

The Relationship between Organisational Factors and Information Systems Success in the Malaysian Electronic-Government Agencies

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ABSTRACT

Information system success has been widely discussed in the past two decades. As systems and technologies are being improved and developed, discussions on their effectiveness and evaluation on their success have been continuously debated by researchers, scholars and practitioners. Besides the major concern of IS effectiveness, factors influencing IS effectiveness are also important. One of these factors is organisational factor. Using perceptual measures, this study aims to investigate the influence of organisational factors on IS success. Survey questionnaires were gathered from 201 users from four central agencies in Putrajaya, Malaysia. Seven items were identified to influence IS success. They are top management support, decision-making structure, management style, managerial IT knowledge, budgeting method, goal alignment, and resources allocation. The study also identified four IS success dimensions; systems quality, information quality, perceived usefulness, and user satisfaction. The study found that the IS success variables are significantly and highly correlated. The study also found all the organisational factors are significantly correlated to the four IS success factors investigated. Further analyses also found goal alignment as the highest predictor of IS success, followed by management style and centralization. Conclusively, it was clear that the significant relationship between the organisational factors investigated and IS success dimensions evidently indicate the importance of these factors in ensuring successful information systems.

Keywords: IS success, user satisfaction, organisational factors, e-government agencies.

ABSTRAK

Kejayaan sistem maklumat (SM) telah mendapat perhatian meluas di dua abad yang lalu. Perbincangan terhadap keberkesanan dan penilaian keatas kejayaan telah dibahaskan secara berterusan oleh para penyelidik,

cendekiawan, dan pengamal SM, memandangkan sistem dan teknologi sentiasa di perbaharui dan di bangunkan. Berkaitan dengan ini, faktor-faktor yang mempengaruhi kejayaan sistem maklumat adalah juga penting. Salah satu faktor tersebut adalah faktor organisasi. Dengan menggunakan ukuran persepsual, soal selidik kajian di kumpul dari 201 pengguna sistem maklumat di empat agensi kerajaan Malaysia yang terletak di Putrajaya. Tujuh faktor organisasi telah dikenal pasti mempengaruhi kejayaan sistem maklumat. Dimensi tersebut adalah struktur pembuat keputusan, pengetahuan pengurus terhadap IT, bantuan pihak atasan, bekalan, kaedah belanjawan, keseimbangan matlamat, dan stail pengurusan. Kajian ini juga telah mengenalpasti kualiti sistem, kualiti maklumat, tanggapan kegunaan, dan kepuasan pengguna sebagai dimensi kejayaan sistem maklumat. Kajian ini mendapati korelasi antara dimensi kejayaan sistem maklumat adalah tinggi dan signifikan. Kajian ini juga mendapati hubungan antara kesemua faktor organisasi dan faktor kejayaan sistem maklumat adalah signifikan.

Katakunci: Kejayaan sistem maklumat, kepuasan pengguna, faktor organisasi, agensi kerajaan elektronik.

INTRODUCTION

The rapid growth in the use of information systems has led to several changes in the workflow of both the private and public sectors. These changes have led private sector units to compete with one another in attempting to develop efficient services, improved products and better systems. Information systems have changed their way of business operations and have effectively helped increase their turnover. To date, the private sector's use of information systems for achieving strategic advantages and gaining financial and business benefits far outweighs its public counterpart.

Starting in the nineties, the public sector's conservative approach to using information systems began to change. Old and rigid systems were being replaced by the new flexible systems. Technologies such as electronic mail, document imaging, and electronic data interchange and the Internet had penetrated into the public sector market. The new information systems have helped to overcome the problem of inefficient public service and information delivery in the public sector (Seneviratne 1999).

The widely used information systems in the public sector have resulted in the concern of effectiveness and performance of these systems by the public managers (Caudle 1991; Swain 1995). Apparently, more studies are needed to assess the effectiveness of information systems and the factors influencing them.

In evaluating IS effectiveness or success, De Lone and Mc Lean (1992) proposed a comprehensive IS success model and later updated their model in

2003. The authors pointed that there was a huge gap in the IS studies in which many researchers seems to overlook. These studies had given small focus on the antecedent factors of the IS success. One of the important antecedent factors of IS success is the organisational factor. Therefore the aim of this study is to investigate the relationship between organisational factors and IS success in the electronic government agencies.

PREVIOUS WORKS

Many IS success studies were conducted since the 1980s. However, the most prominent study on IS success was conducted by De Lone & Mc Lean (1992). Ever since, their study was considered very significant in contributing towards a universal model, which many employed when looking at IS performance. Attempts have also been made to validate their proposed model (Seddon & Kiew 1995 and Rai et al. 2002). Their model was also updated in 2003 with important consequences for further studies.

In addressing the gaps of the research, we investigated organisational factor as one of the antecedent of IS success. It was envisaged that the organisational factor contribute to the IS success of an organisation. Lu & Wang (1997) used management style as a measure of organisational context. Saunders and Jones (1992) identified organisational variables as mission, size, goals, top management support, IS executive hierarchical placement, maturity of IS function, size of IS function, management philosophy/style, evaluator perspective, culture, and IS budget size. Ang et al. (2001) identified organisational factors that influence IT usage as organisational structure, organisational size, managerial IT knowledge, top management support, financial resources, goal alignment and budgeting method.

From a comprehensive list of organisational factors from related studies (Miller 1987; Grover 1993; Rocheleau 1988, King & Sabherwal 1992, Tallon et al. 2000 & Ang et al. 2001), this study identified seven organisational factors to influence IS success. The factors were chosen based on them being the top ten major factors been cited and discussed in key IS organisational and management studies. The factors are decision-making structure, top management support, goal alignment, managerial IT knowledge, management style, resources allocation, and budgeting method.

DECISION-MAKING STRUCTURE

Decision-making structure is defined as the type of control or delegation of decision-making authority throughout the organization and the extent of participation by organisational members in decision-making pertaining to IT/ IS (Hage & Aiken 1969). Previous studies found decentralized decision-making as one of the strongest facilitators of Customer-based information

inter-organisational system (CIOS) adoption (Grover 1993) and IT use in large and complex organisation (Boynton et al. 1994).

On the other hand, there were studies indicated that highly centralized organisational design can expect better management effectiveness of end user computing (Brown & Bostrom 1994) and they tend to adopt more successful strategic information systems applications (King & Sabherwal 1992).

TOP MANAGEMENT SUPPORT

Top management support is conceptualized as the involvement and participation of the executive or top-level management of the organisation in IT/IS activities (Jarvenpaa & Ives 1991).

Based on the important role of the top-level managers to organisations, it is not surprising that top management support has been one of the most widely discussed organisational factors in several IT/IS success studies. For example, top management support has been investigated in several studies linking its influence on IT/IS use (Jarvenpaa & Ives 1991, Boynton et al. 1994, Cahill et al. 1991, Ang et al. 2001), IT/IS adoption (Grover 1993); CBIS implementation (Mohd Yusof 1999); DSS success (Sanders & Courtney 1985); strategic use of IS (King & Teo 1996), system success (DeLone 1988); IS success (Igarria & Zinatelli 1994) and other related IS studies (Zhang et al. 2003; Byrd and Davidson, 2003; Hwang et al. 2004).

Other studies found strong association between top management support and DSS success (Sanders and Courtney 1985); technology adoption success (Cahill et al. 1991); CIOS success (Grover 1993); strategic IS applications success (King & Teo 1996); microcomputer usage (Igarria et al. 1996); perceived usefulness and perceived ease of use of personal computers (Igarria & Zinatelli 1997); and IT usage (Ang et al. 2001).

GOAL ALIGNMENT

Goal alignment involves the linking of business goals and corporate IT goals together. According to Saunders and Jones (1992), to promote the achievement of organisational goals, IS planning must be tied to organisational planning. Accordingly, the current trend towards this issue has gained interests amongst researchers and practitioners in both public and private sectors (Caudle et al. 1991; Swain et al. 1995, Watson et al. 1997, King & Teo 1996, Tallon et al. 2000). Caudle et al. (1991) investigated on the key information systems management issues for the public sector in the USA. They found aligning IS with agency goals ranked second in the survey ranking. In a recent development Ang et al. (2001) investigated the impact of organisational factors together with other factors on IS usage in the Malaysian public sector. They found that goal alignment as the second strongest predictor of IT usage.

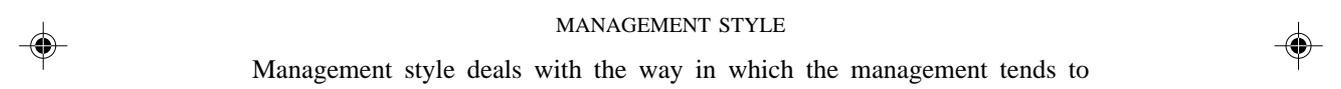


MANAGERIAL IT KNOWLEDGE

Managerial IT knowledge refers to senior management experience and knowledge especially in information technology. This attribute involves the background of the managers, their experience and awareness in IT/IS activities, their recognition towards IT/IS potentials, as well as their ability to plan strategically (Ives & Jarvepaa 1991; Boynton et al. 1994; Ang et al. 2001).

Ives and Jarvenpaa (1991) found support on the relationship between executive background and executive involvement. They found that executives with relevant skills and knowledge background tend to be more productive, more proactive, become more participative in IT/IS projects, and have more favourable views of IT.

Managerial IT knowledge was also found to have an impact on IT use (Boynton et al. 1994). Thus, it was anticipated that public managers too must have sufficient and adequate knowledge and skills on IT/IS to ensure its success. They must be able to recognize the potentials of IT/IS projects in meeting business objectives and must look forward towards the mindset change, and must not be left behind in catching up with the current ICT developments. This study, therefore, proposes that managerial IT knowledge is one of the factors necessary to influence IS success.



MANAGEMENT STYLE

Management style deals with the way in which the management tends to influence, coordinate, and direct people's activities towards group's objectives (Aldag & Sterns 1991; Robbins 1994). Lu and Wang (1997) pointed out that many studies have categorized management styles into people-oriented and task-oriented tasks. People-oriented managers consider inter-personal relationship and are concerned with mutual trust, friendship, respect and warmth. On the other hand, task-oriented managers tend to focus more on task aspect of jobs and deals with defining and organizing tasks for goal attainment.

Lu and Wang (1997) investigated the relationship between management styles with user participation and systems success over MIS growth stages. The authors found mixed results. They found that management styles were related to system success differently over the MIS growth stages.

An important component of management style is leadership style. Lu & Wang's study (1997) seems to support the major finding in Igbaria et al.'s study (1990) on the relationship between leadership style and user satisfaction. Both studies found that leadership style and system success correlate significantly and positively. However, the authors agreed that more issues need to be explored involving the many styles of management and leadership.

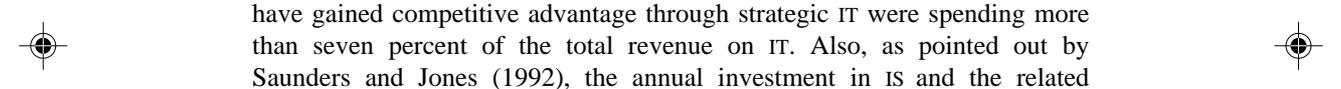


RESOURCES ALLOCATION

According to Ein-Dor and Segev (1978), resources include money, people and time that are required to successfully complete the project. Resources lead to a better organisational commitment and also overcome organisational obstacles (Beath 1991; Tait & Vessey 1988). Sufficient resources also lead to organisational implementation success and project implementation success (Wixom & Watson 2001). Resources may be categorised into money, people, and time.

Ein-Dor and Sejev (1978) and Wixom and Watson (2001) have found significant relationship between resources and IT project implementation. They observed that having sufficient fund, appropriate people and enough time have had positive effects on project's outcome. Thus, this study advocates that resources allocated to IT projects may have important impacts on IS success.

BUDGETING METHOD



Justification deals with budgeting method of IT investment. In view of the strategic role of ICT, justification for IT investment and its relationship with success need to be investigated. Burchett (1988) found that organizations that have gained competitive advantage through strategic IT were spending more than seven percent of the total revenue on IT. Also, as pointed out by Saunders and Jones (1992), the annual investment in IS and the related technologies represent about one-third of organization's total corporate spending. IT investment justification can be based on two aspects, namely cost and quality (Ang et al. 2001). Thus, depending on the objectives of the organizations, the justification of IT/IS investment is either based on quality of the investment or the cost of the investment. In view of the current developments, this study proposed that public sectors are more concerned on the quality of the investment than the cost of investment.

THEORETICAL FRAMEWORK

Having discussed the above organisational factors, we now focus on the theories of IS success based on DeLone and McLean (1992) model as illustrated in Figure 1.

The authors proposed six dimensions of success as the dependent variables - system quality, information quality, system use, user satisfaction, individual impact and organisational impact. Seddon (1997) extended DeLone and McLean's (1992) model by replacing IS use into benefits of use. The author used perceived usefulness construct to substitute De Lone & Mc Lean's IS use construct. This study adopts Seddon's perceived usefulness as an IS success measure replacing system use as in the De Lone and Mc Lean's model.

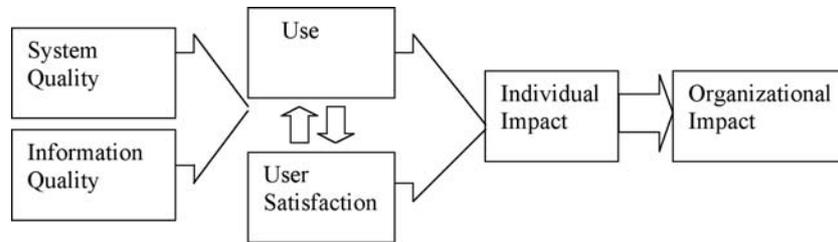


FIGURE 1. DeLone & McLean's Model of Information Systems Success
 Source: DeLone and McLean (1992)

Consequently, based on De Lone and Mc Lean (1992) model, a research framework as shown in Figure 2 was developed. The framework showed the relationship between the organisational factors and the four IS success dimensions.

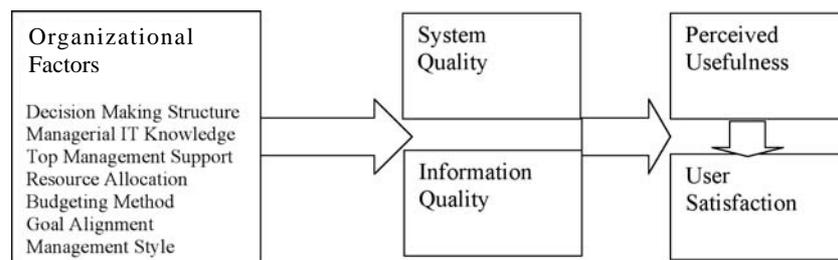


FIGURE 2. Research Framework of the Study

METHODOLOGY

POPULATION AND SAMPLE

The population of study consisted of staff from the electronic government agencies in the Klang valley area and the central administrative agencies Putrajaya in Malaysia. The agencies were involved in the e-government project under the flagship of the Multimedia Super Corridor (MSC). Under the electronic government flagship, several projects had been piloted and implemented such as the Human Resource Management System (HRMIS), the E-procurement, the Generic Office Environment System (GOE) and E-services. The electronic government application systems were implemented in stages starting since 1995.

This survey was conducted in 2003. At that time, there were more than forty electronic government agencies in Malaysia. Out of the total number of agencies, four agencies were selected. The agencies selected were MAMPU,



the Public Service Department (PSD), the Road Transport Division (RTD), and the Implementation and Control Unit (ICU). The agencies were selected based on them being the pilot agencies of the electronic government project.

Prior to the actual field survey, initial visits to the selected agencies and meetings with higher authorities at the agencies were conducted. A sampling frame was acquired which comprised of current lists of employees from the agencies selected. Subjects for this study were then chosen using a stratified random sampling based on their position level. Only employees using an information system in their work were included in the samples. From the sampling frames of the four agencies, a total of 450 subjects were chosen as samples.

MEASURES

The study used perceptual measures to capture data on IS success and organisational factors. Perceptual measures are acceptable measures in most survey research. In most of the questions, a six-point Likert-scale was used to represent the responses of the subjects. The forced-choice scale was adopted in the study to overcome the problem of 'not sure' or 'don't know' responses (Zikmund, 2003). The forced-choice scale was also used to overcome the problem of too many neutral responses, which are common among Asian people when given the option to choose.

Where possible, De Lone and Mc Lean supported the use of validated measures (De Lone & Mc Lean 2003) for IS success. Thus, the study adapted measurement items from related studies on IS success. Five items from Doll & Tokzadeh's (1988) and Davis's (1989) were used to operationalize System Quality. Nine items from Doll & Tokzadeh (1988) were used to operationalize information quality. Doll & Tokzadeh's instruments were acceptable measures and had been validated by other researchers (Seddon & Kiew 1994).

Four items from Seddon and Yip (1992) were used to operationalize overall satisfaction towards the system. Items from Davis's (1989) were used to measure perceived usefulness. Davis's instrument had been widely used by researchers and hence his instrument was a valid and acceptable measure for the perceived usefulness construct.

Besides the above items, demographic factors (age, gender, educational level, job level, departmental level, length of service), frequency of use, types of computer trainings attended were also measured. Frequency of use were measured using six-point Likert scale, from 1=never to 6=always, for four different types of information systems used (office automation, financial IS, human resource IS and Decision Support system). Types of computer training and courses attended were IT awareness, word processing, spreadsheet, e-mail, database, and presentation. Respondents were asked to response to either 'yes' or 'no' for the trainings or courses attended.



A single item measure was used for each of the organisational factors. Using a six-point Likert scale ranging from 1=strongly disagree to 6=strongly agree. Measures were adapted from Ang et al. (2001) and Lu and Wang (1997).

DATA COLLECTION

The study used a self-administered questionnaire to measure the system quality, information quality, perceived usefulness, and user satisfaction. The questionnaires were pre-tested and distributed to members of the postgraduate students and academics who are in the information systems area of specialization. The respondents were asked to critically evaluate the questionnaire with regards to its objective, contents, clarity and ease of completion. After the pre-testing stage, a modified questionnaire was developed for the purpose of conducting a pilot study. The pilot study was carried out in three public agencies in Putrajaya. Ten questionnaires were distributed to each agency. Twenty questionnaires were collected and they were found reliable. Prior to the actual fieldwork, the questionnaires were refined and rephrased accordingly. The questionnaires were also translated to the native language to cater for the lower job level group such as the clerical and the administrative support staff.

The modified questionnaires were then distributed to employees of the selected agencies. A total of 450 questionnaires were distributed, and 201 were returned giving a 45% response rate. Users came from a range of functional areas background including Administrative, Finance and Human resource (38.7%), IT related functions (37.7%) and other areas (23.6%).

RELIABILITY AND VALIDITY

To ensure the quality of measurement and data, reliability and validity tests were performed on the raw data of the study. Factor analysis was used to check for validity of concepts and variables of the study. Factor analysis is also able to identify the structure of a set of variables as well as provide a process for data reduction (Hair et al. 1998). Reliability analysis was done to check for reliability of the instrument. In this study, factor analysis was performed on the dependent factors of the study (Table 1 and Table 2). After that, reliability analysis was conducted (Table 3).

As shown in Table 1, the four IS success variables (perceived usefulness, system quality, information quality and user satisfaction) have eigenvalues greater than 1.0, that being the cut-off loading point adopted in the study. Eigenvalue refers to the amount of variance that a factor can account for. For the IS success factors, factor one has the largest eigenvalue of (14.6) and explains about 59% of the variance. In total the four factors explain about 76% of the variance among the dependent factors.

TABLE 1. Total variance and Eigenvalues for Dependent Factors

Factor	Eigenvalue	% Variance	%Cumulative Variance
1	14.64	58.5	58.5
2	1.68	6.7	65.2
3	1.51	6.1	71.8
4	1.11	4.4	75.7

The results of factors analysis on the IS success factors are shown in Table 2. Twenty-five items from four constructs of IS success dimensions were measured and analysed. The appropriate cut-off significant loading points based on the sample size of the study is 0.4 (Hair, Anderson, Tatham, & Black 1998).

A reliability analysis was then conducted on items of each construct in the study. Reliability refers to the accuracy of a measuring instrument (Kerlinger 1986). Table 3 shows the distribution of the constructs with respect to the number of items in scale and their reliability tests. The study uses Cronbach Alpha to report the reliability of the constructs. According to Nunnally (1978), a Cronbach score .70 or higher is considered reliable. The results showed high values of Cronbach alpha indicating that all the constructs are accurate and hence suggests the instrument is reliable and is suitable to measure the concepts employed in the study.

FINDINGS AND DISCUSSION

RESPONDENTS' PROFILE

Table 4 shows the profile of the respondents of the study. About two thirds of the respondents (62.4%) were between 20-39 years old, followed by (37.6%), who were more than 40 years old. Slightly more than half of the respondents (55.8%) were female. Majority of the respondents (66.8%) had a Diploma certificate or higher, followed by those (33.2%) having lower educational background. Majority of the respondents (59.1%) held executive posts or higher. More than half of the respondents (60.9%) had served the government for six years or more, this includes 21% of the respondents who had served the government for more than twenty years. The remaining respondents (39.1%) had served the government for five years or less.

IS SUCCESS FACTORS

The association between the four IS success dimensions employed in the study, perceived usefulness, information quality, system quality and user

TABLE 2. Factors on the Dependent Variables – Rotated Factor Matrix

Item	Factor			
	1	2	3	4
Systems easy to use	0.28	0.30	0.71	0.30
System are user friendly	0.40	0.32	0.70	0.17
Systems are easy to learn	0.27	0.23	0.80	0.21
Easy to get system to do what we want to do	0.34	0.37	0.65	0.24
Easy to become skillful	0.19	0.42	0.50	0.18
Output presented in useful format	0.42	0.40	0.40	0.25
Satisfied with accuracy of system	0.63	0.12	0.30	0.23
Information is clear	0.69	0.27	0.29	0.16
Systems are accurate	0.75	0.11	0.34	0.15
System provide sufficient information	0.77	0.24	0.20	0.20
System provide up-to-date information	0.75	0.28	0.13	0.21
I get the info I need in time	0.65	0.27	0.19	0.32
System provide precise information	0.79	0.28	0.14	0.26
Information contents meet my needs	0.70	0.28	0.22	0.25
Accomplish task more quickly	0.40	0.64	0.30	0.27
Using the systems improves job performance	0.43	0.69	0.33	0.28
Using system increases productivity	0.37	0.70	0.32	0.34
Systems make the job easier	0.39	0.74	0.26	0.34
Systems enhance effectiveness in job	0.40	0.67	0.33	0.29
System useful to job	0.41	0.72	0.25	0.27
System adequate to meet info processing needs	0.20	0.23	0.27	0.73
Systems are efficient	0.31	0.25	0.25	0.78
Systems are effective	0.35	0.20	0.27	0.82
Overall, satisfied with systems	0.31	0.30	0.23	0.70

TABLE 3. Constructs and reliability tests

Construct	Items in Scale	Cronbach Alpha
Perceived Usefulness	6	0.96
System Quality	5	0.92
Information Quality	9	0.94
User Satisfaction	4	0.94
Organisational Factors	7	0.92

TABLE 4. Respondents profile

Characteristic	Item	Frequency	Percent
Gender	Male	88	44.2
	Female	111	55.8
Age	20-24 years	23	11.6
	25-29	53	26.6
	30-34	22	11.1
	35-39	26	13.1
	40-44	39	19.6
	45-49	24	12.1
	>= 50	12	6.0
Education	High School Cert	66	33.2
	Diploma	50	25.1
	Bachelor	62	31.2
	Masters	19	9.5
	Doctorate	2	1.0
Job level	Top management	9	4.5
	Middle management	51	25.8
	Executive	57	28.8
	Support (admin)	81	40.9
Length of work with government	less than 1 year	19	9.5
	1 - 5	59	29.6
	6-10	31	15.6
	11-15	25	12.6
	16-20	22	11.1
	21-25	25	12.6
	>= 26 years	18	9.0

satisfaction are presented in Table 5. The results showed that the four variables are highly correlated with one another. The values of Pearson correlation matrix ranges from $r = .619$ to $r = .788$. The highest correlation value was between perceived usefulness and information quality. This suggests that the more the users perceived that IS can make their job easier, the more they are also concerned on the quality of the information presented to them. The cutoff value for highly correlated factors is 0.5 as suggested by Hair et al. (1998). The high correlation value suggests the four IS success dimensions are significantly related with each other. This findings are consistent with previous studies on relationship between the four IS success factors (Seddon & Kiew 1994; Rai et al. 2002; Hussein et al. 2003).

TABLE 5. Correlation analysis between IS success factors

Items	Perceived Usefulness	Information Quality	System Quality	User Satisfaction
Perceived Usefulness	1.000			
Information Quality	.788**	1.000		
System Quality	.750**	.677**	1.000	
User Satisfaction	.705**	.669**	.619**	1.000

ORGANISATIONAL FACTORS AND IS SUCCESS

The main objective of the study is to investigate the relationship between organisational factors and IS success factors. As noted previously, seven organisational factors have been identified to be included in the study. The factors of concerned are decision-making structure, managerial IT knowledge, top management support, financial resources, investment quality, goal alignment and management style. Table 3 shows the relationship between the organisational factors and the four IS success factors investigated – system quality, information quality, perceived usefulness and user satisfaction. The table also shows their relationship with the summated IS success factor. Evidently, as depicted in Table 6, all the factors are significantly correlated to one another. This suggests that there is a strong association between organisational factors and IS success.

From Table 6, decision-making structure (centralisation) is found to correlate positively on all the IS success dimensions of the study with Pearson’s r-values ranged between .413 and .534. The significant relationship suggests that a highly centralised organization results in greater satisfaction with system quality, information quality, perceived usefulness and user satisfaction. Therefore, highly centralised organizations tend to have higher system quality, higher information quality, higher perceived usefulness and higher user satisfaction.

The findings are consistent with studies by Brown and Bostrom (1994) on management effectiveness of end user computing, King and Sabherwal (1992) on successful strategic information systems, and Ang et al. (2001) on IT usage in the public sector. However, it is inconsistent with other studies by Grover (1993) on Customer-based information inter-organisational system (CIOS) adoption and Boynton et al. (1994) on IT use in large and complex organisations. The results however gave the impression that public sector organisations tend to adopt the traditional form of decision-making structure.

TABLE 6. Correlation analysis between organisational variables and IS success dimensions

Items	Perceived Usefulness	Information Quality	System Quality	User Satisfaction	IS Success
Organizational Structure	.413**	.481**	.448**	.534**	.531**
Managerial IT Knowledge	.387**	.475**	.413**	.494**	.508**
Top management support	.513**	.531**	.463**	.540**	.585**
Financial Resource	.479**	.521**	.413**	.525**	.537**
Budgeting Method	.554**	.595**	.483**	.584**	.623**
Goal Alignment	.608**	.626**	.523**	.586**	.665**
Management Style	.601**	.517**	.520**	.553**	.663**

** Correlation is significant at the 0.01 level (2-tailed)

Furthermore, in the public sector, decisions are normally made at the strategic level of the organisation.

The relationship between managerial IT knowledge and user satisfaction has strong significant correlation with $r=.494$. Managerial IT knowledge had significant results showing clear perceptions of strong relationships with system quality and higher perceptions in information quality with $r=.413$ and $r=.475$ respectively. The lowest correlation value was between managerial IT knowledge and perceived usefulness ($r=.387$). This low value indicates that managers' recognition of IT potentials is partially associated with the perceptions towards the usefulness of computer-based information systems (CBIS).

The findings are consistent with previous studies by Jarvepaa & Ives (1991) on the progressive use of IT and by Boynton et al. (1994) on the influence of IT management practice on IT use. The above outcomes evidently imply that managers who clearly recognized IS potentials in enhancing productivity have the tendency to promote IS success in their organisation.

Table 6 provides evidence of a positive and significant relationship of top management support on the attributes of IS success. The top management support factor seemed to correlate with all the IS success factors - perceived usefulness, information quality, system quality, user satisfaction and overall IS success with Pearson's r matrix showing (.513, .531, .463, .540 and .585) respectively. The moderately high correlation values suggest that top management support had a significant affect on the four IS success variables. The findings are consistent with most of the past IS studies, including studies by Sanders and Courtney (1985); DeLone (1988); Jarvenpaa and Ives (1991); Cahill et al. (1990); Grover (1993); Boynton et al. (1994); Mohd Yusof (1998); King and Teo (1996); Igbaria and Zinatelli (1994), Ang et al. (2001), Zhang et al. (2003); Byrd and Davidson (2003); and Hwang et al. (2004).

Consequently the outcome validates the assertion that top management plays a very important role in supporting IS and eventually facilitates success in an organization. More importantly, commitment from supportive top officials is most likely to encourage employees to use an IS. Any form of support from top management may help employees to become involved in any IS applications adoption, implementation or utilisation.

Table 6 evidently shows the positive and significant association between the resources allocation factor and the four IS success dimensions, namely system quality, information quality, perceived usefulness and user satisfaction. The Pearson's r-values for the relationship between resource allocation with system quality (.413), information quality (.521), perceived usefulness (.479), user satisfaction (.525) and IS success (.537) are significant at $\alpha < .001$ (2-tailed). This implies higher resource allocation relates to a more positive perception towards system quality, information quality, perceived usefulness and user satisfaction. Thus the findings support the assumptions that resource allocated to IS projects are positively related to the IS success dimensions of the study. The findings are consistent with the findings of previous studies by Wixom and Watson (2001) and Ang et al. (2001). Evidently, the outcome above suggests that adequate resources, including financial, staff and time are important criteria in determining IS success. Organisations having sufficient funds and people tend to succeed in implementing their goals and objectives.

Table 6 also shows the results of the relationship between the budgeting method factor and the IS success dimensions. The budgeting method factor is found to correlate significantly with the IS success variables, with Pearson r-values at the alpha level 0.01 (two-tailed) as follows, system quality $r = .483$, information quality $r = .595$, perceived usefulness $r = .554$, user satisfaction $r = .584$ and IS Success $r = .623$.

Goal alignment (Table 6) was found to correlate significantly with the IS success dimensions, perceived usefulness ($r = .608$), information quality ($r = .626$), system quality ($r = .523$), user satisfaction ($r = .586$) and IS success ($r = .665$). This implies that a positive perception on goal alignment relates to a positive perception on quality of system, quality of output or information, perceived usefulness and user satisfaction. The findings support the assertion that goal alignment is significantly related to IS success. The results are in line with studies on key issues in IS management (Caudle 1991; Dickson, 1985; Saunders & Jones 1992; Whyte & Bytheway 1996, and Watson, 1997) that asserted goal alignment as a significant factor in IS projects and activities.

The results also (see Table 6) reveal that management style correlates highly with all the IS success variables including the summated IS success value with r-values ranging from .517 to .663. The outcome implies that a more positive perception towards a people-oriented style of management relates to a favorable response to and a higher satisfaction with system



quality, information quality, perceived usefulness and user satisfaction. In this study, the analysis reveals that a people-oriented management style is more prevalent than the task-oriented management style. The outcome may be due to the individual level of analysis, where users are more comfortable towards a people-oriented style, where managers consider inter-personal relationships. Another possibility might be due to the culture of Malaysian public sector environment where inter-personal relationships are common within the organisations. Although, very few studies had included management style in their framework, this study was able to highlight the importance of this organisational attribute. The results fully support the previous study on leadership style and IS success (Igarria et al. 1990), but partially support the study by Lu and Wang (1997) on management style and system success over MIS growth.

CONCLUSION

In conclusion, it was clear that the significant relationship between the organisational factors investigated and IS success dimensions evidently indicate the importance of these seven factors in ensuring successful information systems. Consequently, the study adds to the literature on organisational factors influencing IS success that needs more emphasis (De Lone & Mc Lean 2003).

This study has several implications and significance. The findings may assist public managers to identify the important factors that might significantly influence information systems implementation success. Interestingly in this study, the alignment of IS strategy and business objectives (goal alignment), was among the most significant organisational factors of IS success. This shows that IS strategic role has gained much interest not only among the private sector managers, but also the public managers. Studies on this issue provide a strong indication to public managers on the importance of the strategic role of IS. This study evidently supports the issue that the public sector is experiencing a similar impact to its private sector counterparts in terms of IS strategy, and indirectly, this has placed the public sector at par with the private sector in regards to using IS as a competitive tool. Furthermore, the current practices and commitment by the Malaysian government in leading Malaysia into becoming an informative and knowledgeable country has helped public managers to refine the strategic role of IS. Other implications include, the contribution of a theoretical framework on IS success and the external factors.

This study is obviously not without limitation. Besides, investigating organisational factors, other factors influencing success may also need to be examined. Other factors, such as technological factors and individual factors are equally important in promoting success in the organisations. Future

studies should consider these attributes in order to look at success in a more meaningful way. Further research should also look into the empirical studies on net benefits of IS success as included in Seddon (1997) and De Lone and Mc Lean (2003) models. Other limitation includes, subjects of this study are selected only from four public agencies, hence, further studies should include more agencies from different locations and settings.

REFERENCES

- Aldag, R.J., & Stearns, T.M. 1991. *Management*. South-Western, OH.
- Almutairie, H. 200. Evaluating Information Systems Success in Public Organizations: A Theoretical Model and Empirical Validation. Doctoral dissertation, The Pennsylvania State University.
- Ang, C.L., Davies, M.A. & Finlay, P.N. 2001, An empirical Model of IT usage in the Malaysian Public Sector. *Journal of Strategic Information Systems* 10: 159-174.
- Beath, C.M. 1991. Supporting the Information Technology Champions. *MIS Quarterly* 15: 355-372.
- Boynton, A.C., Zmud, R.W. & Jacobs, G.C. 1992. Whose responsibility is IT Management. *Sloan Management Review* 33(4): 32-38.
- Boynton, A.C., Zmud, R.W. & Jacobs, G.C. 1994. The Influence of IT management practice on IT use in large organizations. *MIS Quarterly* 18(3): 299-318.
- Brown, R.M. & Bostrom, R.P. 1994. Organization Designs for the management of end-user computing: Reexamining the contingencies. *Journal of Management Information Systems*. 10(4): 183-211.
- Burchett, R. 1988. *Getting business managers to develop IT strategy, business based strategy*. Southcourt Ltd.
- Byrd, T. A., Sambamurthy, V., & Zmud, R.W. 1995. An examination of IT planning in a large, diversified public organization. *Decision Sciences* 26(1): 49-73.
- Byrd, T. A. & Davidson, N. W. 2003. Examining possible antecedents of IT impact on the supply chain and its effect on firm performance. *Information and Management* 41(2): 243-255.
- Cahill, A.G., Stevens, J.M. & LaPlante, J.M. 1990. The utilization of information system technology and its impact on organisational decision-making. *Knowledge: Creation, Diffusion, Utilization* 12 (1): 53-79.
- Caudle, S.L., Gorr, W.L., & Newcomer, K.E. 1991. Key Information Management Issues for the public sector. *MIS Quarterly* 15(2): 171-188.
- Davis, F.D. 1989. Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. *MIS Quarterly* 13(3): 319-340.
- Davis, G.B., & Hamann, J.R. 1988. In-context information system assessment: A proposal and an evaluation. In N. Bjorn-Andersen & G.B. Davis (Eds.). *Information Systems Assessment: Issues and Challenges*. North Holland, NY: Elsevier Science.
- DeLone, W.H. & McLean, E.R. 1992. Information Systems Success: The Quest for the Dependent Variable. *Information Systems Research* 3(1): 60-90.
- DeLone, W.H. & McLean, E.R. 2003. The DeLone and McLean Model of Information Systems Success: A Ten-Year Update. *Journal of Management Information Systems* 19(4): 9-30.

- Doll, W.J. & Tokzadeh, G. 1988a. The measurement of End-User Computing Satisfaction. *MIS Quarterly* 12(2): 258-274.
- Ein-Dor, P. & Segev, E. 1978. Organisational Context and Success of Management Information Systems. *Management Science* 24 (10): 1064-1077.
- Grover, V. 1993. An empirically derived model for the adoption of customer-based inter-organisational systems. *Decision Sciences* 24(3): 603-639.
- Hage, J. & Aiken, M. 1969. Routine Technology, Social Structure, and Organization Goals. *Administrative Science Quarterly* 14(1): 366-376.
- Hair, J., Anderson, R., Tatham R., & Black, W. 1998. *Multivariate Data Analysis*, Fifth Edition, Prentice Hall, New Jersey.
- Hartog, C. & Herbert M. 1986. 1985 Opinion Survey of MIS Managers: Key Issues, *MIS Quarterly* 10(4): 351-361.
- Hussein, R.; Selamat, M.H.; Mamat, A. & Karim, N.S.A. 2003. The Empirical Investigation on IS Success in the Malaysian Electronic Government Agencies. In *Building a Knowledge Society: Value Creation Through People, Knowledge and ICT*, Abd Rahman eds, M.Z., Abu Bakar, A.B. et al. Research Centre and Kulliyah of ICT, International Islamic University Malaysia, Kuala Lumpur, NCICT 03, Oct 21-22, 278-294.
- Hwang, H., Ku, C, Yen & D. C. Cheng, C. 2004. Critical factors influencing the adoption of data warehouse technology: a study of the banking industry in Taiwan. *Decision Support System* 37(1): 1-21.
- Igbaria, M. & S. A. Nachman. 1990. Correlates of User Satisfaction With End User Computing: An Exploratory Study. *Information and Management* 19(2): 73-82.
- Igbaria, M., & Parsuraman. 1989. A path analytic study of individual characteristics, computer anxiety, and attitudes towards microcomputers. *Journal of Management* 15(3): 373-388.
- Igbaria, M., Baroudi, J. & Parasuraman, S. 1996. A motivational model of microcomputer usage. *Journal of Management Information Systems* 13(1): 127-143.
- Igbaria, M., Zinatelli, N.; Cragg, P. & Cavaye, A. 1997. Personal Computing acceptance factors on small firms. *MIS Quarterly* 21 (3): 279-302
- Jarvenpa, S., Ives, B. 1991. Executive Involvement and Participation in Progressive Use of IT *MIS Quarterly* 15(1): 33-49.
- Kerlinger, F.N. 1986. *Foundations of Behavioral Research*. New York : Harcourt Brace College Publishers.
- King, W.R., & Sabherwal, R. 1992. The factors affecting strategic information systems applications: An empirical assessment. *Information & Management* 23(4): 217-235.
- King, W.R., & Teo, T.S.H. 1994. Facilitators and inhibitors for the strategic use of Information Technology. *Information & Management* 27: 71-87.
- Lu, H.P. & Wang, J.Y. 1997. The Relationship between Management Styles, User Participation, and System Success over MIS growth stages. *Information & Management* 32 (3): 203-213.
- Miller, J. & Doyle, B. A. 1987. Measuring effectiveness of Computer based information systems in the financial service sector. *MIS Quarterly* 11(1): 107-124.
- Mohd-Yusof, M. 1999. A multiple perspective approach to diagnosing computer-based information systems implementation. *Asia-Pacific Journal of Management Sciences* 5: 17-35.

- Myers, B. L., Kappelman, L., & Prybutok, V.R. 1997. A comprehensive Model for Assessing the Quality and Productivity of the Information Systems Function: Toward a Theory for Information System Assessment. *Information Resources Management Journal* 10(1): 6-25.
- Nunnally, J.C., 1978. *Psychometric Theory* (2nd ed.). New York : Mc Graw-Hill.
- Rai, A., Lang, S.S. & Welker, R.B. 2002. Assessing the validity of IS success models: An Empirical test and Theoretical analysis. *Information Systems Research* 13(1): 50-69.
- Robbins, S. 1994. *Management*, 4th ed. Prentice-Hall, Inc.
- Robey, D. 1979. User attitudes and management information system use. *Academy of Management Journal* 22(3): 527-538.
- Sanders, G.L. & Courtney, J.F. 1985. A field study of organisational factors influencing DSS success. *MIS Quarterly* 9(1): 77-93.
- Saunders, C.S. & Jones, J.W. 1992. Measuring Performance of the Information Systems Function. *Journal of Management Information Systems* 8(4): 63-73.
- Seddon, P.B. 1997. A Respecification and Extension of the DeLone and McLean Model of IS Success. *Information Systems Research* 8(3): 240-253.
- Seddon, P.B. & Kiew, M.Y. 1994. *A Partial Test and Development of the DeLone and McLean model of IS Success*. Proceedings of the International Conference on Information Systems, Vancouver, BC, Canada (ICIS 94) 99-110.
- Seddon, P. & Yip, S.K. 1992. An Empirical Evaluation of User Information Satisfaction (UIS) Measures for Use with General Ledger Account Software. *Journal Of Information Systems* 5: 75-92.
- Seneviratne, J.S. 1999. Information Technology and Organisational Change in the Public Sector, In *Idea Group Publishing, Applications in Public Administration: Issues and Trends*. Hershey, USA.
- Suhaimi, M.A. 1998. An Investigation of Successful Strategic Planning of Information Systems within large companies in the United Kingdom, Doctoral thesis, Loughborough University, UK.
- Swain, J.W., White, J.D. & Hubbert, E.D. 1995. Issues in Public Management Information Systems, *American Review of Public Administration*, 25 (3): 279-296.
- Tait, P. & Vessey, I. 1988. The Effect of User Involvement on Systems Success: A Contingency Approach. *MIS Quarterly* 12(1): 91-108
- Tallon, P.P., Kraemer, K.L., & Gurbaxani, V. 2000. Executives' Perceptions of the business value of information technology: A process-oriented approach. *Journal of Management Information Systems* 6(4): 145-173.
- Watson, R.T., Kelly, G.G., Galliers, R.D. & Brancheau, J.C. 1997. Key issues in Information systems management: An international perspective. *Journal of Management Information System* 13(4): 91-115.
- Wixom, B. & Watson, H. 2001. An Empirical Investigation Of the Factors Affecting Data Warehousing Success. *MIS Quarterly* 25(1): 17-32.
- Whyte, G. & Bytheway, A. 1996. Factors affecting information systems' success. *International Journal of Service Industry Management* 7(1): 74-93.
- Zhang, L., Lee, M. K. O., Zhang, Z. & Cheung, C. M. K. 2003. ERP Systems Implementation Determinants and Success Measures in China: A Case Study Approach. In *International Conference on Enterprise Information Systems (ICEIS)*, France.
- Zikmund, W. 2003. *Business Research Methods* (7th Ed.). Ohio: Thomson Learning.



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