Measuring Information System Performance in Public Sector: A Case Study of Pahang State Education Department

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ABSTRACT

This paper aims to measure the IS performance and its importance to the users particularly in public sector. Respondents comprise of a local public sector end users (employees) who had access to its Information Technology (IT) facilities and services (email, internet browsing and a host of office automation system) in Malaysia. A total of 151 responses were obtained. The specific objective of this study includes to identify the IS attribute (amongst systems quality, information quality and service quality) which is perceived to be the most significant relationship in determining end-user satisfaction. Furthermore this study seek to examine the relationship between the demographic factors of the end-users and their evaluation of the overall IS performance. The findings discovered that system quality is the most significant relationship in determining end-user satisfaction. However, the study has found that there is no significant relationship between the end user demographic factors and their evaluation of the overall IS performance. Finding from this study could give public managers the basis to perform a benchmark amongst the different IS applications. In addition, the results of this study can at least be considered by top level management in developing the future policies and strategies to exploit its information resources, to develop its information infrastructure, and to promote the utilization of IS for the purpose of achieving more effective growth of public services.

Keywords: *IS Performance, public sector, end-user satisfaction, system quality*

Introduction

Information technology (IT) has allowed individuals, groups, and organizations to manage information effectively and efficiently. An information system (IS) combines information technology with data, procedures for processing data, and people who collect and use the data. Individuals, organizations, and society need to use a variety of systems to organize the process of collecting, storing, processing, retrieving and communicating of information (Gordon, 2004). Organizations collect extensive amounts of information, and are in a great need to share information among their members.

With the rapid development of IT and IS, particularly distributed processing and network computing, the concept of IT and IS usage have been changed dramatically. It has been found that IT and IS enable completely new ways of performing jobs and sometimes acts as an essential factor in transforming a business process. It has been used in many fields such as public hospital (Vassilios & Prodromos, 2012) and public value of e-government (Kanishka & Hepu, 2012). In comparison with private sector firms, public organizations introduce IS in their business processes reactively rather than proactively, owing to the bureaucracy and culture (Themistocleous *et al.* 2004). Notwithstanding this, public sector organizations are also facing issues on how to successfully adopt and implement IS (Cardozo et al. 1993). Thus, in order to be successful, one must be able to comprehend how end-users perceive the IS attributes, since it would provide clearer insights in understanding and assess the systems' performance.

In the case of the Malaysian Public Service, its current and future roles in the administration and development of the nation are clearly defined by the various macro policies and development plans introduced at the various stages of the country's development. Vision 2020, the National Information Technology Agenda, the National Transformation Policy (NTP) (2011-2020) and the Fourth National Outline Perspective Plan (NOPP) have outlined the nation's vision and efforts to intensify the development of high technology and knowledge intensive industries as well as to make information and communication technology (ICT) the catalyst for the nation's growth in the 21st century. According to National IT Council Malaysia (NITC), Malaysia's ICT spending is expected to reach RM31.5 billion for the year of 2012 which corresponds to 6.1% expansion over 2011. In line with the Ninth Malaysia Plan, the Government spent approximately RM2.2 billion on the development of ICT for the public sector in 2005. This figure is growing annually. Given the existing massive spending in ICT, understanding internal users perceptions on the importance of IS attributes and their performance could perhaps shed a new light on the successfulness of IS implementation.

End-users are now more directly involved with the systems as they navigate themselves typically via an interactive user interface, thus assuming more responsibility for their own applications. As such, the ability to capture and measure end-user satisfaction serves as a tangible surrogate measure in determining the performance of the IS function, services and application deployed within an organization (Ives, Olson and Baroudi, 1983). Besides evaluating IS performance, it is also crucial to evaluate whether the existing IS in the organization meet the users' expectations. Therefore, this paper aims to demonstrate the usage of the importance performance analysis to measure the IS performance (end user satisfaction) and its importance to the users particularly in public sector i.e. Pahang State Education Department (PSED).

Objectives of the Study

This study is an attempt to investigate the perceived performance of organizations by utilizing an extension of DeLone & McLean (1992) Success model, which incorporates performance as a function of end-user satisfaction and system usage. The specific objectives include:

1. To identify the IS attribute (amongst systems quality, information quality and service quality) which is perceived to be most significant relationship in determining end-user satisfaction.
2. To analyze the association between the demographic factors of the end-users and their evaluation of the overall IS performance.

Conceptual Foundation and Hypotheses
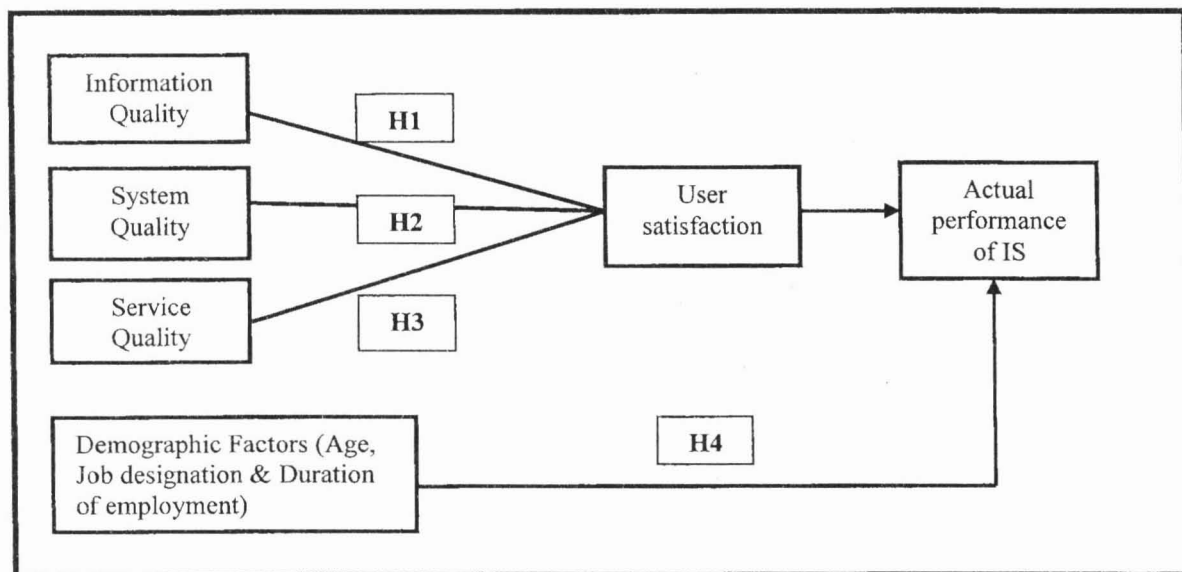
Research Framework

Figure 1: Theoretical framework (adapted from DeLone & McLean)

Defining End-Users

When measuring end-user satisfaction, past research work has indicated the importance of identifying the target user group explicitly. End-users can be defined as the people who directly use the system by performing various practices that prepare data and information for the system (Ozkan, 2006). According to Regan and O'Connor (2004), end user of IS can be defined as the application of information technologies to support both business processes and individual performance with the objective of improving overall organizational effectiveness.

The end-user computing environment typically involves end-users interacting directly with the system to enter information or prepare output reports that are later used in decision-making. As exhibited in most decision-support systems, the end users are assumed to have a bigger responsibility, as compared to the IS staff, who merely accountable in enabling end-users to function more independently by providing support and aid in

the selection of tools. Previously, it was necessary to differentiate users into primary and secondary groups (Davis & Olson, 1985). The primary users are those who make decisions based on the system output while the secondary group would enter information and prepare output report but do not interact directly with the data or use it for other purposes. However, as applications become more user-friendly and end-user computing gains a bigger momentum these roles have since merged.

For the purpose of this research, end-users are defined as the entire end-user population who has access to the standard PSED's IT facilities. These facilities include access to email, internet, intranet, official portal of PSED, host of office automation systems which are developed by the government such as Human Resource Management Information System (HRMIS), and also which were developed in-house by the PSED such as "Sistem Maklumat Menengah" and "Sistem Maklumat Pendidikan Khas".

End User Satisfaction

As the development of e-government in Malaysia is still in progress, for a start, the user satisfaction measure could be used as a surrogate measure of system success. User satisfaction is often used as a surrogate measure of information system effectiveness. User satisfaction typically focuses on the successful interaction between the IS itself and its users.

Bailey & Pearson (1983), define end user satisfaction as sum of one's feelings or attitudes towards a variety of factors affecting that situation. In addition, Zviran et al. (2005) had viewed user satisfaction in terms of system use and acceptance as the practical measure of IS success. According to Gatchalian (1999), end user satisfaction is a measure of success in a highly competitive market and understanding the product's feature and characteristics by end users. Meanwhile, in Enterprise Resource Planning (ERP) acceptance model, Fan and Fang (2006), define end user satisfaction as user's subjective evaluation of various consequences after using ERP systems.

Information Quality

Information quality is concerned with such issues as timeliness, accuracy, relevance and format of information generated by an information system. As such, the information system needs to provide its users access to the right information, at the right time to help make the right decisions (Reicks, 2001). Information quality is defined by Hu (2003) as the quality of the information produced by a system concerning its concentration on information utilization or consumption. In addition, it is defined by features regarding the actual information that is presented by information system (Delone, 1992; Delone, 2003; Aasheim, 2007).

Jung (2007) also found that there is a correlation between information quality and user satisfaction. In the ERP acceptance model, information quality is defined as the user perception of ERP system's output in its reliability, accuracy, completeness and consistency (Fan and Fang, 2006). Meanwhile, the e-Procurement Success model projected by Vaidya (2007), comprised of transperancy, management information and user-friendliness of catalogue. Finding from previous research indicates that information quality is positively related to user satisfaction when regarding PDA solutions and general information systems (Jung, 2007; Ellingsen, 2002; Delone 1992; Almutairi, 2005). Therefore, it is hypothesized that user satisfaction is correlated with information quality hence the first hypothesis is:

H1: There is a significant relationship between information quality and user satisfaction.

System Quality

System quality is concerned with whether or not there are bugs in the systems, the consistency of the user interface, ease of use, response rates in interactive systems, documentation and sometimes quality and maintainability of the program code. System quality in the internet environment is concerned with usability, availability, reliability, adaptability and response time. According to Rolden & Leal (2003), system quality refers to the desired characteristics of the IS itself, which produces the information and it is related to the quality of IS output. Delone (2003) and Aasheim (2007), among others, highlighted that system quality is recognized by technical features regarding the network and the IT equipment itself. Therefore, some of the fundamental facets

of the system quality found in the previous research addressed features like reliability, response time, and accuracy, ease of integration, flexibility and functionality as fundamental of system quality (Hu,2003).

Delone and McLean IS success model has been applied and was used to explain several perspectives such as in Enterprise Resource Planning (ERP) and also in e-procurement. In ERP acceptance model, Fang and Fang (2006) define system quality as the user perception of measuring an ERP system in its flexibility, reliability and accessibility. Meanwhile, in e-procurement success model projected by Vaidya (2007), the system quality variable comprised of ease of use, system availability, and integration capability. In other words, system quality emphasizes on important characteristics of factors intrinsic to system design or implementation (Hu, 2003). In addition, Rolden & Leal (2003) found that, system quality of the executive IS exerted a significant positive influence on end-user satisfaction. It is therefore hypothesized that:

H2: There is a significant relationship between system quality and user satisfaction.

Service Quality

Service quality refers to the overall support delivered by the IS department (IT division for this study) or Internet service provider if services are outsourced. The inclusion of the service quality dimension recognizes the service element in the information systems function. The service orientation approach was borrowed from the service operation SERVQUAL instrument (Parasuraman et al (1988) and Zeithaml et al (1990). There are five elements involved namely tangibles, reliability, responsiveness, assurance and empathy. Tangible is related to the appearance of physical facilities, equipment, personnel and communication materials. Meanwhile reliability is the ability to perform the promised service dependably and accurate. Responsiveness is defined as willingness to help customers and provide prompt service. Assurance is the knowledge and courtesy of employees and their ability to convey trust and confidence and finally, empathy is related to caring, individualized attention which the organization provides to its customers.

In the field of IS, service quality might stand for certain aspects that service quality brings through information systems, which appear to fulfill the end users demand. According to Hu (2003), service quality can be examined in terms of service consistency, reliability, timeliness, empathy, assurance and accuracy or adequacy. In addition, Collier (1994), summarizes popular definitions of quality as: matching specifications, a stage where user specifications are met, a fair exchange of a value at a price, and potential for utilization. Meanwhile, in the e-procurement success model projected by Vaidya (2007), the service quality variable comprised responsiveness, accountability, compliance, process reliability and issue resolution (help desk).

The relationship of service quality and end user satisfaction has attracted considerable interest from researchers in the field of IS (Delone, 2003; Luarn, 2005; Hussein, 2005; Kim, 2005) and has long been recognized as playing a crucial role for both the successful use of the firm's IS and company performance, which strengthens company survival in today's competitive market. There were many previous researches regarding service quality and user satisfaction concerning IS. They found that there is a positive correlation between service quality and user satisfaction concerning information systems (Delone, 2003; Luarn, 2005; Kim, 2005). Beside that, Chung & Dauw (2009), found that service quality has the most influence on user satisfaction in Health Information Systems (HIS) quality. It is then hypothesized that:

H3: There is a significant relationship between service quality and user satisfaction.

Demographic Factors and End-User Satisfaction

Certain user characteristics have been found to affect end-user satisfaction. Harrison and Rainer (1996) indicated that there is a relationship between user satisfaction and age. Older people are less likely to adopt new technology and are hesitant to change (Holsapplem et al, 2005, Palvia & Palvia, 1999; Watson, Rainer, & Koh, 1991; Wierenga & Oude Ophuis, 1997). On the other hand, because younger professionals have often been introduced to information technology (IT) earlier, they might be more easily satisfied with relatively new IT developments.

Job designation can affect end-user satisfaction since different roles and seniority level imposes different responsibilities upon the user. For instance, in an ERP implementation information and process

requirements generally significantly benefit managers (Holsapple & Sena, 2003, 2005), thus, it is reasonable to expect that ERP satisfaction may be higher for managers than for others. In terms of duration of employment, this study aims to see if newer employees are relatively easier to please compared to those who have stayed with the organization for much longer. Therefore this study will examine the association between the end user demographic factors and the actual performance of IS (surrogate for end-user satisfaction).It is therefore hypothesized that:

H4: There is a significant relationship between the end user demographic factors and the actual performance of IS.

Research Methodology

This study used questionnaire survey as the primary form of calling responses from end-users of information systems available in PSED. Survey approach was chosen because it provides quick, inexpensive, efficient and accurate means of assessing information on the population. Other research designs were not adopted because, first, manipulation of variables was not required; and as such experiment method was not appropriate. Second, not many studies have been done conducted to the research area particularly in public sector, thus, secondary data approach alone was not sufficient. Third, observation approach was not viable as there are many things that cannot be observed. Attitudes, opinions, motivations and other intangible states of mind of people cannot be recorded by observation. The survey was outlined in the form of a questionnaire which contained two identical sets of IS attributes. In the first section, they are required to evaluate the actual performance of the same attributes. In the second section, the respondent is asked to evaluate the degree of importance placed upon each attribute. A five-point Likert scale was utilized to quantify their responses. In developing the survey questions, the basic approach developed by Seddon & Kiew (1996) and Sherman (1997) were adopted. Some questions were modified to suit the research context and local conditions particularly in public sector.

A convenience sampling method was employed for the study. The sample was confined to employees at PSED head quarters located in Bandar Indera Mahkota Kuantan Pahang. The questionnaires were distributed to employees who have the access to its IT facilities and system within 10 sectors and units in PSED. All employees who involved in this study were from lower level management up to higher level management. They were asked about their experience and knowledge of using the systems in PSED. In order to provide an adequate level of confidence in the study, a sample size of 300 was targeted, with 417 questionnaires were distributed with the hope of obtaining at least 300 usable responses for analysis. The survey was conducted using self-administered drop-off method. This method was chosen because it was less expensive in terms of manpower as well as time needed. However, only 151 questionnaires were returned which is equivalent to a response rate of 36%.

Findings and Discussion

A total of 151 responses were obtained. Out of the total responses received, 9 were invalid or incomplete and such were rejected. Therefore, 142 responded questionnaires were used for the final analysis.

Summary Statistics of Survey Respondents

The demographic profile of the respondents is presented in Table 1. The number of male respondents was less than the female respondents. There were 40.8% males as compared to 59.2% females in this sample. The female respondents outnumbered male by 18.4%. The majority of the respondents which represented 30.3 percent were between 41 to 50 years old. This was followed by 27.5 percent who fell within the age range of 21 to 30 years old. Other age group of 31 to 40 years old represented 23.9 percent of the respondents. In terms of educational background, the majority of the respondents represented 47.2 percent was SPM/STPM holder. This was followed by those pursuing bachelor's degree (26.8 percent), Diploma (21.1 percent), Master degree (4.2 percent) and Doctorate (0.7 percent). It seems that almost 50 percent of the respondents just have secondary education. With regards to job position, non-officer made up the majority representing 55.6 percent of the total respondent. The remainders were officer amounting of 44.4 percent of the total respondent. Majority of the respondent were not from information technology background (92.3 percent). Only 7.7 percent of the total respondents have information technology background particularly in ICT sector. Table 1 indicates that the highest numbers of respondents came from the Development and Management Service sector 31%, followed by Private/Special

Education sector 14.8%, and then School Management sector with a percentage of 14.1%. While the smallest portion of respondents came from Psychology sector with 2.1%.

Table 1: Demographic Profile of Respondents

	Variable	Value Description	Frequency	Valid Percentage (%)
1	GENDER	Male	58	40.8
		Female	84	59.2
		Total	142	100.0
2	AGE (YEARS)	Below 20	1	0.7
		21-30	39	27.5
		31-40	34	23.9
		41-50	43	30.3
		Above 50	25	17.6
		Total	142	100.0
3	JOB EXPERIENCE (YEARS)	Below 5	30	21.1
		6-10	30	21.1
		11-15	19	13.4
		16-20	22	15.5
		Above 20	41	28.9
		Total	142	100.0
4	EMPLOYMENT DURATION	Below 5	89	62.7
		6-10	29	20.4
		11-15	16	11.3
		16-20	2	1.4
		Above 20	6	4.2
		Total	142	100.0
5	HIGHEST LEVEL OF EDUCATION	Secondary school	67	47.2
		Diploma	30	21.1
		Bachelor's degree	38	26.8
		Professional Qualification	6	4.2
		Postgraduate Degree	1	0.7
		Total	142	100.0
6	EDUCATION BACKGROUND	IT	11	7.7
		None IT	131	92.3
		Total	142	100.0
7	JOB POSITION	None Officer	79	55.6
		Officer	63	44.4
		Total	142	100.0
8	DEPARTMENT	Academic	7	4.9
		Private/Special Edu.	21	14.8
		Islamic Edu.	7	4.9
		School Mgmt	20	14.1
		Evaluation & Exam.	14	9.9
		ICT	4	2.8
		Quality	9	6.3
		Psychology	3	2.1
		Dev. & Mgmt Service	44	31
		Human Dev.	13	9.2
		Total	142	100.0

Testing Hypotheses and Associations Among IS Attributes

Correlation analysis was carried out to test the relationship between the identified variables. Referring back to the causal model as per formulated by Delone and McLean (1992), this section analyzes the relationship between the following variables:

1. The relationship between information quality and end-user satisfaction.
2. The relationship between system quality and end-user satisfaction.
3. The relationship between service quality and end-user satisfaction.

3. The relationship between end-user demographic factors that the actual performance of IS.

These tests were performed using two methods – Pearson Correlation tests and regression analysis. Pearson correlation coefficients (r) can only take on values from -1 to +1. The sign in front of the values indicates whether there is positive correlation (as one variable increase, so to does the other) or a negative correlation (as one variable increases, the other decrease). The sign of the absolute value (ignoring the sign) provides an indication of the strength of the relationship. A correlation of 0 indicates no relationship between the two variables. According to Cohen (1988), the strength of the relationship is low when Pearson Correlation coefficient (r) ranges from 0.1 to 0.29 or -0.1 to -0.29; medium when (r) ranges from 0.3 to 0.49 or -0.3 to -0.49 and high when (r) ranges from 0.5 to 1 or -0.5 to -1. Regression analysis was then conducted in order to assess the predictive power of the predictors (independent variables) in explaining the variance of dependent variable. The results of the Pearson Correlation analysis and Regression analysis are shown in the Table 2 and Table 3 respectively.

Table 2: Pearson Correlation Analysis

Variables	System Quality	Information Quality	Service Quality	User Satisfaction
System Quality	1.00			
Information Quality	0.516(**)	1.00		
Service Quality	0.435 (**)	0.365(**)	1.00	
User Satisfaction	0.487(**)	0.223(**)	0.222(**)	1.00

** Correlation is significant at the 0.01 level.

Table 3: Regression Analysis

Predictors (Independent Variables)	Standardized Coefficient Beta (β)	Significant (p)
System Quality	0.500	0.000
Information Quality	-0.42	0.638
Service Quality	0.20	0.813

Dependent Variable: User Satisfaction
Adjusted R^2 = 0.222

The summary of the coefficient (r) and the significance (p) for all hypotheses are indicated in the following Table 4.

Table 4: Summary of statistics

Hypotheses	Coefficient (r)	Sig (p)	Result
H1: There is a significant relationship between information quality and user satisfaction.	0.223	0.638	Reject
H2: There is a significant relationship between system quality and user satisfaction.	0.487	0.000	Accept
H3: There is a significant relationship between service quality and user satisfaction.	0.222	0.813	Reject
H4: There is a significant relationship between the end user demographic factors and the actual performance of IS.	0.216	0.530	Reject

Correlation between System Quality, Information Quality, Service Quality and User Satisfaction.

From Table 2 above, there are statistical significant relationships among all the variables. The strongest relationship is between system quality and information quality ($r = 0.516$). The relationship with medium strength is between system quality and user satisfaction ($r = 0.487$), system quality and service quality ($r = 0.435$) and information quality and service quality ($r = 0.365$). Lastly, the relationship with the lowest strength are between information quality and user satisfaction ($r = 0.223$) and service quality and user satisfaction ($r = 0.222$). It can also be seen from the table that all the statistically significant relationships are positively related.

Regression analysis was carried out in order to assess the predictive power of the predictors (or independent variables) i.e. system quality, information quality and service quality in explaining the variance of dependent variable i.e. user satisfaction. The result of the analysis is as shown in Table 3 above, which shows that only system quality has significance level of 0.000. This indicated that there is significant relationship between system quality and user satisfaction. The Adjusted R^2 inferred that 22.2% of the variance in the dependent variable could be explained by the predictors while the remaining 77.8% was explained by other factors. Furthermore the standardized coefficients value for system quality ($\beta = 0.500$) is the highest among the predictors, which indicates that system quality is the most important variable in the predicting user satisfaction. This finding is consistent with Rolden & Leal (2003) which found a significant relationship between system quality and end-user satisfaction. In this study, the attributes affecting system quality include easy to use, easy to learn, adaptable for user and easy to become skilful.

The analyses discussed above have successfully tested and supported the hypotheses except for H1 and H3. The first hypothesis, *H1: There is a significant relationship between information quality and user satisfaction;* is not supported since its regression significance level is more than the selected significant level of 0.05 and the correlation analysis shows a weak positive relationship between the two variable ($r = 0.223$). This finding is not support the finding produced in studies conducted by Almutairi (2005) which found a significant relationship between information quality and user satisfaction. There is lack of support for *H3: There is a significant relationship between service quality and user satisfaction;* as the correlation analysis shows a weak positive relationship between the two variables ($r = 0.222$). Even though, it shows positive correlation between service quality and user satisfaction and consistent with Kim (2005) but further analysis using regression analysis indicated an insignificant relationship between service quality and user satisfaction (significance value is 0.813 which is more than $p = 0.05$). Therefore, there is only hypothesis #2, *H2: There is a significant relationship between system quality and user satisfaction;* was supported as the relationships between the variables were statistically significant (significance value is 0.000 which is less than p=0.05). Furthermore, the Pearson Correlation showed a medium positive relationship between two variables ($r = 0.487$).

Association between the Demographic Factors and the Actual Performance of IS

Table 5: Model Summary

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	0.126	0.016	-0.006	0.296	

a. Predictors: (Constant), Job tenure, Job rank, Age
b. Dependent Variable: actual performance

Table 6: ANOVA Analysis

ANOVA						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	0.195	3	0.065	0.740	0.530
	Residual	12.106	138	0.088		
	Total	12.301	141			

a. Predictors: (Constant), Job tenure, Job rank, Age
b. Dependent Variable: actual performance

Based on the computed output in Table 5, the value of R = 0.126 indicates that the strength of the relationship between the independent and dependent variables is very weak. The R^2 value of 0.016 suggests that only 1.6% of the variance in end-user satisfaction is explained by the demographic variables in this sample i.e. age, job designation and duration of employment (tenure). This deduces that 98.4% of the variance in end-user satisfaction is explained by other variables not included in this study. To examine the significance of this relationship, the F value in the ANOVA table as shown in Table 6 is observed. An F value of 0.740 (< 3) at a significance level of p= 0.530 indicates that the result is not significant and that the model is a poor fit. As such, it can be concluded that there is no significant association between the chosen demographic factors and the level of IS performance.

Conclusion

The DeLone and McLean IS Success model has been the definitive framework to measure IS effectiveness. This model had been used in many settings like education and business but lack in e-government environment. This study attempted to replicate the causal model posited by Delone and McLean in the hope to measure the overall effectiveness of PSED and the resulting end-user satisfaction. Understanding end-users' perception about their adopted IS might assist operators and decision makers to understand the weaknesses and promises of IS. Therefore, examining organizations' IS in the light of several identified attributes may provide more and clearer tools to understand and assess its performance.

A total of 151 responses were obtained. The specific objective of this study includes identifying the IS attribute (amongst systems quality, information quality and service quality) which is perceived to be the most significant relationship in determining end-user satisfaction. Furthermore, this study aims to examine the relationship between the demographic factors of the end-users and their evaluation of the overall IS performance. The findings discovered that system quality is the most significant relationship in determining end-user satisfaction. However, the study found that there is no significant relationships between the end user demographic factors and their evaluation of the overall IS performance. The finding from this study could give public managers the basis to perform a benchmark amongst the different IS applications. In addition, the results of this study can at least be considered by top level management in developing the future policies and strategies to exploit its information resources, to develop its information infrastructure, and to promote the utilization of IS for the purposes of achieving more effective growth of public services.

Implications of the Study

There are two main implications of this study. First, findings from this study could serve as a platform for public sectors managers to benchmark amongst the different IS applications and therefore help them in further assessing the issues of user satisfaction, system quality, information quality and service quality of ICT division that internal users are facing with each day with regards to the use of the system. Furthermore, they may undertake a review on the gap between end user initial expectations of IS and its current offerings of the systems to further drill down to the source of this variability. In addition, the results of this study at least can be considered by top level management in developing the future policies and strategies to exploit its information resources, to develop its information infrastructure, and to promote the utilization of IS for the purposes of achieving more effective growth of public services. Failure to initiate effective and timely action will have serious ramifications for the ability of a government to stimulate effective social and economic development of the country particularly in education sector.

Limitations & Suggestion for Further Research

Firstly, due to the time constraint, the sample size of this study was quite small for the results to be generalized. This is may be due to the fact that, during the period of data collection, most of the staff were not at the office as they were posted outstation. A larger sample size might produce different results and provide different implications. A more diverse sample will produce results that are more generalizable. The second limitation of the empirical study is the use of a convenient sample rather than a random systematic sampling, since convenient

method may lead to sampling bias. Additionally, end-user responses on the perceived importance may suffer from their desire to rank everything as "Very Important" to suggest a highly concerned outlook on the overall state of the factors presented. This study could greatly benefit if the sample size is larger as a larger sample might produce a better result. Period of data collection should be longer so that more employees can participate in the study. In addition, future studies could take observation and interview approaches to understand reasons or specific issues that account for variability in users' perception of each IS attribute.

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