CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter details out on the concept of information system performance in general and end-user satisfaction in particular. An information system (IS) is a mechanism used for acquiring, filing, storing, and retrieving organized body of knowledge. Generally, an IS is composed of computing hardware, software and communication facilities. These are tangible portion of an IS, which is very crucial and usually neglected, is the organizational issues of an IS. User requirements analysis, data capturing and cleaning, data maintenance and updating, information dissemination and utilization, etc., all need to be well planned and organized.

End-user satisfaction is particularly relevant when assessing IS success at the individual level, which in turn affects process-level and organizational-level effectiveness. In fact, Zmud (1979) justified the interest in studying end-users in evaluating systems success since this group directly impacts system usage, user satisfaction and user performance.

Ideally, a system is effective based on its impact on decision-making and the resulting productivity gains generated through continual use. However, this “decision analysis” approach is typically not feasible (Ives, Olson and Baroudi, 1983). As an alternative, satisfaction of users with their information systems has been accepted as a measurable surrogate for utility in decision-making.

Evaluating IS performance is very important not just only in private sectors but also in public sectors. It can be benefit an organization in terms of faster decision making and control through provision of timely information and also better decision making and control through provision of relevant information. For example, the IS described by Anthes (1993 cited in Laudon & Laudon, 1995) provided an early warning of performance problems in bulk buying of inputs by US public agencies. Faster decision making released time that would otherwise be tied up on monitoring. Tottle (1986) describes the introduction of an IS to assist government agricultural extension workers in Malaysia. Time was released in this case thanks to upward reporting by the computer system and to exception reporting, which focused the extensions on those farmers with immediate problems.

Government exists to serve their citizens. Their primary activity is record-keeping. The public administration process is, to a large extent, virtually a

process of data/information processing. Government authorities collect and process various data and information – on individuals, families, organizations, and companies, and then on the basis of these data and information, produce new information for the public, such as, policies, strategies, plans, regulations, and various services to the public. Essentially, IT is used to support information processing of governments, including data gathering, storing, processing, dissemination and utilization.

In general, government is the single largest user of IT in many countries. In many countries, the government is the predominant consumers of IT products. Many of the IT use are well-known such as taxation, customs, financial management, statistics and census data gathering, elections, development planning, health, education and welfare, social security, land management and agriculture, and so forth.

According to the Ninth Malaysia Plan, the Government spent about RM2.2 billion on the development of information and communication technology (ICT) for the public sector in 2005 (http://www.epu.jpm.my/rm9/english/Chapter1.pdf). This figure is projected to grow at a rate of 10% annually. Given the already massive spending amount in ICT, internal users' self-assessment could perhaps shed a new light on the success of information system.

The use of IT in the public sector has been developed in two dimensions: office automation and information systems. The first dimension aspires to raise efficiency and productivity of office business, while the second aims at organizing and utilizing information to support administration and management, as well as policy development and decision making, so as to improve effectiveness, efficiency and productivity of an organization as a whole.

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).

Standard economic and business measures of increased throughput, productivity gains, financial payback and return of capital used, are relatively easy to define in manufacturing environment but have little meaning in public administration measuring IT success is recognized as a difficult task(Irani, 2005).

Furthermore, many previous studies attempted to measure information technology (IT) success by quantifying the returns for each IT investment decision. The use of economic measures like return on Investment (ROI), Net

Present Value (NPV) etc. at the organizational level has been cited as the most common form of IT measures of success (Quinn, 1994).

Martilla and James (1977) obtained a link to the use of IS and to user satisfaction. Meanwhile, Delone and McLean (1992) had developed IS success framework which consisted of information quality, system quality, use, user satisfaction, individual impact and organization impact. Recently, Wu and Wang (2006), highlighted that the original IS success model still need further validation.

Besides evaluating IS performance, it is also crucial to evaluate whether the IS in place within the organizations meet the user's expectation. 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.

2.2 Defining the 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). Lucas (1978) measured the sales representatives' satisfaction with a computer-based

system while Power and Dickson (1973) evaluated the managers' input in determining how well their information needs were being satisfied. Lefkovits (1979) included "indirect users" who use computers through other people due to their direct use of the system output typically in the form of reports and analysis.

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 assume a bigger responsibility while the IS staff merely enables them 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 gain a bigger momentum thanks to the advancement in client-server computing and falling hardware prices, 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 Pahang State Education Department IT facilities. These facilities include access to email, internet, intranet, official portal of PSED, host of office automation systems which were developed by

government such as Human Resource Management Information System (HRMIS), and also which were developed in-house by the Pahang State Education Department such as “Sistem Maklumat Menengah and “Sistem Maklumat Pendidikan Khas”.

2.3 End-User Satisfaction

Accordingly, researchers turned to surrogate measures of IT success. One commonly used surrogate measure is user satisfaction. According to DeLone and McLean (1992), user satisfaction refers to the successful interaction between the information system itself and its users. User satisfaction provides a significant surrogate to the critical product of the information system, which cannot be measured, namely changes in organizational effectiveness. The user satisfaction measure has been used since the 1980s until the present day. 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.

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 Gathalian (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.

Seddon and Kiew (1996) and Fan and Fang (2006) had tested the DeLone & McLean model and found that there were substantial support for the connections among system quality, information quality, and user satisfaction. Many of the previous research examined the success of IS in the context of user's satisfaction, which is a function with three qualities namely the information, the system itself and the services produced by the particular IS. There is one criterion that closely related to understand the end-users satisfaction of IS is quality. It can be interpreted in various ways. In this perspective, Ozkan (2006) stated that quality is an empty statement without some indication of its performance and applicability in the user environment and highlighted that quality is contingent and resides in the user's perception of the product. This suggests that quality is closely related to the success in understanding the end-users satisfaction of IS.

2.4 System Quality

As the degree of sophistication increases, the application becomes more capable in solving problems and complex business decisions. It does this by becoming better at identifying problems, presenting alternatives as well as selecting the

best course of action for management intervention (Jenkins & Ricketts, 1979). As identified by Srinivasan (1985), applications with feature-rich modeling capabilities allow them to become highly flexible, and thus are perceived to be more relevant and useful by the end-users. These features include “what if” capability, forecasting capability, linkages to other packages and use of internal as well as external databases.

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, Roldan Leal (2003) found that, system quality of the executive IS exerted a significant positive influence on end-user satisfaction.

2.5 Information Quality

Information quality is concerned with content issue such as personalization, complete, relevant, easy to understand and secure. Users today seldom complain of inadequate information. Instead they moan about information overload and how more often than not, the information gathered is not useful and fails to meet the task objectives. Worse still, if it is buried beneath layers of data requiring multiple clicks and queries, not to mention a reasonable level of intelligence which if often required when one is handling keyword searches. 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). This can be achieved by measuring the enterprise intelligence quotient (EIQ) which is the organization's ability to leverage technology as a tool for effective information

sharing. Information that is highly relevant coupled with useful application features that greatly aids usability can significantly increase user satisfaction.

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 (Ellingsen, 2002, Delone 1992, Almutairi, 2005, livari 2005, Rai 2002).

2.6 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. Sasser et al (1978) first identified the main features of a service provision which was then noted to also be applicable to IS (Normann 1984, Gronroos 1983). The service orientation approach was borrowed from the service operation SERVQUAL instrument (Parasuraman et al (1988) and Zeithaml et al (1988,1990). 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.

2.7 Demographic factors and end-user satisfaction

Certain user characteristics have been found to affect end-user satisfaction, deduced by the level of systems usage observed amongst different user groups. 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 be 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 by 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.

2.8 Importance-Performance Analysis

This framework was first introduced by Martilla and James (1977) to assist in understanding customer satisfaction as a function of both expectations concerning the significant attributes ("importance") and judgments about their performance ("performance"). Analyzed individually, importance and performance data may not be as meaningful as when both data sets are studied simultaneously. Utilizing a two-dimensional grid, also known as the "Action Grid" by Crompton and Duray (1985), a four quadrant matrix helps identify areas needing improvement or fine-tuning of focus and effort to better prioritize actions and resources to minimize mismatches between importance and performance (Hemmasi and Nielsen, 1992). Past research has also concluded that the IP analysis is appropriate for use in the IS context, applicable in various industries

and within different IT infrastructure settings (DeLone and Niederman, 2002, Kophamel and Richardson, 2001).

The Importance-Performance Analysis framework is closely associated with the Expectation Confirmation Theory (ECT), which stated that expectations, coupled with perceived performance, shall lead to post-purchase satisfaction (Oliver, 1977). Applied from psychology, this theory is used heavily in marketing to predict consumer behaviour and the likelihood of repeat purchases. Customers form expectations which are either confirmed or disconfirmed during usage or consumption. If the product consumed exceeds the customers' expectations, positive disconfirmation occurs leading to post-purchase satisfaction. On the other hand, if the product falls short of expectations, negative disconfirmation occurs leading to customer dissatisfaction (Oliver, 1980; Spreng et al. 1996).

The four main constructs in the model include expectations, performance and disconfirmation which form the main independent variables. Satisfaction is the main dependent variable. Expectations help formulate anticipated behavior. Customers would expect certain attributes pertaining to the product at some point in the future, which forms a comparison standard used to evaluate performance at the point of consumption and form a disconfirmation judgment (Halstead, 1999). Disconfirmation is hypothesized to affect satisfaction, with positive disconfirmation leading to satisfaction and negative disconfirmation leading to dissatisfaction. This theory is illustrated as follows:.

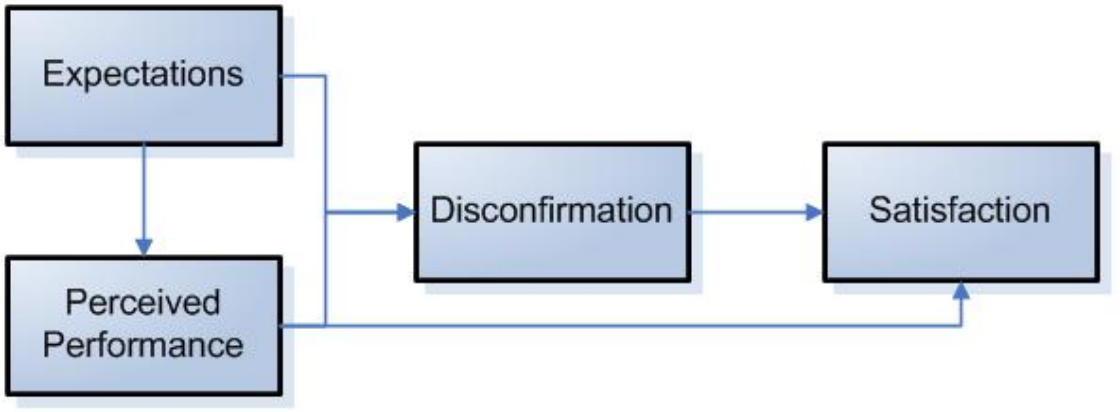

Figure 2.1
Expectations Confirmation Theory (Oliver, 1977)

Bailey and Pearson developed their framework using an expectancy-value model, where the user's attitude is presented as a multi-attribute belief structure. Like most models dealing with expectancy theories, IS researchers apply them to help understand the link between users' attitude and behaviour. In this case, the expectancy theory aims studies the strength of a tendency to act in a certain way, depending on the strength of the expectation that the act will be followed by a given outcome, and on the attractiveness of that outcome to the individual (Robbins, 2003). Additionally, research has shown that people seek consistency among their attitudes and between their attitudes and behaviour (Elliot and Devine, 1994). When an inconsistency occurs, the individual will strive to align his attitude and behaviour, to the extent that he alters his attitude or behaviour, or develop a rationalization for the discrepancy. Applying this in the field of IS research, a user will develop certain expectations on the IT products or services used. In the event that his expectations are met or even exceeded, he will alter

his attitude to expect more from the IT system and subsequently, increase his usage level. In fact this reasoning was used by several IS researchers to predict decisions to use computers (Hill, Smith and Mann, 1987, and Goodhue, 1988).