Journal of Internet Banking and Commerce

An open access Internet journal (http://www.arraydev.com/commerce/jibc/)

Journal of Internet Banking and Commerce, August 2011, vol. 16, no.2 (http://www.arraydev.com/commerce/jibc/)

End-User Computing Satisfaction (EUCS) towards Computerised Accounting System (CAS) in Public Sector: A Validation of Instrument

---

Azleen Ilias
Senior Lecturer, Department of Accounting, College of Business and Accounting, Universiti Tenaga Nasional.
Postal Address: **Department of Accounting, College of Business and Accounting, Universiti Tenaga Nasional, Sultan Haji Ahmad Shah Campus, 26700, Bandar Muadzam Shah, Pahang, Malaysia**
Author's Personal/Organizational Website:
http://www.uniten.edu.my/newhome/content_list.asp?contentid=3411
Email: ***Azleens@uniten.edu.my***

Her research is focused on Services in Computerised Accounting Systems, Financial and Management Accounting Practice and Social Responsibility Reporting. To date, she has published her research in academic journals such as Computer Information Systems (CIS) and International Business Research (IBR), the Journal of Internet Banking and Commerce, and Sustaining Competitiveness in a Liberalised Economy: the Role of Accounting.

Mohd Zulkeflee Abd Razak
Senior Lecturer, Department of Marketing and Entrepreneur Development, College of Business and Accounting, Universiti Tenaga Nasional.
Postal Address: **Department of Marketing and Entrepreneur Development, College of Business and Accounting, Universiti Tenaga Nasional, Sultan Haji Ahmad Shah Campus, 26700, Bandar Muadzam Shah, Pahang, Malaysia**
Author's Personal/Organizational Website:
http://www.uniten.edu.my/newhome/content_list.asp?contentid=3414
Email: ***zulkeflee@uniten.edu.my***

Mohd Zulkeflee Abd Razak research interests include Services Marketing, Retailing,

International Business and Cross-cultural Issues, Accounting, Banking and Financial Instrument-based Services. To date, he has presented and published his research at national and international conferences and in journals such as Computer Information Systems (CIS) and International Business Research (IBR), the Journal of Internet Banking and Commerce, and Sustaining Competitiveness in a Liberalised Economy: the Role of Accounting.

Abstract

This paper adapts and validates instruments (i.e. accuracy, ease of use, reliability, timeliness, content, format, and satisfaction) for measuring end-user computing satisfaction (EUCS) of computerized accounting system (CAS) in government sector (responsibility centre). The research was conducted using a set of questionnaire to 90 public sector's staffs that using CAS. Descriptive analysis and factor analysis were employed in this study to measure and validate the factors contributing to end-user computing satisfaction. The finding of this study verifies that a revised instrument with some changes to the EUCS instruments is still valid in measuring user satisfaction. We found that most of the factor loading for each item is above 0.7, which support the Doll and Torkzadeh model (1988).

Keywords: **End-User Computing Satisfaction, Computerized Accounting System, End-User, Public Sector, & Factor Analysis.**

INTRODUCTION

There is wealth of literature in the area of the measurement of satisfaction among end user computing. Further, it has had a long history within the IS field. Focusing in the area of end-user computing, a number of studies have attempted to capture the overall evaluation that end users have regarding the use of an information system; i.e. satisfaction, as well as the most immediate factors that form satisfaction (Doll et al. 1995; Doll and Torkzadeh 1988, 1991; Henry and Stone, 1994; Torkzadeh and Doll 1991). However, it seems clear that previous research have not attempted to discover the factors affecting the satisfaction of the end users of the CAS especially in the government sectors. Yet, it is essential to determine the factors that contribute to EUCS while assessing the overall evaluation of information system. This study attempts to explore the factors that contribute to the EUCS among the government sectors especially finance department in Malaysia.

Public Sector and Public Sector Accounting

Malaysian government is distributed into three tiers of government namely Federal Government, Statement Government and Local Government. The Federal government is the highest tier, which comprises of ministries, departments and public enterprises. Second tier is State government, which comprises of ministries, departments and public enterprises. The last tier of the government is Local government comprises of city council, municipal council and district council.

Public sector accounting is different from private sector accounting. In public sector, it concerns about the process of studying the accounting practices by those public sector organizations in ensuring accountability in providing services to the public at large. Accounting practices in Malaysia comprises of three major components. First, maintenance of books and records especially vote book as a financial record that must be kept by the government agencies for recording expenditures, liabilities, and changes in budget. Second, all public sectors organisations' accounts are required to be prepared in compliance with rules and regulations set by the Federal Constitutions, Financial Procedure Act 1957, Audit Act 1957, Treasury Instructions and Treasury Circulars. The last component is preparation of reports and statements to be laid in parliament for approval.

In general practices, there are differences between the practices in the public or government sectors and the business/private companies. Hence, the applications of the CAS in these organisations also differ from one to another. For instance, the private organisation utilizes the general ledger system and the accounting principles based on accrual basis. However, the public organisations employ VOT accounting system, which is based on cash basis. The financial management of the organisation is also related to budgeting using a code and warrant system (Statutory Bodies Act 1980 (Account and Annual Report) (Act 240)). Thus, it seems to be interesting to investigate the level of satisfaction among end user computing in government sector, since it is different compared to the company or business organisation.

The emergence of the computerised system gives an impact to both users regardless in

the private sector as well as in the public sector. Due to the claim that the successful implementation of the CAS, the government steps forward to implement the system in most of the government departments. Subsequently, they are able to manage the increasing volume of the financial data transactions, which seem impossible to compile them manually. The implementation of CAS is believed to enhance the performance and productivity, which lead to better administration of financial and accounting management. The CAS does not provide the accounting report only, but also enables the user to evaluate the output of the system and the system itself.

Thus, having a good financial or computerised accounting information system will increase the performance of an organisation. Eventually, this enables the organisation to increase revenue in order to follow the recommendation of self-financing by the ministry.

The objective of the study:

To develop and validate instrument for measuring end-user computing satisfaction (EUCS) in computerized accounting system (CAS) environment particularly in government sector (Responsibility Centre).

Theoretically, this study measures and validates the instrument of Doll and Torkzadeh EUCS (with some additional dimensions) among government sectors. In addition, this instrument is very useful in practice, not only for public sector but also for private sector. Indeed, this is an exploratory study in the public sector towards the achievement of the excellent and better performance.

LITERATURE REVIEW

Many researchers defined end user computing based on their own objectives and setting of the study. Ives, Olson and Baroudi (1983) defines User Information Satisfaction (UIS) is one such evaluation mechanism as to extent to which users believe the information system available to them meets their information requirements. Chin and Lee (2000) defined end-user satisfaction with an information system as the overall affective evaluation and end-user has relating with his or her experience in the information system. They stated that the term “experience” could be made more specific to focus into different aspects related to the information system such as computing or training. According to Doll and Torkzadeh (1988), EUCS is the affective attitude towards a specific computer application by someone who interacts with the application directly. End-user satisfaction can be evaluated in terms of both the primary (application) and secondary user roles (inquiry and decision support application).This study deployed Doll and Torkzadeh definition of the end user computing and EUCS. The end user computing in this study is the people who interact and use the CAS such as financial officer, administrative officer, bursar assistant, account clerk and etc, and eventually they can interpret the report as in needed by the organisation. These end users were asked to reflect their satisfaction or perception on the CAS in their own organisation.

The scope of the discussion is related to EUCS; the previous factors that contribute to the EUCS, Doll and Torkzadeh Model (1988); i.e., content, accuracy, format, ease of use, and timeliness and the modification made by Chin and Lee (2000), i.e. satisfaction

with system speed, and system reliability (self developed). The model will become the fundamental guidelines to examine factors contributing to EUCS in finance department among private companies.

EUCS model is the extension of User Information Satisfaction (UIS) model, which previously had been developed by Ives, Olson and Baroudi in 1983. There were quite numbers of studies done by information system researchers treated User Information Satisfaction (UIS) as their dependent variable. Hamilton and Chervany (1981) stated that several information system researchers have suggested user satisfaction as a success measure for their empirical information system research. These researchers found that user satisfaction is appropriate when a specific information system was involved. Meanwhile, McKinsey & Company (1986) studied the chief executives' satisfaction in their attempt to determine the success of the overall Management Information System (MIS) effort.

In study by Amoli and Farhoomand (1996), they used structural equation modelling techniques to explore the relationship between EUCS and user performance. In their study, it was found that six-attitudinal dimensions of EUCS account for a significant portion of the variation in user performance. Chen et al. (2000) had identified the underlying factors of end-user satisfaction with data warehouses and had developed an instrument to measure these factors. The study demonstrated that most of the items in classic end-user satisfaction measure are still valid in the data warehouse environment, and that end-user satisfaction with data warehouses depends heavily on the roles and performance of organisational information centres.

Heilman and Brusa (2001) evaluated the reliability and validity of a Spanish version of the User Information Satisfaction (UIS) short form (Ives, Olson and Baroudi, 1983), and used the instrument to investigate user information satisfaction among employees of organisations in northern Mexico. Results indicated that Mexican computer users have positive attitudes toward and are generally satisfied with their employers' information systems, especially with their IT staff and services. On an individual scale assessment level, the users are least satisfied with the level of user training they received.

Seddon and Kee Yip (2002) provided an empirical evaluation of three user satisfaction measures for use with computer based general ledger accounting systems. The three measures tested are Ives, Olson, and Baroudi's User Information Satisfaction measure, Doll and Torkzadeh's EUCS measure, and a composite measure that includes questions specifically related to the features offered by general ledger systems. The results from the analysis of the data suggested that Doll and Torkzadeh's is a more useful measure of satisfaction with general ledger systems as compared to Ives, Olson and Baroudi's UIS.

Unlike the other researchers, Pather et al. (2003) argued that the advent of e-Commerce has shifted the location of the traditional user of Information Systems out of the physical domain of the organisation or business. E-commerce businesses now have to deal with a new type of user viz. the e-Customer. Thus, they disputed that established instruments that measure user satisfaction of IS in traditional (brick and mortar) businesses are not completely appropriate. The authors, building on a comprehensive literature study, derived an appropriate model for exploring the measurement of e-customer satisfaction

in the South African context.

Markovic & Wood (2004) addressed the issue of user satisfaction with a computer lab in a university. Both formal and informal data gathering techniques were used to provide comprehensive data for this research. Data was gathered from both users and managers in order to provide a complete picture of the current situation. This data led to a research study of user satisfaction among students and support staff. The research revealed that satisfaction with hours and software and hardware performance had the greatest impact on user satisfaction followed closely by quality of support staff.

Bengts (2004) studies usability as a constituent of end- user computing satisfaction. Different measurement instruments and rating scales for user satisfaction have been created; however, the relationship between satisfaction and usability remains unclear. A web-based system with three different user interface alternatives was implemented and the system was used by information technology students to practice SQL-queries in a university course. 43 students reported their preference and the underlying reasons by answering both structured and open-ended questions in a web-based questionnaire. The results also indicated that availability of desired features, simple interaction and user-control are as constituents of satisfaction more important than simple screen design and error- free usage.

Huang et al. (2004) argued that while end-user computing satisfaction has been studied extensively, new aspects such as purchasing convenience, product prices in the system and product delivery have to be included. In their study, they developed an instrument for reliably and accurately measuring business-to-employee success. Test–retest reliability and construct validity were examined. Finally, they concluded that convenience, delivery, interface, accuracy, price and security influence employee assessments of satisfaction. Managers can use the instrument developed in their study to assess the success of their business-to-employee systems.

Factor Analysis in EUCS Research

In Doll and Torkzadeh (1988) study, the data was examined using principal components analysis as the extraction technique and varimax as the method of rotation. They found six items need to be deleted from 18 item instrument because those items have many multiple loadings for each item (“do you find the output relevant, do you feel the output is reliable, do you find the system is dependable, are you happy with the layout of the output, is the output easy to understand, is the system efficient”).

According to Xiao and Dasgupta (2002), study was developed and validated an instrument measuring user satisfaction in a web-based environment of the end-user Computing Satisfaction (EUCS) particularly internet portals’ users. They found that a revised instrument with some changes to the EUCS instrument with some changes to the EUCS instrument is still valid in measuring user satisfaction.In this factor analysis, the principle components analysis was used as the extraction technique and varimax was used as a method of rotation. The factor matrix consists of 12-item instrument in five determinants (content, accuracy, format, ease of use and timeliness). They found that the factor loading for each item is above 0.7 and only one item is very close to 0.7 which is ask regarding “is the information is clear”. Finally, the Xiao and Dasgupta keep all the

factors as in the instruments. However, as in the item-total correlation, all factors have correlation coefficient greater than 0.4 except one item shown 0.139 for the question "does the system provide sufficient information" and they dropped the item.

Then, in Wang, et al. (2001), study develops a comprehensive model and instrument for measuring customer information satisfaction (CIS) for web sites that market digital products and services due to the current models for measuring user information satisfaction (UIS) and end-user computing satisfaction (EUCS) that are perceived as inapplicable as they are targeted primarily towards either conventional data processing or the end-user computing satisfaction. They also examined using principal components factor analysis as the extraction technique and varimax as the orthogonal rotation method. In the 21-item instrument that consists of seven determinants (customer support, security, ease of use, digital products/service, transaction and payment, information content and innovation) which explaining 82 percent of the variance in the dataset. Furthermore, the significant loading of all items on the single factor indicates unidimensionality. Beside that, the criterion-related validity is assessed by the correlations between the criterion and the 21-item scale which found criterion-related validity of .876 and significant ($p < .000$). Moreover, Wang, et al. (2001) also applied correlation matrix to evaluate the convergent and discriminant validity of the 21-item instrument that have been developed. In this finding, they found that the correlations are significantly different than zero and large enough to proceed with discriminant validity analysis. In overall, the CIS measurement model contains traditional UIS construct (information content), dimensions much the same as EUCS construct (ease of use) and special factors making up the CIS construct (transaction and payment).

In addition, Pikkarainen, K. et al. (2006) study aims to test and validate the End-User Computing Satisfaction (EUCS) model in order to investigate online banking users' satisfaction with the service. They employed an exploratory factor analysis and confirmatory factor analysis to test the validity of EUCS model that consist of content, accuracy, format, ease of use and timeliness. However, they found that banks could improve EUCS by concentrating on the three constructs (content, ease of use, accuracy) which indicate the customers' satisfaction by personalising the service, allowing easier and more convenient use experience. In this research, the Bartlett's Test of Sphericity (sig=0.000) where variables correlate with each other and the Kaiser-Meyer-Olkin (KMO) score 0.825. It shows that factor analysis was appropriate and they used principal axis factoring with varimax rotation. They found different results from original EUCS model that represents content, ease of use and accuracy based on cronbanch's alphas for the factors (content=0.89, ease of use=0.83, accuracy=0.94). In addition, they also found that the original five factor EUCS model is not suitable in the context of online banking. However, the others three factors from the original model are confirmed in measuring EUCS of online banking particularly are content, ease of use and accuracy.

Based on study by Cai, S. et al. (2007) that developed an instrument that measures all the essential aspects of EUCS, including service quality satisfaction as one of the key determinants of EUCS. In this study, the satisfaction was measured by using Kettinger and Lee (1997)13 item IS Adapted SERVQUAL and information quality were measured by using the 12 items of Doll and Torkzadeh (1988) EUCS measure. Researches employed a principal component analysis with a VARIMAX rotation. They found 22 item scales for measuring EUCS and four factors were extracted with a high loading greater

than 0.6 on their primary factors, each factor had eigenvalue greater than one and the variance explained greater than four percent. The four factors are relationship service satisfaction (adapted from responsiveness, assurance, and empathy), information satisfaction (construct from content and accuracy items), system satisfaction (construct from format and ease of use items) and service reliability satisfaction (construct from reliability items).

Additionally, Abdinnour-Helm, S.F. et al. (2005) had revised and revalidates the End-User Computing Satisfaction (EUCS) instrument to measure satisfaction with a Web site from usability perspective particularly important given the increase significance of the Web and the uniqueness of the Web as a computing environment. They employed confirmatory factor analysis and in-variance analysis to study the underlying structure of the adapted EUCS. They found that the EUCS is valid and robust instrument in the Web environment and only timeliness need further refinement. This is because the item “Did the side provide up-to-date information?” did not load well on the timeliness factor and indicated that the relevance of this item for the Web is different that the other computing settings for which the EUCS has been revalidated.

Conclusively, even though the results are mixed, most of the previous studies shown that this instrument is valid and reliable to measure the satisfaction among the end user computing.

RESEARCH METHODOLOGY

Study Design

This study relied on survey design as it deemed more appropriate compared with other designs of research to achieve of the study. The population of this study covered the end users of CAS at finance department of government sectors in East Malaysia. However, only 62 Responsibility Centres were chosen due to the purpose of this study. The Responsibilities Centre consists of 62 departments. We have distributed 2 questionnaires for each department and the total population are 124 respondents. Sekaran, U. (2003) has stated the sample should be taken for this population are 97 respondents. Nevertheless, 90 respondents have fulfilled these questionnaires.

Instrumentation

Basically, the instrument of this study is based on the instruments, which was developed by Chin and Lee (2000). It presents a new set instrument while focusing on the same five construct domains. They are: content, accuracy, format, ease of use, and timeliness (Doll & Torkzadeh, 1988); and satisfaction with system speed (Chin & Lee, 2000). According to their findings, the relationship between the overall measures of satisfaction than the baseline model is expected to relate strongly. However, based on the related literature as discussed earlier, this study proposes another dimension, which is system reliability. This dimension is already tested on the validity and reliability during the pilot study. The value of the Cronbach’s Alpha of 0.70 indicates that the instruments of this study are acceptable and reliable to measure what they are supposed to measure.

Dimensions of EUCS

Dimension and Instrument	Sources
(1) Content, (2) Accuracy, (3) Format, (4) Ease of Use, and (5) Timeliness	Doll and Torkzadeh, 1988
(6) Satisfaction with System Speed	Chin and Lee, 2000
(7) System Reliability	Self Developed

For the purpose of this study, the instruments are adapted from Chin and Lee (2000) and Doll and Torkzadeh (1988). The table summarises the justifications of the selection of the instrumentations. However, some modifications have been made to enable the instruments are fit to be used in the CAS environment. For instance, "Does the system provide the precise information you need?" is modified to "Does the CAS provide the precise information you need? This will ensure the respondents are kept reminded that the system is CAS.

The questionnaires are also attached with a cover letter from the researcher explaining the purpose of the study and the Questionnaire. EUCS section was divided into 6 parts namely: (1) Part A -Content, (2) Part B - Accuracy, (3) Part C - Format, (4) Part D - Ease of Use, (5) Part E - Timeliness, and (6) Part F - Satisfaction with System Speed. A five-item scale was used, where 1 = never; 2 = some of the time; 3 = about half of the time; 4 = most of the time; and 5 = always. The instructions requested respondents to circle the response which best to describe their satisfaction level with the application of computing system.

DATA ANALYSIS AND DISCUSSIONS

Descriptive Analysis

Table 1: Descriptive Analysis

	N	Minimum	Maximum	Mean	Std. Deviation
Content	90	2.33	5.00	3.6593	.57718
Accuracy	90	2.43	5.00	3.5524	.59394
Format	90	2.43	5.00	3.6905	.68168
Ease of Use	90	2.14	5.00	3.6016	.69211
Timeliness	90	2.50	5.00	3.3352	.58513
System Speed	90	2.33	4.83	3.4833	.56204
System Reliability	90	2.29	4.71	3.4889	.55679
Satisfaction (Dependent Variable)	90	2.14	5.00	3.6127	.63247
Valid N (listwise)	90				

The results of the computer output are shown in Table 1. From the result, the highest mean is satisfaction with the format (3.6905) and the lowest mean is timeliness (3.3352). It seems like most of the staff satisfied with format factor and less satisfied with timeliness factor. The highest standard deviation is ease of use (0.69211) and the lowest is system reliability (0.55679). The ease of use is deviate too far from the mean and system reliability is too close to the mean.

Factor Analysis

Seven factors (i.e. accuracy, ease of use, reliability, timeliness, content, format, and satisfaction) contributing to end-user computing satisfaction with computerised accounting system were analyzed using factor analysis as the statistical technique via Statistical Package for Social Sciences (SPSS) version 12 computer program. Next, principal components analysis was used as the extraction technique and varimax as a method of rotation. Factor analysis was conducted in order to reduce items into sizeable factors.

Accuracy

The first factor contributes to end-users computing satisfaction with computerised accounting system known as accuracy with eight statements. Total variance explained for the factor is 4.752 with percentage of variance explained of 59.4. Kaiser-Meyer-Olkin measure of sampling adequacy is 0.856. Factor loading ranges between 0.526 and 0.859. Table 1 illustrates that overall respondents satisfied with accuracy of the computerised accounting system with factor loading 0.859. They agreed that the system provide accurate information, with its loading (0.858) place as the second important

statement in terms of accuracy perspective. Further, provision of reliable and correct information of the system with factor loading 0.848 and 0.817, respectively. Finally, they also come across that the system is accurate to use because it is error free (loading = 0.526).

Table 1: Component Matrix of Accuracy Factor

Statements	Loadings
Overall, are you satisfied with accuracy of the computerised accounting system?	.859
Does the computerised accounting system provide accurate information?	.858
Does the computerised accounting system provide reliable information?	.848
Does the computerised accounting system provide correct information?	.817
Are you satisfied with the accuracy of the computerised accounting system?	.775
Is the information presented by the computerised accounting system dependable?	.738
Is the computerised accounting system accurate?	.684
Is the computerised accounting system error free?	.526

Ease of use

End-users make their mind up to use computerised accounting system in their business transaction by reason of ease of use factor. The factor embraces of eight statements and factor loading ranges between 0.780 and 0.891. Kaiser-Meyer-Olkin measure of sampling adequacy for the factor is 0.928. Total variance explained is 5.571 with % of variance explained is 69.634. As points up in Table 2, respondents find that the system is easy to use (loading = 0.891) and easy to interact with (loading =0.846) Indeed, the system is user friendly (loading = 0.840) and easy to operate the computerised accounting system (loading = 0.827). Computerised accounting system also able to provide end-user with clear and understandable interactions (loading = 0.817). Beside that, it is easy for the end-user to get the computerised accounting system to do what they want it to do (loading =0.810).

Table 2: Component Matrix of Ease of Use Factor

Statements	Loadings
Is the computerised accounting system easy to use?	.891
Overall, are you satisfied with ease of use of the computerised accounting system?	.859
Is the computerised accounting system easy to interact with?	.846
Is the computerised accounting system user friendly?	.840
Is it easy to operate the computerised accounting system?	.827
Is your interaction with the computerised accounting system clear and understandable?	.817
Is it easy to get the computerised accounting system to do what you want it to do?	.810

Does the computerised accounting system provide help tools or user manual?	.780

System Reliability

System reliability factor also not being ignored by end-users in evaluating their satisfaction towards computerised accounting system. The factor consists of eight statements. However, two statements (i.e. the computerised accounting system halted or interrupted, and the computerised accounting system experienced in inconvenient downtime) were removed from the factor as both have factor loadings below cut off point of 0.50. These deletions resulted in a 6-item scale for measuring system reliability of computerised accounting system. Factor loading ranges between 0.629 and 0.880. Total variance explained = 3.662 with percentage of variance explained = 45.777. Kaiser-Meyer-Olkin measure of sampling adequacy is 0.750. It can be clearly notices in Table 3, respondents discover that computerised accounting system is efficient leads the statements related to system reliability factor with loading =0.880. Next, they satisfy with the system effectiveness (loading = 0.830). Further, the computerised accounting system endow with back up or recovery system (loading = 0.701), password protection (loading = 0.675), and equip with the security system (loading = 0.629).

Table 3: Component Matrix of System Reliability Factor

Statements	Loadings
Is the computerised accounting system efficient?	.880
Overall, are you satisfied with reliability of the computerised accounting system?	.836
Is the computerised accounting system effective?	.830
Does the computerised accounting system provide back up or recovery system?	.701
Does the computerised accounting system provide password?	.675
Does the computerised accounting system is equipped by the security system?	.629

Timeliness

Seven statements related to timeliness factor with loading ranges from 0.566 to 0.735 (refer Table 4). In this factor, end-users greatly concern whether the computerised accounting system provide information that is too old to be useful (factor loading = 0.735). This is followed by they frustrated with the timeliness of the computerised accounting system (factor loading = 0.707). They also acquire information from the system that is too late for their needs (factor loading = 0.634). However, they satisfy with the system as it provides up-to-date information (factor loading = 0.608) and they also able to dig up the information they need in time (factor loading = 0.566). The factor's total variance explained is 3.052 with % of variance explained is 43.607. Kaiser-Meyer-Olkin measure of sampling adequacy is 0.774.

Table 4: Component Matrix of Timeliness Factor

Statements	Loadings
Does the computerised accounting system provide information that is too old to be useful?	.735
Are you frustrated with the timeliness of your computerised accounting system?	.707
Overall, are you satisfied with timeliness of the computerised accounting system?	.692
Does the computerised accounting system provide you with the information in a timely manner?	.665
Do you get information from the computerised accounting system that is too late for your needs?	.634
Does the computerised accounting system provide up-to-date information?	.608
Do you get the information you need in time?	.566

Content of the System

Table 5 enumerates that all statements allied to content of the system factor had factor loadings above cut off point of 0.50 as it ranges from 0.699 to 0.853. Kaiser-Meyer-Olkin measure of sampling adequacy for the factor is 0.897 and total variance explained = 6.103 with percentage of variance explained = 61.033. End-users computing satisfaction is due to the output from the computerised accounting system meet their needs with factor loading of 0.853. In fact, through the system, it provides end-users with sufficient information, give the right amount of information and fit with their needs, factor loadings = 0.820, 0.812, and 0.780, respectively. Finally, the smallest loading is 0.699 which the computerised accounting system provides end-users with the accurate information they need.

Table 5: Component Matrix of Content of the System Factor

Statements	Loadings
Does the output from the computerised accounting system meet your needs?	.853
Overall, are you satisfied with content of the computerised accounting system?	.832
Does the computerised accounting system provide sufficient information?	.820
Does the computerised accounting system give you the right amount of information for your needs?	.812
Does the information provided by the computerised accounting system fit your needs?	.780
Does the computerised accounting system provide reports that seem to be just seems to be just about exactly what you need?	.770
Does the information content meet your needs?	.760

How adequately do you feel your computerised accounting system meets the information processing needs?	.742
Do you think you can easily understand the report?	.731
Does the computerised accounting system provide the accurate information you need?	.699

Format

The next factor requires the end-users to provide response on format factor with eight statements. The loadings of the 8 items are depicted in Table 6, ranges from 0.781 to 0.892. The items are grouped by their highest (primary) factor loading. The format (factor loading = 0.852) and layout (factor loading = 0.845) of the system output is satisfactory. End-users are satisfied with how the information is presented to them via the computerised accounting system with factor loading of 0.892. The satisfaction is due to the information presented is clear (loading = 0.824) and is presented in a useful format (loading = 0.811) besides the format presented follows the standard (loading = 0.781). Kaiser-Meyer-Olkin measure of sampling adequacy for the factor is 0.934. Total variance explained = 5.591 with % of variance explained = 69.882.

Table 6: Component Matrix of Format Factor

Statements	Loadings
Are you satisfied with how the information is presented to you?	.892
Overall, are you satisfied with format of the computerised accounting system?	.866
Is the format of the output satisfactory?	.852
Are you satisfied with the layout of the output?	.845
Is the information clear?	.824
Are you satisfied with the way in which the information is presented?	.811
Do you think the output is presented in a useful format?	.811
Does the format presented following the standard?	.781

Satisfaction with the System Speed

The final factor that is associated to end-users computing satisfaction with computerised accounting system known as satisfaction with the system speed factor with seven statements. A statement 'are you frustrated with the speed of the computerised accounting system?' was not load heavily in this factor when its factor loading does not meet the recommended value of 0.50. Thus, six statements remained. Factor loading ranges between 0.696 and 0.888 (refer Table 7). Total variance explained for the factor is 4.083 with % of variance explained is 58.325. Kaiser-Meyer-Olkin measure of sampling adequacy is 0.860. Through the analysis, from overall perspective, end-users are satisfied with the speed of the computerised accounting system loading = 0.888). They also satisfy with how quickly the system runs (loading = 0.841), and operates (loading = 0.826). Encouragingly, the computerised accounting system is able to process a huge number of report (loading = 0.696).

Table 7: Component Matrix Satisfaction with the System Speed Factor

Statements	Loadings
Overall, are you satisfied with the speed of the computerised accounting system?	.888
Are you satisfied with how quickly the computerised accounting system runs?	.841
Are you satisfied with how quickly the computerised accounting system operates?	.826
Is the speed of the computerised accounting system satisfactory?	.821
Does the computerised accounting system operate at a satisfactory pace?	.806
Does the computerised accounting system is able to process a huge number of report?	.696

CONCLUSION

This paper revises and validates instruments (i.e. accuracy, ease of use, reliability, timeliness, content, format, and satisfaction) for measuring end-user computing satisfaction (EUCS) of computerized accounting system (CAS) in public sector (responsibility centre). Descriptive analysis and factor analysis were employed in this study to measure and validate the factors contributing to end-user computing satisfaction. The factor matrix consists of various item instrument in seven determinants (i.e. accuracy, ease of use, reliability, timeliness, content, format, and satisfaction). After examination the data by means of factor analysis, seven factors (i.e. accuracy, ease of use, reliability, timeliness, content, format, and satisfaction) contributing to end-user computing satisfaction with computerised accounting system were extracted with the loadings exceed 0.50 and eigenvalues of more than 1.0.

The findings of the study reveals that accuracy factor embraces eight statements whereby the factor loading ranges between 0.526 and 0.859 which indicates that end-user concerns about the accuracy of the system. Similar with ease of use, it holds of eight statements and factor loading ranges from 0.780 to 0.891 which indicates that end-user easy to use this CAS. As for reliability factor, two statements (i.e. the computerised accounting system halted or interrupted, and the computerised accounting system experienced in inconvenient downtime) were removed as both have factor loadings below cut off point of 0.50 which resulted final reliability factor loadings from 0.629 to 0.880. Meanwhile, the end users afford timeliness factor ranges from 0.566 to 0.735 which shows that the factor is valid in measuring the satisfaction. Besides, ten items are clustered together to reflect the validity of end-users' satisfaction in terms of the content that meets their needs. The loadings of the ten items range from 0.699 to 0.853. In terms of format, end users satisfied with the format presented to them. It comprises of eight statements with loading ranges from 0.781 to 0.892. The last factor is satisfaction with the system speed which ranges from 0.696 to 0.888. The factor remains with six statements when statement 'frustrated with the speed of the computerised accounting

system' is removed due to poor factor loading of less than 0.50.

Overall, the finding of this study verifies that a revised instrument with some changes to the EUCS instruments is still valid in measuring user satisfaction. We found that most of the factor loading for each item is above 0.7, which support the Doll and Torkzadeh model (1988).

Implications, limitations and future research

This study provides evidence that the instrument is a valid and reliable measure in measuring the end-user satisfaction including the staffs in public or government sector. Given this evidence, the IT staff or developer of the government computerized accounting system may apply this instrument in measuring the satisfaction of end-users. However, this study employs small sample size which is limited only among Labuan public sector and cannot be generalized throughout Malaysia. The data collection method (i.e., by using questionnaire) may also affects the findings of this study. A respondent who is not particularly interested in answering the questionnaire is more likely interspersed to answer the question. Consequently, they did not answer the questionnaire genuinely.

Based on the limitation of the current research, the study provides few suggestions for future research. First, future research should consider the sample of study which should include most of the government departments in Malaysia because the expected result can be generalized for Malaysian government sector and a larger sample size would be required to ensure the generalization ability of research. Second, the other data collection method such as in depth interview could also be employed in order to obtain wider possible perceptions of end user. This is due to the fact that questionnaire only provide a very limited space to express the respondents' opinion and perception.

REFERENCES

Abdinnour-Helm, S.F., Chaparro, B.S., and Farmer, S.M. (2005). Using the End-User Computing Satisfaction (EUCS) Instrument to Measure Satisfaction with a Web Site. *Decision Sciences*. Vol. 36. No. 2.

Amoli, J. E. and Farhoomand, A. F. (1996). A structural model of end user computing satisfaction and user performance. *Information & Management.* Vol. 30, Issue 2, pp. 65-73.

Bengts, M. (2004). Usability as a constituent of end-user computing satisfaction, Department of Computer Science and Information Systems, University of Jyväskylä. *Unpublished Master Thesis.*

Cai, S., Jun, M., and Pham, L. (2007). End-User Computing Satisfaction and Its Key Dimensions: An Exploratory Study. *Southwest Decision Sciences Institute 2007.* pp. 725-734.

Chin, W.W., and Lee, M. K. O. (2000). A proposed model and measurement instrument for the formation of is satisfaction: The case of end-user computing satisfaction. *Proceedings of The Twenty First International Conference On Information Systems.* pp. 175-186.

Chen, L., Soliman K. S., Mao E., and Frolick M. N. (2000). Measuring user satisfaction with data warehouses: an exploratory study. *Information & Management.* Vol. 37,

Issue 2, pp.103-110.
Doll, W. J., and Torkzadeh, G. (1988). The measurement of end-user computing satisfaction. *MIS Quarterly*. Vol. 12, Issue 6, pp. 259-274.
Doll, W. J., Raghunathan, T. S., Lim, J.S., and Gupta, Y. P. (1995). A confirmatory factor analysis of the user information satisfaction instrument. *Information Systems Research.* Vol. 6, Issue 6, pp.177-188.
Heilman, G. E. and Brusa, J.O.A. (2001). User information satisfaction in Mexico*. Journal of Information Systems.* Vol. 8, Issue 8, pp. 42-33.
Henry, J. W. and Stone, R. W. (1994). A structural equation model of end-user satisfaction with a computer-based medical information system. *Information Resources Management Journal.* Vol. 7, Issue 2, pp. 21-33.
Hamilton, S. and Chervany, N. L. (1981). Evaluating information system effectiveness. Part I comparing evaluation approaches. *MIS Quarterly*. Vol. 5, Issue 3, pp. 55-69.
Huang, J.H., Yang, C., Jin, B.H, & Chiu, H. (2004). Measuring satisfaction with business-to employee systems, *Computers in Human Behavior 20,* pp.17–35.
Ives, B., Olson, M.H., and Baroudi J.J. (1983). The measurement of user information satisfaction**.** *Communications of the ACM.* Vol. 26, Issue 10, pp.785-793.
Kettinger, William J. and Choong C. Lee. 1997. Pragmatic Perspectives on the Measurement of Information Systems Service Quality. *MIS Quarterly* 21.2 (June): 223-240.
Markovic, B. & Wood, J. (2004). User satisfaction with CBA computer labs, CCSC: *South Central Conference*, pp 232-239.
McKinsey and Company. (1986). Unlocking the computer's profit potential. *McKinsey Quarterly.* Vol**.** 6, Issue 3, pp.17-31.
Pather, S., Erwin, G., & Remenyi, D. (2003). Measuring e-commerce effectiveness: A conceptual model, *Proceedings of SAICSIT 2003*, Pp. 143-152.
Pikkarainen, K., Pikkarainen, T., Karjaluoto, H. and Pahnila, S. (2006). The Measurement of End-User Computing Satisfaction of Online Banking Services: Empirical Evidence From Finland. *International Journal of Bank Marketing*. Vol. 24. No. 3.
Statutory Bodies Act 1980 (Account and Annual Report) (Act 240)
Seddon, P., and Yip, S.K. (2002). An empirical evaluation of user information satisfaction (UIS) measures for use with general ledger accounting software. *Journal of Information Systems*, Spring 92. Vol. 12, Issue 2, pp.49-60.
Sekaran, U. (2000). *Research Method for Business – A skill building approach, (3rd) Edition*, John Wiley & Sons.
Torkzadeh, G., and Doll, W. J. (1991). Test-retest reliability of the end-user computing satisfaction instrument. *Decision Sciences.* Vol. 22, Issue 3, pp.26-37.
Xiao, L. and Dasgupta, S. (2002). Measurement of user satisfaction with web based information systems: An Empirical Study. *Eighth Americas Conference on Information Systems.*
Wang, Y.S., Tang, T.I., and Tang, T.I.E. (2001). An Instrument for Measuring Customer Satisfaction Toward Web Sites That Market Digital Products and Services. *Journal of Electronic Commerce Research*, Vol.2, No. 3.