, TAM postulate that IT usage is determined by behavioral intentions to use a IS, that is jointly determined by the person's attitude toward using the system and its perceived usefulness.

Based on this beliefs-attitudes-intentions paradigm of Fishbein and Ajzen, it has been hypothesized that computer attitudes affect users' behavioral intentions that affect users' actual usage of computer (Rainer and Miller, 1996). Several studies have analyzed the relationship between computer attitudes and user satisfaction with IS/IT (Compeau and Higgins 1995, Rainer and Miller 1996) and none of these studies have used TAM as their "core" research model. Several other studies have used demographic variables such as gender and age in determining the attitudes (Howard and Smith 1986, Igbaria and Persuraman, 1989). Whereas, Hubona and Kennick's (1996) have investigated the three demographic variables such as age, level of education and employment categories and linked with the attitudes.

The researchers also examined CEOs' attitudes. It has been postulated that CEO favorable or positive attitudes have been associated with the increase use of IT. Thong and Yap (1995) study postulates that CEOs' perception and benefit of using IT is more than the associated risks to adopt the technology, the business is more likely to adopt it. Harris (1999) studied the attitudes within EUC framework of an organization and found that favorable computer attitude is associated with the EUC success.

In another study by O'Brien and Wilde (1996) of 268 Australian managers, the influence of training exercise on the manager's attitudes toward the use of IT was examined and found to be significant. Whereas, Winter *et al.* (1998) found that the favorable attitudes of the user managers have predicted the number of use of the personal computer. Seeley and Targett (1999) examined the use of the PCs by the senior executives and were related to the executives' perception of his managerial role, personality and certain external factors. Most recently, Chau (2001) studied the TAM on IT usage behavior and examined the influence of computer attitude and self-efficacy on IT usage behavior and found that computer attitudes were explicitly incorporated with the use of IT.

Based upon this background, we therefore postulate the following hypothesis.

H3: *The positive attitude of CEO exerts a positive effect on the use of IT.*

Research Design

Design of instrument

From the review of literature instrument was developed with the aim of covering the basic research objectives regarding the survey in mind. The questionnaire was divided into three parts. Part 1 captured the background information about the respondents' organizational data. Single item questions were used to ascertain respondents' gender, age, educational level, ownership of PC, and organizational hierarchical level in addition to the questions about the organizational data. Part 2 covers the information about CEO computer literacy asking questions about computer experience and various types of training items. Six-items asking respondents to indicate whether they had experienced in using different types of computer software assessed the computer experience. Responses were coded on five-point scale with 1 for no experience and 5 for excellent experience. The detail is given in Table 1. The total number of categories in which respondents reported experience was used as an overall index of computer experience. Under computer training, we measured individual's response to three questions which asked them to respond in three different categories: Participation in-house computer training program, outside training arranged by vendors or consultant and finally any self-study by the respondents. The response was measured categorically by coding 1 for any training received or 2 for no training. Part 3 covers the information about CEO computer attitudes that were measured by a 7-item scale (Table 1) and questions were adapted from Howard and Smith, (1986); Igbaria and Parasuraman, (1989) and Igbaria and Chakrobari, (1990). The items included affective, cognitive and behavior elements of attitudes. Individuals' were asked to indicate the extent of agreement or disagreement with a series of statements about computer attitudes. The items were recorded in such a way that high scores reflect favorable attitudes towards computer. The dependent variable ITUSE is measured on five-point scale (not at all used 1, very mildly used 2, average used 3, frequently used 4, and very much-used 5) is therefore used to measure the ITUSE. The statistical software package SPSS 10.0 for Windows was used to analyze the hypotheses.

Instrument reliability and validity

Several techniques were used to assess the reliability Cronbach's coefficient (α) and to assess face, construct and discriminant validity.

In order to ascertain *Face validity*, an initial questionnaire was given to thirty chief executives during a 2 days product seminar. We have selected randomly every second name from the registration book and the questionnaire was hand delivered to the CEOs. During the tea break they were briefed about the objectives. At the end of the day 20 questionnaires were received at the registration desk. Three were dropped out because of incomplete. The evidence from the discussion has not only provided a *Face validity* of our instrument that asked questions about chief executive's profile but also has

provided a sound justification to propose various hypotheses. It has also provided the base for selecting a sampling plan.

Table 1: Items used for measuring computer experience and computer attitude

Item Code	Item Description
<i>Experience</i>	
Exp1	Using computer packages such as spreadsheet, word processing or data management.
Exp2	Use of computer language such as SQL, Oracle, dBase IV Foxpro, Access.
Exp3	Building model on computer such as Financial, Statistical or graphical.
Exp4	Programming in computer language such as Cobol, Fortran, Basic, Pascal, C, C++.
Exp5	Participating in non-technical design of computer system such as Feasibility studies or Requirement Analysis.
Exp6	Participating in the technical design of computer system such as systems analysis or design and implementation.
<i>Attitude</i>	
CA1	Using a personal computer helps me make better decision by giving me access to higher quality of information.
CA2	Using a personal computer result in a tendency to over design a simple task.
CA3	Using a personal computer exposes me to vulnerability of computer breakdown & loss of data.
CA4	Using a personal computer allows me to be more innovative by providing the opportunities for more creative analysis and outputs
CA5	Using a personal computer give me the opportunity to enhance my marginal image.
CA6	Using a personal computer improves my productivity on the job.
CA7	Using a personal computer give me more opportunities to obtain the information I need.

In order to ascertain the reliability of the instrument, final version of the instrument was then pilot tested, by asking 50 usable samples selected randomly to complete the instrument. Based on the suggestions of Churchill (1979), two attitude items (CA2 and CA3) were eliminated for which 'corrected-item-total' correlation was $<.40$. The remaining 5 attitude items and 6 items measuring computer experience were then evaluated for convergent validity. This was accomplished using factor analysis (with principal components). All the 5 items were found to load on a single factor termed attitude. Likewise, all the 6 items measuring computer experience loaded on a single factor. Table 2 presents the results of item purification and factor analysis. Reliability was also computed for attitude and computer experience. Chronbach's Alpha (1978) was found to be adequate ($\alpha = .84$) for attitude, where as, for computer experience reliability coefficient remained sufficient ($\alpha = .90$).

Table 2: Results of item-purification and convergent validity

Item Code	Item Description	Corrected Item-Total Correlation	Factor Loading
CA1	Using a personal computer helps me make better decisions by giving me access to high quality information.	.61	.73
CA4	Using a personal computer allows me to be more innovative by providing the opportunities for more creative analysis and output.	.63	.79
CA5	Using a personal computer give me the opportunity to enhance my managerial image.	.70	.79
CA6	Using a personal computer improves my productivity on the job.	.72	.82
CA7	Using a personal computer give me more opportunities to obtain the information I need.	.64	.82
EXP1	Using a computer packages such as spreadsheet, word processing or data management	.52	.60
EXP2	Use of computer languages such as SQL, Oracle, dBase, Foxpro, Access.	.80	.87
EXP3	Building models on computer such as Financial, Statistical, or Graphical.	.72	.80
EXP4	Programming in computer languages such as Cobol, Fortran, Basics, Pascal, C, C++.	.84	.90
EXP5	Participating in non-technical design of computer system such as feasibility studies or Requirement analysis.	.84	.89
EXP6	Participating in the technical design of computer systems such as systems analysis, design or implementation.	.81	.87

Discriminant validity was assessed by subjecting all the items of attitudes and computer experience, to factor analysis. All the 5 attitude items converged on a single factor. And all the six-items of computer experience loaded on second factor. This is shown in Table 3., with the two-factors solution. Thus, the discriminant validity was established.

Data collection

A survey was conducted in December 1999. A questionnaire was sent to 143 various private sector organizations, according to sampling plan. The questionnaire was delivered personally. Out of these, 104 organizations have responded with a response rate of 73%. The questionnaire from seventy-four organizations was filled up by their chief executives officers and was therefore retained for the purpose of the survey. Therefore, true response rate remained 51%, which is satisfactory for such types of studies. Further based upon stratified/purpose selection method, the final results were classified into following main groups. *a) Banks/Insurance b) Hotels/Food Catering c) Travel & Shipping d) Retailers & Wholesalers e) Construction f) Service organizations.* For the purpose of the survey, the above classification presents a reasonable comprehensive and wholesome approach towards inference making on the study.

Table 3: Discriminant validity of computer attitude and computer experience

Item Code	Item Description	Factor 1	Factor2
CA1	Using a personal computer helps me make better decisions by giving me access to high quality information.	.73	
CA4	Using a personal computer allows me to be more innovative by providing the opportunities for more creative analysis and output.	.79	
CA5	Using a personal computer give me the opportunity to enhance my managerial image.	.78	
CA6	Using a personal computer improves my productivity on the job.	.83	
CA7	Using a personal computer give me more opportunities to obtain the information I need.	.81	
EXP1	Using a computer packages such as spreadsheet, word processing or data management		.59
EXP2	Use of computer languages such as SQL, Oracle, Dbase , Foxpro, Access.		.86
EXP3	Building models on computer such as Financial, Statistical, or Graphical.		.80
EXP4	Programming in computer languages such as Cobol, Fortran, Basics, Pascal, C, C++.		.90
EXP5	Participating in non-technical design of computer system such as feasibility studies or Requirement analysis.		.90
EXP6	Participating in the technical design of computer systems such as systems analysis, design or implementation.		.87
<i>Factor</i>	<i>Eigen-value</i>	<i>Pct of Variance</i>	
1	42.4	38.6	
2	3.11	28.3	
<i>Kaiser-Meyer Olkin = .78</i>			
<i>Bartlett-test = 362.16, significance at 0.00</i>			

Results

Those seventy-four questionnaires that were completed by the CEOs were used for the analysis. These questionnaire were received from a variety of business sectors, a breakdown is given in Table 4. It is useful to examine the characteristics of these respondents.

Out of the seventy-four organizations, 40% of the organizations were identified as medium-sized companies and 60% are small-size companies. The use of information technology ranges from somewhat use to very much use. However, the majority (57%) of the organizations indicated their usage from “frequent use” to “extensive use” (mean of 3.6 with standard deviation of 1.10). It is also noticed that use of IT is at minimal level at 43% of the organizations.

Table 4 Main Business Activities of Organizations

Main Business Activities	No of companies	Percentage
Banking, Finance and Insurance	10	14
Trading, Wholesale/ Retail	12	16
Construction Services	9	12
Food/Hotel Services	12	16
Shipping & Travel	11	15
Professional Services	20	27

35% of these organizations have annual sale of less than B\$ 1 million. 45% organizations claimed their sales were in between B\$ 2-5 million. Where as, 20% of the business claimed their sales over B\$10 million.

Most of the respondents (52%) are aged between 30-39 years and possesses first or Bachelor's degree. 65% of the respondents are male as compared to 35% of females.

Hypotheses Testing

In line with the principles of multivariate data analysis, the paired or zero order correlation between the independent and dependent variables is shown in Table 5. The correlation provides directional support for the predicted relationship and shows that collinearity among the independent variables is sufficiently low so as not to affect the stability of regression analysis. Examinations of the correlation reveal that there exists an inter-correlation among independent variables. The CEO's attitude, sales and type of business are statistically significantly correlated with the usage of IT (dependent variable). It is apparent from the table that correlation coefficient is significant and positive for three of the four variables. However, The next step is to look at the combined effects of these variables in predicting the use of IT. Conducting stepwise multiple regression analysis did this. However, in conducting so we should deal with the problem of multicollinearity. Since none of the variables are highly inter-correlated; thus fulfilling Hair *et al.* (1979) criterion that says that variables to qualify for multicollinerity should have coefficient of correlation .80. The results of stepwise multiple regression analysis is presented in Table 6.

Computer literacy, as pointed out earlier, is measured on multi-items multi-dimensional constructs. Most of the items asked questions to determine various computing experience, skills and training received and/or any self-taught skill attained by the CEOs'. Their correlation with the usage of IT is given in Table 5.

Table 5 Pearson Correlation between IT Usage and antecedent variables (n = 74)

Variables	Mean	Std. Dev	Coefficient (r)
Organizational Variables			
SOBUSS (Size of business)	1.44	0.71	-.025
SALES (Sale of business)	2.08	1.10	.381*
BUSTYPE (Type of business)	3.90	2.1	.201*
Chief Executive's Variables			
AVAREXP (Average Experience)	2.35	1.04	.063
COMTRGI (In-house training by CEO)	1.11	0.35	.113
COMTRGO (Outside training by CEO)	1.11	0.31	.113
STAUGHT (Self-taught Computer Skill)	1.07	0.26	.226
AVARATTID (Average Attitude)	4.15	0.58	.363*

** indicates statistical significance at ($p < .01$)

Regression analysis has further found that computer experience did not contribute toward the use of IT. Where as, among computer literacy, in-house training program is found to be significant predictor in determining the organizational use of IT.

Table 6 Result of Stepwise Multiple Regression Analysis Predicting Use of IT (n = 74)

Independent Variables	B	Beta	t-value	p-value
BUSTYPE (Business type)	.25	.403	2.42	.02 *
SOFBUSS (Size of Business)	.23	-.099	.692	.49
SALES (Sales or profitability)	.79	.623	3.78	.00 *
COMTRGI (in-house training)	1.57	.277	1.63	.11
COMTRGO (Out-side Training)	-1.41	-.135	-1.28	.20
STAUGHT (Self-Taught Skill)	1.45	.187	1.81	.08
AVAREXP (Average Experience)	.077	.090	.591	.55
AVARATTID (Average Attitude)	.087	.065	2.26	.04 *

Multiple R = 62% R² (adj) = 39% Std Error = 1.15

The Durbin-Watson statistics is also calculated, as 1.88 that shows that problem of auto-correlation does not exist. Further the R² and adjusted R² suggests that about 40% of the variance is explained by the model that further provides validity and significance of the regression model. Further, it was found to be consistent with other studies (Palvi *et al.* 1994).

Based upon our data analysis in Table 6 as above we therefore summarize the findings of the hypothesis in Table 7. Hypotheses H1(b), H1(c) and H3 were found to be significant.

Discussion

One of the objectives of this study is to identify and to assess the extent of the use of IT in organization. On five-point Likert scale the mean usage of IT in the organizations is 3.51 with a standard deviation of 1.0. From our survey 56% of the organizations claimed their usage of information technology range from more than average to very much use. Where as, 24% of the business uses IT at an average level. Similarly, 20% of the business is still using IT below average. It is interesting to note that out of the 56% of the business that use IT more than average, only 21% are medium sized organizations. Conversely, out of remaining 24% of the organizations that claimed their usage as average,

66% are medium sized. This is evident from our hypotheses testing that the size of the organization is not a determining factor in the use of IT. This in contrast with findings of Ein-Dor & Segev (1978), Lind *et al.* (1989) and Lesjek *et al.* (1995) who has concluded that small organizations are highly dependent on IT in promoting their business. However, our findings are in line with Raymond and Magnenet (1982) and Gremillion (1994) who found that size of the organization and use of microcomputer is not correlated. The size of the business therefore, does not exert positive effects on the organizational use of IT.

Table 7 Summary of Findings

Hypothesis	Relationship	Result
H1 (a)	The size of business to the organizational use of IT.	Not Supported
H1 (b)	The type of business to the organizational use of IT.	Supported
H1 (c)	The sale of business to the organizational use of IT.	Supported
H2 (a)	Computer experience of CEO to the use of IT	Not Supported
H2 (b)	Computer in-house training of CEO to the use of IT.	Not Supported
H2 (c)	Computer outside training of CEO to the use of IT.	Not Supported
H2 (d)	Computer self-taught skill of CEO to the use of IT.	Not Supported
H3	Positive computer attitude of CEO to the use of IT.	Supported

The type of business is found to be a significant variable in our study. Our findings support the Valida *et al.* (1994) who found that different business sectors have different levels of IT integration. Organizations involved in goods and services have higher intensity of computer usage as compared to those involved with product manufacturing and distribution. Valida (op cit) concluded that both small and large firms in Malaysia are receiving similar type of IT support. Our findings also confirm the results of a study by Currie (1996), Rahim *et al.* (1998) and Seyal *et al.* (1999). A further analysis of means (ANOVA) between various groups and also tests for significant differences has indicated that Banking and Travel business sectors is the more avid user of IT.

The sales of the organizations under survey are found to be significant contributing factor in the use of IT. However, this study has confirmed the findings of Burn (1990), Valida (1994), and Seyal *et al.* (1999) who has studied the IT among the Hong Kong and Malaysia based organizations and concluded that IT is being used to gain competitive advantages. Our results of responding organizations show the relationship of sales and the use of IT. We may conclude that IT is used to increase the sales. However, the extent up to which IT is used for strategic or competitive advantages are yet to be measured. It is very difficult to generalize the result on the basis of our survey result. At present, the use of IT is measured on how much it is used within the surveyed organizations but doesn't measure the purpose of use within the organization. In order to find out the deeper insight of the findings, this issue has to be re-addressed accordingly.

As far as chief executives' computer literacy is concerned, most of the literature review supports the CEO's educational qualification that positively contributes towards the use of IT (Nickell & Seado, 1986); whereas, prior computer training is found to be significant contributing factor (O'Brien &

Wilde, 1996) (Schleich *et al.* 1990). Delone (1988) and Montazemi (1998) identified the computer literacy as a significant attitude determinant. In our survey CEOs' computer experience and various elements of computer training such as Computer in-house training, outside training and self-taught skill were measured under the umbrella of computer literacy. Unfortunately none of these variables are found to be. This is in contrast with Scawen (1989) who concluded that behavior can be influenced by education and training or at least in short term, training can provide better understanding of IT. Our finding does not supports Palvi *et al.* (1994) who stressed executives' in-house training. This finding does not support our previous findings where, in-house training of CEO had a positive impact on the use of IT (Seyal *et al.* 1999). This new finding holds a positive affects and has to be investigated in greater depth in future studies that why the executives training could not have an impact on the use of IT.

In order to assess the computer experience of CEOs, several items were studied that includes the respondents' experience with various packages and systems related tasks. None of the several factors is found to be significant predictor towards the use of IT. This in contrast with the findings of various researchers, Nazem & Price (1984), Soh and Raman (1990) who found experience with word processing dominate in determining the CEOs positive effect on the organizational use of IT.

Finally, The attitudes of the CEOs' were studied and that were found to be significant in exerting a positive effect on use of IT. A closer look of Table 8 further reveals that mean score for each of the attitudinal item is around and above of the 4.00 and overall mean score remains 4.5 that further indicates that overall CEOs has an positive attitudes towards the use of IT.

Table 8 Computer Attitudes Mean Rating

Items	Mean	Std. Dev
CA1. Using a personal computer helps me make better decisions by giving me access to high quality information	4.1	.98
CA4. Using a personal computer allows me to be more innovative by providing the opportunities fro more creative analysis and outputs	4.4	.60
CA5. Using a personal computer give me the opportunity to enhance my managerial image	4.3	.73
CA6. Using a personal computer improves my productivity on the job	4.4	.76
CA7. Using a personal computer give me more opportunities to obtain the information I need	4.3	.79

Our results that computer attitudes of the CEOs have an impact on the use of IT within the organizations are in line with several of the previous attitudinal studies such as Thong & Yap who found that the more positive attitude of the CEOs, the more is the adoption of IT within the organizations. Our results are also consistent with Winter *et al.*, Seeley and Targett, and Chau. Whereas, present findings are in contrast with Igbaria & Chakrabarti and O'Brien and Wilde who found training of the managers further develop the attitudes toward the use of the technology.

Conclusions

The research represents our ongoing efforts to empirically researching the IT usage among the Bruneian small and medium sized business organizations. It has, in fact, provided some valuable information about the nature of IT use in Bruneian SMEs. In general our findings have verified some conclusions drawn in previous studies, however, the inclusion of the new attitudinal variables in CEOs' parameter has changed the previous findings.

This study has concluded, firstly, in terms of organizational parameter that use of IT is influenced by sales and type of business. Secondly, the study has concluded that nevertheless the computer literacy of CEOs, the use of IT is very much associated with the positive attitudes of the CEOs. This further makes sense; as such in our survey about 60% of the business are small sized organizations and their decision-making process rests on their chief executives. The practitioners in the industry, computer vendors, IT policy makers and planners must further explore the ways to introduce the new dimensions of IT to the organizational level, by reinforcing CEOs' attitudes. This can be further explored by a systematic practice of educating CEOs through product seminars, workshops and trade-shows.

The research has also identified that most of the surveyed organizations are using IT above average in order to run their business, however, the research does not confirm the turnaround and strategic support from IT application. That aspect needs to be addressed in forthcoming research. That will further provide an insight to the CEOs and policy makers in reinforcing their mission statement and in re-tuning their business perspectives. As such the dawn of new millennium has opened a new venue of business use of IT, CEOs should not only explore the ways to adopt it but should also encourage their functional and business managers to learn and use these techniques for the business gain and to built a real IT culture within their organizations.

Finally, when building an IT culture for their organizations, management should ensure that the IT strategy they adopt leads to business-oriented applications. By linking the business plans with the IT plans could further enhance the strategic use of IT.

References

- Ang, J and Pavri, F. "A Survey and Critique of the Impacts of Information Technology", *International Journal of Information Management* (14:2), 1994, pp.122-133.
- Ang, J and Koh, S. "Exploring the Relationships Between User Information Satisfaction", *International Journal of Information Management* (17:3), 1997, pp. 169-177.
- Bostrom, R. P and Heinen, J. S. "MIS Problems and Failures: A Sociotechnical Perspective-Part 1. The Causes.", *MIS Quarterly* (1:3), 1977, pp. 17-32.
- Burn, J. M. "The Strategic Use of IT in Hong Kong Organizations: An Analysis of Applications in Small to Medium Sized Organizations", *Proceedings of International Conference on IT*, 1990.
- Chau, P.Y.K. "Influence of Computer Attitudes and Self-Efficacy on IT Usage Behavior", *Journal of End User Computing* (13:1), 2001, pp.26-33.
- Churchill, G.A.J. "A Paradigm for Developing Better Measures of Marketing Constructs", *Journal of Marketing Research* (10:5), 1979, pp. 64-73.
- Compeau, D.R and Higgins, C.A. "Computer Self-Efficacy: Development of a Measure and Initial Test", *MIS Quarterly* (19), 1995, pp.189-211.
- Currie, W.L. "Organizational Structure and the use of Information Technology: Preliminary Findings of a Survey in the Private and Public Sector", *International Journal of Information Management* (16:1), 1996, pp.51-64.
- Cronbach, L. J. "Coefficient Alpha and the Internal Structure of Tests", *Psychometrika* (Sept), 1951, pp. 297-234.
- Cragg, P.B and King, M. "Small Firm Computing: Motivators and Inhibitors", *MIS Quarterly*, 1993, pp. 47-60.
- Davis, F.D. "Perceived Usefulness, Perceived Ease of use, and User Acceptance of Information Technology", *MIS Quarterly*, 13, 1989, pp. 319-340.
- Delone, W.H. "Determinants of Success for Computer Usage in Small Business", *MIS Quarterly*, 1988.
- Ein-Dor, P and Segev, E. "Organizational Context and the Success of Management Information System", *Management Science*, (24:10), 1978, pp. 1067-1077.
- Fink, D. "Guidelines for the Successful Adoption of Information Technology in Small and Medium Enterprise", *International Journal of Information Management* (18:4), 1998, pp. 243-253.
- Fishbein, M., Ajzen, I. *Belief, Attitude, Intention and Behavior: An Introduction to Theory & Research*, 1975, (Boston: Addison-Wesley).
- Fuerst, W. L and Cheney, P. H. "Factors Affecting the Perceived Utilization of Computer-based Decision Support Systems in Oil Industry", *Decision Sciences* 13, 1982, pp.554-569.
- Galbraith, J. R. "Designing Complex Organization", 1973, (MA: Addison-Wesley).
- Geissler, J., and Hordiage, P. "University Students' Computer Knowledge and Commitment to Learning", *Journal of Research on Computing in Education*, 25, 1993, pp.347-365.
- Gremillion, L.L. "Organization Size and Information Systems Use: An Empirical Study", *Journal of Management Information System* (1:2), 1984, pp. 4-17.
- Gutek, B. A., Bikson,T.K and Mankin, D. "Individual and Organizational Consequences of Computer based Office Information Technology: In S.Oskamp(Ed), *Applied Social psychology Annual* (vol-5), 1984, (Beverly Hill: Sage Publication).
- Hair, J.F., Anderson, R. E., Tatham, R.L and Grablovsky, B.J. *Multivariate Data Analysis*, 1979, (Tulsa, OK: Petroleum Publishing Company).
- Harris, R. "Attitudes towards End-User Computing: A Structural Equation Model" *Behavior & Information Technology*, (18:2), 1999, pp.109-125.
- Henderson, J.C and Treacey, M.E. "Managing End-User Computing for Competitive Advantage", *Sloan Management Review* (27:2), 1993, pp. 3-14.
- Hubona, G.S., Kennicks, E. "The Influence of External Variable on IT Usage Behavior", *In the Proceedings of the 29th Annual Hawaii International Conference on Systems Science*, 1996, pp.166-175.
- Howard, G.S., Smith, R.D. "Computer Anxiety in Management: Myth or Reality", *Communications of the ACM*, 29, 1986, pp. 611-615.
- Howard, G. S and Mendelow, A. L. "Discretionary Use of Computers: An Empirically Derived Explanatory Model", *Decision Science* (22:2), 1991, pp.241-265.
- Iacovou, C.L.,Benbasat, I and Dexter, A.S. " Electronic Data Interchange and Small Organizations: Adoption and Impact of Technology" *MIS Quarterly*, 1995, pp.467.
- Igbaria, M., and Chakraborti, A. "Computer Anxiety and Attitudes Towards Microcomputer Use", *Behavior & Information Technology* (9:3), 1990, pp.229-241.

- Igbaria, M., and Nachman, S. "Correlates of User Satisfaction with End User Computing", *Information and Management* (19:2), 1990, pp. 73-82.
- Igbaria, M., and Persuraman, S. "A Path Analytic Study of Individual Characteristics, Computer Anxiety and Attitudes towards Microcomputer", *Journal of Management* (15:3), 1989, pp. 373-388.
- Ives, B., Olsen, M.H and Baroudi, J.J. "The Measurement of User Information Satisfaction", *Communication of the ACM* (10), 1983, pp. 785-793.
- Jones, T., Clark, V.A. "A Computer Attitude Scale for Secondary Students", *Computers Education*, (22:4), 1994, pp.315-318.
- Kasper, G and Carvery, R. "A Laboratory Study of User Characteristics and Decision Making Performance in End User Computing", *Information and Management*, (9:2), 1985, pp.87-96.
- Kay, R.H. "An Exploration of Theoretical and Practical Foundations for Assessing Attitudes towards Computers: The Computer Attitude Measure (CAM)", *Computer in Human Behavior*, (9:4), 1993, pp.370-380.
- Lesjak, D., Bobek, S and Glogovsek, J. "Information Technology Management In Small Firms: The Slovenian Case", *Focus: Information Technology*. efm forum 95/1, 1995.
- Lind, M.R., Zmud, R.W and Fischer, W. A. "Microcomputer Adoption- The Impact of Organization Size and Structure", *Information and Management* (16:3), 1989.
- Loyd, B.H., and Gressard, C. "The Effects of Age, Sex and Computer Experience on Computer Attitudes", *AEDS Journal* 18, 1984, pp.67-72.
- Montazemi, A. R. "Factors Affecting Information Satisfaction in the Context of the Small Business Environment", *MIS Quarterly* (12:2), 1988, pp. 239-256.
- Nazem, S.M., and Price, R.L. "Microcomputers in Small Business: A market Survey", *The Journal of Microcomputer Systems Management* (1:1), 1989, pp.29-40.
- Nickell, G. S and Seado, P.C. "The Impact of Attitudes and Experience on Small Business", *American Journal of Small Business* (spring), 1986, pp. 37-48.
- O'Brien, G. J and Wilde, W. D. "Australian Manager's Perception Attitudes and Use of Information Technology", *Information and Software Technology* 38, 1996, pp. 783-789.
- Palvi, P., Means, D.W and Jackson, W.M. "Determinants of Computing in very Small Businesses", *Information and Management* 27, 1994, pp.161-174.
- Palvi, P.C. "Developing a Model of the Global and Strategic Impact of Information Technology", *Information and Management*, 32, 1997, pp. 229-247.
- Porter, M. and Millar V.E. "How Information Gives you Competitive Advantage", *Harvard Business Review*, (63:4), 1985, pp.149-160.
- Premkumar, G. "An Empirical Study of IS Planning Characteristics at Common Industries", *OMEGA* (20), 1992, pp.611-629.
- Rahim, M. Md., Seyal, A.H., and Noah, M A. R. "Use of Software Systems Development Methods: An Empirical Study in Brunei Darussalam", *Information and Software Technology*, (39:14-15), 1998, pp.949-963.
- Rainer, R.K., and Miller, M.D. "An Assessment of the Psychometric Properties of the Computer Attitude Scale", *Computers in Human Behavior* 4, 1996.
- Raymond, L and Magenet, T.N. "Information System in Small Business: Are they Used in Management Decision?", *American Journal of Small Business* (16:4), 1982, pp.20-27.
- Rivaid, S and Huff, S. L., "Factors of Success for End-User Computing", *Communication of the ACM* (31:5), 1988.
- Rockart, J.F and Flannery, I. "The Management of End-User Computing", *Communication of the ACM*, (26:10), 1983, pp. 776-784.
- Sander, G.L and Courtney, J.F. "A field Study of Organizational Factors influencing DSS Success", *MIS Quarterly*, (9:1), 1985, pp.77-93.
- Scawen, P. "IT and Management Pyramid", *Business Strategy International*, 1989, pp.207-209.
- Schleich, J.F., Corney, W.J and Boe, W.J. "Microcomputer Implementation in Small Business: Current Status and Success Factors", *Journal of Microcomputer Systems Management* (fall), 1990, pp.2-10.
- Seeley, M., and Targett, D. "Patterns of Senior Executives' Personal Use of Computers", *Information and Management* 35, 1999, pp. 315-330.
- Seyal, A.H., Rahim, M., Rahman, M.N, and Yussof, A.W. "A Survey of IT Usage Among Small and Medium Business Organizations in Brunei Darussalam", *In the Proceedings of Conference on IT in Asia (CITA 99)*. Kuching, Malaysia Sept 16-17, 1999.
- Simenson, M. et al. "Development of a Standardized Test of Computer Literacy and a Computer Anxiety Index", *Journal of Educational Computer Research* (3:2), 1987, pp.231-241.

- Smith, B.N., Necessary, J.R. "Assessing the Computer Literacy of Undergraduate College Students", *Education*, (17:2), 1996, pp.188-194.
- Soh, C., Yap, C. S., and Raman, K. S. "Factors Contributing to Successful Computerization in Small and Medium Enterprises in Singapore", In: *Proc of the ENDEC International Entrepreneurship Conference on Entrepreneurship; A Spectrum of Possibilities*, 1990, pp.74-81.
- Sohal, A.S and Lionel, N.G. "The Role and Impact of Information Technology in Australian Business", *Journal of Information Technology* 13, 1988, pp. 201-211.
- Thong, J.Y.L and Yap, C. S. "CEO Characteristics, Organizational Characteristics and Information Technology Adoption in Small Business", *Omega*, *International Journal of Management Science* (23:4), 1995, pp. 429-442.
- Valida, A. C., Leng, A. C., Kasiran, M. K., Hashim, S and Suradi, Z. " A Survey of Information Technology Utilization Among Business Organizations in Malaysia", *Proceedings of International Conference on IT*, KL: Malaysia, 1994.
- Winter, S.J., Chudoba, K.M, Gutek, B.A. "Attitudes towards Computer: When do they Predict Computer Use", *Information and Management*, 34, 1998, pp. 275-284.
- Yap. C.S., Soh. C.P.P., and Raman, K.S. "International Systems Success Factors in Small Business", *OMEGA International Journal of Management Science*, (5:6), 1992, pp.597-609.

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