Adoption of Management Information Systems in Context of Yemeni Organizations: A Structural Equation Modeling Approach

Yaser Hasan Al-Mamary [*1], Alina Shamsuddin[1], Nor Aziati Abdul Hamid [1], Mohammed Hasan Al-Maamari[2]
[1]Faculty of Technology Management and Business
Universiti Tun Hussein Onn Malaysia
86400, Malaysia
[2]Faculty of Humanitarian & Administrative Sciences
University of Modern Sciences Yemen
Yaser_almamary@yahoo.com

JDIM
Journal of Digital Information Management

ABSTRACT: *The objectives of this study are to develop integrated model for successful adoption of management information systems. The questionnaire used to collect primary data, and analyzes the data by using AMOS software and SPSS statistical program. Then use appropriate statistical processors and tests, for getting signs to support subject of study. The 424 completed questionnaires were received from the companies. Data were obtained through 4 telecommunication companies in Yemen. Confirmatory factor analysis derived from* exploratory factor analysis *of all measures used in the study and hypothesized model were tested with structural equation modeling techniques. A major contribution of this study is the formation of a theoretically based model which integrates the technological, organizational, and people factors. Furthermore, the use of SEM in this study allows simultaneous investigations of different dimensions. The research model also serves as a diagnostic tool for the organizational administrators and managers to identify the factors that impact on successful adoption the management information systems in the organization. Additionally, identify the impact of adoption of management information systems in organizations. Moreover, this study provides impetus for organizational administrators and managers to continue adopting of management information systems in their organizations.*

Subject Categories and Descriptors
K.6 [Management of Computing and Information Systems]; Performance and usage measurement: **H.5.3 [Group and Organization Interfaces]**

General Terms: Management Information Systems

Keywords: Integrated Model, Adoption, MIS, Telecommunication Companies, Yemen

Received: 9 August 2015, Revised 14 September 2015, Accepted 19 September 20

1. Introduction

There are a lot of organizations in Yemen that used management information systems, such as banks, telecommunications companies, ministries and universities. The use of management information systems has become necessary for any organization to facilitate the work procedures, improve efficiency, productivity, and improve performance in general [1].

In case of telecommunication companies in middle-east especially in Yemen, telecommunications companies used management information systems to collect, process, store, and retrieving the information as needed for aim improve the employees performance [2]. The adoption of technology and management information systems in organizations directly contribute to improve performance, productivity ,efficiency, and profitability [3].

Assessing the success of management information systems has been identified as one of the most critical issues in IS field several conceptual and empirical studies have been conducted to explore this confusing yet important issue. A huge debate continues the concerning of the appropriate set of variables that can be used to determine the users' perception of IS success.

However, studies relating to this issue within the context of Arab countries are few and lack of the ability to propose an appropriate evaluation criterion for Arab organizations [4]. According to Al-Mamary et al. [5] the field of MIS in Yemeni companies still dealing with issues in adopting the technologies and success factors.

As mentioned by past scholars, the successful adoption of technology in any companies is much depending on technology, project, organization, user, social, and task factors [6]. However, in reality these factors are much neglected by organizations especially among small companies. According to Al-Mamary et al. [7] the organizations must understand the factors that affect successful adoption of MIS toward enhancing the individual performance.

In addition, there are separate models that explain the factors that effect on MIS success. For example, there are separate model for use of technological factors, use, user satisfaction, individual impact and organizational impact developed by Delone and Mclean [8] ; [9]. In addition, there are separate model for the organizational factors developed by Igbaria et al. [10]. Moreover, there are separate model for people factors developed by Igbaria & Livari [11], and there are separate model for perceived usefulness , and ease of use developed by Davis [12]. In this study, the researcher used the theories that focus on technology factors, organizational factors, and people factors. The selected theories for this study are compatible with the Yemen's problems .The selected theories are technology acceptance model ,IS success model ,Computer Usage Model, and Personal Computing Acceptance Model. The proposed model will combine the four theories to develop integrated model for the management information systems success. The proposed model consists of Technology Acceptance Model variables (perceived usefulness), information system success model variables (system quality, information quality , service quality, user satisfaction, and organizational impact) , Personal Computing Acceptance Model variables (top management support , and user training), and Computer Usage Model variables (computer self-efficacy and user experience).

2. Literature Review

The most popular models in the field of information systems success, and technology adoption such as the technology acceptance model and information system success model focuses on the technology factors of the successful implementation of information systems. In addition there are another model called computer usage. The theoretical grounding for this model mainly comes from technology acceptance model (TAM) social cognitive theory (SCT), theory of reasoned action (TRA), and theory of planned behavior (TPB). This model focuses on people factors (computer experience, computer anxiety, and self-efficacy) and organizational support. Moreover there are another model called personal computing acceptance. This model focuses on the organizational factors (Intra-organizational Factors, Extra-organizational Factors). This study developed integrated model for successful adoption of management information systems that link three factors (technological, organizational, and people).

2.1 Technology acceptance model

The Technology Acceptance Model, developed by Davis et al. [13] was one of the most influential research model in studies of the determinate of information systems and information technology acceptance to predict intention to use and accept the information systems and information technology by individuals. In the Technology Acceptance Model, there are two determinants including perceived ease of use and perceived usefulness [14]. Figure 1 depicts the Technology Acceptance Model.

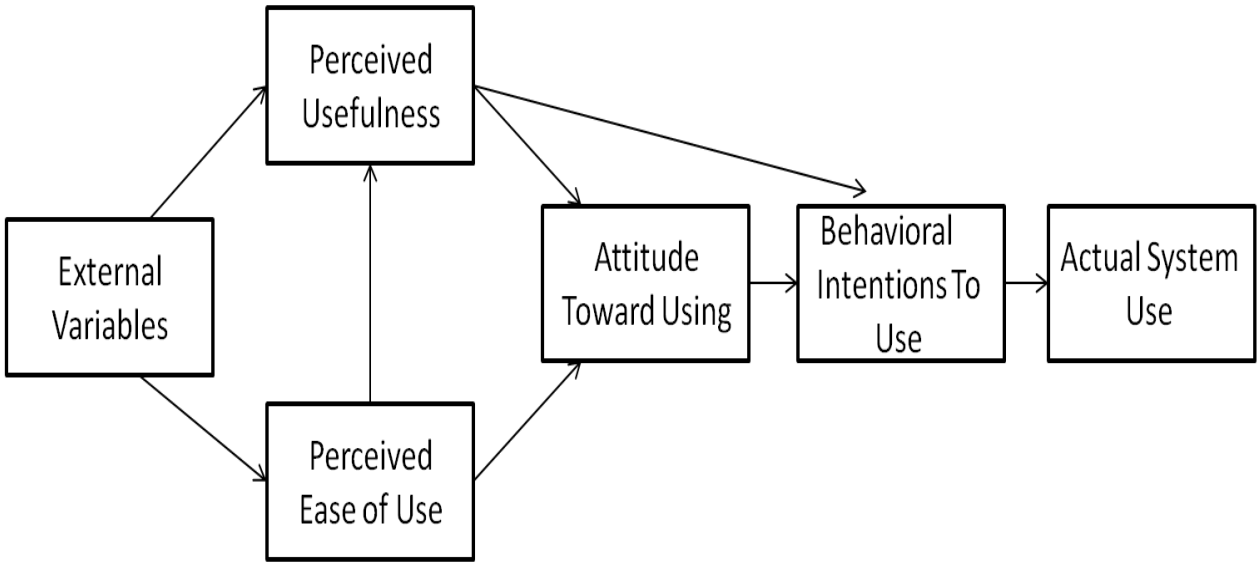

Figure 1. Technology Acceptance Model

In summary TAM identifies two main variables for the successful adoption of the technology, and these variables are perceived usefulness, and ease of use. The model mainly focuses on the technical side only. Note that acceptance of the technology in some cases need top management support to encourage the end user to accept the technology or need training or self-efficacy etc. Therefore, there are several aspects to encourage the end-user to accept the technology.

2.2 Delone and Mclean's IS Success Model

Delone & Mclean [8] performed a review of the research published during the period 1981–1987, and created taxonomy of IS success based upon this review. In their 1992 paper, they identified six variables or components of IS success: system quality, information quality, use, user satisfaction, individual impact, and organizational impact [15]. Figure 2 depicts IS Success Model.

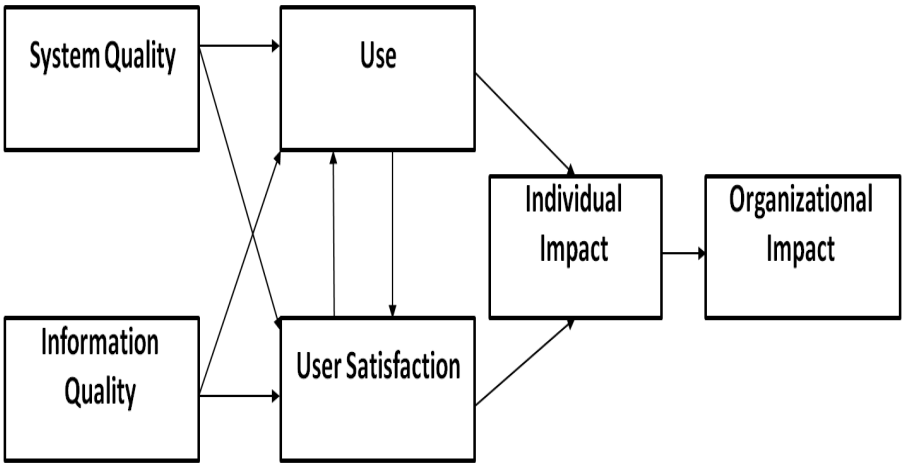

Figure 2. Delon and Mclean IS Success Model

In 2003, proposed updated IS success model developed by [9]. They added service quality as one important dimension. In addition, they added intention to use as an alternative measure because an attitude is worthwhile to measure in some context. Finally, they combined individual and organizational impact to one dimension, named net benefits. Figure 3 depicts updated Delon and Mclean IS Success Model.

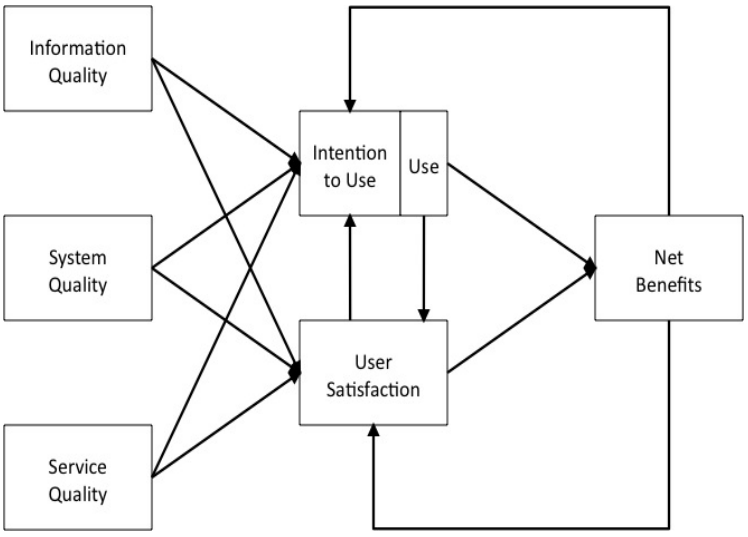

Figure 3. Updated Delone & Mclean IS Success Model

In summary Delone and Mclean [8] IS success model identifies six variables for the successful adoption of information systems, and these variables are system quality, information quality , use, user satisfaction , individual impact, and organizational impact as the independent variables in the model focuses on the technical side only. In addition the updated model of Delone & Mclean [9] added the service quality as an independent factor. More over it was merged with two variables (individual impact and organizational impact) to net benefits. Despite the update, but the model is still focused on the technical mainly ignoring the rest of the factors.

2.3 Computer Usage Model

The theoretical grounding for this theory comes from social cognitive theory (SCT), theory of reasoned action

(TRA), theory of planned behavior (TPB); and technology acceptance model (TAM). This model introduces an extended technology acceptance model (TAM) that explicitly incorporates self-efficacy and its determinants (experience and organizational support) as factors affecting computer anxiety, perceived ease of use, perceived usefulness and the use of computer technology [11]. Figure 4 depicts Computer Usage Model.

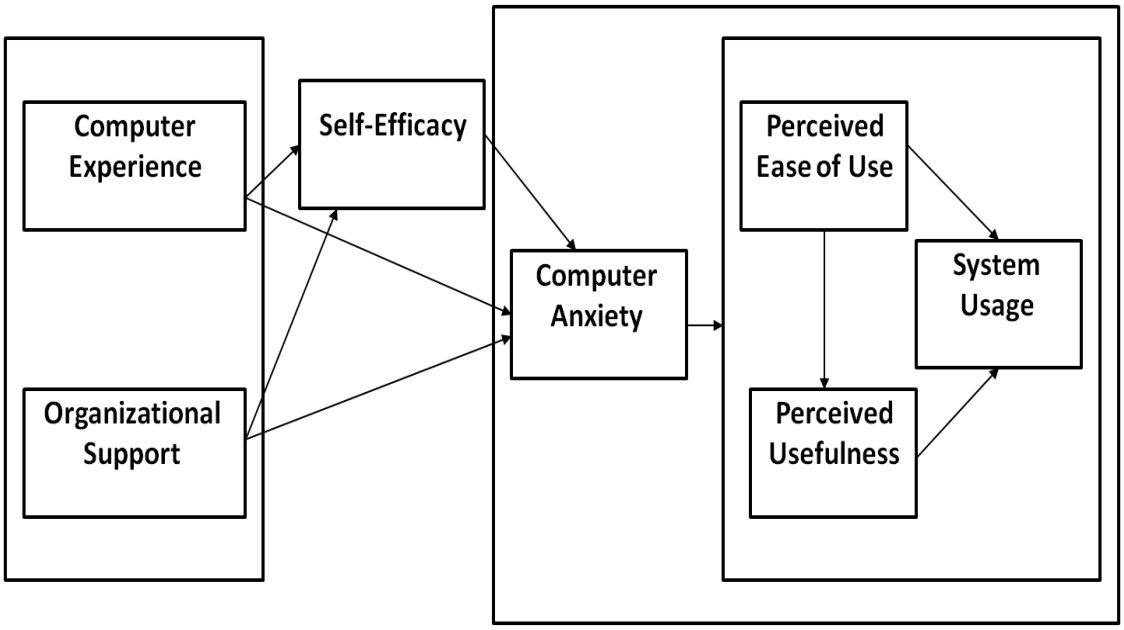

Figure 4. Computer Usage Model

In summary Computer Usage Model identifies seven variables for system usage, and these variables are (computer experience, organizational support, self-efficacy, computer anxiety, perceived ease of use, perceived usefulness, and system usage) and proposed that computer experience, organizational support will effect on computer anxiety, and self-efficacy. The model focuses on the people factors and organizational support and then its effect on system factors then effect on system usage. In addition, the model did not identify the organizational factors clearly.

2.4 Personal Computing Acceptance Model

This model posits that personal computing acceptance in small firms is a function of perceived ease of use and perceived usefulness. These two factors are hypothesized to have a direct effect on personal computing acceptance in small firms. The model also proposes that these two factors mediate the effects of the intra and extra-organizational factors on personal computing acceptance. The figure shows that the intra- and extra-organizational factors are expected to influence personal computing acceptance indirectly through their effects on perceived ease of use and perceived usefulness [10]. Figure 5 depicts Personal Computing Acceptance Model

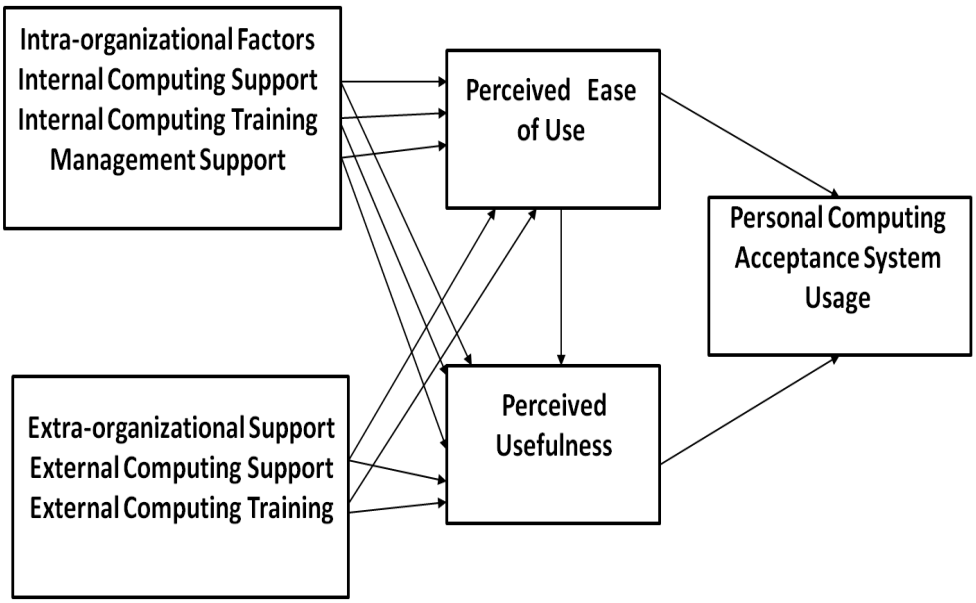

Figure 5. Personal Computing Acceptance Model

In summary Personal Computing Acceptance Model identifies two main variables for acceptance of the use of the system, and these variables are (intra-organizational , and extra-organizational support) and proposed that these factor will effect on perceived usefulness and ease of use . The model mainly focuses on the organizational side and its effect on the system factors then effect on the system usage.

3. The Conceptual Model

The conceptual model combined the four theories that compatible with Yemen problem, to develop integrated model for the successful adoption of MIS in telecommunication companies in Yemen. Proposed model consists of the following variables : system quality, information quality, service quality, top management support, user training, computer self-efficacy, computer experience, perceived usefulness, user satisfaction, and individual performance impact. Figure 6 shows the conceptual model.

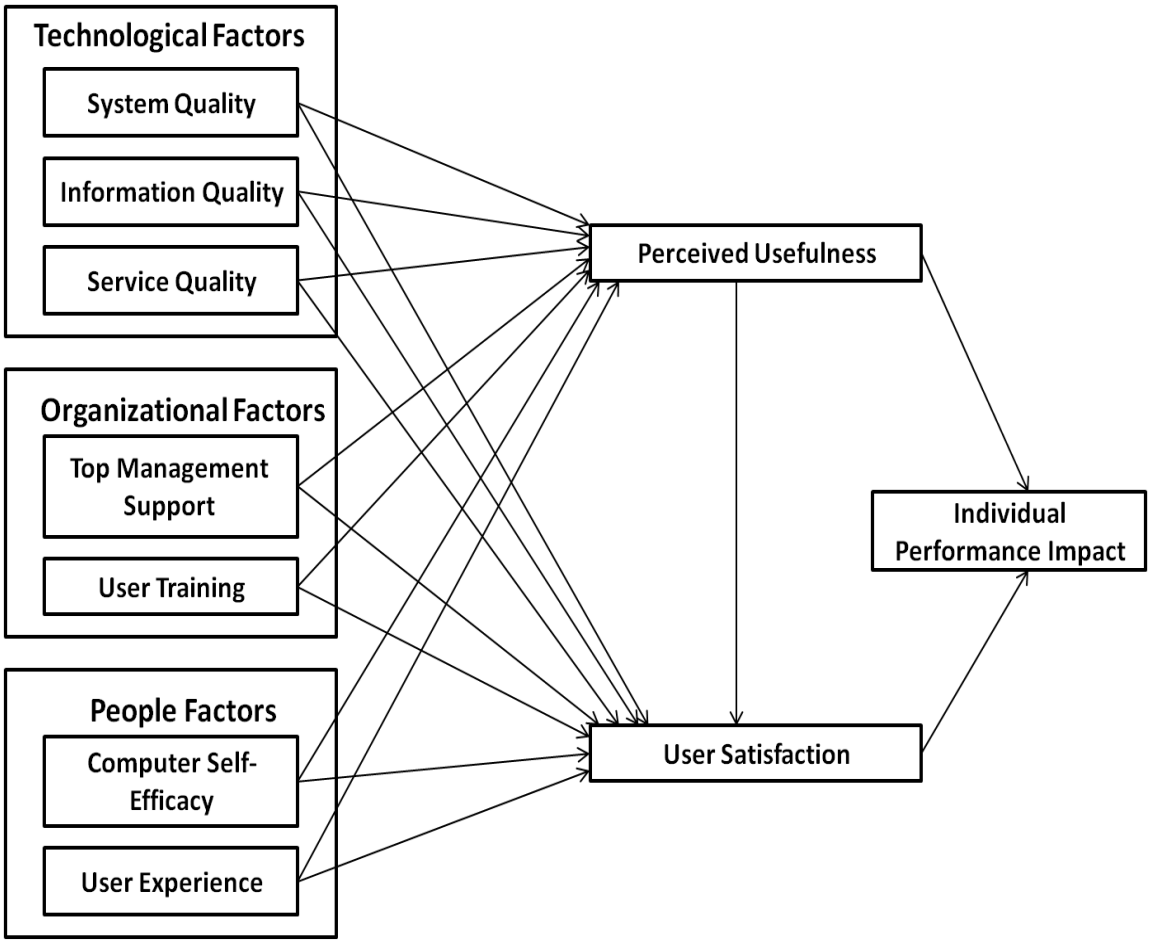

Figure 6. Integrated Success Model of Management Information Systems

4. Methodology

4.1 Research population / sample

The population for this study are the employees in telecommunication companies in capital of Yemen (Sana'a). The type of sample techniques used in this study was a purposive sample. A total of 700 questionnaires were distributed, and 530 questionnaires were recovered. However, among those returned questionnaire, 100 were completely blank, and 6 were not answered completely. Therefore, remaining 424 questionnaires were used for data analysis.

4.2 Data collection Method

This study used a survey for data collection. A total of 424 respondents from a telecommunication company located in Sana'a (Yemen) participated in this study by completing a survey questionnaire. Draft questionnaire was pilot-tested by 104 employees to get their opinion about wording, content, meaningfulness, relevance, and clarity of the scale.

4.3 Instrument Design

To achieve the objectives of the study, the data was collected through a questionnaire. The researcher has designed a questionnaire as a tool of the current study in order to obtain preliminary data necessary, because of the importance of the questionnaire in (1) saving time and effort on the researcher, (2) by using questionnaire the participants' responses can be anonymous or confidential, this is especially important if you are gathering sensitive information, and (3) the researcher need data from many people. The questionnaire was prepared on the basis of review of literature and many discussions with

consultants and experienced academicians. The responses were collected on seven point liker type scale ranging from strongly disagree to strongly agree (l. Strongly disagree, 2.disagree, 3.Somewhat disagree, 4.Neither agree or disagree, 5. Somewhat agree, 6. Agree, 7. Strongly agree) .

4.4 Data Analysis Method

Data was analyzed quantitatively using the appropriate descriptive analysis for the distribution of population and demographic while validate to model using structural equation modeling techniques. The proposed research model was analyzed using the structural equation modeling (SEM) supported by Analysis of Moment Structures (AMOS) and the SPSS (Statistical Package for the Social Sciences) software program. AMOS is a SEM package supported with SPSS. The researcher used structural equation modeling technique instead of others techniques for the following reason .The previous techniques such as multiple regression, factor analysis, multivariate analysis of variance , discriminate analysis can examine only a single relationship at a time , do not enable us to test the researcher's entire theory. For this reason, we now analysis by using structural equation modeling. Structural equation modeling can examine a series of dependence relationships simultaneously.

4.5 Reliability

Cronbach's Coefficient Alpha is method used to measure the reliability of the questionnaire between each field and the mean of the whole fields of the questionnaire. Table 1 shows the values of Cronbach's Alpha for each construct.

Item	Cornbach's Alpha	N of Items
SyQ	0.852	7
IQ	0.849	7
SerQ	0.850	6
TMS	0.846	6
UT	0.860	6
CSE	0.860	6
UE	0.881	6
PU	0.859	6
US	0.845	6
IP	0.857	8

Table 1. Testing Reliability Result

5. Results

5.1 Demographic Profiles

Table 2 shows the profile of respondents

5.2 Exploratory Factor Analysis

According to Suhr [16] exploratory factor analysis (EFA) is a variable reduction technique which identifies the number of latent constructs and the underlying factor structure of a set of variables. exploratory factor analysis (EFA) helps to determine what the factor structure looks like according to how participant responses. Exploratory factor analysis is essential to determine underlying constructs for a set of measured variables.

This study employed principal components analysis (PCA) with Promax rotation , exploratory factor analysis was performed using SPSS (version 22).

5.3 Measurement model

The measurement models for each construct were assessed using confirmatory factor analysis (CFA) employing AMOS version 21. According to Awang [17] confirmatory factor analysis (CFA) is a special form of factor analysis. It is employed to test whether the measures of a constructs are consistent with the researcher's understanding of the nature of that construct.

In other hand, use four indicators whenever possible . Moreover having three indicators per construct is acceptable, particularly when other constructs have more than three. Constructs with fewer than three indicators should be avoided [18].

In this study, confirmatory factor analysis (CFA) was performed on the measurement model to assess the unidimensionality, reliability, and validity of measures. Two broad approaches were used in the CFA to assess the measurement model. First, consideration of the goodness of fit (GOF) criteria indices and second, evaluating the validity and reliability of the measurement model.

5.4 Measures of Goodness-of-Fit

Goodness-of-fit is measure indicating how well a speci

fied model reproduces the covariance matrix among the indicator variables [18]. According to Awang [17] in SEM , there are a series of goodness-of-fit indexes that reflect the fitness of the model to the data at hand. At the mo-

		Frequency	Percent
Company	Yemen Mobile	101	25.0
	Sabafon	168	41.6
	MTN	79	19.5
	Y	56	13.9
Department	Information Systems/ IT	182	45.0
	Customers Service	174	43.1
	Accounting and Finance	25	6.2
	Human Resource	14	3.5
	Marketing and Sales	9	2.2
Gender	Male	346	85.6
	Female	58	14.4
Age Group	Less than 30	194	48.0
	30 less than 40	192	47.5
	40 less than 50	18	4.5
	Above 50	0	0.0
Education	High School	3	0.7
	Diploma	20	5.0
	Bachelor	351	86.9
	Master	29	7.2
	PhD	1	0.2
Designation	Administration Staff	128	31.7
	Technical Support Staff	121	30.0
	Head of Department	18	4.5
	Manager	11	2.7
	Others	126	31.1
Working Experience	Less than 2	71	17.6
	2 - less than 4	94	23.3
	4 - less than 6	82	20.3
	6 - less than 8	81	20.0
	Above 8	76	18.8

Table 2. Profile of respondents

Name of category	Name of Index	Level of Acceptance
Absolute Fit	RMSEA	(a),(d) ,(e), (f) RMSEA <0.05 good fit (d) ,(e),(f) RMSEA <0.08 acceptable fit
Absolute Fit	GFI	(a),(d) ,(e),(f) GFI > 0.9 means satisfactory fit . (b),(c) ,(e),(f) Value greater than 0.80 suggests a good fit.
Incremental Fit	NFI	(d) ,(e),(f) NFI > 0.9 means satisfactory fit. (b) ,(e),(f) Value greater than 0.80 suggests a good fit
Incremental Fit	CFI	(a),(d) ,(e),(f) CFI > 0.9 means satisfactory fit .
Incremental Fit	TLI	(b),(d) ,(e),(f) TLI > 0.9 means satisfactory fit
parsimonious Fit	Chisq/df	(d) ,(e),(f), The value < 5.0 is acceptable

Table 3. Goodness-of-Fit indexes

ment , there is no agreement among the researchers which fitness indexes should be reported. Hair et al. [18] recommend the use of at least three fit indexes by including at least one index from each category of model fit. The three fitness categories are absolute fit, incremental fit, and parsimonious fit . The information concerning the fitness index category, their level of acceptance, and comments are presented in Table 3.

5.5 Confirmatory Factor Analysis Results

CFA was performed on the measurement model comprising ten factors, which were: system quality (SyQ), information quality (IQ), service quality (SerQ), top management support (TMS), user training (UT), computer self-efficacy (CSE),user experience (UE), perceived usefulness (PU),user satisfaction (US) , and individual performance (IP). Figure 2 depicts CFA model derived from EFA. In initial CFA 44 items were used which were derived from the EFA .In addition Figure 3 depicts the final CFA model after deleting these problematic items.

5.6 CFA model derived from EFA

The CFA model fit well based on GOF indexes as shown in Table 4, and Figure 7 .The NFI, GFI achieved the required level was above 0.8, TLI , and CFI achieved the required level was above 0.9 the ChiSq/df <3 ,and the RMSEA was below 0.08.

Index Value	Comments
Chisq/df = 1.966	The required level is achieved
NFI = 0.840	The required level is achieved
CFI = 0.914	The required level is achieved
GFI = 0.802	The required level is achieved
TLI = 0.905	The required level is achieved
RMSEA = 0.057	The required level is achieved

Table 4. The Improved Fitness Indexes for All Constructs Simultaneously
(CFA model derived from EFA)

Given the fact that the goodness of fit indices of the initial run of CFA were within the recommended level, but there are two items ue2, ue3 with low factor loading less than 0.6. According to Awang [17] factor loading value should be greater than 0.6 . According to Hair et al. [18] the size of the factor loading is one important consideration. In the case of high convergent validity, high loadings on a factor would indicate that they converge on a common point, the latent construct. At a minimum, all factor loadings should be statistically significant. Because a significant loading could still be fairly weak in strength, a good rule of thumb is that standardized loading estimates should be .5 or higher. According to Norhayati and Aniza [23] factor loading should to be > 0.6. According to Othman et al. [24] for the first step, any measuring item having a factor loading less than 0.6 should be deleted from the measurement model. Thus, after dropping these problematic items, the measurement model was re-run, as recommended by ([17]; [18]). Final CFA model is depicted in Figure 8.

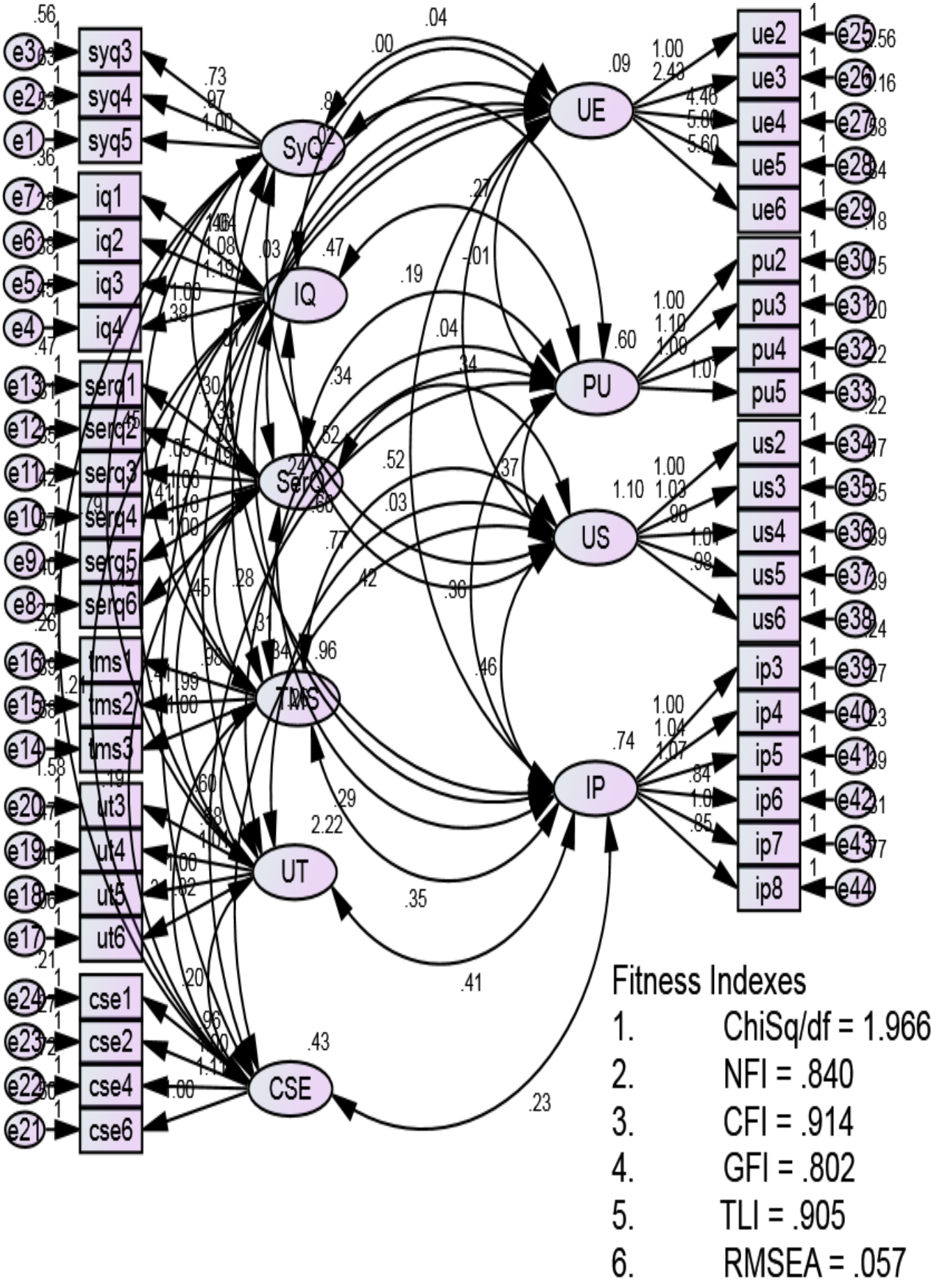

Figure 7. CFA model derived from EFA

5.7 Final CFA model

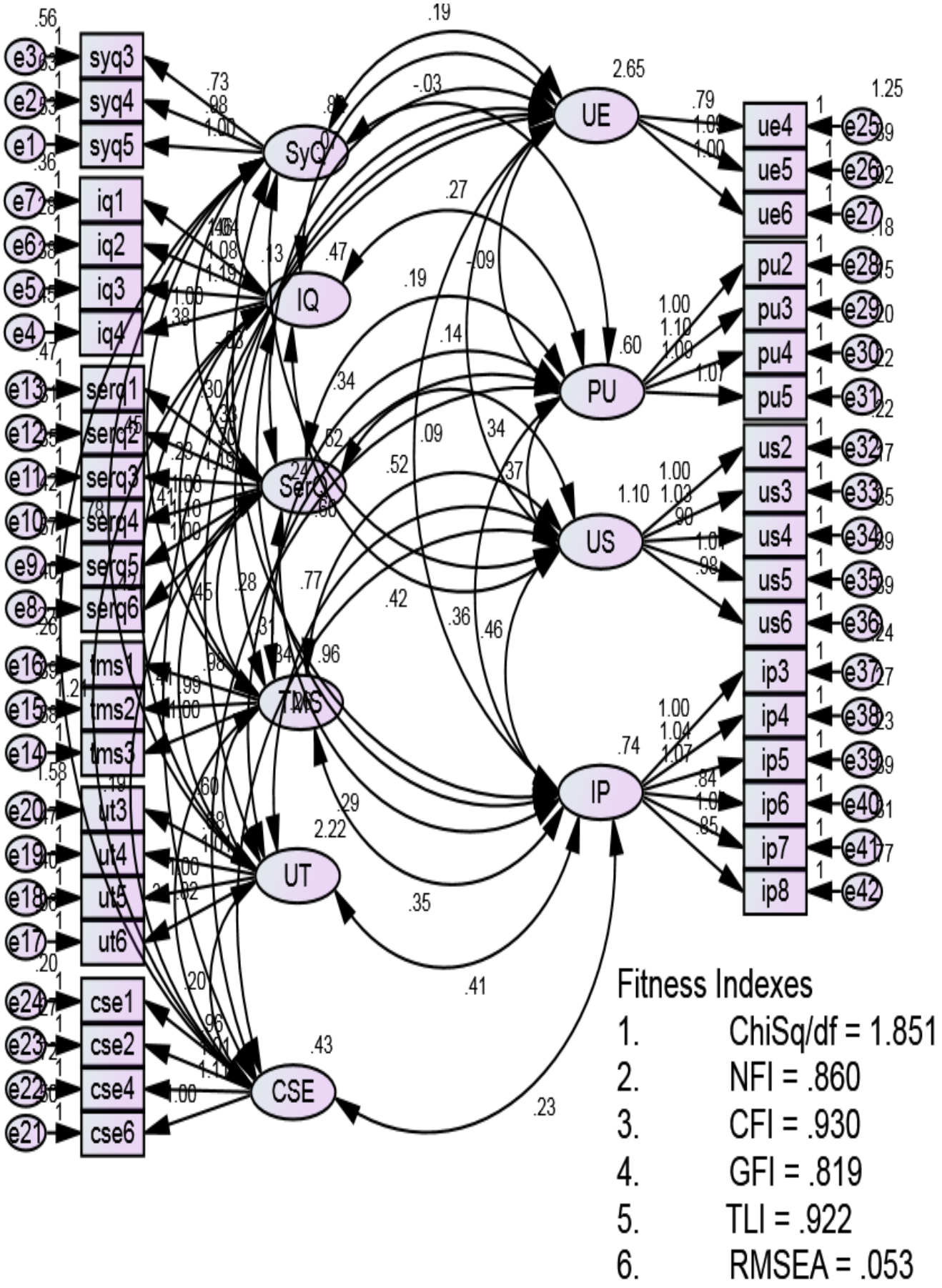

Figure 8. Re-Specify CFA Model

The CFA model fit well based on GOF indexes as shown in Table 5, and Figure 8. The NFI , GFI were above 0.80, and TLI, CFI were above 0.90 the ChiSq/df <3 ,and the RMSEA was below 0.08. In addition all items with factor loading value greater than 0.6.

5.8 Reliability and Validity of A Measurement Model

According to Awang [17] once the CFA procedure for every measurement model is completed, the researchers need to compute other remaining measures which indicate the validity and reliability of the measurement model. For the validity can be assessed through convergent validity (AVE >=0.50) , construct validity (all fitness indexes for the models meet the required level), and discriminant validity (all redundant items are either deleted or constrained , also the correlation between exogenous constructs is <= 0.85). According to Zait & Bertea [25] in order to establish discriminant validity there is need for an appropriate AVE (Average Variance Extracted) analysis. In an AVE analysis, we test to see if the square root of every AVE value belonging to each latent construct is much larger than any correlation among any pair of latent constructs.

For the reliability can be assessed through internal reliability (Cronbach alpha >= 0.70), and construct reliability (CR >=0.70). Table 6 shows the measures of validity and reliability of a measurement model. In this study AVE, Cronbach alpha, and CR achieved the required level. In addition, the correlation between exogenous constructs is <= 0.85. Moreover, the square root of every AVE value belonging to each latent construct is much larger than any correlation among any pair of latent constructs

5.9 Structural Model

Structural model is set of one or more dependence relationships linking the hypothesized model's constructs. The structural model is most useful in representing the interrelationships of variables between constructs [18]. Structural Equation Modeling (SEM) was rarely employed by the past researcher. Only few from past researchers used SEM in their analysis method. SEM technique help to produce a better model. Using this technique enable the researchers to simultaneously test complex relationship and measure the strength among item from each independents variables and dependent variables of the research model. Besides that, SEM can be used to confirm the model that has been developed in the study and subsequently the model can be used by other researcher for further study.

5.10 Initially proposed Structural Model

The proposed model did not fit well based on GOF indexes as shown in Table 8, and Figure 9. The GFI were below 0.80.

Index Value	Comments
Chisq/df = 1.851	The required level is achieved
NFI = 0.860	The required level is achieved
CFI = 0.930	The required level is achieved
GFI = 0.819	The required level is achieved
TLI = 0.922	The required level is achieved
RMSEA = 0.053	The required level is achieved

Table 5. The Improved Fitness Indexes for All Constructs Simultaneously (Final CFA model)

Index Value	Comments
Chisq/df = 2.010	The required level is achieved
NFI = 0.834	The required level is achieved
CFI = 0.909	The required level is achieved
GFI = 0.794	The required level is not achieved
TLI = 0.901	The required level is achieved
RMSEA = 0.058	The required level is achieved

Table 6. The Improved Fitness Indexes for All Constructs Simultaneously (Final CFA model)

Given the fact that the goodness of fit indices of the initial run of SEM were not within the recommended level, further detailed evaluation was conducted to refine and respecify the model, in order to improve the discriminate validity and achieve better fit of the model [26]. The model refinement procedure applied following criteria recommended by researchers. According to Awang [17] factor loading value should be greater than 0.6 . The standard residual values should be within the threshold (above 2.58 or below – 2.58) as recommended by Hair et al. [18]. Finally, modification indices (MI) that show high covariance and demonstrate high regression weights are candidate for deletion [18] ; [27]. Thus, after dropping these problematic items, the SEM model was re-run, as recom

mended by ([17]; [18]; [26]). Final SEM model is depicted in Figure 10.

5.11 Revised structural model

The revised model fit well based on GOF indexes as shown in Table 9, and Figure 10 . The GFI, NFI were above 0.80, TLI, and CFI above 0.90, the ChiSq/df <3 ,and the RMSEA was below 0.08. In addition, Table 10 shows the summary of hypotheses testing.

Index Value	Comments
Chisq/df = 1.900	The required level is achieved
NFI = 0.854	The required level is achieved
CFI = 0.925	The required level is achieved
GFI = 0.810	The required level is achieved
TLI = 0.917	The required level is achieved
RMSEA = 0.055	The required level is achieved

Table 7. Goodness of Fit Indices for the Revised Structural Model

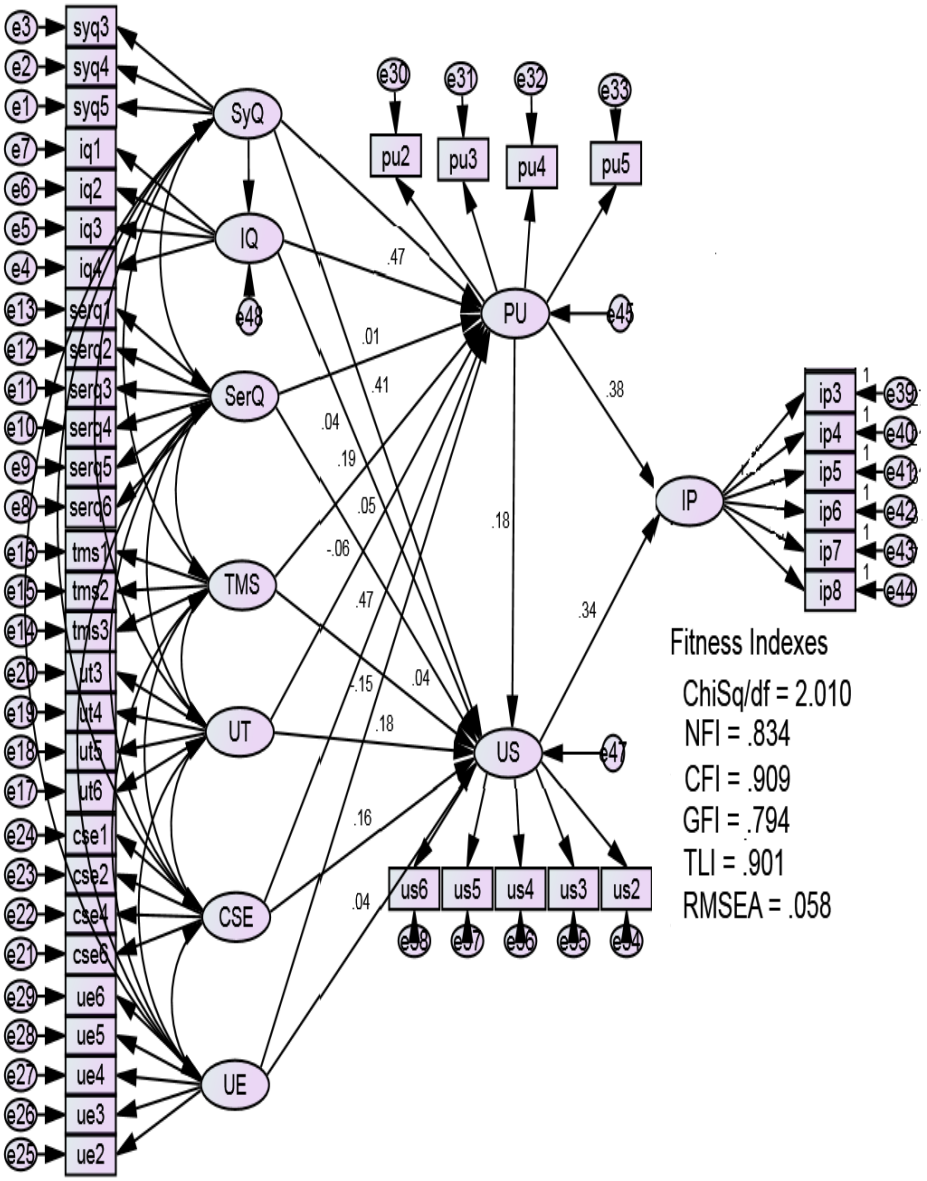

Figure 9. Initially proposed structural model

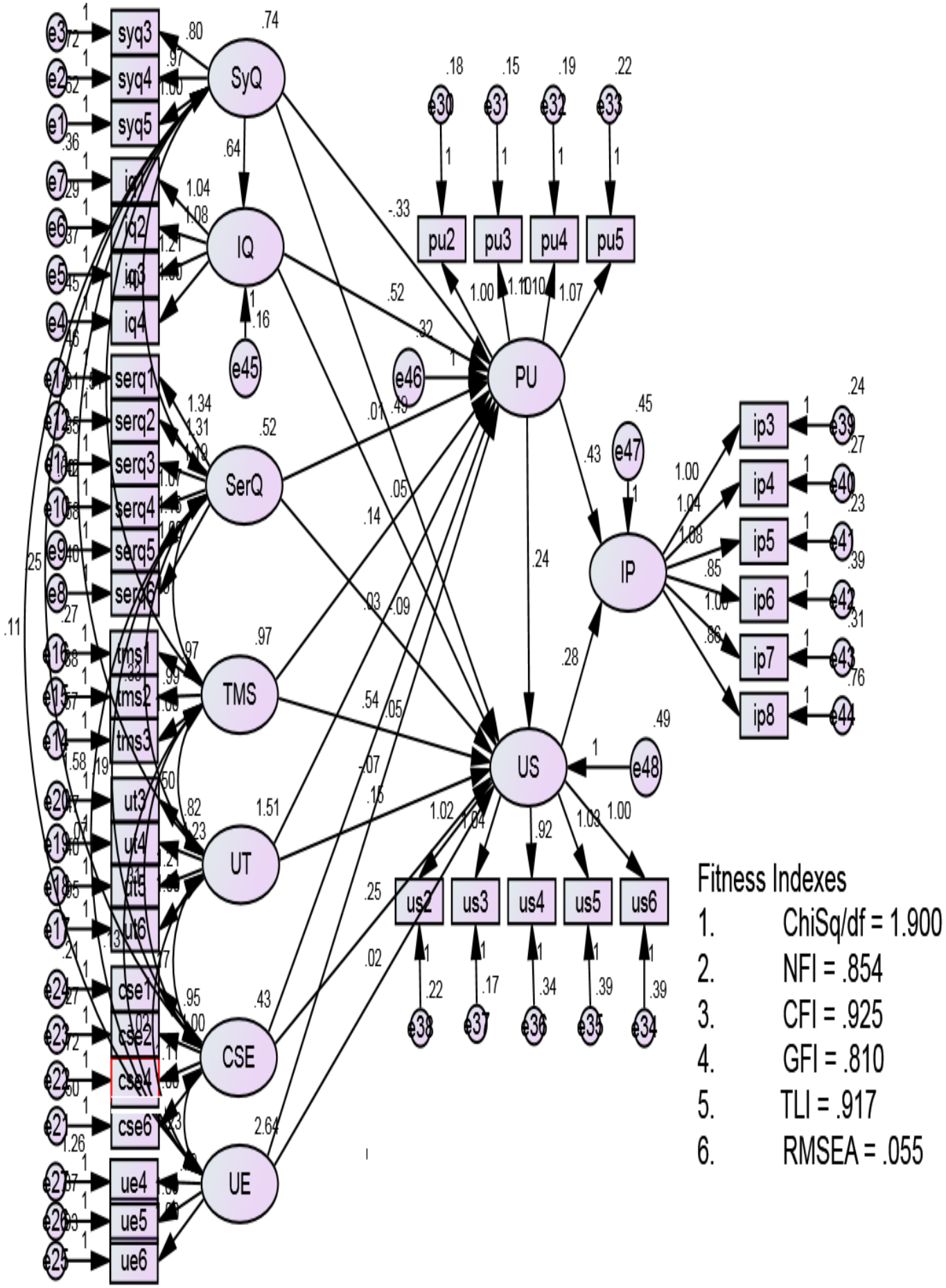

Figure 10. Revised structural model

Path	Critical Ratios	p-value
SyQ—>PU	-2.229	0.026 Rejected
SyQ—>US	2.587	0.010 * Supported
SyQ—>IQ	9.838	*** Supported
IQ—>PU	3.730	*** Supported
IQ—>US	0.284	0.777 Rejected
SerQ—>PU	0.107	0.914 Rejected
SerQ—>US	-0.852	0.394 Rejected
TMS—>PU	2.265	0.024 * Supported
TMS—>US	0.612	0.540 Rejected
UT—>PU	0.731	0.465 Rejected
UT—>US	2.894	0.004 ** Supported
CSE—>PU	6.173	*** Supported
CSE—>US	2.193	0.028 * Supported
UE—>PU	-2.922	0.003 Rejected
UE—>US	0.683	0.495 Rejected
PU—>IP	6.428	*** Supported
PU—>US	2.604	0.009 ** Supported
US—>IP	5.821	*** Supported

Table 10. Summary of Hypotheses Testing

Note: * $p < 0.05$; ** $p < 0.01$; *** $P < 0.001$; SyQ=System Quality; IQ=Information Quality; SerQ=Service Quality; TMS=Top Management Support; UT=User Training; CSE=Computer Self-Efficacy; UE=User Experience; PU=Perceived Usefulness; US=User Satisfaction; IP=Individual performance .

6. Discussion

The organizational administrators and managers must be aware that the there are many factors effect on individual performance. This study helps managers and policy makers in Arab countries to identify the factors that impact on successful adoption the MIS in the organization. In addition, the proposed model of this study serves as a diagnostic tool for the organizational administrators and managers to identify the impact of adopt of MIS in organizations. Moreover, The findings provide incentive for organizational administrators and managers to develop appropriate implementation procedures to improve efficient use of MIS in order to improve the individual performance. In addition , the findings of this study may be helpful to organizations ,mainly information systems department, in the area of successful adoption of information systems. Organizations can utilize of this model to success adoption of MIS in organization towards improve the individual performance.

According to empirical findings of this study there is positive and direct relationship between system quality and information quality. This result is consistent with the past studies ([28]; [29]) reported that system quality has a significant and positive effect on information quality .

In addition, the research findings in this study indicate that there are positive and direct relationship between information quality, top management support, and computer self-efficacy with perceived usefulness. This result is consistent with the past studies ([30]; [31]) reported that information quality has a significant and positive effect on perceived usefulness. Moreover, (e.g., [32]; [33]), reported that top management support has a significant and positive effect on perceived usefulness. In addition, (e.g., [34]; [35]), reported that computer self-efficacy has a significant and positive effect on perceived usefulness.

Moreover, the research findings in this study indicate that there are positive and direct relationship between system quality, user training, computer self-efficacy, and perceived usefulness with user satisfaction. This result is consistent with the past studies (e.g., [31]; [36]), reported that system quality has a significant and positive effect on user satisfaction. In addition, (e.g., [37]; [38]) reported that user training has a significant and positive effect on user satisfaction. Moreover, (e.g., [39]; [40]), reported that computer self-efficacy has a significant and positive effect on user satisfaction. In addition, (e.g., [31]; [36]), reported that perceived usefulness has a significant and positive effect on user satisfaction.

Lastly, the research findings in this study indicate that there are positive and direct relationship between perceived usefulness, and user satisfaction with individual performance. This result is consistent with the past studies (e.g., [41]; [42]) reported that perceived usefulness has a significant and positive effect on individual performance. In addition, (e.g., [43]; [44]) reported that user satisfaction has a significant and positive effect on individual performance.

7. Conclusion

The purpose of this study was to evaluate the relationship between technology factors, organizational factors, and people factors with perceived usefulness and user satisfaction toward impact on the individual performance. Data was collected using a survey questionnaire. The resultant 424 usable responses were analyzed with the SEM technique to validate the theoretical model and test the hypotheses. The proposed model of this study is built from review of literature. The selected theories were com patible with the Yemen's problems. in particular, the selected theories were about information system success, acceptance of technology and usage of computer. SEM analysis were used in the analysis. Given that the finalized structural model (see Figure 10) show that The proposed model fit well. The proposed model was tested using AMOS. The fit indices of the modified proposed model show good model fit (Chisq/df=1.900 , NFI=0.854, CFI=0.925, GFI=0.810, TLI=0.917, RMSEA=0.055).

The overall goodness-of-fit indices of the model provide statistical evidence of the generalisability of the model as applied to the organizations in Yemen.

Acknowledgements

The authors would like to thank Faculty of Technology Management and Business UTHM for help. In addition thank ministry of Higher Education and Scientific Research in Yemen for support.

References

[1] Al-Mamary, Y. H., Shamsuddin, A., Aziati, N. (2014). The meaning of management information systems and its role in telecommunication companies in Yemen. *American Journal of Software Engineering*, 2 (2) 22–25.

[2] Al-Mamary, Y.H., Shamsuddin, A., Nor Aziati, A.H., Al-Maamari, M. H. (2015). Issues Related to Employees at Telecommunication Companies in Yemen and the Role of Management Information Systems in Solving it, *International Journal of Hybrid Information Technology*, 8 (12).

[3] Al-Mamary, Y. H., Shamsuddin, A., Hamid, N. A. A. (2015). Enhancing Technological Capability of Telecommunications Sector in Yemen: A Technology Adoption Approach. *Mediterranean Journal of Social Sciences*, 6 (4S1), 108-112.

[4] Al-adaileh, R. M. (2009). An evaluation of information systems success: A user perspective–the case of jordan telecom group. *European Journal of Scientific Research*, 37 (2) 226–239.

[5] Al-Mamary, Y. H., Shamsuddin, A., Aziati, N. (2015) The Pilot Test Study of Relationship Between Management Information Systems Success Factors and organizational performance at Sabafon Company in Yemen, *Journal of u- and e- Service, Science and Technology*, 8 (2) 337-346.

[6] Petter, S., DeLone, W., McLean, E. R. (2013). Information systems success: The quest for the independent variables. *Journal of Management Information Systems*, 29 (4) 7–62.

[7] Al-Mamary, Y. H., Shamsuddin, A., Aziati, N. (2014). Factors affecting successful adoption of management information systems in organizations towards enhancing organizational performance. *American Journal of Systems and Software*, 2 (5) 121–126.

[8] Delone & Mclean, E. R. (1992). Information systems success: the quest for the dependent variable. *Information Systems Research*, 3 (1) 60–95.

[9] Delone., Mclean, W. H. (2003). The delone and mclean model of information systems success: a ten-year update. *Journal of Management Information Systems*, 19 (4) 9–30.

[10] Igbaria, M., Zinatelli, N., Cragg, P., Cavaye, A.L. (1997). Personal computing acceptance factors in small firms: a structural equation model. *MIS quarterly*, p. 279–305.

[11] Igbaria, M., Iivari, J. (1995). The effects of self-efficacy on computer usage. *Omega*, 23 (6) 587- 605.

[12] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, p. 319–340.

[13] Davis, F.D., Bagozzi, R. P. Warshaw, P. R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science*, 35 (8) 982–1003.

[14] Chen, S. C., Li, S. H., Li, C. Y. (2011). Recent related research in technology acceptance model: A literature review. Australian *Journal of Business and Management Research*, 1 (9) 124-127.

[15] Petter, S., DeLone, W., McLean, E. (2008). Measuring information systems success: models, dimensions, measures, and interrelationships. *European Journal of Information Systems*, 17(3) 236–263.

[16] Suhr, D.D. (2006). Exploratory or confirmatory factor analysis? SAS Institute Cary.

[17] Awang, Z. (2012). Structural equation modeling using AMOS graphic. Penerbit Universiti Teknologi MARA.

[18] Hair, J., Anderson, R., Tatham, R. , Black,W. (2010). Multivariate Data Analysis, 7th edition, Prentice Hall.

[19] Forza., Filippini, R. (1998). Tqm impact on quality conformance and customer satisfaction: a causal model. *International Journal of Production Economics*, 55 (1) 1–20.

[20] Greenspoon., Saklofske, D. H. (1998). Confirmatory factor analysis of the multidimensional students life satisfaction scale. *Personality and Individual Differences*, 25 (5) 965–971.

[21] Al-Mamary, Y. H., Shamsuddin, A. (2015). Testing of The Technology Acceptance Model in Context of Yemen , *Mediterranean Journal of Social Sciences*, 6 (4S1), 268-273.

[22] Al-Mamary., Yaser Hasan., Shamsuddin., Alina. (2015). The Impact of Top Management Support, Training, and Perceived Usefulness on Technology Acceptance, *Mediterranean Journal of Social Sciences 6 (6S4)*, p 1-17.

[23] Norhayati, M., Aniza, A. (2014). Psychometric properties of the malay version of impact of event scale-revised (ies-r). *International Journal of Collaborative Research on Internal Medicine & Public Health (IJCRIMPH)*, 6 (2).

[24] Othman, N.B., Hussein, H.B., Salleh, S.B.M., Wahid, H.B.A. (2014). Resilience scale: Exploration of items validity and reliability first-order cfa model.

[25] Zait., Bertea, P. E. (2011). Methods for testing discriminant validity. *Management & Marketing Journal*, 9 (2).

[26] Kline, R.B. (2011). Principles and practice of structural equation modeling. Guilford press.

[27] Byrne, B.M. (2001). Structural equation modeling with AMOS: Basic concepts, applications, and programming.

[28] Gorla, N., Somers, T.M., Wong, B. (2010). Organizational impact of system quality, information quality, and service quality. *The Journal of Strategic Information Systems*, 19 (3) 207–228.

[29] Ifinedo, P. (2011). Examining the influences of external expertise and in-house computer/ it knowledge on erp system success. *Journal of Systems and Software*, 84 (12) 2065–2078.

[30] Pai., Huang, K. I. (2011). Applying the technology acceptance model to the introduction of healthcare information systems. *Technological Forecasting and Social Change*, 78 (4) 650–660.

[31] Park, S., Zo, H., Ciganek, A. P. Lim, G. G. (2011). Examining success factors in the adoption of digital object identifier systems. Electronic commerce research and applications, 10 (6) 626–636.

[32] Chen., Hsiao, J. L. (2012). An investigation on physicians acceptance of hospital information systems: a case study. *International Journal of Medical Informatics*, 81 (12), 810–820.

[33] Shih., Huang, S. S. (2009). The actual usage of erp systems: an extended technology acceptance perspective. *Journal of Research and Practice in Information Technology*, 41 (3) 263–276.

[34] Lui., Hui, W. (2011). The effects of knowledge on security technology adoption: Results from a quasi-experiment. *In*: Information Science and Service Science (NISS), 2011 5th *International Conference on New Trends in*, 2, *IEEE*, 328–333.

[35] Ramayah, T., Aafaqi, B., Ignatius, J. (2004). Role of self-efficacy in e-library usage among students of a public university in Malaysia. Malaysian *Journal of Library and Information Science*, 9, 39–58.

[36] Landrum, H.T., Prybutok, V. R., Strutton, D., Zhang, X. (2008). Examining the merits of usefulness versus use in an information service quality and information system success web based model. *Information Resources Management Journal (IRMJ)*, 21 (2) 1–17.

[37] Bradford., Florin, J. (2003). Examining the role of innovation diffusion factors on the implementation success of enterprise resource planning systems. *International Journal of Accounting Information Systems*, 4 (3) 205–225.

[38] Dezdar., Ainin, S. (2011). The influence of organizational factors on successful erp implementation. *Management Decision*, 49 (6) 911–926.

[39] Saba, T. (2012). Implications of e-learning systems and self-efficiency on students outcomes: a model approach. *Human-centric Computing and Information Sciences*, 2 (1) 1–11.

[40] Bin, W., Chu-hong, Z., Qiong-yu, H., Zhen-peng, L. (2010). Empirical research on the factor of erp's user customer satisfaction based on triadic reciprocal determinism. *In*: Management Science and Engineering (ICMSE), 2010 International Conference on, IEEE, 58–66.

[41] Ali, B. M., Younes, B. (2013). The Impact of Information Systems on user Performance: An Exploratory Study. *Journal of Knowledge Management, Economics and Information Technology,* 3 (2).

[42] Shih, H. P. (2004). Extended technology acceptance model of Internet utilization behavior. *Information & Management*, 41 (6) 719-729.

[43] Igbaria, M., Tan, M. (1997). The consequences of information technology acceptance on subsequent individual performance. *Information & Management*, 32 (3) 113-121.

[44] Sharabati, M. M., Sulaiman, A., Salleh, N. A. M. (2015). End User Satisfaction and Individual Performance Assessments in e-Procurement Systems. *International Journal of Computer Theory and Engineering*, 7 (6) 503.