www.ijecs.in
International Journal Of Engineering And Computer Science ISSN:2319-7242
Volume 6 Issue 7 July 2017, Page No. 22084-22096
Index Copernicus value (2015): 58.10 DOI: 10.18535/ijecs/v6i7.31

An Extended ERP model for Yemeni universities using TAM model.

Marwa Abdulrahman Al-hadi[1], Nagi Ali Al-Shaibany[2]

[1]Sana'a University, Department of Computer Science,
Sana 'a, Yemen
eng.marwa.alhadi30@gmail.com
[2 1]Sana'a University, Department of Information Technology,
Head of department
Sana'a, Yemen
shaibany@gmail.com

Abstract: ***The main problems had been discussed for a while are complexity and failure of ERP system in an institution. To solve these problems and reduce this complexity some researchers were concentrated on the effect of perceived usefulness (PU) and perceived ease of use (PEOU) on the attitude toward using enterprise resource planning (ERP) system based on the theory of technology acceptance model (TAM) whereas, others focus on studying critical success factors (CSFs). On the other side, limited researchers put them together to check the influence of critical success factors on PU and PEU, as a key factor for accepting ERP system. However, this paper focuses on studying these CSFs and its affection on Yemeni higher education institutions using an extended technology acceptance model (TAM). This paper analyzes the impact of CSFs on user attitude toward using ERP at Yemeni higher education institutions. The proposed model has thirteen constructs, and they are: 1. Vision and objectives (VO), 2. Top management support and commitment (TM), 3. Business process (BP), 4. Organizational structure (OS), 5. Budget size (BS), 6. Human resources management (HRM), 7. Project management (PM), 8. Training and education (TE), 9. Business process re-engineering (PRE), 10. Communication and connection (COM), 11. Perceived ease of use (PEOU) 12. Perceived usefulness (PU), 13. Attitude toward (AT) using ERP and sixteen hypotheses which was generated to study the relationship between these constructs. The present Partial Least Squares (PLS) involves these relationships based on a survey of 123 users to measure the acceptance of this model. Results suggest important applied attitude toward using ERP and to develop the understanding of how to implement this attitude in higher education institutions and also we find that understanding of user's perceived ease of use and user's perceived usefulness should be taken into consideration for an institution in pre-implementation stage of an ERP system especially at Yemeni higher education institutions.***

Keywords: Enterprise resource planning (ERP), Technology acceptance model(TAM), Critical success factors(CSFs), Top management support and commitment, Business process, Organization structure, Budget size, Human resources management, Project management, Training and Education, Business process re-engineering, Communication and connection.

1. INTRODUCTION

Combination of information and information based processes within and across functional areas in an institution is a preparation toward using ERP system[1]. Whereas, [2, 3] define ERP as a functional structure contains sets of functional units and each functional unit work separated to achieve their own goal and objectives and they can incorporate all the data and related processes of an institution into a unified information system. Besides, ERP also is defined as all the data within an institution's or organization's business processes that related to functional areas come together to represent a business application [4].

Implementation of ERP system in higher education institutions or universities is a pointer to a new technology revolution in that country and it is as gain for higher education institutions instead of legacy administration and management systems. [5]. In fact, replacing legacy systems at higher education institutions into ERP solutions will motivate enhancing services to the customer, and increase working effectively, moreover it holds to facilitate administrative process[6]. In reality, depending on ERP in higher education institutions will reduce the yearly cost of legacy system and also risk, in addition to enhancing the performance, whereas, the performance is the core reason for deciding that the system is success[1, 7].

According to standard processes, monitoring activates and data flow during the system ERP cost becomes under control and could be lower than before, furthermore the availability of cloud ERP is ones of the most reasons to continue thinking, rethinking and using ERP in higher education system [8, 9].

As a matter of fact, critical success factors (CSFs) in institution's systems help in deciding whether we are able to complete the implementation or not[8, 9]. To the best of our knowledge, ERP system is one of those systems which relies on CSFs as a major point in implementation[10]. It is popularly believed that budget size, cost, business process, information flow, project objectives are considered as a major ERP CSFs [10].

Interacting of TAM model to set of external CSFs to measure acceptance of user to this technology. However, researchers of this work have used CSFs which studied before in [11] as a previous work as external factors to interact with the major model of technology acceptance to understand the affect of these factors in higher education institutions in Yemeni. This model will suggest what should we take in consideration

during implementation and answer the question about could we use an ERP system in higher education intuitions at Yemeni universities. Thus, recognizing that ERP could be implemented at Yemeni higher education institutions and having the pre-implementation stage toward success of ERP implementation.

2. RELATED WORK

2.1. RESEARCH CONTEXT AND HYPOTHESES

There are multiple reasons that encourage using ERP system such reasons access to data and integrated information, and also the ability to have reports faster [12]. Indeed, using an ERP in different fields works as a success indicator due to numerous benefits that return to the institution such as progress in timeliness of information flow by allowing having daily report instead of the monthly or yearly, high accuracy of information with detailed content, better representation of data [12]. When an institution is looking for the benefits of integration, the best practice and also seeking for full range of functionality through the institution then ERP considers as one of the suitable solution[13]. These benefits force multiple institutions to use ERP [14]. In higher education institutions that ERP systems have been utilized to support the administrative, organizational and accounting functions, such as in the administration of instructors, facilities, courses, schedule management, the students checking and the business control of the institution[15, 16]. Likewise, searching for the best practice of ERP in higher education institutions is the key of making ERP success by understanding requirements clearly and how the implementation works, in addition to what do you want your business to become and also by evaluating the needs and requirements [12, 17].However the expected benefits of ERP implementation will not be recognized without users' acceptance [18].

Having the opinion of users is a measure for technology acceptance for the reason that the user is the most important part of an institution and has an affect on institution's performance [18]. Therefore, looking for the implementation of ERP should be adapted to user expectation. In this case, it becomes necessary to understand the processes and to be near to user understanding in order to get a successful ERP system implementation[19].

To contribute to the acceptance of ERP at Yemeni higher education institutions, we use TAM as a measure to expect the user acceptance. TAM is known as a theoretical model which measures a system acceptance by extending a set of factors of the expected environment [20]. Therefore, Using TAM will represent the adaptation of ERP at Yemeni universities. Meanwhile, these factors are CSFs of ERP implementation at Yemeni universities.

The following subsections represent research hypotheses, model and modules used for our research model.

2.2. TECHNOLOGICAL ACCEPTANCE MODEL (TAM)

The theory of reasoned action (TRA) is the base that let Davis - the one who proposed TAM- to think about technology acceptance model (TAM)[21]. TAM has been clarified individual's acceptance toward the technology proposed[21]. TAM has been extensively used to study individual technology acceptance behavior in numerous types of information systems. Moreover, TAM is one of the most widespread models which have been used since 1989[22].

TAM is a predication tool that will predict using and acceptance the technology or information system [23]. In TAM model, there are two major factors or constructors and they are perceived usefulness factor (PU) and perceived ease of use factor (PEOU) which interact with external variables or factors to orientate toward (AT) technology acceptance [24]. PU proposed to understand the degree of performance, whereas PEPU is a measure for free of effort assigned[25]. These factors affected by external variables toward the technology suggested .These variables may have a direct or indirect effect on the suggested technology[26]. These factors could be social factor, political factors or cultural factors[27]. Moreover, TAM model is used in various fields such as: understand the users' acceptance of e-learning in higher education [28],and it proves itself in social media[29], it also offers a broad understanding of TAM impacts on the adoption of mobile banking applications [20].

Knowing that, TAM is proposed as the fundamental model to measure the acceptance of ERP technology. This study selected external factors from our previous literature which illustrated within set of issues should be included in pre-implementation stage [11, 30].

The first three proposed hypotheses which represent the original TAM that extended to check the acceptance of this technology at Yemeni higher education institutions using a set of external factors. These three hypotheses are established and proved by[31, 32] and they are perceived ease of use impacts the perceived usefulness whereas both perceived usefulness and perceived ease of use impact attitude toward using the system. Therefore, it is hypothesized that:

H1*: Perceived ERP ease of use (PEOU) has positive effect on perceived ERP usefulness (PU).*

H2*: Perceived ERP ease of use (PEOU) has positive effect on attitude toward ERP system (AT).*

H3*: Perceived ERP usefulness (PU) has positive effect on attitude toward ERP system (AT).*

Although these three factors have the value of adoption of technology on the targeted environment, they do not have a full impact on motive user to accept the new technology such as ERP technology or not [33].

Therefore, we include other ten external factors that might relate to Yemeni higher education institutions environment to measure the adoption of ERP. These external factors might effect on the original factors of TAM model toward using of ERP.

2.3 THE CSFS FOR ERP SYSTEM IMPLEMENTATION AT YEMENI HIGHER EDUCATION INSTITUTIONS

Knowing that CSFs are a set of factors that selected based on the study environment in order to have a competitive performance of the institution or organization and a pointer to have the new system [34]. From this definition, our target is to measure the success of TAM model at Yemeni higher

education institutions based on set of CSFs which represented in[11]. These factors related to the nature of Yemeni universities which might be relevant to adopt ERP in higher education institutions in Yemen. We can group these CSFs for ERP implementation into ten CSFs categories: (1) Vision and objectives (VO),(2) Top management support and commitment(TM), (3) Business process (BP), (4) Organizational structure (OS), (5) Budget size (BS), (6) Human resources management (HRM), (7) Project management (PM), (8) Training and education (TE), (9) Business process re-engineering(PRE), (10) Communication and connection(COM). Each category is analyzed in the following subsections.

2.3.1. Top management support and commitment.

Top management is the starting point to accept dealing with ERP or stay with the same business work, it's as a negotiator between business and technology [35]. Top management support is as a technique for enhancing knowledge participation in an institution and it is an important guide to minimize ERP implementation problems and also a reason for judging of success in implementation of ERP[36].
Based on top management responsibilities and commitments they should draw up policies, strategies and defining the overall objectives of the whole institution and develop future plans to achieve the desired goals and also establish the organizational structure of the institution[37, 38] .Top management work as a translator of policies of board directors into goal, objectives and shared vision [39]. Therefore, we can state the following hypothesis as:

H4*: Top Management(TM) has a positive effect on the institution vision and objectives (VO).*

Through the definition of this hypothesis, we suppose that the acceptance of an ERP doesn't only depend on top management support, but it is also necessary for it to have a clear vision and objectives which impacted by top management. Whereas The analysis that is done by the top management of the institution is a warning point to decide to apply ERP in higher education [40].

2.3.2. Business Vision and objectives.

Business vision seems as the overall purpose of the institution which reflects the expectation of stakeholders of the current business in the institution [41, 42]. According to[35, 43] adaptation of ERP helps to meet institution goal and objectives. It is important to have and understand a clear business plan and vision and it is required as a leader during the ERP life cycle[44, 45].

Therefore, it is recommended having a clear business plan which includes the institution's strategic goals and objectives before ERP implementation otherwise the institution might be in a high possibility of ERP implementation failure [46]. This vision and objectives may be affected by the top management decision and affected on business process and information flow during ERP implementation [47, 48]. Therefore, the following hypothesis defined as:

H5*: Vision and objectives (VO) has a positive effect on the Business process (BP).*

2.3.3. Business Process Re-engineering

Michael Hammer, James Champy and Davenport in 1993 thought about the ability to reconsidering, rethinking and redesign the business process to accomplish affected developments in serious measures of performance and this affected will reduce cost, enhance service, and facilitate data flows and they called it as business process re-engineering[49], [50].

Moreover, process of change appears in business process re-engineering which contains changes in structures, and processes within the business environment, in addition to change in the entire technology used, human, and other organizational dimensions [51, 52].

Whereas, selection processes of ERP depend on functionality, user friendly and reliability to guarantee the success of ERP system and facilitate data flow are implemented [53]. Therefore, best practice of ERP shows up when it has fit business processes and these business processes are flexible to get into re-engineering and also help in change management process [54, 55]. Impact of ERP business processes enforces thinking about re-engineering and the way of managing change and all that help in the integration process of most business processes and also help ERP to progress toward effectiveness[55, 56]. As a result, concluding the change appeared in an institution and thinking about re-engineering according to problems found in the current information system's processes[57]. Therefore, we hypothesize that:

H6*: Business process Re-engineering (PRE) has a positive effect on Business process (BP).*

H7*: Business process Re-engineering (PRE) has a positive effect on Organizational structure (OS).*

2.3.4. Business process

The management process of an institution should take in consideration the business processes toward future change[58]. Whereas, business process defined as a structured activities or tasks that produce a particular service or product[59]. While process follows the objectives that might be discussed and set by top managers and affected by organizational objectives and vision [60, 61].The ability to determine requirements of functional components leads to determinate system needs and thus effect on performance of system and facilitate using [62]. Furthermore, enhancing in business processes has a direct impact on using and directing towards using ERP[63, 64]. Therefore, we can state the following hypothesizes as:

H8: *Business process (BP) has a positive effect on Perceived usefulness (PU).*

H9: *Business process (BP) has a positive effect on Perceived ease of use (PEOU).*

2.3.5. Organizational structure .

In order to meet the goals of an institution we should define how tasks are divided, grouped, and coordinated in an institutions which are known as organizational structure[65]. Looking for the best organized way let build integrated departments to represent the organizational structure as well[66]. Besides, it could be effected by re-engineering process and looking for ERP project success [67].

Organizational structure has a direct impact on enhancing system and this enhancement will appear during project management [68].While, failing in organizational structure is a point to fail in ERP implementation and ERP project management [69] Therefore, it is hypothesized that:

H10*: Organizational structure (OS) has a positive effect on project management (PM).*

2.3.6. Training and education.

An institution will never have the benefit of ERP system until their employees have appropriate knowledge about how to deal with the new system[70]. ERP system installation without suitable training, will indicate to the system failure [71].The aim of user training and education program is to confirm that employees are comfortable with the system and help also in growth of user skills and understanding[72]. With ERP system user should be aware of the processes and capable to understand how the system works [73].

For that reason training doesn't indicate to only operate the new system but also to recognize and understand the new processes within the system even users have strong skills, they can't manage the operation of ERP system[74]. Therefore, it is essential to pay attention on training in order to confirm ERP system success, in addition to that, having appropriate training can be an indicator of robust human resources management[75]. Training and education considerations should be fit to human resources management [76]. Then the following hypothesis is proposed:

H11: *Training and education (TE) has a positive effect on human resources management (HRM).*

2.3.7. Human resources management

The ability to correct the direction of human by improving their skills towards institution interests in order to increase the benefits toward institution development is called human resources management[77]. The purpose of HRM is to maximize the productivity of an institution by improving the effectiveness of its employees [77].

Human resources management considered as a factor of project management and its impacts on project management especially in performance and facilitate using ERP system and it should be suitable for both internal and external human resources [74, 78]. Thus, the following hypothesis defined as:

H12: *Human resources management (HRM) has a positive effect on Project management (PM).*

2.3.8. Budget size.

Perhaps the most advantage of using ERP in institutions depends on the cost factor [9]. To have completely implementation of ERP system, the budget size that prepared should be enough[79]. Even the cost of ERP is high due to the cost of planning, implementation, customization and configuration; the advantages that refer to the institution will be high[80].

Functional fitness, total cost, training, and integration are criterions that effect on implementation of ERP[81]. Moreover, budget size has impact on the best implementation of ERP and that will depend on the project manager plan [82]. Whereas, budget size may affect on the capability of project management cause the budget is the way to manage project with a safe base [83], therefore the following hypothesis:

H13: *Budget size (BS) has a positive effect on Project management (PM).*

2.3.9. Project management

Tracking project progress from the beginning, initiating, planning, executing, controlling, until closing and monitor various defined activities in different stages of the system implementation to achieve a specific goal is called project management [74]. Effective management of ERP project needs three important factors, they are cost, time and human resources management[84]. In addition to that, it involves using of skills and knowledge to monitor activities in order to guarantee that the objectives will accomplish [85]. The purpose of project management is to have better resource management, better performance control, better decision making [86].

In order to have the best practice of ERP, caring of project management is the key[87] . Whereas, project management has a direct and high impact on perceived usefulness and easy to use according to its related factors[88]. As a result, the following hypotheses are suggested:

H14*: Project management (PM) has a positive effect on perceived usefulness (PU).*

H15*: Project management (PM) has a positive effect on perceived ease of use (PEOU).*

2.3.10. Communication and connection.

Sharing information, and activities between ERP project team at each stage in ERP implementation will be covered thought team communication and connection [89]. An effective communication between the departments and also between employees of the entire institution, will increase the probability of ERP success via effective communication [90]. Moreover, communication could happen between project team as inward communication or between whole institution as outward communication[91]. It is a critical success factor to communicate between business and IT team, while communication has the ability to cover the scope, responsibilities, and persistence of an ERP project implementation [92]. Keeping in mind that all activities such as business process management and enhance strategies and so on should be achieved during a contact point[84] .
Communication is a challenge task in ERP system implementation and it effects performance of ERP system[93]. Thus, the following hypothesis defined as:

H16: *Communication and connection (COM) has a positive effect on perceived usefulness (PU).*

3. METHODOLOGY

3.1 Research model and design

The proposed model, which is shown in Fig.1, abbreviates all the above hypotheses formulated. With such a model, we propose to emphasize which factor impacts on the acceptance of ERP by multiplying users. In order to continue in confirming the hypotheses, we have designed a field study as a

necessary tool to get the information that would allow us to carry out this test. The selected procedure of choosing the sample and the instrument validity are detailed below.

A field survey was employed to test our research model. This study is interested in Yemeni higher education institutions system. ERP system is set of events and functions focused on gathering, distribution, assessment, storage, and recovery of items within the institutions, and oriented toward flow of these items from the points where they are created to the final anticipated receivers [94, 95].

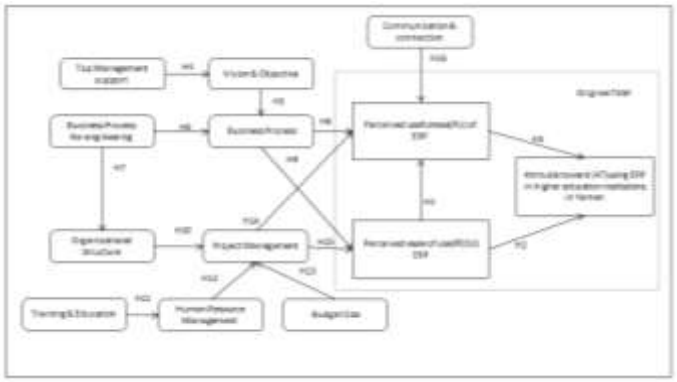

Figure 1: Structure model, relations and hypotheses of different constructs for higher education institutions in Yemen

According to[1, 6, 96-101] and also CSFs study[11] the appropriate modules could be implemented for Yemeni higher education institutions is as comprising of three modules which are represented in Fig. 2.

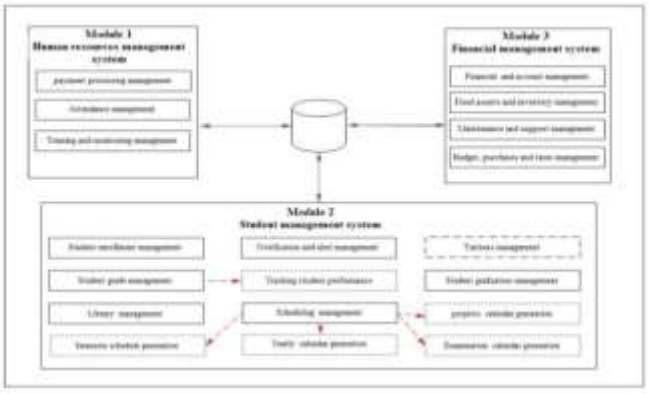

Figure 2: Higher education modules

As we can see, the higher education system is not a single integrated module; it incorporates of human resources management system, student management system and financial management system. Thus, the higher education system involves three systems. The functions included in each module are as follow:

- **Module 1**: Human resources management system (payment processing management, attendance management and training and monitoring management).
- **Module 2**: Student management system (student enrolment management, notification and alert management, student grade management, student graduation management, library management, scheduling management) in addition to tuitions management as additional system, whereas scheduling management includes other sub system (semester scheduler generation, yearly calendrer generation, examination calendar generation and project calendar generation).
- **Module 3**: Financial management system (financial and account management, fixed asserts and inventory management, maintenance and support management, budget, purchased and taxes management).

In order to develop a model that represents the relationships of the thirteen proposed constructs measured by many items Partial Least Squares (PLS) has been applied to test hypotheses .[102, 103]. PLS proposed by[104] which allows to measure the consistency and validity of the research model [105-107]. Likewise, PLS method is more concerned with the model predictability[108].

Furthermore, the main advantages of PLS are the possibility of testing a model with a reduced sample through data without a normal or unidentified distribution, and with a varied number of constructs[103, 109].In addition, there is no parametric conditions in PLS[102].

3.2 Sample selection

This study was accomplished with potential users from a set of institutions with ERP system pre-implementation, without considering their improvement level, we only check the ability of having ERP at higher education institutions and would it be acceptable if we think to install it at a set of universities .In light of this paradigm, we chose three universities as our sample and they are Sana'a university, university of science and information technology and Azal university in addition of having information from other expert who use ERP system. Having of these universities is according to their IT department in each which deals with ERP such as IT Assistant Support, Database Administrator, Chief Executive officer, IT Manager. The information was collected via a questionnaire and the number of survey response was 123 valid answers out of 227 questionnaires. Of these, 123 and the main demographic information about this study is shown in Table 1.

Table 1: Demographic information

Variable	Number	Total sample (%)
Gender		
Male	90	73.17
Female	33	26.83
Age		
20-25	51	41.46
26-64	72	58.54
more than 64	0	0.00
Educational level		
Diploma	2	1.63
B.Sc.	67	54.47
Master	45	36.59
Ph.D.	9	7.32
other	0	0.00
Your specialist		
Computer science	23	18.70
Information Technology	52	42.28
Information System	13	10.57
Other	35	28.46
Degree of understanding ERP		
High	27	21.95
Average	81	65.85
Limited	12	9.76
A little Bit	3	2.44
I don't know ERP	0	0.00
Current position		
Chief Executive officer	3	2.44
General manger	0	0.00
Unit manager	0	0.00
IT Manager	9	7.32
Project manager	3	2.44
Consultant	0	0.00
Team leader	3	2.44

Business/system Analyst	3	2.44
Database Administrator	6	4.88
System programmer	22	17.89
Employee	40	32.52
IT Assistant Support	3	2.44
Others	31	25.20
Years of Experience in ERP		
Less than 1 year	39	31.71
More than 1 and less or equal to 5 years	33	26.83
More than 5 and less or equal than 10 years	34	27.64
More than 10 years	17	13.82

3.3 Survey design

In order to measure each of these factors involved and interact with TAM model which is established for our study that is represented in Fig. 1. We accomplished a review of the literature that allowed us to identify items for each of these constructs. We involved eighty-four items in the survey which were prepared and systematized, and thirteen categories which are represented in Table 2. The first part in the survey focuses on the external constructs that interact with the TAM model which is organized into ten different categories as well: vision and objectives, top management support, business process, organizational structure, budget size, human resources management, project management, training and education, business process re-engineering, and communication and connection which studied as a main related to Yemeni higher education institutions environment. The second part includes the TAM model variables, prepared into three categories as perceived usefulness, perceived ease of use and attitude toward ERP using. The questionnaire was originally prepared in Arabic and English. Since the questionnaire was distributed in Yemen. A five point Likert -type scale is used to specify the degree of acceptance in each statement of a questionnaire. Likert-type scale was utilized as a part of this survey from (1) ‘‘strongly disagree’’ to (5) ‘‘strongly agree”.

Table 2: Items

Constructs	Items	Sources
Vision and Objectives (VO)	VO1, ERP system supports business goals VO2, An organization must have a clear vision (strategic plan) about the implementation of ERP. VO3, ERP system plays an important role to meet satisfaction, due to the impact of the organization's objectives VO4, ERP system plays an important role to meet the need due to the impact of the organization's objectives VO5, Organization objectives may be the reason for rejection of ERP system. VO6, Organization objectives may impact on performance of ERP. VO7, Organization objectives may affect by the Top management decision.	[41, 110-114]
Top Management support(TM)	TM1, Top management may help in supporting a decision to implement ERP. TM2, Top management understands the importance of ERP. TM3, Top management works to follow up what is happening with the practical units in the -ERP system TM4, Top management allocates all the required the main points for ERP implementation TM5, Top management is likely to consider that ERP as an important tool to implement goals in a strategic vision TM6, Top management must be involved in every step of the ERP implementation	[115-119]
Business Process (BP)	BP1, A clear business processes in ERP system refers to clear processes in the organization. BP2, The processes built in ERP meet most needs required from organizational processes BP3, Processes flow built in ERP correspond to flow of organizational processes BP4, The processes built in ERP accommodate with the change required from the organization. BP5, The processes built in ERP are convenient BP6, The business functions in the ERP system are well defined.	[120-122]
Organizational structure (OS)	OS1, Organizational structure affects on ERP implementation. OS2, The ERP system adapts to different architecture designs OS3, ERP system must behave in a way that develops the organizational structure. OS4, Functional units in the organizational structure must be clear to be known by ERP system. OS5, Same organizational structure facilitates to deal with ERP . OS6, Same organizational structure for a long while encourage to deal with ERP OS7,Support dynamic change in organization structure, affect the growth of organizational capabilities	[84, 123-125]
Budget size(BS)	BS1, The cost of ERP implementation significantly higher than the expected budget BS2, With the ERP system, the organization saves operating costs. BS3, When the organization recognizes the important of ERP system it will attitude toward using it. BS4, ERP system can be taken as successful system if it meets cost. BS5, ERP enables business process changes that can offer benefits in terms of cost reduction.	[126-128]
Human Resources Management (HRM)	HRM1, Human resources management performance may affect on ERP implementation. HRM2, Human resources management performance may affected on success of ERP HRM3, Human resources management factor are not easy to handle their errors. HRM4, Human factors are more important than technical problems in ERP system. HRM5, The implementation of a new advanced software system such as ERP requires capable human resources. HRM6, Human resources must strengths before embarking on an ERP system implementation HRM7, Productivity increase when skilled human resource deal with ERP	[85, 129-131]
Project Management (PM)	PM1, Decision of updating ERP depends mainly on ERP manager. PM2, I think project manager led toward ERP implementation. PM3, Project manager endeavors to solve complications may meet during ERP work. PM4, Project manager must have a good knowledge and technical experience in business processes management in ERP. PM5, Project manager have a plan and good strategies for ERP implementation PM6, Project manager must continually manage the change may happened during the implementation.	[132-135]
Training and Education(TE)	TE1, The kind of training provided should include complete development training. TE2, Level of understanding is substantially improved after going through the training program. TE3, The training gives some confidence in the real implantation of ERP system TE4, The training should adequate enough and detail for the trainers TE5, Resources for training should be provided. TE6, Training on ERP system should be ease to use. TE7, Interaction with trainers should be in progress to guarantee good ERP implantation.	[64, 136]
Business process re-engineering(PRE)	CMPR1, ERP system is an important tool that supports changing in business process. CMPR2, When using ERP system that support change in an organization’s business process that gain competitive advantages. CMPR3, ERP enables business process changes, which can offer, productivity improvement. CMPR4, ERP enables business process changes, which can offer, improved customer service. CMPR5, Some business processes must be reformed to appropriate the ERP applications. CMPR6, Business processes must be recognized and the necessary changes must be made and make sure that the selected ERP system will reflect the complete business processes.	[50, 55, 67, 137]
Communication and connection(COM)	COM1, There is a need for communication to be present throughout ERP implementation. COM2, Availability of a specific person (or group) is available for assistance with some software difficulties COM3, There aren’t any obstacles in the communication during ERP COM4, It prefers to have periodic meetings among the functional areas about the ERP that have a positive impact. COM5, Successful ERP implementation needs an effective communication plan to communicate	[12, 85, 138, 139]

	about the scope and objectives, among various functions and especially between business and IT personnel. COM6, Successful ERP implementation needs an effective communication plan to communicate about the updates and changes among various functions and especially between business and IT personnel. COM7, A key factor for the successful ERP implementation requires a corporate culture that emphasizes the value of sharing common goals and the value of trust between partners, employees, managers and corporations.	
Perceived ease of use(PEOU)	PEOU1, You will not become confused when you will use ERP. PEOU2, There is little error when using ERP. PEOU3, ERP are easy to use. PEOU4, ERP is easy to learn how to deal with it. PEOU5, Interaction with the ERP system is clear and understandable based on a good interface design that satisfies end-users need. PEOU6, ERP is easy to access to the data. PEOU7, ERP is convenient.	[26, 31, 63, 64, 93]
Perceived Usefulness(PU)	PU1, Using ERP to improve job performance. PU2, ERP support critical aspect job. PU3, Using ERP allow accomplishing more work than would otherwise be possible. PU4, Using the ERP system to increase productivity. PU5, ERP will be useful for institution.	[26, 31, 63, 64, 93]
Attitude toward using ERP(AT)	AT1, Using ERP system is a good idea. AT2, Using ERP are satisfying. AT3, Using ERP is beneficial. AT4, The ERP system will provide accurate information. AT5, The ERP system will be better than the old system. AT6, The ERP system will make data analysis easier. AT7, The ERP system will provide integrated information. AT8, The ERP system will provide reliable information.	[23, 140, 141]

3.4 Instrument reliability and validity of the model

Before completing the main survey, we did a pre-test and a pilot test to validate the questionnaire. For the pre-test, research experts on the ERP and TAM methodology studied the survey structure. Inspected viewpoints, such as the appropriateness of the questions and answers and the indications in each part of the survey structure and the survey length have been taken in consideration. Four specialists in the application of ERP and TAM methodology had reviewed the survey structure and additional opinion from other specialist had been taken.

Subsequently, a pilot test occurred which included 10 ERP users. In that test we took the chance to ask for their estimation of the survey significance and simplicity. The response in both cases was reflected on the survey's final design. In general, the results of the pre-test and the pilot survey showed that the survey was true and would permit the ERP users to join in the study without any trouble of understanding.

Once the clarifying of this survey was confirmed, it was essential to analysis data via two-stage policy of measuring this model, first step contains prove of individual reliability for each item, followed by determining the validity of each construct[142].

To represent the individual item reliability, we use correlations between the item and the construct which called loadings. The validity of each construct is acceptable if loading higher than 0.505[103].Table 3 shows the loading for each item. Knowing that, reliability creates to measure the internal coherence of all the items in relationship to constructs.

Table 3: Items and component loading

Construct	Items	Mean	Standard deviation	Component loading
VO	VO1	4.382114	0.504412	0.645
	VO2	4.504065	0.705644	0.644
	VO3	4.235772	0.736421	0.589
	VO4	4.105691	3.357724	
	VO5	0.827925	0.967760	
	VO6	4.268293	0.544317	0.646
	VO7	4.170732	0.806808	0.702
TM	TM1	4.365854	0.749517	
	TM2	3.886179	0.737777	0.676
	TM3	3.707317	0.947228	0.763
	TM4	3.934959	0.947298	
	TM5	4.113821	0.759673	0.670
	TM6	3.788618	0.943068	0.795
BP	BP1	4.219512	0.901152	0.769
	BP2	4.211382	0.925522	0.773
	BP3	3.837398	0.852902	0.728
	BP4	3.934959	0.807139	0.691
	BP5	4.081301	0.634958	0.772
	BP6	4.252033	0.774528	0.659
OS	OS1	4.03252	0.858277	
	OS2	3.926829	0.841259	0.671
	OS3	4.065041	0.623841	0.560
	OS4	4.081301	0.753065	
	OS5	3.804878	1.045353	0.604
	OS6	3.715447	0.979464	0.761
	OS7	3.674797	0.683481	0.517
BS	BS1	3.723577	1.018685	0.585
	BS2	4.03252	0.778133	
	BS3	4.235772	0.878535	0.587
	BS4	3.764228	1.094557	0.657
	BS5	4.081301	0.855009	0.581
HRM	HRM1	3.918699	0.774528	0.599
	HRM2	4.113821	0.759673	0.762
	HRM3	2.95122	0.8575	
	HRM4	4.121951	0.719578	
	HRM5	4.252033	0.730972	0.522
	HRM6	4.300813	0.571667	0.609
	HRM7	4.00813	0.78402	0.623
PM	PM1	3.739837	1.085201	0.698
	PM2	3.723577	0.852199	0.618
	PM3	4.284553	0.62095	0.609
	PM4	4.317073	0.760900	0.634
	PM5	4.382114	0.579999	0.581
	PM6	4.341463	0.584349	0.703
TE	TE1	4.479675	0.716888	0.698
	TE2	4.268293	0.80034	0.631
	TE3	4.398374	0.596985	0.646
	TE4	4.536585	0.590813	0.722
	TE5	4.512195	0.548707	0.735
	TE6	4.406504	0.584463	0.719
	TE7	4.495935	0.59194	0.718
PER	PRE1	4.341463	0.663192	0.705
	PRE2	4.373984	0.645265	0.770
	PRE3	4.195122	0.775216	0.754
	PRE4	4.081301	0.946031	0.694
	PRE5	4.113821	0.759673	
	PRE6	4.211382	0.656019	0.629
COM	COM1	4.365854	0.630746	0.678
	COM2	4.520325	0.618692	0.594
	COM3	3.03252	1.108351	
	COM4	4.186992	0.618692	0.600
	COM5	4.284553	0.607607	0.595
	COM6	4.284553	0.579999	0.758
	COM7	4.430894	0.67849	0.595
PEOU	PEOU1	3.528455	1.026894	0.604
	PEOU2	4.01626	0.839435	0.743
	PEOU3	3.707317	0.893801	0.703
	PEOU4	3.813008	0.83322	0.709
	PEOU5	4.02439	0.762475	0.741
	PEOU6	4.065041	0.786566	0.710
	PEOU7	4.113821	0.726583	0.698
PU	PU1	4.365854	0.781636	0.622
	PU2	4.130081	0.74613	0.660
	PU3	4.146341	0.764831	0.864
	PU4	4.211382	0.822352	0.852
	PU5	4.325203	0.607277	0.698
AT	AT1	4.455285	0.704226	0.578
	AT2	4.186992	0.591602	0.675
	AT3	4.439024	0.629159	0.679
	AT4	4.178862	0.77916	0.779
	AT5	4.260163	0.638099	0.766
	AT6	4.560976	0.560245	0.634
	AT7	4.341463	0.687467	0.745
	AT8	4.284553	0.891861	0.690

In the case of the items of the vision and objectives, top management and commitment, organizational structure, budget size, human resources management, business process re-engineering and communication and connection constructs, we had to accomplish a factorial analysis in order to detect those

items which had little interpretive ability for these constructs. The results of this analysis directed us to eliminate item VO4, VO5 from vision and objectives construct, TM1, TM4 from top management and commitment construct, OS1, OS2 from organizational structure construct, BS2 from budget size construct, HRM3, HRM4 from human resources management construct, PRE5 from business process re-engineering construct and COM3 from communication and connection.
After eliminating these specific items which are less related to each construct we should measure internal coherence of all the items in relationship to constructs and between and verify that the selected items were qualified and related to constructs and also confirmed the reliability of each item, the Cronbach coefficient alpha and the composite reliabilities coefficient were used[143, 144]. Table 4 indicates the values of each coefficient. While using of Cronbach's alpha coefficients to determine a scale's consistency between variables for each construct. Knowing that, during reliability analysis the consistency of the constructs gained where Cronbach's alpha coefficient at 0.5 or higher was reflected acceptable [145-150] and Composite reliabilities are over the minimum acceptable limit of 0.70 [147, 151-154].

The validity was measured by examining whether each item loaded higher on the construct it measured than on any other construct. The same construct point to clearly higher factor loadings on a single construct than on other constructs. The factor structure matrix of loadings Table 5 shows that the measurement demonstrated reasonable validity. Items which measuring the same construct indicate factor loadings on a single construct. This is also a sign of the validity of the measurement.

Then, it demonstrates that the items are able to measure constructs for which they were selected. Whereas the expected outcomes, given that the fact that the selected items were taken from related studies whose have a predictive ability had been verified.

Table 4: Composite reliability and Cronbach alpha

Construct	Composite reliabilities	Cronbach alpha
Vision and objectives (VO)	0.782855	0.633
Top management support(TM)	0.818482	0.703
Business process(BP)	0.897744	0.822
Organizational structure (OS)	0.800997	0.687
Budget size(BS)	0.715256	0.524
Human resources management (HRM)	0.795102	0.668
Project management (PM)	0.812413	0.691
Training and education(TE)	0.869169	0.813
Business process re-engineering(PER)	0.850522	0.773
Communication and connection (COM)	0.751647	0.784
Perceived ease of use (PEOU)	0.872614	0.820
Perceived usefulness(PU)	0.860700	0.792
Attitude toward using(AT)	0.882544	0.841

4. TESTING THE RESEARCH MODEL

Once the validity and reliability of the model was established and proven, hypotheses have been tested and the structural model is examined. To test H1 through H16, a PLS analysis was performed to test theses hypotheses.

Regression coefficients are based on bootstrapping and not on samples estimator and it allows the generality of the results and the computation of the t-value for each hypothesis[155].The results are showed in Fig. 3, and in Table 5 which summarize the relationships between different constructs. If all R-Squared are higher than 0.10, the predictive capability of the model is satisfactory[103].

5. DISCUSSION

From a theoretical vision, it clarifies that the user acceptance verifies the ability to apply ERP systems via TAM model. All the relationships suggested by TAM have been tested. In this sense, this study contributes on the indication of ERP systems acceptance through CSFs and TAM, and this finding display that does ERP will be acceptable at Yemeni higher education institutions.
PLS was evaluated by t-value which has the ability to generalization of the result and R-square which should be higher than 0.10 and it represents the satisfactory of model. Having p-value or probability of value is to determine the significant of our result that related to our hypotheses.

The theory of TAM suggests that there is a significant positive relationship and impact between PEOU, PU and AT toward using ERPs and that found on (H1, H2, H3). According to our study there is a significant and positive relation between perceived ease of use and perceived usefulness (H1) and perceived ease of use have higher and direct influences on attitude toward using ERP at Yemeni Higher education institutions (H2). H3 was also supported; the result indicates that perceived usefulness significantly affected on attitude toward using ERP at Yemeni Higher education institutions.
The relationship between "top management support" and "vision and objectives" (H4) is not supported by the test results summarized in Table 5. Sometimes, "top management support" could not have a full impact on vision and an objective therefore the institution doesn't have the ability to implement the system as well and it couldn't have the intended benefits even it could be significant and have a degree of confident success, it not satisfies in this model .Likewise, H12, is not supported too; the result indicates that "human resources management " will not have a full impact on project management even it will be satisfied as integrated unit toward ERP model. As well, H14 is not supported, the result indicates that "project management" will not influence on perceived usefulness. Therefore, these three hypotheses are not supported in this study.

Whereas, H5 was supported; the result notifies that "vision and objectives" have a direct impact on" business process" and have the ability of data flow based on strategic vision. H6 and H7 were supported; the results indicate that ability of "business process re-engineering" will improve, change and modify "business process "and "organizational structure" to be oriented to have better than the proposed profits.

H8 was supported; the clearness of "business process", the more perceived usefulness we could have, and the positive impact of business process will appear during dealing with ERP system.

H9, H15 and H16 were supported; these findings indicate that "business process", "project management" and "communication and connection", absolutely have impact and influence on "perceived ease of use" at Yemeni higher education institutions which facilities dealing with the system via communication and connection and it allows project managers to manage the processes in order to helping user to understand how to use the system.

H10 and H13 were also supported; the test results clearly recommend that unorganized organizational structure may

disable project manager toward enhancing the current system to be better. Similarities, "budget size" effect on the ability to manage the project and less budget size may confuse project manager and their ability to manage ERP system pre-implementation processes

H11 was supported, it should be noted that training and education is becomes a key factor for an institution to implement an ERP system successfully and it have a positive effort on human resources management and lead to develop their skills to deal with this kind of system. All these paths have been supported in the research model which illustrates on Fig. 3.

Identified and tested critical success factors for years in implementation of ERP system is still unclear. Therefore, this research tested the impacts of these critical success factors on the user perceived usefulness and eases of use based on TAM and measured how the user will accept this technology in their environment. Whereas the environment use for this study is Yemeni higher education institutions. As a result of this study, it confirmed the impact of business process and perceived ease of use on perceived usefulness. Vision and objectives have the ability to control, defining and clarifying the selected process. Business process re-engineering has the ability to change and correct the track of the current business process and occur a beneficial change toward enhancing performance and also

Table 5: Factor structure matrix of loadings((highest values in bold)

Items	VO	TM	BP	OS	BS	HRM	PM	TE	PER	COM	PEOU	PU	AT
VO1	**0.645**	0.070	0.148	-0.050	0.048	0.178	0.033	0.177	0.406	0.217	-0.014	0.533	0.391
VO2	**0.644**	0.034	0.122	0.006	-0.177	0.132	0.089	0.095	0.234	0.168	-0.217	0.285	0.336
VO3	**0.589**	0.191	0.194	0.152	-0.153	0.055	-0.096	0.237	0.112	0.145	-0.051	0.285	0.130
VO6	**0.646**	0.119	0.421	0.105	0.127	0.558	0.109	0.466	0.347	0.480	0.085	0.327	0.437
VO7	**0.702**	0.367	0.308	-0.014	0.080	0.241	0.265	0.179	0.266	0.186	0.070	0.442	0.376
TM2	0.057	**0.676**	0.181	0.226	-0.136	0.132	0.231	0.237	-0.087	0.052	0.295	0.163	0.163
TM3	0.212	**0.763**	0.565	0.396	0.246	0.248	0.199	0.382	0.238	0.176	0.488	0.540	0.441
TM5	0.553	**0.670**	0.404	0.344	0.226	0.324	0.336	0.210	0.260	0.166	0.230	0.404	0.365
TM6	-0.010	**0.795**	0.339	0.165	0.283	0.136	0.392	0.237	-0.012	0.187	0.348	0.238	0.204
BP1	0.285	0.435	**0.769**	0.067	0.222	0.396	0.389	0.458	0.187	0.361	0.211	0.293	0.432
BP2	0.185	0.375	**0.773**	0.057	0.260	0.125	0.577	0.458	0.294	0.397	0.431	0.363	0.452
BP3	0.123	0.426	**0.728**	0.206	0.203	0.156	0.312	0.304	0.192	0.039	0.325	0.343	0.462
BP4	0.312	0.356	**0.691**	0.357	0.257	0.088	0.215	0.413	0.247	0.182	0.045	0.351	0.401
BP5	0.451	0.505	**0.772**	0.361	0.309	0.336	0.425	0.547	0.530	0.449	0.389	0.561	0.626
BP6	0.316	0.212	**0.659**	0.285	0.319	0.105	0.057	0.400	0.289	0.419	0.250	0.178	0.550
OS2	0.087	0.245	0.219	**0.701**	0.282	0.197	0.199	0.216	0.277	0.168	0.260	0.224	0.172
OS3	0.225	0.175	0.343	**0.550**	0.285	0.183	0.317	0.327	0.415	0.423	0.279	0.212	0.504
OS5	-0.212	0.335	0.030	**0.682**	0.195	0.043	0.003	-0.153	0.165	-0.049	0.443	0.111	0.144
OS6	0.002	0.231	0.076	**0.853**	0.366	0.178	-0.027	-0.045	0.357	0.176	0.236	0.161	0.232
OS7	0.273	0.299	0.446	**0.514**	0.115	0.250	0.123	0.375	0.311	0.259	0.131	0.417	0.378
BS1	0.030	0.126	0.016	0.066	**0.642**	0.358	0.208	0.022	0.143	0.194	-0.141	-0.099	-0.086
BS3	0.069	0.096	0.519	0.226	**0.491**	0.152	0.488	0.314	0.301	0.327	0.306	0.280	0.388
BS4	-0.189	0.188	0.156	0.292	**0.748**	0.104	0.152	0.156	0.152	0.165	0.086	-0.086	0.068
BS5	0.029	0.162	0.248	0.373	**0.609**	0.281	0.256	0.172	0.309	0.064	0.059	0.178	0.065
HRM1	0.063	0.175	0.328	0.235	0.428	**0.647**	-0.011	0.107	0.169	0.215	0.198	0.076	0.114
HRM2	0.320	0.183	0.242	0.257	0.341	**0.798**	0.056	0.231	0.168	0.287	0.059	0.135	0.266
HRM5	0.045	0.369	0.101	0.068	0.171	**0.613**	0.405	0.234	0.227	0.215	0.380	0.249	0.109
HRM6	0.600	0.264	0.200	0.086	-0.034	**0.637**	0.217	0.441	0.395	0.333	0.196	0.516	0.466
HRM7	0.179	-0.019	0.025	0.114	0.182	**0.597**	0.214	0.238	0.262	0.113	-0.218	0.151	0.086
PM1	-0.121	0.398	0.127	0.157	0.438	0.104	**0.698**	0.141	0.242	-0.016	0.143	0.141	-0.054
PM2	-0.216	0.387	0.266	0.317	0.347	-0.007	**0.618**	0.315	0.210	0.210	0.318	0.160	0.035
PM3	0.287	0.099	0.251	0.086	0.070	0.361	**0.609**	0.480	0.366	0.272	0.179	0.362	0.316
PM4	0.081	0.103	0.460	-0.066	0.243	0.076	**0.634**	0.310	0.180	0.262	0.296	0.218	0.323
PM5	0.448	0.146	0.295	0.006	-0.034	0.314	**0.581**	0.426	0.421	0.390	0.115	0.381	0.492
PM6	0.339	0.272	0.479	-0.024	0.418	0.312	**0.703**	0.425	0.309	0.405	0.129	0.277	0.362
TE1	-0.022	0.391	0.301	0.246	0.167	0.278	0.472	**0.698**	0.364	0.528	0.503	0.279	0.304
TE2	0.243	0.114	0.398	0.017	0.120	0.143	0.057	**0.631**	0.217	0.397	0.063	0.189	0.297
TE3	0.184	0.120	0.538	0.169	0.252	0.224	0.348	**0.646**	0.397	0.495	0.177	0.220	0.505
TE4	0.176	0.315	0.513	0.072	0.383	0.266	0.455	**0.722**	0.250	0.563	0.367	0.367	0.467
TE5	0.306	0.065	0.292	0.022	-0.091	0.141	0.250	**0.735**	0.383	0.503	0.026	0.420	0.452
TE6	0.480	0.369	0.392	0.112	0.195	0.337	0.260	**0.719**	0.472	0.397	0.139	0.609	0.488
TE7	0.349	0.434	0.399	0.106	0.205	0.399	0.655	**0.718**	0.480	0.483	0.415	0.531	0.497
PRE1	0.072	-0.034	0.288	0.319	0.373	0.135	0.491	0.483	**0.711**	0.519	0.259	0.355	0.358
PRE2	0.335	0.052	0.242	0.352	0.288	0.397	0.377	0.470	**0.741**	0.371	0.275	0.504	0.401
PRE3	0.325	0.141	0.295	0.286	0.313	0.309	0.359	0.316	**0.791**	0.417	0.288	0.435	0.472
PRE4	0.355	0.094	0.178	0.343	0.136	0.254	0.144	0.269	**0.783**	0.358	0.170	0.465	0.470
PRE6	0.354	0.257	0.432	0.283	0.201	0.218	0.253	0.422	**0.605**	0.449	0.394	0.698	0.602
COM1	0.236	0.150	0.170	0.131	0.229	0.252	0.393	0.494	0.413	**0.740**	0.305	0.169	0.328
COM2	0.374	0.098	0.405	0.038	0.238	0.211	0.167	0.522	0.476	**0.758**	0.029	0.252	0.489
COM4	-0.055	0.254	0.338	0.279	0.079	0.174	0.228	0.500	0.252	**0.569**	0.533	0.162	0.461
COM5	0.401	0.237	0.411	0.150	0.144	0.295	0.170	0.570	0.349	**0.611**	0.190	0.458	0.617
COM6	0.181	0.192	0.245	0.267	0.244	0.250	0.222	0.441	0.392	**0.798**	0.330	0.285	0.512
COM7	0.313	-0.055	0.167	0.175	0.296	0.251	0.243	0.362	0.484	**0.695**	-0.083	0.177	0.344
PEOU1	-0.313	0.334	0.083	0.231	0.131	0.098	0.192	0.241	0.067	0.062	**0.604**	0.180	0.163
PEOU2	0.187	0.547	0.411	0.337	0.167	0.167	0.434	0.340	0.335	0.176	**0.743**	0.592	0.580
PEOU3	-0.167	0.118	0.095	0.167	-0.121	-0.006	0.030	0.166	0.134	0.193	**0.703**	0.111	0.196
PEOU4	-0.185	0.212	0.053	0.355	-0.038	0.077	0.034	0.100	0.294	0.181	**0.709**	0.136	0.197
PEOU5	0.082	0.362	0.343	0.476	0.113	0.118	0.270	0.199	0.340	0.202	**0.741**	0.352	0.270
PEOU6	0.115	0.382	0.467	0.109	0.127	0.189	0.298	0.313	0.314	0.335	**0.710**	0.504	0.425
PEOU7	0.181	0.400	0.473	0.396	0.185	0.244	0.308	0.374	0.389	0.404	**0.698**	0.488	0.625
PU1	0.530	0.159	0.266	0.206	0.025	0.388	0.143	0.330	0.512	0.258	0.271	**0.622**	0.589
PU2	0.289	0.359	0.347	0.353	0.186	0.122	0.317	0.260	0.410	0.287	0.289	**0.660**	0.437
PU3	0.442	0.523	0.404	0.381	0.104	0.226	0.266	0.371	0.541	0.271	0.540	**0.864**	0.510
PU4	0.474	0.442	0.339	0.106	0.004	0.244	0.381	0.453	0.497	0.166	0.429	**0.852**	0.464
PU5	0.358	0.229	0.382	0.093	-0.018	0.177	0.249	0.551	0.509	0.375	0.162	**0.698**	0.502
AT1	0.254	0.461	0.418	0.241	0.072	0.169	0.426	0.306	0.360	0.278	0.574	0.526	**0.578**
AT2	0.280	0.400	0.450	0.395	0.123	0.211	0.081	0.351	0.325	0.451	0.294	0.360	**0.675**
AT3	0.420	0.253	0.479	0.243	0.014	0.240	0.173	0.390	0.400	0.523	0.186	0.398	**0.679**
AT4	0.413	0.234	0.476	0.326	0.066	0.277	0.115	0.435	0.442	0.456	0.260	0.480	**0.779**
AT5	0.205	0.317	0.408	0.426	0.166	0.070	0.106	0.389	0.340	0.434	0.485	0.503	**0.766**
AT6	0.428	0.087	0.371	0.285	0.069	0.245	0.134	0.488	0.504	0.524	0.180	0.374	**0.634**
AT7	0.405	0.097	0.530	0.177	0.203	0.275	0.222	0.536	0.514	0.607	0.194	0.360	**0.745**
AT8	0.377	0.369	0.482	0.125	0.151	0.159	0.402	0.466	0.568	0.409	0.459	0.654	**0.690**

6. Conclusion

facilitate using of system. Sometimes, business process re-engineering helps in modifying and updating the organizational structure in order to have better performance. Providing enough training to employees, helping them to understand the business process and the influence will appear during human resources management. Budget is a sensitive factor toward ERP, whereas budget size plays a critical role in the ability to manage the project and also as an indicator to complete the implementation process. Project manager concentrates on the organizational structure of the institution that because of the system should be built based on organizational structure. The effect of business processes, project management and communication and connection on the perceived ease of use is high based on the studied environment. Other prove to the previous studied and literature about TAM that perceived ease of use, perceived usefulness have a positive impact on Attitude toward ERP.

In general, these results indicate that if we implement this system at Yemeni higher education institutions it could adopt the environment and it could help to improve the quality of service moreover, it will increase efficiency. We recommended taking our finding in consideration and trying to develop future research and also starting scientific practice in the information systems by applying ERP at universities in addition to analyzing ERP acceptation after completes the implementation. Ministry of higher education should include an integrated and comprehensive organizational structure for all universities. Ministry of higher education should support self-control on universities based on central communication.

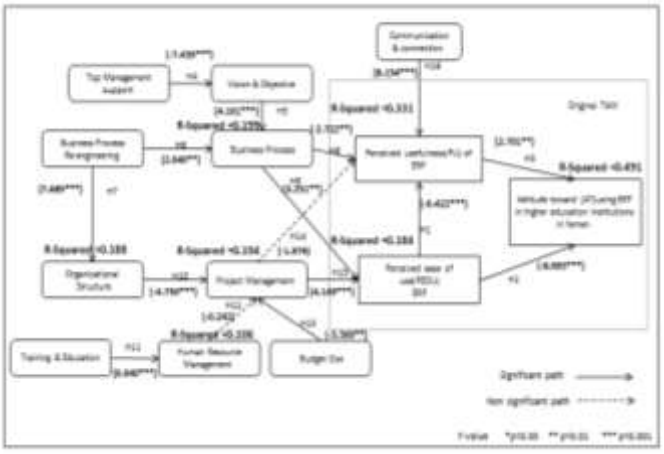

Figure 3: Results of testing model.

Table 5: Hypotheses Test

Hypotheses		T-value	P-value	Support?	Construct	R-Square
H1	PEOU →PU	-6.422	Yes, p < 0.001 extremely statically significant	Support		
H8	BP→PU	-2.722	Yes, p<0.01 very statistically significant	Support	PU	0.331
H14	PM→PU	-1.979	NO,P>0.05 not quite statically significant	No		
H2	PEOU→AT	-8.993	Yes, p < 0.001 extremely statically significant	Support	AT	0.491
H3	PU→AT	-2.701	Yes, p<0.01 very statistically significant	Support		
H4	TM→VO	-7.436	Yes, p < 0.001 extremely statically significant	No	VO	
H5	VO→BP	4.161	Yes, p < 0.001 extremely statically significant	Support	BP	0.199
H6	PRE→BP	2.640	Yes, p<0.01 very statistically significant	Support		
H7	PRE→OS	7.685	Yes, p < 0.001 extremely statically significant	Support	OS	0.188
H10	OS→PM	-4.750	Yes, p < 0.001 extremely statically significant	Support		
H12	HRM→PM	-0.242	NO,P>0.05 not quite statically significant	No	PM	0.194
H13	BS→PM	-3.366	Yes, p<0.01 very statistically significant	Support		
H11	TE→HRM	6.940	Yes, p < 0.001 extremely statically significant	Support	HRM	0.106
H9	BP→PEOU	3.251	Yes, p<0.01 very statistically significant	Support		
H15	PM→PEOU	4.149	Yes, p < 0.001 extremely statically significant	Support	PEOU	0.184
H16	COM→PEOU	8.154	Yes, p < 0.001 extremely statically significant	Support		

References

[1] P. King, "The promise and performance of enterprise systems in higher education," *EDUCAUSE Quarterly*, pp. 1-7, 2002.

[2] E. Nazemi, M. J. Tarokh, and G. R. Djavanshir, "ERP: a literature survey," *The International Journal of Advanced Manufacturing Technology*, vol. 61, pp. 999-1018, 2012.

[3] P. Garg and A. Garg, "An empirical study on critical failure factors for enterprise resource planning implementation in Indian retail sector," *Business Process Management Journal*, vol. 19, pp. 496-514, 2013.

[4] S. Candra, "The Impact of Enterprise Resource Planning Success in Indonesia Company," *Advanced Science Letters*, vol. 20, pp. 184-187, 2014.

[5] H. J. Abdellatif, "ERP in higher education: a deeper look on developing countries," in *2014 International Conference on Education Technologies and Computers (ICETC)*, 2014, pp. 73-78.

[6] P. King, R. B. Kvavik, and J. Voloudakis, "Enterprise resource planning systems in higher education," *EDUCAUSE Center for Applied Research: Research Bulletin*, vol. 22, pp. 1-11, 2002.

[7] B. Scholtz, A. Calitz, and C. Cilliers, "Usability evaluation of a medium-sized ERP system in higher education," *Electronic Journal of Information Systems Evaluation*, vol. 16, pp. 148-161, 2013.

[8] M. Soliman and N. Karia, "Enterprise Resource Planning Systems in Higher Education Context: Functionalities and Characteristics," *International Journal of Innovative Research in Science, Engineering and Technology*, vol. 4, pp. 10408-10413, 2015.

[9] S. Das and M. Dayal, "Exploring determinants of cloud-based enterprise resource planning (ERP) selection and adoption: A qualitative study in the Indian education sector," *Journal of Information Technology Case and Application Research*, vol. 18, pp. 11-36, 2016.

[10] C. Annamalai and T. Ramayah, "Does an implementation stage act as a moderator in enterprise resource planning (ERP) projects in India? An empirical study," *Asian Journal of Research in Banking and Finance*, vol. 2, pp. 200-227, 2012.

[11] M. A. Al-Hadi and N. A. Al-Shaibany, "Critical Success Factors (CSFs) of ERP in Higher Education Institutions," *International Journal*, vol. 7, 2017.

[12] D. Swartz and K. Orgill, "Higher education ERP: Lessons learned," *Educause Quarterly*, vol. 24, pp. 20-27, 2001.

[13] A. Momoh, R. Roy, and E. Shehab, "Challenges in enterprise resource planning implementation: state-of-the-art," *Business Process Management Journal*, vol. 16, pp. 537-565, 2010.

[14] J. K. Nwankpa, "ERP system usage and benefit: A model of antecedents and outcomes," *Computers in Human Behavior*, vol. 45, pp. 335-344, 2015.

[15] O. O. Olugbara, B. M. Kalema, and R. M. Kekwaletswe, "Identifying critical success factors: the case of ERP systems in higher education," 2014.

[16] D. F. Rico, "ERP in higher education," *online] http://www. davidfrico. com accessed 23rd February*, 2012.

[17] A. A. Rabaa'i, W. Bandara, and G. Gable, "ERP systems in the higher education sector: a descriptive study," in *Proceedings of the 20th Australasian Conference on Information Systems*, 2009, pp. 456-470.

[18] C. A. Rajan and R. Baral, "Adoption of ERP system: An empirical study of factors influencing the usage of ERP and its impact on end user," *IIMB Management Review*, vol. 27, pp. 105-117, 2015.

[19] K. Lyytinen and M. Newman, "A tale of two coalitions–marginalising the users while successfully implementing an enterprise resource planning system," *Information Systems Journal*, vol. 25, pp. 71-101, 2015.

[20] S. Bueno and J. L. Salmeron, "TAM-based success modeling in ERP," *Interacting with Computers*, vol. 20, pp. 515-523, 2008.

[21] I. Ajzen and M. Fishbein, "Belief, attitude, intention and behavior: An introduction to theory and research," ed: Reading, MA: Addison-Wesley, 1975.

[22] S. Y. Park, "An analysis of the technology acceptance model in understanding university students' behavioral intention to use e-learning," *Educational technology & society*, vol. 12, pp. 150-162, 2009.

[23] P. Legris, J. Ingham, and P. Collerette, "Why do people use information technology? A critical review of the technology acceptance model," *Information & management*, vol. 40, pp. 191-204, 2003.

[24] S. Alharbi and S. Drew, "Using the technology acceptance model in understanding academics' behavioural intention to use learning management systems," *International Journal of Advanced Computer Science and Applications (IJACSA)*, vol. 5, 2014.

[25] M. Y. Chuttur, "Overview of the technology acceptance model: Origins, developments and future directions," *Working Papers on Information Systems*, vol. 9, pp. 9-37, 2009.

[26] V. Venkatesh, "Determinants of perceived ease of use: Integrating control, intrinsic motivation, and emotion into the technology acceptance model," *Information systems research*, vol. 11, pp. 342-365, 2000.

[27] P. Surendran, "Technology acceptance model: A survey of literature," *International Journal of Business and Social Research*, vol. 2, pp. 175-178, 2012.

[28] J. Schoonenboom, "Using an adapted, task-level technology acceptance model to explain why instructors in higher education intend to use some learning management system tools more than others," *Computers & Education*, vol. 71, pp. 247-256, 2014.

[29] C. Evans, D. Professor Raymond Hackney, R. Rauniar, G. Rawski, J. Yang, and B. Johnson, "Technology acceptance model (TAM) and social media usage: an empirical study on Facebook," *Journal of Enterprise Information Management*, vol. 27, pp. 6-30, 2014.

[30] L. Qian, E. K. Schmidt, and R. L. Scott, "ERP pre-implementation framework for Higher Education Institution: A case study in Purdue University," in *2015 IEEE International Conference on Industrial Engineering and Engineering Management (IEEM)*, 2015, pp. 1546-1550.

[31] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS quarterly*, pp. 319-340, 1989.

[32] F. D. Davis, "User acceptance of information technology: system characteristics, user perceptions and behavioral impacts," 1993.

[33] M. Koufaris, "Applying the technology acceptance model and flow theory to online consumer behavior," *Information systems research*, vol. 13, pp. 205-223, 2002.

[34] J. L. Salmeron and I. Herrero, "An AHP-based methodology to rank critical success factors of executive information systems," *Computer Standards & Interfaces*, vol. 28, pp. 1-12, 2005.

[35] T. H. Davenport, "Putting the enterprise into the enterprise system," *Harvard business review*, vol. 76, 1998.

[36] C. M. Muinde, P. Lewa, and J. N. Kamau, "The Influence of Top Management Support on Knowledge Sharing during the Implementation of ERP Systems in Kenya," 2016.

[37] R. M. Grant, *Contemporary strategy analysis: Text and cases edition*: John Wiley & Sons, 2016.

[38] D. L. Goetsch and S. B. Davis, *Quality management for organizational excellence*: pearson Upper Saddle River, NJ, 2014.

[39] S. R. Robbins and R. B. Duncan, "The role of the CEO and top management in the creation and implementation of strategic vision," *The executive effect: Concepts and methods for studying top managers*, vol. 2, pp. 205-233, 1988.

[40] M. C. Kocakulah and D. R. Willett, "Enterprise Resource Planning (ERP) System Implementation: Promise and Problems," *Review of Business Information Systems (RBIS)*, vol. 7, pp. 35-44, 2011.

[41] P. Ifinedo, "Impacts of business vision, top management support, and external expertise on ERP success," *Business Process Management Journal*, vol. 14, pp. 551-568, 2008.

[42] G. Ford, "Strategic uses of evaluation and performance measurement," in *Proceedings of the 4th Northumbria International Conference on Performance Measurement in Libraries and Information Services*, 2002, pp. 19-30.

[43] T. H. Davenport, *Mission critical: realizing the promise of enterprise systems*: Harvard Business Press, 2000.

[44] T. C. Loh and S. Koh*, "Critical elements for a successful enterprise resource planning implementation in small-and medium-sized enterprises," *International journal of production research*, vol. 42, pp. 3433-3455, 2004.

[45] M. L. Markus, C. Tanis, and P. C. Van Fenema, "Enterprise resource planning: multisite ERP implementations," *Communications of the ACM*, vol. 43, pp. 42-46, 2000.

[46] E. J. Umble and M. M. Umble, "Avoiding ERP implementation failure," *INDUSTRIAL MANAGEMENT-CHICAGO THEN ATLANTA-*, pp. 25-33, 2002.

[47] E. J. Umble, R. R. Haft, and M. M. Umble, "Enterprise resource planning: Implementation procedures and critical success factors," *European journal of operational research*, vol. 146, pp. 241-257, 2003.

[48] A. Al-Mudimigh, M. Zairi, and M. Al-Mashari, "ERP software implementation: an integrative framework," *European Journal of Information Systems*, vol. 10, pp. 216-226, 2001.

[49] A. T. Al-Amri, "Development of business process reengineering methodology for a commercial airline," University of Huddersfield, 1998.

[50] T. H. Davenport, "Reengineering the corporation," *MIT Sloan Management Review*, vol. 35, p. 103, 1993.

[51] P. O'Neill and A. S. Sohal, "Business Process Reengineering A review of recent literature," *Technovation*, vol. 19, pp. 571-581, 1999.

[52] J. Xiang, N. Archer, and B. Detlor, "Business process redesign project success: the role of socio-technical theory," *Business Process Management Journal*, vol. 20, pp. 773-792, 2014.

[53] R. Tamošiūnienė and A. Marcinkevič, "Using analytic hierarchy process method in ERP system selection process," *KSI Trans. Knowl. Soc*, vol. 6, pp. 41-45, 2013.

[54] S. Guha, W. J. Kettinger, and J. T. Teng, "Business process reengineering: building a comprehensive methodology," *Information Systems Management*, vol. 10, pp. 13-22, 1993.

[55] H. Willmott, "Process Reengineering, Information Technology and the Transformation of Accountability: The Remaindering," *Information Technology and Changes in Organizational Work*, p. 62, 2016.

[56] J. Esteves and J. A. Pastor, "Towards a unified ERP implementation critical success factors model," in *Atas da Conferência da Associação Portuguesa de Sistemas de Informação*, 2016.

[57] E. Cameron and M. Green, *Making sense of change management: a complete guide to the models, tools and techniques of organizational change*: Kogan Page Publishers, 2015.

[58] G. Keczer, "Management and Organizational Characteristics of Educational Institutions," *EDUCATION*, vol. 1, 2014.

[59] A. Lindsay, D. Downs, and K. Lunn, "Business processes—attempts to find a definition," *Information and software technology*, vol. 45, pp. 1015-1019, 2003.

[60] R. S. Schuler, "Strategic human resources management: Linking the people with the strategic needs of the business," *Organizational dynamics*, vol. 21, pp. 18-32, 1992.

[61] M. C. Jensen, "Value maximization, stakeholder theory, and the corporate objective function," *Journal of applied corporate finance*, vol. 14, pp. 8-21, 2001.

[62] S. Matende and P. Ogao, "Enterprise resource planning (ERP) system implementation: a case for user participation," *Procedia Technology*, vol. 9, pp. 518-526, 2013.

[63] G. Hackbarth, V. Grover, and Y. Y. Mun, "Computer playfulness and anxiety: positive and negative mediators of the system experience effect on perceived ease of use," *Information & management*, vol. 40, pp. 221-232, 2003.

[64] F. Calisir and F. Calisir, "The relation of interface usability characteristics, perceived usefulness, and perceived ease of use to end-user satisfaction with enterprise resource planning (ERP) systems," *Computers in human behavior*, vol. 20, pp. 505-515, 2004.

[65] W. Currie, "Organizational structure and the use of information technology: Preliminary findings of a survey in the private and public sector," *International Journal of Information Management*, vol. 16, pp. 51-64, 1996.

[66] W. Hasselbring, "Information system integration," *Communications of the ACM*, vol. 43, pp. 32-38, 2000.

[67] S. L. Walston, L. R. Burns, and J. R. Kimberly, "Does reengineering really work? An examination of the context and outcomes of hospital reengineering initiatives," *Health Services Research*, vol. 34, p. 1363, 2000.

[68] M.-Q. Duong, "The Changing Needs for Higher Education Organizations Structure in Vietnam: Evidence from Japanese, Taiwanese, and Thai Universities," *Journal of Education and Learning (EduLearn)*, vol. 7, pp. 21-28, 2013.

[69] S. F. King and T. F. Burgess, "Understanding success and failure in customer relationship management," *Industrial Marketing Management*, vol. 37, pp. 421-431, 2008.

[70] A. Cassidy, *A practical guide to information systems strategic planning*: CRC press, 2016.

[71] I. Alcivar and A. G. Abad, "Design and evaluation of a gamified system for ERP training," *Computers in Human Behavior*, vol. 58, pp. 109-118, 2016.

[72] N. Elkhani, S. Soltani, and M. Nazir Ahmad, "The effects of transformational leadership and ERP system self-efficacy on ERP system usage," *Journal of Enterprise Information Management*, vol. 27, pp. 759-785, 2014.

[73] H. J. Rosenblatt, *Systems analysis and design*: Cengage Learning, 2013.

[74] H. Kerzner, *Project management: a systems approach to planning, scheduling, and controlling*: John Wiley & Sons, 2013.

[75] R. Gupta and S. K. Naqvi, "A framework for applying critical success factors to ERP implementation projects," *International Journal of Business Information Systems*, vol. 17, pp. 469-490, 2014.

[76] B. Y. Obeidat and A. B. Abdallah, "The relationships among human resource management practices, organizational commitment, and knowledge management processes: A structural equation modeling approach," *International Journal of Business and Management*, vol. 9, p. 9, 2014.

[77] C. Hendry, *Human resource management*: Routledge, 2012.

[78] J. Ram, D. Corkindale, and M.-L. Wu, "Implementation critical success factors (CSFs) for ERP: Do they contribute to implementation success and post-implementation performance?," *International Journal of Production Economics*, vol. 144, pp. 157-174, 2013.

[79] M. A. Razi and J. M. Tarn, "ERP system solutions for small companies: readiness & selection," *Journal of small business strategy*, vol. 14, pp. 71-85, 2015.

[80] M. A. Rahman and B. Saha, "An Assessment to Identify Causes of ERP Implementation Failure and to Predict Its Success: A Case Study on Beximco Pharmaceuticals Limited," 2016.

[81] M. Hassan, M. A. Jabar, F. Sidi, Y. Y. Jusoh, and S. Hassan, "ENTERPRISE RESOURCE PLANNING ADOPTION LIFECYCLE: A SYSTEMATIC LITERATURE REVIEW," *Journal of Theoretical and Applied Information Technology*, vol. 85, p. 403, 2016.

[82] B. D. Rouyendegh and T. E. Erkan, "ERP system selection by AHP method: case study from Turkey," *International Journal of Business and Management Studies*, vol. 3, pp. 39-48, 2011.

[83] V. Kale, *Implementing SAP® CRM: The Guide for Business and Technology Managers*: CRC Press, 2014.

[84] F. Fui-Hoon Nah, J. Lee-Shang Lau, and J. Kuang, "Critical factors for successful implementation of enterprise systems," *Business process management journal*, vol. 7, pp. 285-296, 2001.

[85] T. M. Somers and K. Nelson, "The impact of critical success factors across the stages of enterprise resource planning implementations," in *System Sciences, 2001. Proceedings of the 34th Annual Hawaii International Conference on*, 2001, p. 10 pp.

[86] R. A. Noe, J. R. Hollenbeck, B. Gerhart, and P. M. Wright, *Gaining a competitive advantage*: Irwin: McGraw-Hill, 2003.

[87] R. Bose, "Customer relationship management: key components for IT success," *Industrial management & Data systems*, vol. 102, pp. 89-97, 2002.

[88] K. Amoako-Gyampah, "Perceived usefulness, user involvement and behavioral intention: an empirical study of ERP implementation," *Computers in Human Behavior*, vol. 23, pp. 1232-1248, 2007.

[89] O. Françoise, M. Bourgault, and R. Pellerin, "ERP implementation through critical success factors' management," *Business Process Management Journal*, vol. 15, pp. 371-394, 2009.

[90] T. Ramayah, M. H. Roy, S. Arokiasamy, I. Zbib, and Z. U. Ahmed, "Critical success factors for successful implementation of enterprise resource planning systems in manufacturing organisations," *International Journal of Business Information Systems*, vol. 2, pp. 276-297, 2007.

[91] W.-H. Tsai, M. J. Shaw, Y.-W. Fan, J.-Y. Liu, K.-C. Lee, and H.-C. Chen, "An empirical investigation of the impacts of internal/external facilitators on the project success of ERP: A structural equation model," *Decision Support Systems*, vol. 50, pp. 480-490, 2011.

[92] S. Sternad, S. Bobek, Z. Dezelak, and A. Lampret, "Critical success factors (CSFs) for enterprise resource planning (ERP) solution. Implementation in SMEs: what does matter for business integration," *Enterprise Information Systems for Business Integration in SMEs: Technological, Organizational and Social Dimensions. New York, NY: Business Science References*, pp. 412-431, 2009.

[93] R. Saadé and B. Bahli, "The impact of cognitive absorption on perceived usefulness and perceived ease of use in on-line learning: an extension of the technology acceptance model," *Information & management*, vol. 42, pp. 317-327, 2005.

[94] A. Y. Noaman and F. F. Ahmed, "ERP systems functionalities in higher education," *Procedia Computer Science*, vol. 65, pp. 385-395, 2015.

[95] A. Abugabah and L. Sanzogni, "Enterprise resource planning (ERP) system in higher education: A literature review and implications," *International Journal of Human and Social Sciences*, vol. 5, pp. 395-399, 2010.

[96] A. M. Aljohani, A. Peng, and M. Nunes, "Critical factors leading to ERP replacement in Higher Education Institutions in Saudi Arabia: preliminary results," *iConference 2015 Proceedings*, 2015.

[97] M. Soliman and N. Karia, "Enterprise Resource Planning (ERP) Systems in the Egyptian Higher Education Institutions: Benefits, Challenges and Issues."

[98] R. Ahmad, Z. Othman, and M. Mukhtar, "Campus ERP implementation framework for private institution of higher learning environment in Malaysia," *WSEAS Transactions on advances in engineering education*, vol. 1, pp. 1-12, 2011.

[99] R. M. T. B. R. Lope, Z. Othman, and M. Mukhtar, "ERP implementation framework for Malaysian private institution of higher learning," in *Electrical Engineering and Informatics (ICEEI), 2011 International Conference on*, 2011, pp. 1-5.

[100] G. SABAU, M. MUNTEAN, A.-R. BOLOGA, R. BOLOGA, and T. SURCEL, "Implementing ERP Systems in Romanian Universities."

[101] L. Qian, E. Schmidt, and R. Scott, "ERP pre-implementation framework for Higher Education Institution: A case study in Purdue University," in *Industrial Engineering and Engineering Management (IEEM), 2015 IEEE International Conference on*, 2015, pp. 1546-1550.

[102] W. W. Chin, "Commentary: Issues and opinion on structural equation modeling," ed: JSTOR, 1998.

[103] R. F. Falk and N. B. Miller, *A primer for soft modeling*: University of Akron Press, 1992.

[104] H. Wold, "Partial least squares," *Encyclopedia of statistical sciences*, 1985.

[105] B. H. Wixom and H. J. Watson, "An empirical investigation of the factors affecting data warehousing success," *MIS quarterly*, pp. 17-41, 2001.

[106] W. W. Chin, "Partial least squares is to LISREL as principal components analysis is to common factor analysis," *Technology Studies*, vol. 2, pp. 315-319, 1995.

[107] D. Barclay, C. Higgins, and R. Thompson, *The Partial Least Squares (pls) Approach to Casual Modeling: Personal Computer Adoption Ans Use as an Illustration*, 1995.

[108] W. W. Chin, "PLS-Graph user's guide," *CT Bauer College of Business, University of Houston, USA*, vol. 15, 2001.

[109] J. Hulland, "Use of partial least squares (PLS) in strategic management research: A review of four recent studies," *Strategic management journal*, pp. 195-204, 1999.

[110] E. W. Ngai, C. C. Law, and F. K. Wat, "Examining the critical success factors in the adoption of enterprise resource planning," *Computers in industry*, vol. 59, pp. 548-564, 2008.

[111] C. W. Holsapple and M. P. Sena, "ERP plans and decision-support benefits," *Decision Support Systems*, vol. 38, pp. 575-590, 2005.

[112] H. Jinno, H. Abe, and K. Iizuka, "Consideration of ERP Effectiveness: From the Perspective of ERP Implementation Policy and Operational Effectiveness," *Information*, vol. 8, p. 14, 2017.

[113] A. Tenhiälä and P. Helkiö, "Performance effects of using an ERP system for manufacturing planning and control under dynamic market requirements," *Journal of Operations Management*, vol. 36, pp. 147-164, 2015.

[114] C. M. DRURY, *Management and cost accounting*: Springer, 2013.

[115] Z. Shao, Y. Feng, and Q. Hu, "Effectiveness of top management support in enterprise systems success: a contingency perspective of fit between leadership style and system life-cycle," *European Journal of Information Systems*, vol. 25, pp. 131-153, 2016.
[116] A. Boonstra, "How do top managers support strategic information system projects and why do they sometimes withhold this support?," *International Journal of Project Management*, vol. 31, pp. 498-512, 2013.
[117] A. Rice, *The enterprise and its environment: A system theory of management organization* vol. 10: Routledge, 2013.
[118] S. Ahmadi, E. Papageorgiou, C.-H. Yeh, and R. Martin, "Managing readiness-relevant activities for the organizational dimension of ERP implementation," *Computers in Industry*, vol. 68, pp. 89-104, 2015.
[119] H. Altamony, A. Tarhini, Z. Al-Salti, A. Gharaibeh, and T. Elyas, "The relationship between change management strategy and successful enterprise resource planning (ERP) implementations: A theoretical perspective," *International Journal of Business Management and Economic Research*, vol. 7, pp. 690-703, 2016.
[120] J. F. Chang, *Business process management systems: strategy and implementation*: CRC Press, 2016.
[121] J. Jeston and J. Nelis, *Business process management*: Routledge, 2014.
[122] J. Becker, M. Kugeler, and M. Rosemann, *Process management: a guide for the design of business processes*: Springer Science & Business Media, 2013.
[123] K.-K. Hong and Y.-G. Kim, "The critical success factors for ERP implementation: an organizational fit perspective," *Information & Management*, vol. 40, pp. 25-40, 2002.
[124] H. V. D. Parunak, A. D. Baker, and S. J. Clark, "The AARIA agent architecture: From manufacturing requirements to agent-based system design," *Integrated Computer-Aided Engineering*, vol. 8, pp. 45-58, 2001.
[125] M. Hammer and S. Stanton, "How process enterprises really work," *Harvard business review*, vol. 77, pp. 108-120, 1999.
[126] E. M. Kamhawi, "Critical factors for implementation success of ERP systems: an empirical investigation from Bahrain," *International Journal of Enterprise Information Systems*, vol. 3, p. 34, 2007.
[127] P. Kelle and A. Akbulut, "The role of ERP tools in supply chain information sharing, cooperation, and cost optimization," *International Journal of Production Economics*, vol. 93, pp. 41-52, 2005.
[128] S. Shang and P. B. Seddon, "A comprehensive framework for classifying the benefits of ERP systems," *AMCIS 2000 proceedings*, p. 39, 2000.
[129] A. M. Aladwani, "Change management strategies for successful ERP implementation," *Business Process management journal*, vol. 7, pp. 266-275, 2001.
[130] M. Al-Mashari, A. Al-Mudimigh, and M. Zairi, "Enterprise resource planning: A taxonomy of critical factors," *European journal of operational research*, vol. 146, pp. 352-364, 2003.
[131] A. Madapusi and D. D'Souza, "The influence of ERP system implementation on the operational performance of an organization," *International Journal of Information Management*, vol. 32, pp. 24-34, 2012.
[132] V. Kumar, B. Maheshwari, and U. Kumar, "An investigation of critical management issues in ERP implementation: emperical evidence from Canadian organizations," *Technovation*, vol. 23, pp. 793-807, 2003.
[133] M. Al-Mashari and A. Al-Mudimigh, "ERP implementation: lessons from a case study," *Information Technology & People*, vol. 16, pp. 21-33, 2003.
[134] E. T. Wang, C. C.-L. Lin, J. J. Jiang, and G. Klein, "Improving enterprise resource planning (ERP) fit to organizational process through knowledge transfer," *International Journal of Information Management*, vol. 27, pp. 200-212, 2007.
[135] T. H. Davenport, D. W. De Long, and M. C. Beers, "Successful knowledge management projects," *Sloan management review*, vol. 39, p. 43, 1998.
[136] S. I. Tannenbaum and G. Yukl, "Training and development in work organizations," *Annual review of psychology*, vol. 43, pp. 399-441, 1992.
[137] W. Aalst, M. Adams, A. Hofstede, and N. Russell, "Introduction," *Modern Business Process Automation*, pp. 3-19, 2010.
[138] S. Sarker and A. S. Lee, "Using a case study to test the role of three key social enablers in ERP implementation," *Information & Management*, vol. 40, pp. 813-829, 2003.
[139] K. Amoako-Gyampah and A. F. Salam, "An extension of the technology acceptance model in an ERP implementation environment," *Information & management*, vol. 41, pp. 731-745, 2004.
[140] T. Escobar-Rodríguez and L. Bartual-Sopena, "Impact of cultural factors on attitude toward using ERP systems in public hospitals," *Revista de Contabilidad*, vol. 18, pp. 127-137, 2015.
[141] M. Zviran, N. Pliskin, and R. Levin, "Measuring user satisfaction and perceived usefulness in the ERP context," *Journal of computer information systems*, vol. 45, pp. 43-52, 2005.
[142] J. C. Anderson and D. W. Gerbing, "Structural equation modeling in practice: A review and recommended two-step approach," *Psychological bulletin*, vol. 103, p. 411, 1988.
[143] C. E. Werts, R. L. Linn, and K. G. Jöreskog, "Quantifying unmeasured variables," *Measurement in the social sciences. Chicago: Aldine*, pp. 270-92, 1974.
[144] L. J. Cronbach and L. Furby, "How we should measure" change": Or should we?," *Psychological bulletin*, vol. 74, p. 68, 1970.
[145] A. M. Al-Osail, M. H. Al-Sheikh, E. M. Al-Osail, M. A. Al-Ghamdi, A. M. Al-Hawas, A. S. Al-Bahussain, *et al.*, "Is Cronbach's alpha sufficient for assessing the reliability of the OSCE for an internal medicine course?," *BMC research notes*, vol. 8, p. 582, 2015.
[146] K. M. Loewenthal, *An introduction to psychological tests and scales*: Psychology Press, 2001.
[147] J. CDATA-Nunnally and I. Bernstein, "Psychometric Theory," ed: New York: McGraw-Hill, 1978.
[148] U. Hove, "Psychology Press," *Meyer, DE, & Kieras, DE*, 1999.
[149] M. Adriaan Boermans and M. Kattenberg, "Estimating Reliability Coefficients with Heterogeneous Item Weightings Using Stata: A Factor Based Approach," 2011.
[150] F. Kerlinger and H. Lee, "Foundations of Behavioral Research Thomson Learning," *New York*, 2000.
[151] D. Gefen, D. Straub, and M.-C. Boudreau, "Structural equation modeling and regression: Guidelines for research practice," *Communications of the association for information systems*, vol. 4, p. 7, 2000.
[152] J. Nunnally, "Psychometric methods," ed: New York: McGraw-Hill, 1978.
[153] J. Hair Jr, W. Black, B. Babin, R. Anderson, and R. Tatham, "SEM: An introduction," *Multivariate data analysis: A global perspective*, pp. 629-686, 2010.
[154] J. Hair, W. C. Black, B. J. Babin, R. Anderson, and R. Tatham, "L.(2010)," *Multivariate data analysis*, vol. 7.
[155] D. A. Freedman and S. C. Peters, "Bootstrapping a Regression Equation: Some Empirical Results," *Journal of the American Statistical Association*, vol. 79, pp. 97-106, 1984/03/01 1984.

Authors Profile

Marwa Alhadi received the B.S. in Information system and primary M.S. degrees in computer science from faculty of computer and information technology in 2011 and 2016, respectively. During 2011-2016, I stayed as a lecturer in the field of computer and information technology at Sana'a University. Recently, I concentrate on researches and conferences. Having a conference paper in 2016 about survey of semantic annotation and it will be a published as a small book nearly and published a paper in 2017 about Critical success factor in higher education institutions.

Nagi Al-Shaibany received the B.S. in Computer Engineering from Sana'a University, Yemen, and the M.S. in art from New Mexico State University NMSU, USA and PhD. in International Information Technology Policy ITPP from Seoul National University, South Korea. He works in teaching and researching and now he is the head of Information technology department in college of Computer and Information Technology in Sana'a University. He had multiples researchers in computer science and information technology and policy. He also supervised many projects in undergraduate and graduate level as well.