Examining the determinants of users' acceptance of IT in the Yemeni public sector: pilot study

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Abstract

This paper presents the results of a pilot study conducted to test a pre-proposed model. The model modified the technology acceptance model (TAM) by adding the constructs: Organizational culture, Individual factors, Gender, and Perceived Personal Benefit to the original version of TAM. Data was collected quantitatively from 30 employees of the Ministry of Social Affairs and Labor (MoSAL) – Yemen, whom their jobs involve using IT. SmartPLS software PLS-SEM method was used to test the reliability of measurement model, and to assess the structural model. The results confirmed the reliability of the research instrument, as the measures of internal consistency were mostly acceptable. The results also indicated the significance of the hypotheses that relates organizational culture with perceived usefulness and perceived personal benefit; the. Finally, the model showed a good predictive power since 47% of the focal factor, behavioral intention, was explained by its relationships with the other factors.

Keywords. Information Technology; Technology Acceptance Model, Public Sector; Organizational Culture; Perceived Personal Benefit

Introduction

There is a consensus that the significant improvements in productivity promised by IT will only be achieved if IT tools are widely used[1]. According to a survey conducted by the Standish Group to identify the factors that led some IT projects to be challenged projects rather than successful ones, user input came on the top of the list of those factors[2].The poor user involvement, along with several other factors, had led to a noticeable phenomenon in the statistics of the Information Systems Implementation projects, which is the disappointing success rates.

For example, in the CHAOS report published in 2013, the Standish Group summarized the outcomes of about 50,000 surveyed projects in five study periods, namely, 2004,2006,2006,208,2010, and 2012, hence, the projects were classified to three groups: successful (projects that delivered on time, with the planned features , within the planned budget limits), challenged (late, over budget, with less features than required), and failed (projects that were cancelled before delivery, or delivered but never actually utilized), the results are shown in the following table:

Table 1. Project resolution results from CHAOS research [3]

	2004	2006	2008	2010	2012
Successful	29%	35%	32%	37%	39%
Failed	18%	19%	24%	21%	18%
Challenged	53%	46%	44%	42%	43%

Despite the steady increase of the success rates in the last three periods, the success rates are still less than expected, comparing to the huge amounts of money invested in huge IT projects in both, public and private sectors.

Because of that, the literature is full of studies that attempted to uncover the causes of success and failure of IT projects in general; and due to the great concern about the importance of user involvement in the IT implementation and post implementation process , and the factors that determine the user involvement such as : that attitude, acceptance, and behaviour towards increasingly adopted IT tools; there is a large number of studies that try to investigate the influence of those factors on the IT adoption process. However, only a few studies have focused on technology acceptance in the public sector. Moreover, those few published studies did not cover the context of Arabic developing countries and their different cultural and social characteristics. Therefore, this study is trying to enrich

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literature by introducing the results of an empirical study conducted in the public sector of one the developing Arab countries, Yemen, and the scope of the study will be the Ministry of Social Affairs and Labour, Hadhramout-Yemen, this is because it is one of the biggest ministries in Yemen in terms of employees, budget and beneficiaries; it is also one of the few ministries that experienced several IS implementation projects, since the early 90s.

Aim

the purpose of the current paper is to present the results of an initial test (a pilot study) of a model that was proposed-with a minor modification- by the authors in previously published article[4], the goal of the study is to provide an effective way to predict the determinants of user involvement in the context of public sector of a third world country, Yemen.

The model (shown in the following figure) was derived from the related literature, along with the researchers' assumptions about the factors that influence employees' acceptance of new IT tools and IS in the context of Yemeni public sector. TAM was the basis of this model with the following additions:

-The construct of perceived personal benefit was added to express the effect of financial compensation for using IT tools, on the employees' intention towards using these tools optimally. this factor is influential in the case being studied, MoSAL- Hadhramout-Yemen, where it was noticed that computers and other IT tools were best utilised in the departments whereby the employees receive extra payment for using IT tools [5].

-The external variables construct of TAM, was decomposed to two separate constructs to cover in detail the external variables that are believed to have significant impact on the technology acceptance in the case study. Those constructs are organisational culture and individual factors. Previous research has reported that the existence of positive culture in an organisation will create a facilitating environment that will enhance the employees involvement in any new projects including IT[6].

-Individual factors, are also believed to be an important determinant of the attitude of employees toward using IT tools. It was proven empirically For example, during the implementation of the new Automated System of Issuing Foreign Workers' Permits in MoSAL in 2010, many employees were reluctant to use the system, however, the strong resistance was lessened when the management established a new training program whereby most of the employees were enrolled in the training course that suits their previous background and computer efficacy[7]. This shows the importance of training as one of components of the individual factors.

-The gender was added as a moderator to two relationships: firstly, between organizational culture and (perceived usefulness (H9), and secondly between organisational culture and perceived personal benefit (H10). In a country like Yemen, where the gender gap in employment is one of the highest in the world, the gender is perceived as a very influential factor, especially in IT related jobs, where women are normally being allocated to easy, routine tasks such as data entry or word-processing. This is believed to have negative effect on female's acceptance of IT, and the theirs perceived benefits from using IT tools.

The relationships between the basic TAM constructs (Perceived Usefulness, Perceived Ease of Use, Attitude toward use, and Behavioral intention), and the added constructs (Organizational Culture, Individual Factors, Gender and Perceived Personal Benefit) are being hypothesized as follows:

Hypothesis1: Organizational Culture has a positive effect on the Perceived Usefulness.
Hypothesis 2: Organizational Culture has a positive effect on Perceived Personal Benefit.
Hypothesis 3: Individual Factors have positive effect on the Perceived Ease of Use.
Hypothesis 4: Individual Factors have positive effect on the Perceived Personal Benefit.
Hypothesis 5: Perceived Ease of Use has significant positive effects on the Perceived Usefulness of IT tools.
Hypothesis6: Perceived Usefulness has significant positive effect on Attitude towards using IT tools.
Hypothesis7: Perceived Ease of Use has significant positive effect on Attitude towards using IT tools.
Hypothesis 8: Perceived Personal Benefit has a positive effect on Attitude toward use.
Hypothesis 9: Perceived Usefulness has significant positive effect on Behavioural Intention to use.
Hypothesis 10: Attitude towards using the IT tools has significant positive effects on Behavioural Intention to use.
Hypothesis 11: The positive relationship between Organizational Culture and Perceived Usefulness is stronger in case of men than it is in the case of women.
Hypothesis 12: The positive relationship between Organizational Culture and Perceived Personal Benefit is stronger in case of men than it is in the case of women.

Importance and contribution

It is expected that understanding the constructs suggested by this model, can lead to better practices in the future IT projects in the context of Yemeni public sector, which will hopefully, result in an improved user involvement during the IT implementation phase, and improved IT utilization in the post implementation phase.

We believe that this study will contribute importantly to the user acceptance literature by covering an area which has been rarely covered in the previous studies, which is the public sector of a developing, Arabic country. It also contributes to the technology acceptance theory by providing a practically tested model that includes several potentially important underlying factors, namely, organizational culture and personal benefit along with the gender factor, and the last one, specially, is believed to be very influential in a country that has a large gap between genders in education and employment.
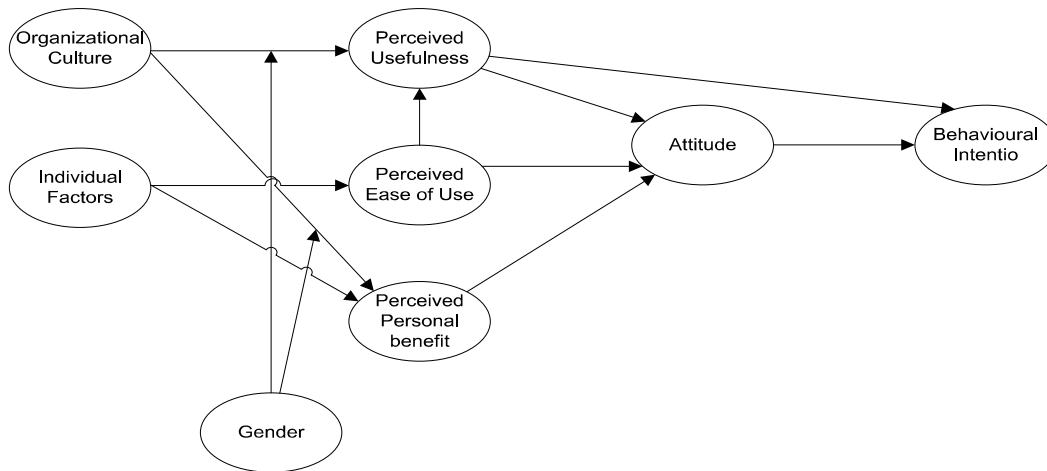

Figure 1. Research model

Method

The primary data of this research was collected quantitatively; a questionnaire was designed to fit with the variables that were included in the research model. The questionnaire was divided to three parts, part A contained the solicits and demographic data, part B was consisted of a number of statements that focused on the identified model constructs, where a five point Likert scale was used to assure sufficient discrimination, and part C was added after the advice of the experts who were consulted as part of the content validation process, and it was dedicated to the respondents' recommendations and suggestions. As for a pilot study, the questionnaire was then prepared to be answered electronically using Google forms and it was sent to a pre-test sample of 30 MoSAL employees whom their job duties involve dealing with IT.

The proposed research model was examined using SmartPLS 2.0 software; the partial least square (PLS) method of the Structural Equation Modeling (SEM) was used to analyze the data. SEM enables the researcher to test the measurement model and assess the structural model at the same time, it's also a powerful instrument for analyzing SMALL samples [8] so, the research model was created in the used software, SmartPLS 2.0, and every construct was assigned the associated set of indicators, then excel file that contains collected data was imported.

4.1 Measurement Model Test

To assess the measurement model, the PLS algorithm was run, the results of running the algorithm are used to evaluate the reliability of the measurement model by testing the internal consistency, which is measured by the items' loading (which has to be ≥ 0.7 for all items), and composite reliability (which must be from 0.6 to 0.7 for each construct in the case of a preliminary study)[9].

4.2 Assessment of Structural Model

The purpose of this test is to test the significance of the proposed hypotheses, which can be verified by finding the following values: path coefficient β,t-value and P-value. Normally, if t-value is greater than 2, that means that the relationship between underlying constructs is significant; additionally, if the P-value is less than 0.05 that means that the associated hypothesis is support[10]. The value of the coefficient of determination R2 is also calculated, R2 provides information about the goodness of fit of the research model, it explains how much of the variance of the focal factor can be caused by its relationships to the other factors[11] [10].

Results

To test the reliability of the research instrument, PLS algorithm was executed, algorithm calculates: the item's loading of every construct's items, the value of coefficient of determination R2, and the composite reliability. The PLS algorithm has yielded a satisfactory results for the items loadings, except for one item of the construct perceived usefulness (PU6: I think IT is useful for my job), and also one item of the construct attitude (AT1 - In my opinion it would be very desirable to use IT), and both items will be revised before distributing the questionnaire to the whole sample.

The values of the composite reliability were all accepted according to the above mentioned rule, which confirms the reliability of the research instrument. The value of R2 for the focal factor (behavioural intention) was 0.47. In the research that involve studying the variations of the human behavior, it is hard to get high values of R^2 , and according to[12] it is considered acceptable, in such studies, to get values of 25% or 30%, which means that the 47% that was resulted by the research model, is promising value, and it reflects good model predictability.

Conclusion

This paper has presented the results of a pilot study that was conducted as a part of research work aiming to identify the determinants of user acceptance of IT in the context of Yemeni public sector, with the Ministry of Social Affairs and Labour as the targeted study domain . The theoretical foundation of the study is the research model suggested by the researcher based on his observations along with a thorough review of the related literature. The model is modified version of the well known Technology Acceptance Model; with additional constructs the researcher great impact on the context being investigated.

A questionnaire was prepared and sent to a sample of 30 employees in the ministry being investigated, and the results were generated using SmartPLS 2.0.The results of the measurement model testing showed the reliability of the instrument, except for two questionnaire items that are needed to be improved. The structural model assessment results were also promising, 47% of the focal factor was explained or caused by its relationships with the other factors of the model, which reflects high predictive power of the research model.

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