# Evaluating End-User Satisfaction with an E-Government Service Electronic Labor Exchange (ELX)

## (Menilai Kepuasan Pengguna Akhir dengan Perkhidmatan E-Kerajaan Pertukaran Buruh Elektronik (ELX))

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*ABSTRACT*

*A major domain of e-Government research has been the examination of information delivery to citizens. These services involve communications and transactions between government, at various levels, and citizens. The rise of these services has led to a concurrent need to develop models of citizen satisfaction with e-governmental services. This research aims to contribute to this need by devising an ELX Consumer Satisfaction Index (ELXCSI) model and using it to evaluate citizen satisfaction with e-government electronic labor exchange (ELX) service delivery in Malaysia. This paper presents results of a statistical analysis of an end-user survey conducted in 2009 to evaluate user satisfaction with ELX service. Using structural equation modeling, a highly statistically significant goodness-of-fit was found for the model, which included 15 measures capturing three performance constructs (utility, efficiency, customization) as affecting satisfaction. The calculated ELXCSI of 66 indicates that more effort should be carried out by government to improve performance measurements in order to increase satisfaction among end-users of ELX service in Malaysia.*

*Keywords: E-Government; service delivery; electronic labor exchange (ELX); end-user satisfaction; structural equation modeling; Malaysia*

*ABSTRAK*

*Domain utama kajian e-Kerajaan tertumpu kepada penyelidikan terhadap penyampaian maklumat kepada rakyat. Perkhidmatan ini melibatkan komunikasi dan transaksi antara kerajaan pada berbagai peringkat dengan rakyat. Peningkatan perkhidmatan ini telah membawa kepada keperluan serentak untuk membentuk model kepuasan pengguna terhadap perkhidmatan e-Kerajaan. Kajian ini bertujuan untuk menyahut seruan ini dengan membentuk model indek kepuasan pengguna terhadap perkhidmatan pertukaran buruh elektronik (ELXCSI) dan menggunakannya untuk menilai kepuasan pengguna dengan penyampaian perkhidmatan e-Kerajaan ELX di Malaysia. Kertas ini melaporkan keputusan analisis statistik menggunakan survei pengguna akhir yang dilakukan pada 2009 untuk menilai kepuasan pengguna dengan perkhidmatan ELX. Menggunakan pemodelan persamaan struktur (SEM), ketepatan padanan yang tinggi didapati bagi model yang mengandungi 15 ukuran yang mewakili tiga konsruk prestasi (utiliti, kecekapan, dan kelaziman) sebagai mempengaruhi kepuasan. ELXCSI terhitung yang bernilai 66 menunjukkan bahawa lebih banyak usaha patut dilakukan oleh kerajaan untuk membaiki pengukuran prestasi untuk meningkatkan kepuasan terhadap perkhidmatan ELX dalam kalangan pengguna akhir di Malaysia.*

*Kata kunci: E-Kerajaan; penyampaian perkhidmatan; pertukaran buruh elektronik (ELX); kepuasan pengguna akhir; pemodelan persamaan struktur; Malaysia*

## INTRODUCTION

Electronic Government (E-Government) refers to the delivery of government-related information and services online through the Internet or other digital means (West 2004). Public agencies, utilizing this facility, provide a range of services to various stakeholders. A major service domain involves the effective delivery of information to citizens (i.e. government-to-citizen services). The continued rise of Internet connectivity has led to concurrent increase in use of these services. For example, a survey conducted by Norris and Moon (2005) indicates that nearly 90% of U.S. local governments with populations of 10,000 or more had official web sites through which they delivered various services. Further, Pew Internet reports that 77% of Internet users, or 97 million adult U.S. citizens, participate in some form of e-government (Horrigan 2004). These reports indicate that

there is an apparent realization as to the importance of e-government initiatives – by citizens and by government agencies at various levels.

The issue then becomes the extent to which citizens are satisfied with their electronic encounters with government. At a prima facie level, West (2004) notes that one valuable characteristic of such initiatives is that they allow citizens to seek public services at their own convenience and not just when the government office is open. As such, citizens are increasingly expecting government units to perform like commercial entities (Reynolds and Regio 2006). That is, citizens want their electronic encounters to be more akin to a commercial transaction (e.g. Amazon.com). Traunmuller and Wimmer (2003) note that although citizen-centric interactive websites have been produced, there are also heightened expectations in terms of the quality of e-government transactions. Consequently, online e-government initiatives need to be user-centric or citizen-centric in nature (Parks & Schelin 2005; Scott, Golden & Hughes 2006; West 2005). For this reason, there is a need to identify theoretical constructs and measures that can be used to evaluate citizen experiences using e-government information services. Such detailed evaluations can provide insights for better delivery of e-governmental services.

Many countries including Malaysia have realized the benefits of e-government services in providing information and services to their citizens. These e-government services provide citizens and businesses with greater convenience in terms of accessing information and transacting services. ELX which is one of the applications under the 7th Multimedia Super Corridor Flagship Electronic Government Project was launched by the Ministry of Human Resources on 30th of May 2002. On 1st of August 2008, one of the modules, Job Clearing System (JCS), was changed to JobsMalaysia which was officially launched on 22nd November 2008. JobsMalaysia provides various facilities to citizens and businesses including jobseeker registration, employer registration, job matching and job search. To implement ELX services successfully, it is important to ensure that people are receptive to use the services or else huge investments in these electronic services may be wasted. In today's service economy, most governments realize that service delivery objectives can only be materialized through high level of customer or consumer satisfaction. For most products and services, customer satisfaction has a strong positive effect on critical success factors, such as service adoption, use, customer loyalty, retention and the likelihood of product or service repurchase or repetitive usage. In other words, the degree to which the services offered is examined related to its acceptance in terms of satisfaction is an important investigation area since satisfaction may reflect service adoption and use.

As e-government services become more widespread, the significance of customer satisfaction, loyalty, and retention becomes vital to the success of e-government initiatives. Several studies to explore the relationships between user perceptions, performance dimensions and satisfaction with e-government services have been undertaken. Understanding roles of performance dimensions and the degree to which the services offered is examined related to its acceptance in terms of satisfaction is vital to government and policy makers since satisfaction may reflect service adoption and use. Thus, customer satisfaction, through its antecedents and consequences, can explain how consumers' past experience and evaluation regarding a particular e-government service form perceptions of satisfaction, which in turn, influences consumers' future dispositions and intentions regarding further patronizing of that service. Based on this information, government may make better strategic decisions in terms of budget allocations, promotions and customer service strategies.

The primary purpose of the research is to measure end-users satisfaction with the ELX service to gain insight into the factors effecting satisfaction and to develop ELX consumer satisfaction index. The paper is organized as follows. The next section draws from literature on customer and user satisfaction and presents an ELX consumer satisfaction index (ELXCSI) model and hypotheses development. Subsequently, the methodology of the study including the process of data collection and measures are described. The final section details the findings of the study.

## RESEARCH MODEL AND HYPOTHESES DEVELOPMENT

### THE ELXCSI MODEL

As citizens increasingly interact with e-government services and e-government services become more widespread, there are widespread expectations for effective service delivery from such initiatives. As such, it is important to understand factors that affect satisfaction by understanding and influencing consumer expectations. There are two objectives of the study. Firstly, it explores the relationships between four constructs namely utility, efficiency, customization and satisfaction within the context of end-user of e-government service ELX. Secondly, the ELX consumer satisfaction index will be developed. The ELX consumer satisfaction index (ELXCSI) model formulated by this study considers these varied perspectives and presents a causal construct comprised of features that promote confidence, trust, openness in utilizing ELX service. Figure 1 describes the ELXCSI model and the relationships among its four major constructs in which satisfaction is affected by customization, efficiency and utility of ELX service. The ELXCSI research model has been formulated with the aim of providing a scale by which government-to-citizen web-

based service delivery can be evaluated - in terms of satisfaction derived by citizens (Horan, Abhichandani & Rayalu 2006).

Results obtained from prior studies on Technology Acceptance Model (TAM) (Davis, 1989), e-commerce, and diffusion of innovation have drawn several measures in evaluating performance, perceived quality and antecedents of satisfaction based on consumption experience. Doll and Torkzadeh (1988), in developing the End-User Computing Satisfaction (EUCS) instrument, identified content, format and timeliness of the information delivered and the ease of use facilitated by a system. Effectiveness of information delivered by a system has been measured through the User Information Satisfaction (UIS) model (Ives, Olson & Baroudi 1983). Brooke (1996) formulated a usability index – System Usability Scale (SUS). This study investigates three antecedents of consumer satisfaction namely customization, efficiency and utility in using e-government ELX services. Customization refers to the degree to which the service offered is customized to meet heterogeneous customer needs or the service has meet consumer specifications. Personalization and customization refers to the ability of a service to be shaped or reshaped so as to better meet the individual needs or wants of a user (O'Looney 2001). It is important that the service delivers facility of providing dynamic information, provides various options of accessing the information and offers the facility of customizing the information contained in the website. This customization construct is formed to evaluate the aspect of digital delivery. Zeithaml et al. (2000) identify the importance of responsiveness and ease of navigation in utilizing a service offered through websites and Loiacono et al. (2002) have included usability measure in devising a quality instrument for websites – Webqual. Other studies have also contributed to formulation of utility construct (Fayish et al. 2005; Muylle et al. 2004; Wang, Tang and Tang 2001; Zeithaml et al. 2000) that examines whether the website is usable or not. In general, utility covers aspects such as easy to learn, easy to use, user's friendly, easy to remember, making minimal error, and can be trusted (Fitzpatrick & Higgins 1998). While the importance of usable and reliable information is largely acknowledged, it is also pertinent that the information can be accessed efficiently with minimal effort by the end-user. Efficiency construct examines the accessibility and organizations of the features and information available in the website and online service delivery (Fayish et al. 2005; Huizingh 2000; Zhang & Dran 2001). Satisfaction is a theoretical construct that cannot directly be measured by an objective variable but can indirectly be measured using proxies or indicators (Andreassen 2000; Johnson & Fornell 1991). Thus, it is more desirable to use a multi-indicator to measure consumer satisfaction. Since it is generally agreed that consumer satisfaction is defined as the consumer's response to the evaluation of the perceived discrepancy between expectations and perceived

performance of the product, expectations, perceived performance, and discrepancy or disconfirmation are the natural antecedents of consumer satisfaction (Yi 1990).

The primary objective in developing the ELXCSI model is to evaluate ELX end-user satisfaction. The *theoretical ELXCSI* that we propose will be based on the concept of cumulative customer satisfaction (CS) and the concept behind the development of the ELXCSI model also requires a methodology with two fundamental properties. First, the methodology must recognize that the index and other constructs in the model represent different types of customer evaluations that cannot be measured directly. Accordingly, the ELX index uses a multiple indicator approach to measure overall customer satisfaction as a latent variable. Second, as an overall measure of customer satisfaction, the ELXCSI model will be measured in a way that not only accounts for consumption experience, but also is forward-looking. To this end, the index is embedded in the system of cause and effect relationships which makes the centerpiece in a chain of relationships running from the antecedents of customer satisfaction — utility, efficiency, and customization to the consequences of customer satisfaction — loyalty. In this paper, an attempt is made to calculate the ELXCSI in the context of end-user satisfaction with the government service ELX using structural equation modeling. The purpose of calculating this index is to determine the level of satisfaction in using ELX service. The calculation of the ELXSCI is based on American Consumer Satisfaction Index (ASCI) as suggested by Fornell et al. (1996). This paper proposes the following formula for the ELXSCI:

$$\text{ELXCSI} = \frac{\sum_{i=1}^{3} w_i \overline{x}_i - \sum_{i=1}^{3} w_i}{4 \sum_{i=1}^{3} w_i} \times 100$$

where ELXSCI = ELX in satisfaction index, $w_i$'s = the unstandardized estimates, $\overline{x}_i$ = the means of measurement variables.

## HYPOTHESES

The study proposes that utility, efficiency, and customization have important influences on customer satisfaction. A structural equation modeling (SEM) is used in this study to analyze the structural effect of these three constructs on satisfaction results. In this paper, firstly, the study aims to test the fitness of the overall SEM model based on the main null hypothesis: $H_0$: The overall hypothesized model has a good fit. For structural equation modeling, accepting this hypothesis indicates that the model presented adequately reproduce the observed covariance matrix (Bollen 1989; Joreskog 1989; Mueller 1996) and suggests that the data fit the proposed SEM model. Therefore, in the test of goodness of fit for the

SEM, the probability that is expected should not be significant (p-value > 0.05) to support the overall null hypothesis which suggests that the overall hypothesized model has a good fit. Then secondly, the study investigates the main research hypotheses of the study regarding the relationships between utility, efficiency, customization, and satisfaction. Therefore, the following main research hypotheses are investigated:

$H_{1A}$: Utility has a positive structural effect on satisfaction
$H_{1B}$: Efficiency has a positive structural effect of satisfaction
$H_{1C}$: Customization has a positive structural effect on satisfaction

## RESEARCH METHODOLOGY

### PROCEDURE

The primary objective of the research is to explore relationships between performance measures namely customization, efficiency, utility and satisfaction in the context of ELX service in Malaysia. This paper forms part of a larger study on impact of e-government system application. Seven of the lead applications launched by government namely eService, eSyariah, eFilling, eSila, eProcurement, eKL and ELX were studied. This paper is only confined to ELX. A survey questionnaire designed comprised of questions related to 1) the ELXCSI model; 2) demographics; and 3) past user experience with e-government service ELX. The survey was designed to inquire about user experiences with the ELX based on performance and satisfaction dimensions as well as to understand the characteristics of users utilizing this service.

The instrument used in this study was a structured survey questionnaire, which was designed to assess the end-users of ELX in term of the described dimensions. To enable respondents to indicate their answers, five–point interval scales were used for the questionnaire. Several items of the three constructs, which have been widely referred, were extracted. Similarly, the dependent variables namely satisfaction also used a five-point interval scale, representing a range of agreement on emotional dimension statements whether the end-users were satisfied with the ELX service. The sample units of analysis in this study are end-users of e-government service delivery Electronic Labor Exchange (ELX). One hundred and ninety responses were received and analyzed.

### MEASURES

The items developed for the study were based on the literature. Based on these measures and overall constructs,15 survey questions were identified. Of this total, 12 of them were based on 3 performance constructs and 3 were identified as constituents of the satisfaction measure. All items developed for the study were based on the literature on consumer satisfaction. All items were rated on a five-point Likert scale questions, designed to collect responses with varying degrees of agreement or disagreement, ranging from 1 (most negative value) to 5 (most positive value).

*Customization* was assessed using 3 items measuring the extent to which the service offered has met various customer needs and specifications. Example items are, "the system makes task easier" and "the system is beneficial".

*Efficiency* was assessed using 5 items measuring the ability of the service to be accessed efficiently with minimal effort by the user. Example items are, "the system can reduce the transaction time", "fast and accurate transaction", and "the system accomplishes task more quickly".

*Utility* was assessed using 4 items measuring the usability of the service including easy to learn, easy to use, easy to remember, friendly, and making minimal error. Example questions are, "the system is easy to use", "the system is user friendly", and "the system is easy to learn".

*Satisfaction* was assessed using 3 items measuring the extent to which users were satisfied with the service. Example items are, "I am confident with the system" and "I am dependent on the systems".

The above measures discussion and their relationships have led to the formulation of our research model which is summarized in Figure 1.
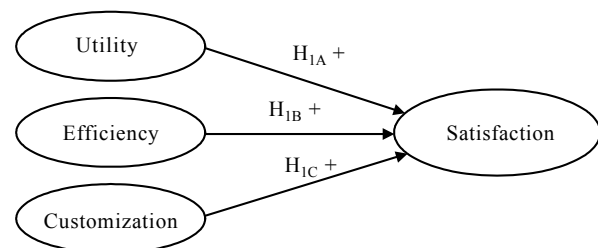


FIGURE 1. ELXCSI research model

### INDEPENDENT AND DEPENDENT VARIABLES' MEASUREMENTS: FACTOR ANALYSES, VALIDITY AND RELIABILITY

As the initial data analysis, satisfaction and performance variables were subjected to factor analyses, validity and reliability tests. Since data for this study was generated using multi-scaled responses, it was deemed necessary to test for reliability. The reliability analysis is concerned with the consistency of the research findings and most frequently associated with multi-item scales. The validity and reliability tests were computed to select and assess the final items of the constructs that would be utilized for statistical and hypotheses testing (Nunnally 1978; Ahire, Golhar & Walter 1996). The reliability analysis was

conducted by computing the Cronbach's alpha for the main constructs. Confirmatory factor analysis (CFA) was conducted to investigate whether the factors derived from the exploratory factor analysis fit the constructs described theoretically in the literature review. Three dimensions of performance namely utility, efficiency and customization adapted from several sources were included in the study.

## RESULTS AND MODEL EVALUATION

Background data collected in the study can be divided into three different groups – demographics, ELX usage, and experience with ELX service. Demographic data included information such as Age, Gender, Level of Education, Employment Status, and Ethnicity. Further, data regarding experiences using ELX service was collected. About 58.9 percent of respondents were under or equal to 25 years of age (Table 1). This was due to the nature and types of the services offered by ELX for people

searching for jobs. Nearly 60 percent of respondents were females. Most of the respondents were Malays. More than 55 percent of respondents had a Bachelor's degree. Nearly 39 percent of respondents were students. The majority of respondents were working. About 71 percent respondents were single. The percentages of respondents with either no working experience or 1 – 5 years working experience were 42.3 and 32.8, respectively. Most of the respondents were either from education (32.1%) or services (26.3%) sectors.

The model presented in Figure 1 was evaluated using Explanatory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) (Byrne 2001). SPSS v16.0 was used to calculate item reliability and Cronbach alpha (Nunnally 1978) for various constructs. Average Variance Extracted (AVE) and construct reliability were calculated based on standardized regression weights and measurement errors (Hair et al. 1998). Table 2 illustrates the reliability estimates. Initially, to filter out the variables that failed to explain the cohesiveness of a construct, corrected item-to-total correlations and Cronbach alphas were examined per construct. Variables with low corrected item-to-total correlations (i.e. < 0.50) and pair-wise correlations (i.e. < 0.50) were removed. Constructs with Cronbach alpha less than 0.70 were removed from further analysis. Subsequently, additional analyses involved examining squared multiple correlation ($R^2$), regression weights (i.e. factor loadings for observed variable and structural coefficient for constructs), AVE and construct reliability. $R^2$ indicates the amount of variance explained, predicted or accounted for by a set of variables (Schumaker & Lomax 2004). The reliability result shows that the Cronbach's alpha measures for the main constructs exceed the threshold point of 0.70 suggested by Nunnally (1978). Alpha coefficients for satisfaction scales and performance scales ranged between 0.791 and 0.854 after the alpha maximization processes were carried out (Table 2).

TABLE 1. Demographic profile of ELX respondents

| Characteristics | | Frequency | Percentage |
|---|---|---|---|
| Gender | Male | 77 | 40.5 |
| | Female | 113 | 59.5 |
| Age | <= 25 | 112 | 58.9 |
| | 26 – 30 | 42 | 22.1 |
| | 31- 40 | 19 | 10.0 |
| | 41- 55 | 13 | 6.6 |
| | > 55 | 4 | 2.1 |
| Occupational | Employed | 109 | 57.4 |
| Status | Unemployed | 5 | 2.6 |
| | Self-employed | 8 | 4.2 |
| | Students | 68 | 35.8 |
| Educational Level | Ph. D | 2 | 1.1 |
| | Masters | 12 | 6.3 |
| | Degree | 106 | 55.8 |
| | Diploma | 41 | 21.6 |
| | STPM | 10 | 5.3 |
| | SPM | 19 | 10.0 |
| Ethnic Group | Malay | 164 | 86.3 |
| | Chinese | 10 | 5.3 |
| | Indian | 13 | 6.8 |
| | Others | 3 | 1.6 |
| Marital Status | Single | 135 | 71.1 |
| | Married | 55 | 28.9 |
| Industrial Sector | Manufacturing | 5 | 2.6 |
| | Education | 61 | 32.1 |
| | Trade | 3 | 1.6 |
| | Agriculture | 4 | 2.1 |
| | Services | 50 | 26.3 |
| | Construction | 7 | 3.7 |
| Years of Working | 0 | 80 | 42.3 |
| Experience | 1 – 5 | 62 | 32.8 |
| | 6 – 10 | 21 | 11.1 |
| | 11 – 20 | 15 | 7.9 |
| | 21 – 30 | 9 | 4.8 |
| | > 30 | 2 | 1.0 |

TABLE 2. Results of reliability tests

| Construct | Exploratory Factor Analysis –EFA (Varimax Rotation) | | | Reliability |
|---|---|---|---|---|
| | Eigenvalue | % of Variance Explained | Cumulative Variance Explained | Cronbach Alpha |
| Utility | 6.395 | 42.634 | 4.634 | 0.846 |
| Efficiency | 1.551 | 10.337 | 52.972 | 0.823 |
| Customiztion | 1.197 | 7.982 | 60.954 | 0.822 |
| Satisfaction | 1.149 | 7.659 | 68.613 | 0.747 |

Notes: Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization (KMO = 0. 873, Bartlett's Test of Sphericity (chi-sq = 714.062**)

The result from the exploratory factor analysis indicates that the KMO (Kaiser-Meyer-Olkin) measure is 0.873 with significant chi-square value (Barlett's Test of Sphericity = 714.062). The value of KMO in this analysis surpasses the threshold value of 0.50 as recommended by Hair et al. (1998). Table 3 reports descriptive statistics and shows that all constructs exhibit high factor loadings and fall into the 4 designated factors. This result provides evidence to support the theoretical conceptualization of the four constructs.

Given the confirmatory nature of this study, the statistical analysis technique called structural equation modeling (SEM) was utilized. A SEM model was employed to investigate simultaneous linkages that allow a researcher to determine the relative strength of relationships between performance and satisfaction. To support the assumption regarding the fitness of the SEM

model with the empirical data, the acceptance of the null hypothesis of the overall model is expected. Hence, in this test of goodness of fit for the structural equation modeling, the resulting probability should be higher than 0.05 to support the overall null hypothesis of the model. The overall model was evaluated using SAS v9.2 statistical software using Maximum Likelihood Estimation (MLE) as the variables were found to be multivariate normal and the sample size was moderate (Hair e al. 1998) and reported in Figure 2 and Table 4. We use standardized variables to evaluate the measurement portion of the model and fit measures, whereas we use unstandardized variables as inputs to calculate index.

The SEM result in Figure 2 indicates that the direct structural effect of 'utility' on 'satisfaction' is substantial with structural effect value of 0.2426 (Figure 2 and Table 4) suggesting that utility is an important determinant of

TABLE 3. Descriptive statistics and factor analysis

| Construct/ Indicator | Mean (Std. Dev.) | Factor loading 1 (utility) | Factor loadings 2 (efficiency) | Factor loading 3 (customization) | Factor loading 4 (satisfaction) |
|---|---|---|---|---|---|
| **EFFICIENCY** | | | | | |
| The system accomplishes task more quickly (EF1) | 3.7105 (0.8516) | 0.425 | **0.653** | 0.094 | 0.081 |
| The system can reduce the transaction time (EF2) | 4.1263 (0.8066) | 0.089 | **0.743** | 0.334 | 0.053 |
| The system can precisely revise previous record (EF3) | 3.9000 (0.7736) | 0.179 | **0.592** | 0.269 | 0.253 |
| The system let users finish the transaction at their own times (EF4) | 3.9053 (0.8174) | 0.149 | **0.781** | 0.021 | 0.230 |
| Fast and accurate transaction (EF5) | 3.6736 (0.7826) | 0.493 | **0.620** | 0.108 | 0.141 |
| **UTILITY** | | | | | |
| The system is easy to use (UT1) | 3.8737 (0.8636) | **0.806** | 0.165 | 0.162 | 0.152 |
| The system is user friendly (UT2) | 3.7157 (0.8056) | **0.811** | 0.182 | 0.092 | 0.156 |
| The system is easy to learn (UT3) | 3.8684 (0.7688) | **0.798** | 0.207 | 0.130 | 0.057 |
| I am satisfied with the system (UT4) | 3.7632 (0.7501) | **0.639** | 0.217 | 0.248 | 0.293 |
| **SATISFACTION** | | | | | |
| I am confident with the system (ST1) | 3.8737 (0.7523) | 0.248 | 0.322 | 0.436 | **0.576** |
| The system is trustworthy (ST2) | 3.7368 (0.7930) | 0.154 | 0.147 | 0.142 | **0.847** |
| I am dependent on the system (ST3) | 3.2526 (0.9536) | 0.151 | 0.144 | 0.072 | **0.776** |
| **CUSTOMIZATION** | | | | | |
| The system makes task easier (CU1) | 4.0790 (0.6894) | 0.309 | 0.353 | **0.677** | 0.051 |
| The system saves cost (CU2) | 4.0421 (0.7686) | 0.089 | 0.088 | **0.879** | 0.133 |
| The system is beneficial (CU3) | 4.1895 (0.6390) | 0.155 | 0.148 | **0.835** | 0.181 |

Note: Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization (Rotation converged in 5 iterations).
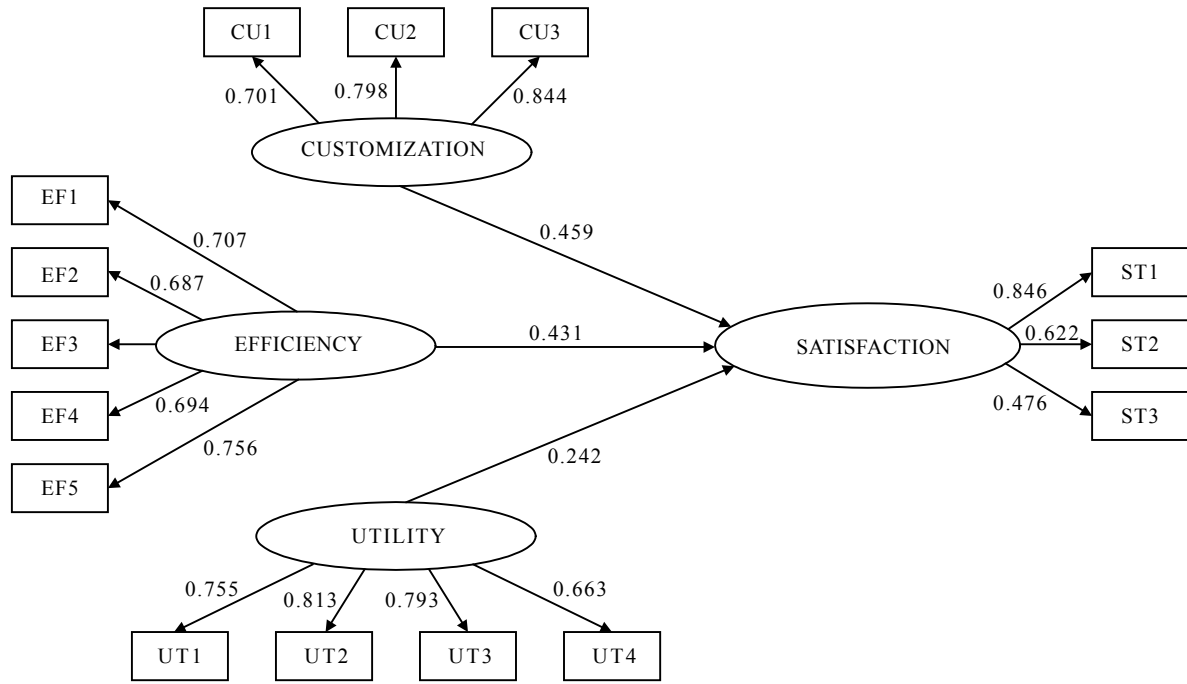
FIGURE 2. Result of the structural model showing the structural lingkage between performance and satisfaction

satisfaction on e-government service ELX in Malaysia. The standardized structural coefficient of 'utility' on 'satisfaction' is associated with low standard error (0.0738) and non-zero critical ratio (3.2877), which indicates that the structural effect between these two constructs, is

positive and relationship is significant. The direct structural effect of 'efficiency' on 'satisfaction' is higher and significant (structural effect value of 0.431) with low standard error (0.0718) and non-zero critical ratio (6.0028). The direct structural effect of 'customization' on

TABLE 4. Structural and measurement results of the SEM ELXCSI model

| (i) Constructs/ Indicators | Std. Loadings | Std. Errors | Critical Ratio | Probability |
|---|---|---|---|---|
| EFFICIENCY | | | | |
| The system accomplishes task more quickly (EF1) | 0.0777 | 0.0457 | 15.4982 | 0.000 |
| The system can reduce the transaction time (EF2) | 0.6898 | 0.0472 | 14.6162 | 0.000 |
| The system can precisely revise previous record (EF3) | 0.6215 | 0.0529 | 11.7415 | 0.000 |
| The system let users finish the transaction at their own times (EF4) | 0.6948 | 0.0468 | 14.8573 | 0.000 |
| Fast and accurate transaction (EF5) | 0.7569 | 0.0415 | 18.2249 | 0.000 |
| UTILITY | | | | |
| he system is easy to use (UT1) | 0.7750 | 0.0379 | 20.4305 | 0.000 |
| The system is user friendly (UT2) | 0.8139 | 0.0348 | 23.3724 | 0.000 |
| The system is easy to learn (UT3) | 0.7933 | 0.0364 | 21.7719 | 0.000 |
| I am satisfied with the system (UT4) | 0.6635 | 0.0478 | 13.8676 | 0.000 |
| SATISFACTION | | | | |
| I am confident with the system (ST1) | 0.8467 | 0.0516 | 16.4217 | 0.000 |
| The system is trustworthy (ST2) | 0.6217 | 0.0580 | 10.7150 | 0.000 |
| I am dependent on the system (ST3) | 0.4756 | 0.0664 | 7.1637 | 0.000 |
| CUSTOMIZATION | | | | |
| The system makes task easier (CU1) | 0.7012 | 0.0458 | 15.2934 | 0.000 |
| The system saves cost (CU2) | 0.7981 | 0.0396 | 20.1726 | 0.000 |
| The system is beneficial (CU3) | 0.8448 | 0.0372 | 22.6956 | 0.000 |
| | | | | |
| (ii) Exogenous/endogenous Path | | | | |
| a. UTILITY → SATISFACTION | 0.2426 | 0.0738 | 3.2876 | 0.000 |
| b. EFFICIENCY → SATISFACTION | 0.4314 | 0.0717 | 6.0028 | 0.000 |
| c. CUSTOMIZATION → SATISFACTION | 0.4588 | 0.0707 | 6.4857 | 0.000 |

'satisfaction' is the highest and significant (structural effect value of 0.459) with low standard error (0.0707) and non-zero critical ratio (6.4857). Therefore, we have enough evidence to accept the three main research hypotheses. Firstly, 'utility' has a positive effect on customer satisfaction ($H_{1A}$). Secondly, 'efficiency' has a positive structural effect on 'satisfaction' ($H_{1B}$) and thirdly, 'customization' has a positive structural effect on satisfaction ($H_{1C}$). Thus, the evidence is clear to suggest that performance measures namely utility, efficiency, and customization can ultimately improve end-user satisfaction of ELX services in Malaysia. Looking at the structural loadings of performance determinants on 'satisfaction', all constructs have positive impacts on 'satisfaction' but 'customization' has the highest contribution toward 'satisfaction'. This is followed by 'efficiency' and 'utility' measures.

Various recommendations have been proposed for fit-indices depicted in Table 5. One of the preliminary fit indices is the value obtained by dividing Chi-Square with degrees of freedom (CMIN/df). Although there is no clear-cut guideline about what value of CMIN/df is acceptable, a frequent suggestion is that this ratio should be less than 3 (Kline 1998). In this study, value of less than 3 was obtained. Other indices have been recommended, as they are less sensitive to sample sizes, such as GFI and AGFI. Both of the indexes range from 0 to 1 with values close to 1 being indicative of good fit. However, no absolute threshold levels for acceptability have been established (Hair et al. 1998). Based on the values obtained in this study, it can be concluded that the model fits the sample data in moderation. PGFI is indicative of parsimony in the model with a value greater than 0.5 indicates better parsimony. NFI and CFI have been proposed to be the practical criterion of choice. CFI values of 0.95 and greater for a model have been generally considered as an indication of a well-fitting model (Bentler 1988). Similar values ($\geqslant$ 0.95) have been obtained in these analyses. Values of 0.05 or less have been proposed for error approximation and residuals (Byrne 2001). Values close to 0.05 have been obtained in this study. This analysis yielded the following results: GFI - 0.92, AGFI - 0.93, NFI - 0.96, CFI - 0.91, RMSEA - 0.06, RMR - 0.07.

The results of the study suggest that 'customization', 'efficiency', and 'utility' are important factors that influence emotional satisfaction with the 'customization' construct affects the most. Features related to efficient access were also found to be determinants of overall satisfaction in using ELX services. These features included better organization and integration of content as well as visual presentation. Among the dependent satisfaction emotional measures, respondents were found to be very confident in using ELX and fairly trust the system. This implied that end-users generally quite satisfied with services provided by ELX.

### ELX SATISFACTION INDEX

Since findings from several statistical analyses above strongly indicate that utility, efficiency and customization are very important in enhancing satisfaction, this study attempts to explore the level of satisfaction in using ELX by calculating ELXCSI. The ELXCSI calculated is equal to 66. A score of 66 for the ELXCSI is still considered moderate but above average. Therefore, more effort should be carried out by government to encourage and promote ELX services in order to increase satisfaction among end-users.

### CONCLUSION

The ELXCSI represents a significant step forward in the evolution of end-user satisfaction indicators. It provides an independent and uniform means of assessing the quality of e-government service used. For policy makers, ELXCSI has the potential to be a useful tool for evaluating and enhancing the e-government service delivery as a whole. Based on this information, government may make better strategic decisions in terms of budget allocations, promotions and customer service strategies. For customers, ELXCSI provides information that is not only useful in making transaction decisions, but also likely to lead to improvement in the quality of the services they consumed, as well as in their overall standard of living. The existence of such a measure would likely lead to improvement in the quality of e-government services in general and ELX in particular. In addition, ELXCSI should have particularly important implications for the quality of these services. To summarize, ELXCSI represents a new means of evaluating and enhancing performance for the e-government services. It provides a complement to conventional over the counter measures. It has the

TABLE 5: Results of the overall model fit

| Statistics | Model Values | Recommended values for good fit |
|---|---|---|
| Probability Level | > 0.10 | $\geqslant$ 0.05 |
| $c^2$/df | 2.750 | $\leqslant$ 3.00 |
| Bollen (1989) Incremental Fit Index (IFI) | 0.915 | $\leqslant$ 0.90 |
| Parsimony Goodness of Fit (PGFI) | 0.677 | $\geqslant$ 0.5 |
| Adjusted Goodness of Fit Index (AGFI) | 0.931 | $\geqslant$ 0.90 |
| Bentler (1988) comparative fit model (CFI) | 0.913 | $\geqslant$ 0.90 |
| Normed fit index (NFI) | 0.964 | $\geqslant$ 0.90 |
| Goodness of fit index (GFI) | 0.917 | $\geqslant$ 0.90 |
| Root Mean Squared Error of Approximation (RMSEA) | 0.06 | |
| Root Mean Square Residual (RMR) | 0.07 | |

potential to move to center stage the quality services – as experienced by the customers of those services – of government service delivery. As marketing scholars and practitioners have long recognized that customer satisfaction is an important and central concept, as well as an important goal of all business activity, the role of government in promoting e-government services should be self-evident.

Government websites have been known to generate a considerable amount of Internet traffic (ComScore Networks 2006) and this suggests there is an overall realization as to the importance of e-government initiatives – by citizens and by government agencies at various levels. As these sets of interactions spread, expectations from online e-government initiatives increase. The need to address these expectations has been widely recognized as an essential step to improving relations between public agencies and citizens (Gronlund 2005). Ho (2002) and Osborne and Gaebler (1992) have recommended specific user-centric features to be implemented by agencies to promote the e-government paradigm. Similarly, concepts related to universal usability– universal access to information and communications - have been introduced to propel the effective dissemination of e-government applications (Association for Computing Machinery, 2006; Schneiderman, 2003). This study advances the notion of examining the applicability of a multi-dimensional model of citizen satisfaction. To address this need, the study has formulated a model to reflect certain specific performance and emotional attributes.

The results suggest that utility, efficiency, and customization are important factors that influence emotional satisfaction. It is hoped that future research will extend the ELXCSI model to other domains and other online e-government service deliveries. The overall vision is that such a model will drive the creation and use of highly effective and satisfying online governmental services.

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