A Validation of the End-User Computing Satisfaction (EUCS) Towards Computerised Accounting System (CAS)

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Abstract
Purpose - This study aims to develop and validate an instrument for measuring end-user computing satisfaction in computerized accounting system (CAS) environment particularly in private sectors organization. Thus, the study aims to contribute to the existing body of knowledge in the area of information technology.
Design/methodology/approach - Theoretically, this study measures and validates the instrument of Doll and Torkzadeh EUCS (with some additional dimensions) among private companies. The study relied on survey design.
Findings - This paper revised and validated instruments for measuring end-user computing satisfaction (EUCS) in computerized accounting system (CAS) in private sectors organization. Descriptive analysis and factor analysis were employed in this study to measure and validate the factors contributing to end-user computing satisfaction.
Originality/value - The relationship between the management of an organisation and the information system are measured by the satisfaction of the users. This phenomenon encourages a more focused measurement to explain the overall satisfaction of the computerised accounting system (CAS).
Keywords: End-User Computing Satisfaction, Computerized Accounting System, Accounting Information System, End-User, Private Organization, Factor Analysis
Paper type: Research Paper

Introduction

Accounting Information System

Accounting is the service function that seeks to provide the users with quantitative information. On the other hand, AIS (Accounting Information System) is an information system that is designed to make the accomplishment of accounting function possible. AIS processes data and transactions to provide users with the information they need to plan, control, and operate their businesses (Romney et al., 1997:2). Previously, AIS (Accounting Information System) were performed manually on recording, summarizing and validating of data associated with financial accounting, managerial accounting, and tax compliance issues (Hollander et al. 1996). Now, AIS (Accounting Information System) can be performed with the help of computers. Contemporary IS (Information System) cannot function without computers and other technical means to measure primary information, gather and register it in carriers, process and transmit it to consumers. For this reason, computerized information systems (CIS) are designed and implemented (Mahdi et al., 2010).

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Accounting information plays an important role in the process of managing an enterprise's activity. In the last ten years, there has been an intensive process of implementing AIS in the world. These systems were implemented in large industrial and small trade enterprises. Later, implementation of AIS started in other enterprises and state institutions. The implementation of AIS is quite an expensive investment project for most Enterprises (Mahdi et al., 2010). Although the cost of AIS implementation is quite expensive, it also provides a lot of benefits. According to some researchers, AIS will help in improving performance measures and productivity. Gelinas (1990) considers the effectiveness of AIS as a measure of success to meet the established goals. The success of AIS implementation can be defined as profitably applied to area of major concern to the organization, is widely used by one or more satisfied users, and improves the quality of their performance. In addition, the quality of accounting information is also determined by other factors such as the level of primary information automation, functionality of computer software, integration of accounting and other types of economic information (Mahdi et al., 2010).

Measuring Information System

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 (Computerised Accounting System) in their own organisation.

In measuring the effectiveness of information system has proven to be difficult (Seddon and Kee Yip, 2002). In fact, MIS Quarterly described it as one of the most "haunting problems" of Management Information System (MIS) (Davis 1989). Since it is difficult to directly measure the quality and effectiveness of information system, researchers tend to adopt the indirect measurement of information system. One of the measurements of information system is End User Computing Satisfaction (EUCS). The relationship between the management of an organisation and the information system are measured by the satisfaction of the users. This phenomenon encourages a more focused measurement to explain the overall satisfaction of the computerised accounting system (CAS). Specific questions about certain information system, i.e. CAS, in relation to the factors affecting the end users computing system seem necessary instead of general questions.

Background of the Study

Since the beginning of 1980s, many researches had conducted survey in information system field highlighting the tremendous development in end-user computing world. In fact, the growth of end-user computing is one of the significant phenomena of the 1980s in the information management world (David, 1983). Business Week (1982) quoted an estimate from Dataquest, Inc. that the training industry would capture $3 billion of the $ 14 billion spent on personal computers by 1986. These phenomena give indications that the growth of the end-user

computing has already started more than 20 years ago. Furthermore, it is more complicated during the emergence of the borderless world through the introduction of Internet and other information technological advances and gadgets. For instance, according to research done by Nielsen Media Research-Media Index, the statistic of personal computer at home based on total adult in Peninsular Malaysia for the year 2005 is 13,139,000 compared with year 2000 is 11,212,000. It seems there is an increasing of personal computer at home aligned with the existence of information communication technology in Malaysia.

The tremendous adoption of CAS is actually has been influenced by many other factors as well. Breen et al. (2003) determined the factors that motivated the use of a CAS as well as the factors that hindered the introduction of a CAS. They reported that only 55% of owner-managers used a CAS whereby the most popular CAS is MYOB (54.9%). Furthermore, they found that the existence of accountant has influenced early starters to introduce a CAS so that small businesses have better records of their financial activities. Obviously, the introduction of a CAS should not be seen as a threat to the accountant, but rather an opportunity.

Moreover, the study by Breen et al. (2003) was designed to investigate small business usage of a CAS to ascertain if there are obstacles that prevent small business from migrating to such a system for both users of CAS and non-users CAS. The study identified a number of other motivating factors included the computer self-efficacy of the owner-manager, the cost and perceived benefits of the innovation, ability to pay for the innovation, having the time to implement the CAS and possessing the staff capable of using the system. Beside, the CAS users stated that they believed the software had a positive impact on the business. However, the CAS non-users stated two major reasons for not using the CAS because a CAS was not needed and would not add value to the business and owner manager lacked IT skills and knowledge to employ it.

Extensively, Bresseler & Bresseler (2003) identified types of accounting information system software utilized by small businesses and asked entrepreneurs whether they are satisfied with the implementation of their software package. Beside, the study also identified the most important variable regarding the choice of accounting information system software application. They suggested that entrepreneurs overwhelmingly chose software package that they found easier to use and were heavily influenced by consultants and business counselors when selecting software package. In addition, the most popular software package is Quick Books and more than half of the respondents are very satisfied based on ease of use or additional software features.

The Purpose and Significance of the Study

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 validate the factors affecting the satisfaction of the end users of the CAS especially in private companies particularly in CAS or AIS. 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 private companies in Labuan F.T.

The Objective of the Study

This study aims to develop and validate an instrument for measuring end-user computing satisfaction in computerized accounting system (CAS) environment particularly in private sectors organization.

Thus, the study aims to contribute to the existing body of knowledge in the area of information technology. Further, the study provides the constructs to measure and evaluate EUCS among the private companies in Labuan F.T. Theoretically, this study measures and validates the instrument of Doll and Torkzadeh EUCS (with some additional dimensions) among private companies. In addition, this instrument is very useful in practice, not only for public sector but also for private sector towards the achievement of the excellent and better performance.

The remainder of this paper is organized as follows. A review of related literature on End-User Computing Satisfaction and research questions is discussed. Next, the methodology employed in this study, research instruments used and data analysis method involved are described. Finally, the empirical results and discussion of the study are drawn.

Literature Review

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. 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 organization 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), their study has 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, study of Wang et al. (2001) 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 personalizing 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

Respondents

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 private companies in Labuan F.T. However, only 300 from 400 list of private companies' being selected due to their active operation. This list has been taken from Companies Commissions of Malaysia (SSM). We have distributed 3 questionnaires for each company and the total population are 900 respondents. Sekaran, U. (2003) has stated the sample should be taken for this population are 269 respondents.

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.
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. The questionnaires are divided into two sections. The first section is for the dimension of EUCS and the second section is for the personal information. For the first section, it 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, (6) Part F - Satisfaction with System Speed and (7) Part F - Satisfaction with System Reliability. The second section is about the personal information of the respondent. These include their gender, education background, position, and computerised accounting course. 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

Respondents Profile

Table 1: Respondents Profile

Current Position in Department	Frequency	Percent
Bursar	1	.4
Vice Bursar	1	.4
Bursar Assistant	2	.7
Accountant	41	15.2
Accountant Assistant	28	10.4
Financial Officer / Controller	1	.4
Financial Officer Assistant	5	1.9
Information System Officer	4	1.5
Information System Officer Assistant	2	.7
Data Processing Operator	2	.7
Data Processing Operator Assistant	3	1.1
Administrative Officer	6	2.2
Administrative Officer Assistant	9	3.3
Administration Clerk	34	12.6
Accountant Clerk	55	20.4
Account Clerk	41	15.2
Other (please specify)	34	12.6
Gender		
Male	107	39.8
Female	162	60.2
Level of Education		
Master or higher	17	6.3
Degree	82	30.5
Diploma	92	34.2
SPM / STPM	78	29.0
Tenure in Current Position		
less than 2 years	70	26.0
2-5 years	107	39.8
5-10 years	60	22.3
more than 10 years	32	11.9
Tenure in Current Organization		
less than 3 years	105	39.0
3-15 years	118	43.9
15-25 years	38	14.1
25-35 years	8	3.0
Attendance of any Computerized Accounting Courses		
yes	186	69.1
no	83	30.9
Possession of any Additional Computerized Skills		
UBS	102	37.9
MYOB	26	9.7
LOTUS 123	43	16.0
PeachTree	12	4.5
MrAccounting	24	8.9
QuickBook	7	2.6
Others	55	20.4

Table 1 shows more details of respondents regarding current position in department, gender, level of education, tenure in current position and organization, attendance for any of

computerised accounting courses and possession of any additional computerised skills. Most of respondents have participated directly towards CAS due to their position and tenure in their organisation. More than 30% of respondents had Diploma, Bachelor, Master or PhD degree and more than 30% also had attend any course for Computerised Accounting (69.1%). In addition, most of respondents also possessed extra computerised skills such as UBS, MYOB, LOTUS 123, PeachTree, MrAccounting, QuickBook, and any computerised skills.

Descriptive Analysis

Table 2: Descriptive Analysis

	N	Minimum	Maximum	Mean	Std. Deviation
Content	269	1.00	5.00	3.7584	.75612
Accuracy	269	1.00	5.00	3.7069	.76381
Format	269	1.00	5.00	3.7361	.76687
Ease of use	269	1.00	5.00	3.7127	.75819
Timeliness	269	1.00	5.00	3.5006	.74765
System speed	269	1.33	5.00	3.5805	.69953
System reliability	269	1.00	5.00	3.6187	.74341
Satisfaction (Dependent Variable)	269	1.00	5.00	3.7299	.73212

Table 2 presents descriptive analysis (minimum, maximum, mean and standard deviations) were obtained for the interval scaled dependent and independent variable. The minimum for most of the variable is 1.00 and the maximum is 5.00. From the results, it shows the mean for seven factors (content = 3.7584; accuracy = 3.7069; format = 3.7361; ease of use = 3.7127; timeliness = 3.5006; system speed = 3.5805; system reliability = 3.6187). The mean for satisfaction is 3.7299. In general, it shows that the users computing are quite satisfied with the CAS. The minimum indicate that the end users are never satisfied and the maximum indicate the end users always satisfied with computerised accounting system (CAS). From the standard deviation results, the lowest is system speed (.69953). It shows rating satisfaction for system speed were consistently close to the mean rating. However, the highest is format (.76687) and clearly more spread from the mean. It defined that some user's ratings are very high and the others were low satisfaction.

Reliability Analysis

Table 3: Reliability Anxalysis

Variable	Alpha (Coefficient)	N=Item
Satisfaction (Dependent Variable)	0.771	7
Content	0.922	9
Accuracy	0.897	7
Format	0.747	7
Ease of Use	0.898	7
Timeliness	0.812	6
System Speed	0.818	6
System Reliability	0.818	7

Table 3 present the Reliability Analysis, Cronbach's alpha reliability coefficients of the seven factors and satisfaction (dependent variable). All the factors were all above 0.7. A sample of the result obtained for Cronbach's alpha test for satisfaction with the factors is shown in Table 2. It seems that this study provides quite reliable instruments because the score is higher as compared to Doll and Torzadekh. For example, the content score in Doll and Torkzadeh study is 0.89 as compared to 0.922 in this study; accuracy = 0.91 (0.897); format = 0.78 (0.747); ease of use = 0.85 (0.898); and timeliness = 0.82 (0.812) . The satisfaction with system speed in this study (0.818) is higher compared to Chin and Lee study (0.72). Furthermore, even though system reliability is a new dimension in this study, it provides a reliable dimension for EUCS measurement (0.818). Further, system reliability in this study is more reliable as compared to Amdan et al. (2006) whereby the Alpha is only about 0.7204. In general, the closer the reliability coefficient gets to 1.0, the better. Reliabilities less than 0.6 are considered to be poor, those in the 0.7 ranges, acceptable, and those 0.8 good (Sekaran, 2000). It is of evidence that the Cronbach's alpha value for the seven factors in this study ranged from 0.747 to 0.922. Therefore, the internal consistency reliability of the measures used in this study can be considered to be good.

Factor Analysis

Inputs available in the questionnaires 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 suggests answers to four major questions:

1. How many different factors are needed to explain the pattern of relationships among these variables?
2. What is the nature of those factors?
3. How well do the hypothesized factors explain the observed data?
4. How much purely random or unique variance does each observed variable include?

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. Details elucidation is accessible below.

Accuracy

End-users make their mind up to use computerised accounting system in their business transaction by reason of accuracy factor. The factor embraces of eight statements and factor loading ranges between 0.679 and 0.841. Kaiser-Meyer-Olkin measure of sampling adequacy for the factor is 0.914. Total variance explained is 4.966 with % of variance explained is 62.069. As accentuates in Table 4, respondents discover that the system provide reliable (loading = 0.841), accurate (loading = 0.833), and correct information (loading = 0.771). Indeed, the computerized accounting system is error free (loading = 0.679).

Table 4: Component Matrix of Accuracy Factor

Statements	Loadings
Does the computerized accounting system provide reliable information?	.841
Is the information presented by the computerized accounting system dependable?	.833
Does the computerized accounting system provide accurate information?	.829
Overall, are you satisfied with accuracy of the computerized accounting system?	.814
Are you satisfied with the accuracy of the computerized accounting	.795

system?	
Does the computerized accounting system provide correct information?	.771
Is the computerized accounting system accurate?	.725
Is the computerized accounting system error free?	.679

Ease of Use

Eight items are clustered under ease of use factor which end-users apply in evaluating their satisfaction towards computerized accounting system. However, statement 'overall, are they satisfied with ease of use of the computerized accounting system' is removed from the factor as its factor loading below cut off point of 0.50. These deletions resulted in a 7-item scale for measuring ease of use of computerized accounting system. Factor loading ranges between 0.712 and 0.836. Total variance explained = 4.475 with percentage of variance explained = 55.935. Kaiser-Meyer-Olkin measure of sampling adequacy is 0.894. Table 5 exemplifies that respondents discover the system is easy to operate, and easy to use with factor loadings 0.836, and 0.825, respectively. This features less likely to be experienced by end-users in the traditional accounting system. In other word, the system is user friendly (loading = 0.790) as they can easily get the system to do what they want it to do (loading = 0.788) and provide help tools or user manual (loading = 0.712) for reference.

Table 5: Component Matrix of Ease of Use Factor

Statements	Loadings
Is it easy to operate the computerized accounting system?	.836
Is the computerized accounting system easy to use?	.825
Is the computerized accounting system user friendly?	.790
Is it easy to get the computerized accounting system to do what you want it to do?	.788
Is your interaction with the computerized accounting system clear and understandable?	.779
Is the computerized accounting system easy to interact with?	.769
Does the computerized accounting system provide help tools or user manual?	.712

System Reliability

Table 6 enumerates that six from eight statements allied to system reliability factor had factor loadings above cut off point of 0.50 and it ranges from 0.714 to 0.829. The two statements are 'the computerized accounting system experienced in inconvenient downtime' and 'frequency the computerized accounting system halted or interrupted'. Kaiser-Meyer-Olkin measure of sampling adequacy for the factor is 0.811 and total variance explained = 4.048 with percentage of variance explained = 50.605. End-users satisfy with the computerized accounting system attributable to it efficiency and effectiveness (loadings = 0.829, and 0.819, respectively). Preference to shift practices from traditional accounting to using computerized accounting system when it is equip by back up or recovery system (loading = 0.742), password protection (loading = 0.725), with trusted security system (loading = 0.714).

Table 6: Component Matrix of System Reliability Factor

Statements	Loadings
Is the computerized accounting system efficient?	.829
Is the computerized accounting system effective?	.819
Overall, are you satisfied with reliability of the computerized accounting system?	.814

Does the computerized accounting system provide back up or recovery system?	.742
Does the computerized accounting system provide password?	.725
Does the computerized accounting system is equipped by the security system?	.714

Timeliness

Pertaining to timeliness factor, the computerized accounting system provides end-users with information in a timely manner with factor loading = 0.797 and also up-to-date information with factor loading = 0.747. Undeniably, they are able to obtain information from the system that is too late for their needs (factor loading = 0.667). Above all, they do not experience any frustration with the timeliness of the computerized accounting system with factor loading = 0.660 (refer Table 7). Kaiser-Meyer-Olkin measure of sampling adequacy for the factor is 0.811. Total variance explained = 3.548 with % of variance explained = 50.681.

Table 7: Component Matrix of Timeliness Factor

Statements	Loadings
Does the computerized accounting system provide you with the information in a timely manner?	.797
Does the computerized accounting system provide up-to-date information?	.747
Overall, are you satisfied with timeliness of the computerized accounting system?	.725
Do you get the information you need in time?	.714
Do you get information from the computerized accounting system that is too late for your needs?	.667
Does the computerized accounting system provide information that is too old to be useful?	.661
Are you frustrated with the timeliness of your computerized accounting system?	.660

Content of the System

The next factor requires the end-users to provide response on content of the system factor. Ten items are clustered together which end-users apply in evaluating their satisfaction towards computerized accounting system in terms of the content of the system. The loadings of the ten items are depicted in Table 8, ranges from 0.724 to 0.826. The items are grouped by their highest (primary) factor loading. Kaiser-Meyer-Olkin measure of sampling adequacy for the factor is 0.944 and total variance explained = 6.216 with percentage of variance explained = 62.164. The information provided by the computerized accounting system fit the end-users needs lead the list related to content of the system factor, followed by they can easily understand the report when the system information content meet their needs. The factor loadings are 0.811, 0.808, and 0.790, respectively. Above and beyond, the computerized accounting system give them the right amount of information for their needs (loading = 0.790).

Table 8: Component Matrix of Content of the System Factor

Statements	Loadings
Overall, are you satisfied with content of the computerized accounting system?	.826
Does the information provided by the computerized accounting system fit your needs?	.811
Do you think you can easily understand the report?	.808

Does the output from the computerized accounting system meet your needs?	.807
Does the computerized accounting system provide reports that seem to be just seems to be just about exactly what you need?	.798
Does the information content meet your needs?	.790
Does the computerized accounting system give you the right amount of information for your needs?	.790
How adequately do you feel your computerized accounting system meets the information processing needs?	.787
Does the computerized accounting system provide the accurate information you need?	.738
Does the computerized accounting system provide sufficient information?	.724

Format

Eight statements related to format factor. Nevertheless, statement 'is the information clear' is confiscated from the list as its factor loading do not exceed the recommended cut off value of 0.50 and above. As affirms in Table 9, the factor finally comprises of seven statements with loading ranges from 0.710 to 0.846. In terms of format of the computerized accounting system, end-users feel comfortable and satisfy with the way in which the information is presented (loading = 0.846) as the format of the system following the standard ((loading = 0.805). The factor's total variance explained is 4.639 with % of variance explained is 57.987. Kaiser-Meyer-Olkin measure of sampling adequacy is 0.910.

Table 9: Component Matrix of Format Factor

Statements	Loadings
Are you satisfied with the way in which the information is presented?	.846
Is the format of the output satisfactory?	.827
Overall, are you satisfied with format of the computerized accounting system?	.825
Are you satisfied with how the information is presented to you?	.812
Does the format presented following the standard?	.805
Are you satisfied with the layout of the output?	.802
Do you think the output is presented in a useful format?	.710

Satisfaction with the System Speed

The next section requires the end-users of the computerized accounting system to provide response on satisfaction with the system speed factor which encompasses seven statements that ranges from 0.670 to 0.841. Nonetheless, the factor remains with six statements when statement 'frustrated with the speed of the computerized accounting system' is removed due to poor factor loading of less than 0.50. Kaiser-Meyer-Olkin measure of sampling adequacy for the factor is 0.868. Total variance explained = 3.794 with % of variance explained = 54.203. Table 10 infers that end-users satisfied with how quickly the computerized accounting system runs with loading = 0.841. In fact, the speed of the system is satisfactory (loading = 0.830), and operate at a satisfactory pace (loading = 0.792.). It also able to process a huge number of report (loading = 0.751).

Table 10: Component Matrix Satisfaction with the System Speed Factor

Statements	Loadings
Are you satisfied with how quickly the computerized accounting system runs?	.841

Is the speed of the computerized accounting system satisfactory?	.830
Are you satisfied with how quickly the computerized accounting system operates?	.799
Does the computerized accounting system operate at a satisfactory pace?	.792
Does the computerized accounting system is able to process a huge number of report?	.751
Overall, are you satisfied with the speed of the computerized accounting system?	.670

Conclusion

This paper revises and validates instruments (i.e. accuracy, ease of use, timeliness, content, format, system speed and system reliability) for measuring end-user computing satisfaction (EUCS) in computerized accounting system (CAS) in private sectors organization. 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, timeliness, content, format, system speed and system reliability). After examination the data by means of factor analysis, seven factors (i.e. accuracy, ease of use, timeliness, content, format, system speed and system reliability) 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.

For instance, under accuracy factor, it embraces of eight statements and factor loading ranges between 0.679 and 0.841 which indicates that end-user concerns about the accuracy of the system. Meanwhile, under ease of use, statement 'overall, are they satisfied with ease of use of the computerized accounting system' is removed from the factor as its factor loading below cut off point of 0.50. These deletions resulted in a 7-item scale for measuring ease of use of computerized accounting system. Factor loading ranges between 0.712 and 0.836. Reliability factor removed 'the computerized accounting system experienced in inconvenient downtime' and 'frequency the computerized accounting system halted or interrupted' as they loadings below cut off point of 0.50 which resulted final reliability factor loadings from 0.714 to 0.829. The end users afford timeliness factor ranges from 0.797 to 0.660 which shows that this factor is valid in measuring the satisfaction. Besides, ten items are clustered together which end-users apply in evaluating their satisfaction in terms of the content of the system. The loadings of the ten items range from 0.724 to 0.826. Nevertheless, under the format factor, statement 'is the information clear' is confiscated from the list as its factor loading do not exceed the recommended cut off value of 0.50 and above. Finally, it comprises of seven statements with loading ranges from 0.710 to 0.846. In terms of format of the CAS, end-users feel comfortable and satisfy with the way in which the information is presented (loading = 0.846). The last factor is satisfaction with the system speed which ranges from 0.670 to 0.841. The factor remains with six statements when statement 'frustrated with the speed of the computerized 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 research provides evidence that the instrument is a valid and reliable measure in Labuanese applications. Given this evidence, managers and software product developers can confidently apply the instrument in the investigation of competing tools, features, and technologies in especially in Labuan. However, this study employs small sample size which is limited only among Labuan private companies 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.

The size of the system is also should be taken into consideration. The small size of the system is expected to have a simple feature, user friendly and understandable. As compared to the bigger size system, it will be more complicated and require more time to understand the system. Thus, the different perception of end user on overall satisfaction toward the system can be distinguished. According to ACCPAC International, company need to evaluate application performance such as scalability as a product that help to expand as the business grows, how quickly and efficiently the new software can be installed, how simple and easily to be used, the capability to produce the reports that company requires, the capability to test for errors or preventing mistakes, how well the audit trails for errors is implemented and how each confidential functions and reports can be protected through password.

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 private companies in Malaysia because the expected result can be generalized for Malaysian end-user computing 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 more possible perceptions of end user. This is due to the fact that questionnaire only provide a limited space to express their opinion towards the computerized accounting system.

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