A Validation of Instrument for End-User Computing Satisfaction (EUCS) Through Structural Equation Modelling: A Case on Government Financial Management System (GFMAS)

Azleen Ilias, Mohd Zulkeflee Abd Razak
College of Business and Accounting
Universiti Tenaga Nasional

Norazah Suki, Mohd Rushdan Yasoa'
Labuan School of International Business and Finance
Universiti Malaysia Sabah

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Abstract

This study focuses on end-user computing satisfaction (EUCS) pertaining Government Financial Management System (GFMAS) in the Accountant General's (AG) Department. The goodness-of-fit for end-user computing satisfaction model has been measured by structural equation modelling. Researchers found that all constructs (content, format, accuracy, timeliness, ease of use, system speed and system reliability) in this model can be considered as acceptable constructs. Furthermore, this research found that content, format, ease of use, system speed and system reliability has contribute on the satisfaction of GFMAS usage. Overall, this paper will contribute in the usage and performance on Government Financial Management System (GFMAS) and computerised accounting system. Thus, Accountant General's Department should be able to focus on other factors that might provide more influence and impact towards the satisfaction of computerised usage.

Keywords: end-user computing satisfaction (EUCS), structural equation modelling, computerised accounting system

Introduction

Computerised Accounting System (CAS)

There are several accounting information system that are currently being used among government sectors which include Government Financial and Management Accounting System (GFMAS), Standard Accounting System for Government Agencies (SAGA), State Government's Standard Computerised Accounting System (SPEKS), Micro Accounting System (SPM), and Electronic Budget Planning and Control System (e-SPKB). In this current study, researchers focused only to the usage of Government Financial and Management Accounting System (GFMAS).

The application system is known as Government Financial and Management Accounting System or GFMAS was developed in year 2005 and began its operation in 2006 at 25 AG branch offices together with 10 self-accounting departments. This system has enhanced operational efficiency and effectiveness to enable AG Department to deliver value-added service especially to Federal Government. This system also able to capture accounting transactions and prepare financial statements based on accrual basis of accounting. In order to ensure the effectiveness of the project, The GFMAS Project Management team is adopting the Accelerated System Application Program (ASAP) methodology to manage the implementation activities and deliverables of the project.

GFMAS has been developed with several objectives. First is to improve services quality of AG Department through the usage of the latest information technology application. Second, it may provide a standard mechanism to monitor all government accounting transactions. Third, due to problems arose from the legacy or existing government accounting system, GFMAS emerges to overcome these problems and setbacks. Finally, GFMAS could assist AG Department in providing value added services to government and its agencies in the accounting and financial matters (Kok Ming, 2006).

The existence of GFMAS is viewed as an approach to enhance government payment process and accounting for the government's receipts in a fast and efficient manner. In fact, this is in line with AG's Department tagline "Excellent Accounting at Your Service". GFMAS is an integrated system which is capable of allowing acceleration in financial planning, budget control and government accounting. It combines all the accounting functions that cover payment, receipts, remuneration control, unclaimed monies, government loans, loans and advance payment to public sector personnel, investment and preparation of the Public Accounts in one integrated platform (Accountant General's Department).

With this new system, a data warehouse was established called the Business Warehouse (BW). This data warehouse represents the central data repository for the public sector accounting systems managed by AG's Department. The initiative to move from older system to a new GFMAS is an attempt to improve the accounting and financial management in the public sector's departments. At the same time, this move is also seen to be an attempt to increase the quality of data produced and the performance of the accounting systems (Abd Rahman, 2008).

As everyone know, government are in progress in shifting from cash basis to accrual basis accounting system, thus the development of computerised accounting system is very crucial to be given more attention. The attention can be provided by having more study on the existence computerised accounting system in order to improve the satisfaction of using system in future. A lot of research has been done on the End-User Computing Satisfaction (EUCS), but from the best of our knowledge, there are few researches done on government sectors.

Significance of the Study

It seems clear that there is a lack of study has been conducted in the area of EUCS among government sectors, particularly in AG Department. This can be supported by Dufner, Holley & Reed (2002), Chircu and Lee (2003), Kamal (2006), Ward (2006) and Norshidah, Husnayati & Ramlah (2009) which stated that the testing and validation of and EUCS model for electronic government systems by public officers, are not apparent. Thus, the study aims to contribute to the existing body of knowledge in the area of accounting information system for public sector.

Purpose of the Study

The main purpose of this research is to determine the validation of the End-User Computing Satisfaction (EUCS) instrument to measure satisfaction and to determine the main factors that contribute to overall satisfaction towards GFMAS.

Research Questions

Based on the purpose of the study, the research question that will be achieved is:

RQ1: How fit the model that has been developed?
RQ2: What are the main factors that contribute to overall satisfaction towards GFMAS?

This paper continues with a literature review in discussing and elaborating of End-User Computing Satisfaction (EUCS). Next, the research design which includes a sample; instrumentation and data collection are presented. This is followed by quantitative analysis and the findings consist of Structural Equation Modelling. The final part concludes the study and provides suggestions for further research

Literature

End User Computing Satisfaction (EUCS)

Many researchers defined end user computing satisfaction 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.

End-user computing (EUC) refers to direct interaction with application software by managerial, professional, and operating level personnel in user department (Doll & Torkzadeh, 1989). And, the term “competency” first was introduced by David McClelend (1973), a social psychology scholar, in early 1970 has been variously defined by many researchers. Generally speaking,

competency is a total set of knowledge, skills and attitudes as the action characteristics of an organizational member that can do his or her own task outstandingly and efficiently in an organizational environment (Boyatiz, 1982).

Mirable (1997) defined competency as a set of knowledge, skills, abilities, or other characteristics that differentiates high from average performance. Athey and Orth (1999) presented that competency is a set of observable performance dimensions, including individual knowledge, skills, attitudes and behavious, as well as collective team, process and organization capabilities that is linked to high performance, and provides the organization with sustainable competitive advantage. Rodriguez et al. (2002) indicated that competency is a measurable pattern of knowledge, skill, abilities, behaviours, and other characteristics that an individual needs to perform work roles or occupational functions successfully.

The measure of End-User Satisfaction was developed by Doll and Torkzadeh (1988) and has been retested for validation (Doll and Torkzadeh, 1991; Hendrickson, Glorfeld, and Cronan, 1994; McHaney, 1999; McHaney, 2002). The instrument is highly reliable, consistently reporting reliable Cronbach alphas (Hendrickson, Glorfeld, and Cronan, 1994). It has been used in the personal computing environment and well as the mainframe environment (Hendrickson, Glorfeld, and Cronan, 1994), the Decision Support System environment (McHaney and Cronan, 2001) and with computer simulations (McHaney and Cronan, 1998). The EUCS instrument has been validated for today's popular enterprise wide applications (Somers, Nelson, Karimi, 2003) that employ standardized software modules with user customizable interfaces. Such applications (e.g., SAP, Oracle, and PeopleSoft) are commonly used by global firms' users in a variety of national cultures.

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 that has been 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.

Some researchers have examined the relationship of EUCS and performance. For instance, Amoli and Farhoomand (1996) explored 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.

Markovic & Wood (2004) addressed the issue of user satisfaction with a performance of computer lab in a university. 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.

Heilman and Brusa (2001) evaluated the reliability and validity of a Spanish version of the User Information Satisfaction (UIS) short form 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.

User satisfaction has become a pervasive measure of the success or effectiveness of information systems for both managers and researchers. Originally developed by Doll and Torkzadeh (1988) to measure a user's satisfaction with a specific application, the end user computing satisfaction (EUCS) instrument has been widely used and cross-validated (Doll, Xia & Torkzadeh, 1994; McHaney, Hightower & White 1999; Somers, Nelson, Karimi, 2003). While the original instrument is relatively old, the item-factor loadings for the 12-item instrument have been remarkably stable. Gelderman (1998) found that EUCS was a good predictor of an application's impact on organizational performance and, thus, a useful surrogate for system success.

User satisfaction is common measure of IS success, for which several standardized instruments have been developed and tested (Zviran and Erlich, 2003; Doll et al., 2004). User satisfaction is a critical construct because it is related to other important variables, including systems analysis and design. Satisfaction has been used to assess IS success and effectiveness, the success of decision support systems, office automation success and the utility of IS in decision making (Zviran et al., 2006). In web-based systems, in particular, satisfaction can

depend on numerous factors, including web design, content, user interface, navigation and information structure.

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.

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 is still valid in measuring user satisfaction.

In addition, Pikkarainen's, 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 addition, they also found that the original five factor EUCS model is not suitable in the context of online banking. However, the three factors (content, ease of use and accuracy) from the original model are confirmed in measuring EUCS of online banking.

Based on the study by Cai et al. (2007), they 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. 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) revised and revalidated 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 site 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 than the other computing settings for which the EUCS has been revalidated.

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 GFMAS such as accountant, financial officer, information system officer, data processing operator, 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 towards GFMAS 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. The model will become the fundamental guideline to examine factors contributing to EUCS generally in government sector and specifically at AG Department. The current research done is considered important to be implemented in government sector according to the previous study done by Horan, Abhichandani, & Rayalu (2006), Norshidah, Husnayati & Ramlah (2009), Vassilios & Chatzoglou (2012) and Siti Aminah, Norman & Selamat (2012) which also tested in the aspect of end-users computing satisfaction pertaining government and public system. Besides that, the research done by Mohsen Dastgir & Mortezaie (2012) and Siti Aminah, Norman, & Selamat (2012) pertaining computerised accounting system shown also concurrently significant with researchers’ current study. The summary for several studies related with the EUCS can be referred to the Table 1 below.

EUCS is used as the main model and the following hypothesized the relationships.

Content

In Doll and Torkzadeh study, they labelled content of information as the most important dimension in evaluating EUCS. They also suggested that content is one of the factors that represent the satisfaction. Based on Norshidah, Husnayati & Ramlah (2009), researchers found that content is the main contributor to end-user satisfaction. Besides that, there has been proven that there is a positive relationship between content and end-users satisfaction in recent study done by Siti Aminah, Norman, & Selamat (2012). Therefore, this study proposes that content has a significant effect on end user computing satisfaction towards GFMAS. Based on the above discussion the following hypothesis has been proposed:

H1: There will be a significant influence on content towards using GFMAS

Accuracy

Bailey and Pearson (1983) proposed 39 system-related items for measuring user satisfaction. Among their ten most important items, in descending order of importance, were information accuracy, output, timeliness, reliability, completeness, relevance, precision, and currency. Olson and Lucas (1982) proposed report accuracy and appearance as measures of information quality in office automation systems. Subsequently, it seems to suggest that accuracy is one of the factors that represent the satisfaction. The respondent who is satisfied with the accuracy of information is also satisfied with overall system. In recent research done by Norshidah, Husnayati & Ramlah (2009), accuracy is played as main contributor in end-user computing satisfaction. There also proven to have positive relationship to the end-users satisfaction with computerised accounting system in research done by Siti Aminah, Norman, & Selamat (2012). Thus, this study suggests that accuracy has a significant effect on end user computing satisfaction towards GFMAS. Based on the above discussion the following hypothesis has been proposed:

H2: There will be a significant influence on accuracy towards using GFMAS

Format

Bailey and Pearson (1983) classified format of information reported as the one of the description measures in their study. Doll and Torkzadeh (1988) used format in their study as the second dimensions in determining EUCS. Mihir and Bijan (2002) identified six relevant dimensions (relevance, confidence, usefulness, ease of use, format and playfulness) of user satisfaction under a research framework for user satisfaction with decision support and usability of a Decision Support System. In recent study done by Siti Aminah, Norman, & Selamat (2012), the study shown that format have positive relationship to the end-users

satisfaction of computerised accounting system. Thus, the study expects that the satisfaction with the format of the report might have the relationship with the overall satisfaction towards GFMAS. Based on the above discussion the following hypothesis has been proposed:

H3: There will be a significant influence on format towards using GFMAS

Ease of Use

Ease of use has become increasingly important in software design (Branscomb and Thomas, 1984). There is increasing evidence that the effective functioning of an application depends on its ease of use or usability (Goodwin, 1987). If end users find an application easy to use, they may become more advanced users, and therefore, better able to take an advantage of the range of capabilities the software has to offer. Also, ease of use may improve productivity or enable decision makers to examine more alternatives (Doll and Torkzadeh, 1988). Additionally, the recent study done by Siti Aminah, Norman, & Selamat (2012), has proved that ease of use has positive relationship with users' satisfaction in using computerised accounting system.

Ease of use is expected to increase the level of overall EUCS. It shows that ease of use is one of the factors that represent the overall EUCS. The respondent who is satisfied with ease of use of the system is expected to satisfy with overall system. Hence, this study suggests that ease of use has a significant effect on end user computing satisfaction towards GFMAS. Based on the above discussion the following hypothesis has been proposed:

H4: There will be a significant influence on ease of use towards using GFMAS

Timeliness

According to Chang et al. (2003), timeliness is referring to the speed and frequency of information provided by accounting information system (AIS). Consistent with Chenhall and Morris (1986) and Choe (1996), they measured timeliness with two items, namely speed and frequency, using a seven-point Likert type scale. In general, if the end-users satisfy with the timeliness of the report produced by the CAS, they may be satisfied with the overall of the system.

Timeliness has been proven to be one of contributor in users' satisfaction as evidence provided in research done by Siti Aminah, Norman, & Selamat (2012) and Norshidah, Husnayati & Ramlah (2009). Hence, timeliness is assumed to increase the level of overall EUCS. This study suggests that timeliness is one of the factors that represent the overall EUCS towards GFMAS. Based on the above discussion the following hypothesis has been proposed:

H5: There will be a significant influence on timeliness towards using GFMAS

System Speed

Chin and Lee (2000) extended the existing research by providing a new conceptual perspective on how EUCS is formed and how does it going to be measured. In addition, they operationalised this new perspective by providing a new measurement instrument for empirical testing. Beyond the EUCS context, they suggested that their model and approach were too general to be used in creating new measures in other IS satisfaction areas where concerns have been raised (i.e. service quality, Van Dyke et al. 1997). Thus, they constructed another dimension as one of the factors contributing to EUCS. They proposed that overall operating speed might also represent another factor. The argument is that, within the human computer interaction literature, the speed with which a computer system responds has been argued to be an important factor influencing the usability and emotional responses among users. This in turn makes satisfaction with the operating speed of a system should have a strong impact on the overall satisfaction with system used above and beyond the other functional attributes being considered (i.e., content, accuracy, format, ease of use, and timeliness). Thus, this study suggests that satisfaction with system speed has a significant effect on end user computing satisfaction towards GFMAS. Based on the above discussion the following hypothesis has been proposed:

H6: There will be a significant influence on system speed towards using GFMAS

System Reliability

Providing a reliable and effective information protection requires an approach which needs some considerations from variety of areas, either within or outside the information technology area (Capron and Perron, 1993). An information protection program is more than establishing controls for the computer held-data; but it should also address all forms of information. Swanson (1974) used several dimensions to measure MIS appreciation among managers. These include the reliability of a computer system, on-line response time, the ease of terminal use and so forth. Hamilton and Chervany (1981) proposed data currency, response time, turnaround time, data accuracy, reliability, completeness, system flexibility, and ease of use among others. King and Epstein (1983) proposed multiple information attributes to yield a composite measure of information value. Reliability is one of the proposed information included in his study. The computer system would not be able for processing should there be unavailability of essential software and data. Eventually, the system can be retrieved should there are back ups. Thus, this study expects that when the end user satisfies with the system reliability, it will lead them to be satisfied with the overall EUCS to the system. Thus, this study hypothesises that system reliability has a significant effect on end user computing satisfaction towards GFMAS. Based on the above discussion the following hypothesis has been proposed:

H7: There will be a significant influence on system reliability towards using GFMAS

Authors	Research sample	Instrument	Analysis	Factor
Norshidah, M. Husnayati, H, & Ramlah, H. (2009) Research Setting: Malaysia	The internal end-users' usage of Malaysia's electronic government systems in public offices.	- EUCS instrument Doll and Torkzadeh	T-test ANOVA Reliability analysis Confirmatory and Structural Equation Model	Timeliness, Content, Accuracy, Format, Ease of Use, Satisfaction
Vassilios, P. A. & Chatzoglou, P.D. (2012) Research Setting: East Macedonia and Thrace	Hospital Information System users from all main public hospitals	- EUCS model Doll and Torkzadeh -Bailey and Pearson's model - Delone and Mclean model	Correlation Exploratory and Confirmatory Factor Analysis Structural Equation Model	Timeliness, Content, Accuracy, Format, Ease of Use, Satisfaction, Information Quality, System Quality, Support in sourcing, Support out sourcing
Wang., L., Xi., Y., & Huang, W.W (2007) Research Setting: Xi'an Jiao Tong University	Undergraduate from Xi'an Jiao Tong University as users for Group Decision Support System (GDSS)	- EUCS instrument Doll and Torkzadeh	Reliability analysis Confirmatory Factor Analysis	Timeliness, Content, Accuracy, Format, Ease of Use, Satisfaction
Yu-Ting, Y., Chien-Tsai, L, Shwu-Jiuan, W. & Ting-I, L. (2008) Research Setting: Taiwan	Diabetes patient who had used the Patient-Oriented Education Management (POEM)	- EUCS instrument Doll and Torkzadeh	Correlation	Timeliness, Content, Accuracy, Format, Ease of Use, Satisfaction
Xiao-Ling Jin & Li Xiong (2012) Research Setting: China	Users for knowledge-based virtual communities	- User satisfaction - Expectation Disconfirmation theory	PLS	Perceived performance and disconfirmation of information quality (accuracy, comprehensiveness, relevance and timeliness & User information satisfaction.

Pikkarainen, K., Pikkarainen, T., Karjaluoto, H. and Pahnila, S.(2006) Research Setting: Finland	Online Banking Users	- EUCS instrument Doll and Torkzadeh	Exploratory Factor Analysis Confirmatory Factor Analysis Mann-Whitney	Timeliness, Content, Accuracy, Format, Ease of Use, Satisfaction
Kanellou, A. & Spathus, C. (2012) Research Setting: Greece	Users for Enterprise Resource Planning (ERP) system (consist of Accountants and IT Professionals)	- EUCS instrument Doll and Torkzadeh - Delone and Mclean model - ERP Benefit - System performance - User satisfaction	Principal Component Analysis (PCA) Reliability Analysis Correlation T-test OLS Regression	IT accounting benefits, Operational accounting benefits, Organizational accounting benefits, Managerial accounting benefits, Operational accounting benefits, User Satisfaction, Net benefit
Chung-Kuang Hou (2012) Research Setting: Taiwan	Users for Business Intelligence Systems in Taiwan's electronic industry (IS Executives or Senior Manager)	- EUCS instrument Doll and Torkzadeh - System usage - Individual Performance	Structural Equation Model	Timeliness, Content, Accuracy, Format, Ease of Use System Usage: frequency and duration Individual Performance: -decision making quality / job performance/ individual productivity / job effectiveness / problem identification speed / decision making speed / the extent of analysis in decision-making Control variable-firm size and elapse time

Mohsen Dastgir & Mortezaie. A.S. (2012) Research Setting: Iran	Users for Accounting Information System (Financial Managers from companies listed in Tehran's stock exchange)	- EUCS instrument Doll and Torkzadeh - Bailey and Pearson's model	Reliability Analysis Z statistic	Timeliness, Content, Accuracy, Format, Ease of Use, Satisfaction Moderator: level of education / field of study / jobs experience
Horan, T.A., Abhichandani, T. & Rayalu, R. (2006) Research Setting: Los Angeles and Minneapolis	Users for e-government in Advanced Travel Information System (ATIS)	- User Satisfaction - EUCS instrument Doll and Torkzadeh	Rating and Scores	Utility-ease of use, ease of navigation, completeness, usefulness, coverage Reliability-uptime and accuracy Efficiency-ease of access, presentation Customization-customized access, customized content Flexibility-flexible planning, dynamic content Overall satisfaction measures
Siti Aminah, I., Norman., M.S., & Selamat., K. (2012) Research Setting: Malaysia	Users for Computerized Accounting System	EUCS instrument Doll and Torkzadeh Individual Job Performance	Reliability Analysis, ANOVA, Exploratory Factor Analysis, Regression Analysis	Timeliness, Content, Accuracy, Format, Ease of Use, User Satisfaction, User Job Performance

Table 1: The Summary for Several Studies

Research Methodology

Sample of Respondents

The research respondents for this study consist of two groups namely executive and non-executive of Accountant General's Department staff in Federal Territory of Labuan (n=20), Kota Kinabalu (n=73), Keningau (n=10), Tawau (n=14) and Sandakan (n=23). The sampling technique for this study that has been applied is purposive sampling because the staff for each branch have been determined based on their experience of GFMAS usage. Initially, we expect to distribute questionnaire to approximately 167 respondents. However, we received 140 responses only which represent 84% of the total sample.

Research Questionnaire

The questionnaire is divided into two sections. The first section is for the dimension of EUCS. While, the second section is for the personal information. For the first section, it is divided into seven 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 - System Speed and (7) Part G – System Reliability. The second section is about the personal information of the respondents. These include their gender, education background, position, year of service (tenure), and experience attending computerised accounting course.

Findings

Respondent Profiles

A total of 33.6 percent are male respondents. More than half of the respondent (55.8 percent) work as Administrative Assistant and Accountant Assistant, followed by Senior Accountant Assistant (10.7 percent). 74.3 percent of them have been working with the organization for 15 years and below. 8.9 percent have been working between 25 to 35 years of service. The survey also shows that 48.6 percent of the respondents are SPM/STPM holders, 32.1 percent are Diploma holders. More than 50 percent of the respondents have attended computerised accounting course and 56 percent had additional computerised accounting skill such as LOTUS 123 and UBS.

Structural Equation Modelling

Structural Equation Modelling was performed utilizing a two-step approach (i.e. measurement model and structural model) by using the maximum likelihood as the estimation method.

Measurement Model

The validity of each construct in the model was tested via item loading, composite reliability, and average variance extracted (AVE) (see Table 2). All standardised loadings items is larger than 0.50 on their expected factor. The composite reliability scores for all constructs surpassed the acceptable level of 0.70 Hair, Black, Babin, & Anderson (2010), indicating a relatively high level of constructs reliability. The average variances extracted (AVE) of latent constructs go beyond the recommended threshold value of 0.50 Hair, Black, Babin, & Anderson (2010), Hence, the current data have a good convergent validity.

Table 2: Reliability and Validity Analysis

Constructs	Items	Loadings	Composite Reliability	Average Variance Extracted
Content	C1	.828	0.813	0.731
	C2	.781		
	C3	.844		
	C4	.763		
	C5	.855		
	C6	.822		
	C7	.762		
	C8	.689		
	C9	.632		
Accuracy	A10	.683	0.859	0.819
	A11	.751		
	A13	.913		
	A14	.913		
	A15	.785		
	A16	.595		
Format	F17	.707	0.811	0.703
	F18	.712		
	F19	.918		
	F20	.904		
	F21	.838		
	F22	.838		
	F23	.790		
Ease of use	Eu24	.704	0.807	0.796
	Eu25	.769		
	Eu26	.857		
	Eu27	.845		
	Eu28	.888		
	Eu29	.874		
	Eu30	.534		

Timeliness	T34	.703	0.824	0.845
	T35	.828		
	T36	.688		
System speed	S37	.821	0.745	0.706
	S38	.851		
	S39	.898		
	S40	.923		
	S41	.715		
System reliability	R44	.718	0.759	0.823
	R45	.640		
	R46	.626		
	R48	.950		
	R49	.923		
Satisfaction	C50	.694	0.784	0.702
	A51	.812		
	F52	.754		
	R56	.691		
	E53	.799		
	T54	.804		
	S55	.752		

Table 3 depict that all variable has a positive correlation with users' satisfaction on EUCS GFMAS at $p<0.01$. Indeed, the shared variances of the construct with other constructs were lower than the squared root of AVE of the individual factors, confirming discriminant validity. Hence, each construct was statistically different from the others.

Table 3: Correlation Coefficients and Descriptive Statistics of Latent Variables

	1	2	3	4	5	6	7	8
(1) Content	.855							
(2) Accuracy	.660**	.905						
(3) Format	.649**	.617**	.838					
(4) Ease of use	.571**	.574**	.685**	.892				
(5) Timeliness	.312**	.278**	.337**	.373**	.919			
(6) System speed	.446**	.425**	.487**	.566**	.478**	.840		
(7) System reliability	.466**	.360**	.387**	.379**	.322**	.498**	.907	
(8) Satisfaction	.664**	.566**	.692**	.652**	.339**	.655**	.486**	.838

**. Correlation is significant at the 0.01 level (2-tailed).

Structural Model

The measure of the fit of the structural model was done through examining several goodness-of-fit indices (see Table 4). The results indicated that the χ^2 of the model was 2219.883 with 1103 degrees of freedom (χ^2/df = 2.013) and RMSEA of 0.075. The fit indices value for CFI, GFI, NFI, and IFI were above 0.90 and RMSEA below 0.08, indicating a satisfactory fit. Thus, the overall fit measures of the structural model indicate that the fit of the model is acceptable.

Table 4: Goodness-of-fit Indices for Structural Model

Fit indices	Accepted Value	Model Value
Absolute Fit Measures		
χ^2 (Chi-square)		2219.883
df (Degrees of Freedom)		1103
Chi-square/df (χ^2/df)	< 3	2.013
GFI (Goodness of Fit Index)	> 0.9	0.924
RMSEA (Root Mean Square Error of Approximation)	< 0.08	0.075
Incremental Fit Measures		
AGFI (Adjusted Goodness of Fit Index)	> 0.80	0.884
NFI (Normed Fit Index)	> 0.90	0.904
CFI (Comparative Fit Index)	> 0.90	0.964
IFI (Incremental Fit Index)	> 0.90	0.926
RFI (Relative Fit Index)	> 0.90	0.985
Parsimony Fit Measures		
PCFI (Parsimony Comparative of Fit Index)	> 0.50	0.660
PNFI (Parsimony Normed Fit Index)	> 0.50	0.772

The results for structural model exhibit that all independent variables accounted for 68.2% of the total variance in users' satisfaction on EUCS GFMAS. Table 5 and Figure 1 illustrated that five estimated path coefficients were significant at $p<0.05$, signifying five hypotheses were supported. System speed is the most important factor that influence users' satisfaction on EUCS GFMAS ($\beta = 0.477$, $p<0.05$), followed by system reliability ($\beta = 0.355$, $p<0.05$). Users' satisfaction on EUCS GFMAS also affected by format ($\beta = 0.284$, $p<0.05$). Similar significant findings appears for content factor ($\beta = 0.261$, $p<0.05$). Surprisingly, timeliness and accuracy were the insignificant factors that unable to influence users' satisfaction on EUCS GFMAS.

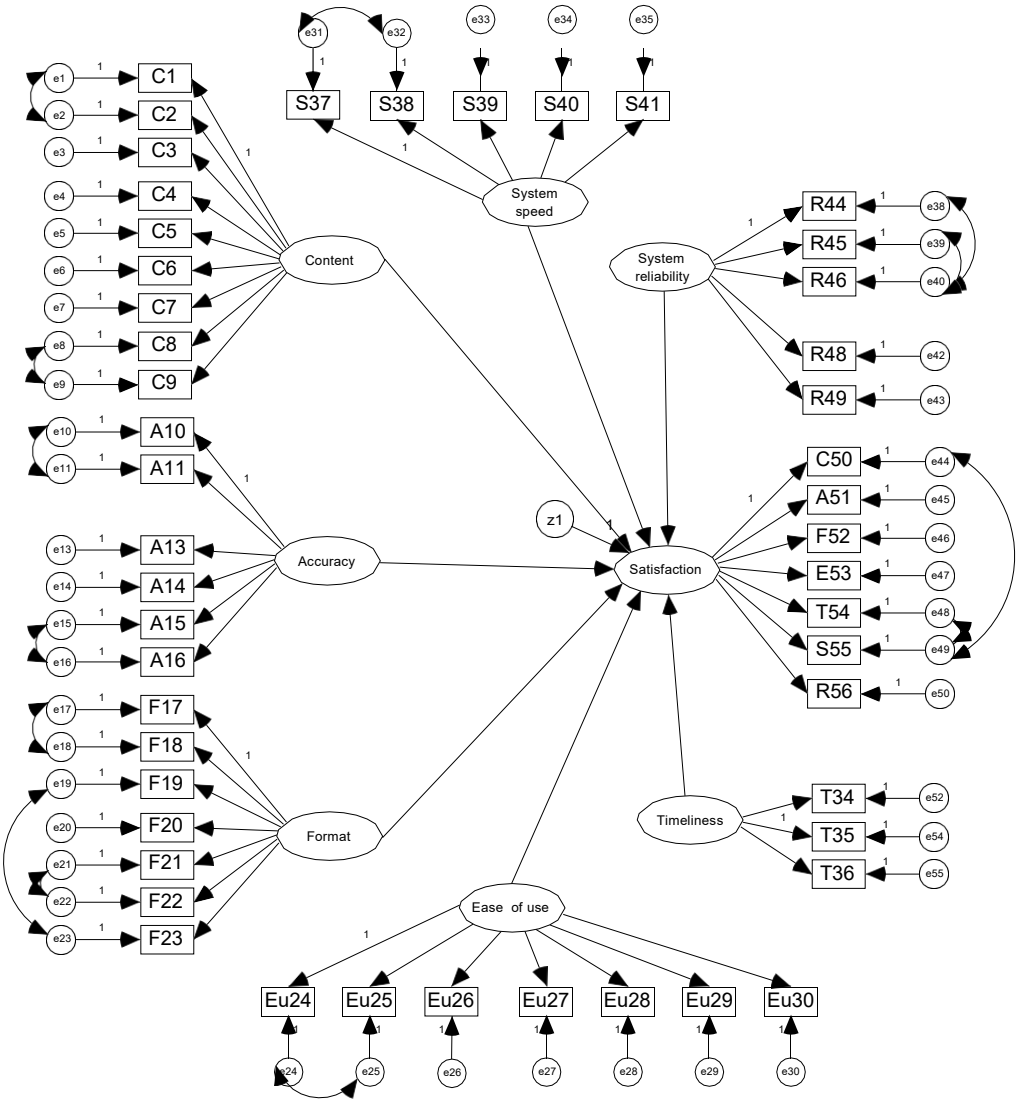

Figure 1: Structural Model

Table 5: Relationship with Users' Satisfaction

			Estimate	S.E.	C.R.	P
System reliability	--->	Satisfaction	.355	.051	4.452	.000*
Timeliness	--->	Satisfaction	-.0065	.030	-.631	.528
System speed	--->	Satisfaction	.477	.049	5.637	.000*
Content	--->	Satisfaction	.261	.042	3.563	.000*
Accuracy	--->	Satisfaction	.050	.054	.726	.468
Format	--->	Satisfaction	.284	.058	3.773	.000*
Ease of use	--->	Satisfaction	.159	.043	2.245	.025*

* $p < 0.05$

Discussion

Measurement Model

In this study, the validity of each construct has been tested based on item loading, composite reliability and average variance extracted (AVE). In this study, the factor loading for each item is more than 0.5. According to Fornell & Larcker (1981), the estimation of the items squared a factor loading that shows greater than 0.5 are considered very significant. Thus, for this current study, all items are considered significant.

All composite reliability scores are more than the acceptable level of 0.7 (Content = 0.813, Accuracy = 0.859, Format = 0.811, Ease of use = 0.807, Timeliness = 0.824, System speed = 0.745 and System Reliability = 0.759). As compared to Chung-Kuang Hou (2012), the composite reliabilities ranged from 0.888 to 0.955 (Contents = 0.931, Accuracy = 0.919, Format = 0.888, Ease of Use = 0.955, Timeliness = 0.936). Based on Hair, Black, Babin, & Anderson (2010), the composite reliability that shows higher than 0.7 suggests good reliability. High composite reliability indicates that internal consistency exists and all measures consistently represent the same latent construct. Fornell & Larcker (1981) also mentioned that the composite reliability for each construct has to exceed the threshold of 0.7.

In this study, the average variance extracted (AVE) estimates for all dimensions were above 0.5 and these results indicate the measurement model exhibited reasonably adequate convergent validity. This has been supported by Hair, Black, Babin, & Anderson (2010) and Fornell & Larcker (1981).

Finally, in this study the discriminant validity is important in measuring model to determine to what extent a construct is truly distinct from other constructs. From Fornell & Larcker (1981) advocate that the correlations between items in any two construct should be lower than the square root of the average variance shared by items within a construct. Thus, the results in this current study conclude that satisfactory dsicriminant validity of all the constructs.

Thus, all above results encompass satisfactory content, construct, convergent and discriminant validity as well as construct reliability.

Structural Model

The study measured how fit the structural model through the goodness-of-fit indices. The study tested using Chi-Square, GFI, RMSEA, AGFI and NFI. Firstly, Chi-Square statistic is the fundamental measure of differences between the observed and estimated covariance matrices. It is very sensitive with the sample size. Hair, Black, Babin, & Anderson (2010) suggested alternative goodness-of-fit measures; Chi-square/df ($\chi 2/df$), GFI, RMSEA, NFI, CFI and IFI). Researchers found that the model Chi-square/df ($\chi 2/df$) = 2.013, GFI = 0.924, RMSEA = 0.075, NFI = 0.904, CFI = 0.964 and IFI = 0.926. These results can be considered as acceptable construct.

This current research is confirming the previous research done by Doll and Xia (1994) in McHaney, (2002). Chi-square/df (χ2/df) = 3.72, NFI = 0.94, GFI = 0.929, AGFI = 0.889, RMSR = 0.035. In research done by Pikkarainen (2006), the model fit was excellent as shown in results Chi-square = 30.09, GFI = 0.97, CFI= 0.98, RMSEA = 0.04 and NFI = 0.90). In Chung-Kuang Hou (2012), Chi-square/df (χ2/df) = 2.315, GFI = 0.905, RMSEA = 0.063, NFI = 0.950, AGFI = 0.862 and NNFI = 0.961). In McHaney, (2002), Chi-square/df (χ2/df) = 2.62, NFI = 0.98, GFI = 0.98, AGFI = 0.91 and RMSR = 0.04). In Wang & Huang (2007), shown that RMSEA = 0.077, NNFI = 0.95 and CFI = 0.97. Furthermore, in Norshidah, Husnayati, & Ramlah, (2009), showed Chi-square/df (χ2/df) =1.602, CFI = 0.98, NFI = 0.949, GFI = 0.920, AGFI = 0.861, RMSR = 0.048 and RMSEA = 0.068.

Hypothesis Testing

The hypotheses can be tested by examining the structural model. The results show that the overall coefficient for structural model was 68.2% of the variance in EUCS GFMAS and it was explained by content, accuracy, format, ease of use, timeliness, system speed and system reliability. The results of the proposed structural equation model analysis in Table 6, indicating support for H1, H3, H4, H6 and H7. The results support H1, which states that high level of content performance of using GFMAS will lead to higher level of satisfaction. The path coefficient from content to satisfaction is 0.261, which statistically significant at $p<0.000$.

The result for H3 is also supported, which indicates that the level format has influence on end-user satisfaction. The path coefficient in this model from format to EUCS is 0.284, which statistically significant at $p<0.000$. This result is consistent with our expectation, whereby the format produce by the system is according to the reporting requirement.

Hypothesis H4 is also supported which indicates that ease of use has influence on overall satisfaction. The path coefficient is 0.159, which statistically significant at $p<0.000$. The system is considered as user-friendly for GFMAS end-users.

The results also indicate that the system speed will lead to improve the overall satisfaction level for end-users, thus confirming Hypothesis 6. The path coefficient in this model from system speed to EUCS is 0.477, which statistically significant at $p<0.000$.

System reliability has been confirmed to have impact on EUCS as shown in the path coefficient in this model is 0.355, which statistically significant at $p<0.000$. Thus, H7 is supported. However, H2 and H5 was failed to be supported in this model, which indicates that accuracy and timeliness are not provide influence towards the overall satisfaction for GFMAS performance. Overall results has been proven that content, format, ease of use, system speed and system reliability are the main factors that provide impact in this current study.

As results in Siti Aminah, Norman, & Selamat (2012) shown that accuracy have relationship with user satisfaction, while other factors such as content, format, ease of use and timeliness

have no significant relationship to the satisfaction. Compared with Norshidah, Husnayati, & Ramlah, (2009), the main priorities in this study are timeliness, content and accuracy. Then, in research done by Mohsen Dastgir & Mortezaie (2012), information content, ease of use, accuracy, format and timeliness has an impact on the end-user computing satisfaction.

Table 6: Results for Structural Model

Hypotheses	Path: from ---> to	Results
H1: There will be a significant influence on content towards satisfaction using GFMAS	Content---> Satisfaction	Accept
H2: There will be a significant influence on accuracy towards satisfaction using GFMAS	Accuracy---> Satisfaction	Reject
H3: There will be a significant influence on format towards satisfaction using GFMAS	Format ---> Satisfaction	Accept
H4: There will be a significant influence on ease of use towards satisfaction using GFMAS	Ease of use---> Satisfaction	Accept
H5: There will be a significant influence on timeliness towards satisfaction using GFMAS	Timeliness ---> Satisfaction	Reject
H6: There will be a significant influence on system speed towards satisfaction using GFMAS	System speed--->Satisfaction	Accept
H7: There will be a significant influence on system reliability towards satisfaction using GFMAS	System reliability --->Satisfaction	Accept

In conclusion, the model that has been tested in the current research pertaining computerised accounting system (GFMAS) has confirmed to be valid and in line with previous research done and the model is acceptable fit. This research successful provide evidence that content, format, ease of use, system speed and system reliability has contribute on the users' satisfaction of GFMAS particularly in government sector.

Implication

The current study implemented has supported to the theoretical of Doll and Torkzadeh (1988), Doll and Torkzadeh (1991) and Doll and Xia (1994). It shows that items are fit in the constructs and model that has been tested through measurement model and structural model.

In this study, Accountant General's Department should be able to focus on other factors that might provide more influence and impact towards the satisfaction of computerised usage. As mentioned by the Auditor General of Malaysia that GFMAS have greatly facilitated the preparation of financial statement of the federal and 13 states (Seminar paper from National Audit Department, 2007). Furthermore, the implementation of computerised accounting system need to be enhance in government sector since they are preparing in shifting to accrual accounting system. Thus, this research will provide a good impact in assessing more factors that able to assist in improving the usage of computerised accounting system.

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