Assessment Of IT Utilization In The Administration Of Higher Education In The Kingdom Of Saudi Arabia: A Case Study Of Imam Muhammad Ibn Saud Islamic University (IMAMU)

Dr. Qazi, Raza Ur Rehman

Abstract: Purpose of this study was to assess the IT utilization higher education in by employees of the Establishment (Idara) department at the IMAMU. In this study focus was on Personal Computer technology utilization. The study was based on the "Technology Acceptance Model" (TAM), developed by Davis in 1986 [1]. According to Davis, "A key purpose of TAM is to provide a basis for tracing the impact of external factors on internal beliefs, attitudes, and intentions" [1]. In TAM, two fundamental variables, "Perceived Usefulness" and "Perceived Ease of Use" were tested [1]. These two variables determine the usage and acceptance of a system [1]. This study will test all the paths of original TAM, along with new factors (perceived personal utility) incorporated in the extended model developed by Dr. Qazi, Raza Ur Rehman (2007) [2]. Factors like organizational culture, individual factors including level of education and duration of training as external factors were also tested. The study results are based on data collected from the employees of the establishment department (Idara Office) of Imam Muhammad Ibn Saud Islamic University, KSA. Furthermore, in this study data are collected from employees (both male and female) who have used the Personal Computer technology at work for at least one year .The results of this study indicated an overall positive association between all the constructs of the factors being tested except the association between the level of education and the actual computer use at job. Similarly negative association was found between organizational culture and actual use of PC at job. Detailed analysis is presented in the analysis section.

Keywords: IT (Personal Computer used by employees at work), Organizational Culture, Perceived Ease of Use, Perceived Usefulness, Attitude, Behavior Intention, Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), Theory of Planed Behavior" (TP)

1 INTRODUCTION

Previous studies suggested that there is no relationship between IT investment and performance in developing countries [21, 22]. This was because of the low level of IT investment, lack of IT infrastructure and IT-knowledge [21, 22]. For the last 2 decades, governments around the world has been making significant investments in IT, negating the first claim of the previous research. This fact is more pertinent about Saudi Arabia especially in the education sector. According to the Ministry of Communication and Information Technology of KSA, 80% of industrial companies use computers and its applications [26]. It is of interest to study the use of IT in Universities at KSA as there is not enough evidence on the proper utilization of IT in Administrative departments of Higher education sector [26]. This study will provide a feed back to the Government of KSA on the current status of Personal Computer Technology use in higher education administration. Because of some country specific issues (national culture, attitude, and work habits), it is not possible to apply the original TAM constructs. This study will not only help management of Imam University measure their use of Personal Computer Technology use but can also be extended nationwide.

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The selection of Imam University for this project is because it will be convenient to collect data under direct supervision of the author plus the data will be more authentic. This study examined the influence of external factors (individual, organizational, and system) on users' perceptions: "Perceived Usefulness" and "Perceived Ease of Use" of the PC technology use and also on the actual use of PC technology. This research has used the model prepared by Davis in 1986 known as "Technology Acceptance Model" (TAM) [1]. TAM provides a basis for tracing the impact of external factors on internal beliefs, Attitudes, and intentions [1, 3, 4, and 6]. This study is taking the basic concepts of TAM to assessing the use of Personal Computer Technology in public organizations. This study will test all the original paths of TAM, along with the new factors incorporated in the model by Dr. Qazi Raza Ur Rehman [2].

LITERATURE REVIEW

IT USE IN DEVELOPING COUNTRIES

As compared to developed nations of the world, few research studies have been conducted on IT utilization in developing countries [21, 22]. Two contemporary studies of 36 developing countries worldwide came to the interesting conclusion that wealthier, industrialized countries showed a positive and significant relationship between IT, growth and productivity, but that there was no evidence of such relationship for developing countries [21, 22]. They further stated that the reason for this gap is low level of IT investment relative to GDP in developing countries and lack of complementary assets such as the necessary infrastructure and knowledge-base to support effective use of IT. In developing world the high transmission cost and inadequate communication facilities led to reduction in the use of information. In situations like this, introduction of IT may have several effects on government organizations of

developing countries [21, 22]. Public administration is highly information-intensive and that the use of modern IT has the potential to increase efficiency, transparency and accountability of governments [20]. Tolero has further stated that "Information and Communication Technologies (ICTs) in developing countries can transform old challenges and create unprecedented possibilities for sustainable economic development, just as it has for business in the industrial world and that, rural and poor urban communities can be integrated into economic life and thereby raise income levels, through information services" [20]. A study of eleven Asia-pacific countries conducted by Kraemer and Dedrick in 1994 for the period, 1983 to 1990 indicates positive correlation between IT and growth [24]. In the manufacturing sector on productivity measurement in the developing world, all reported that "Firms using IT employ a more highly skilled work force, assign greater importance to product quality, invest more in R&D activities and are more export oriented [24]. A case study of Turkey conducted by Ferhan Cebi and Sitki Gozlu shows that Information Technology enhances organizational performance [25]. This is due to the fact that those organizations, which make use of strategic opportunities of information technology, enhance their organizational performance [25].

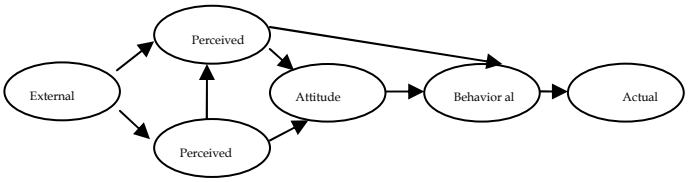
IT USE IN HIGHER EDUCATION

Use of IT in Higher education administration has begun in early 70's. IT has been in use in areas like for example student admissions, examination, human resources, management information systems. With the passage of time the student influx in higher education institution has increased which have also increased the importance of IT tools to process the large volume of data. In the 2008 report for higher education for Organization of Economic Co-operation and Development (OECD), it is stated that 57% of school students went to university for higher education in 2006 as opposed to 37% in 1995 [28]. This rapid increase in the number of students in higher education needs to be managed by administration using more advanced IT tools. So more focused is required on IT for solving the problem of higher education administration. The administration of universities can for example use the IT tools for online student registration, e-governance, online access to courses, online course fee deposit etc [28]. The report says "With the application of latest IT tools it is now possible to manage institutions with large student population more effectively and efficiently for example the UK Open University is handling 200,000 students using IT tools". With the use of Information and Communication Technologies the administration of higher education can better manage their core functions. According to the 2009 world conference on higher education following are the key benefits of ICT use in higher education. "First, ICT technology can process voluminous records quickly, meticulously and impeccably. Second, technology can generate reliable and consistent records. Third, records and data produced are searchable and quickly retrievable. Fourth, digital records save space, a premium cost to institutions. Fifth, technology saves human resources for data entry and servicing student admission and registration. With advanced scanning technology, completed application forms can be read into the databases in a matter of seconds. Other software like Learning Management Systems (LMS) (e.g. the open source Model used by Athabasca University and many other institutions, including those in the VUSSC network mentioned earlier) allow students to register for courses directly online, pay online and get course information online. Sixth, technology can expand the geographical boundary for student intake and facilitate cross-border higher education."[30]

THE "TECHNOLOGY ACCEPTANCE MODEL (TAM)"

Davis developed a new model for assessing IT acceptance, called the "Technology Acceptance Model" or TAM. TAM deals only with human behavior towards computer use. The TAM has been tested for assessing IT acceptance based on the data of about one decade. It therefore may be more appropriate to predict personal computer use. According to Davis "A key purpose of TAM is to provide a basis for tracing the impact of external factors on internal beliefs, Attitudes, and intentions. The model was designed with two fundamental variables, which were considered important in "dealing with the cognitive and effective determinants of computer usage". The two variables are "Perceived Usefulness" and "Perceived Ease of Use". It is these two variables that determine the usage and acceptance of a system. [1, 3, 4, 5, 6]

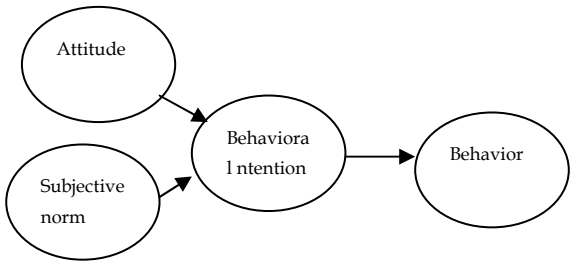
Figure 1: Technology Acceptance Model, Davis



THEORY OF REASONED ACTION (TRA)

Fishbein and Ajzen developed the "Theory of Reasoned Action" (TRA) [6]. According to the theory "Behavior (system usage) is best predicted by intentions and that intentions are jointly determined by the person's Attitude and subjective norm concerning the behavior" [6]. They also demonstrated that "Attitudes toward an object influence intentions and ultimately influence behavior with respect to the object, that is, its use" [6]. Furthermore they found that "behavior occurs within four criteria: the action that defines the behavior, the target at which the behavior is directed, the context in which it occurs, and the time at which it is performed" [6]. Figure 2 and equation 1 represents the TRA.

Figure 2: Theory of Reasoned Action



Equation 1: BI = ATT + SN
BI: Behavioral Intention, ATT: Attitude, SN: Subjective norm

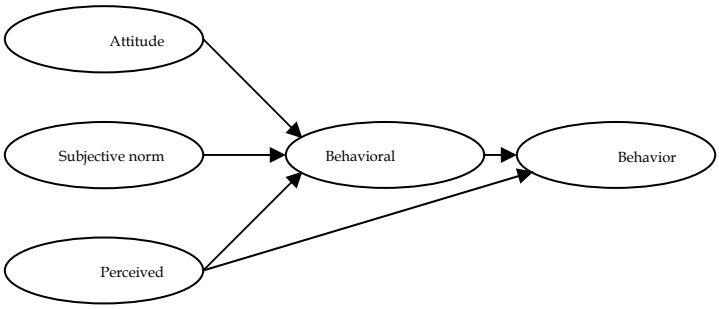
THEORY OF PLANNED BEHAVIOR (TPB)

Based on TRA, Ajzen developed the "Theory of Planned Behavior" that states that behavior is not completely under the control of human will [5]. In TRA, intentions determine or affect behavior when behavior is under the control of human's will. Ajzen argued that other non-motivational factors such as availability of resources and opportunity also have an effect on a person's behavior [5]. Mathematically, it is represented as shown in equation 4 below.

Equation 2: BI = A + SN + PBC

BI: Behavioral Intention, A: Attitude, PBC: Perceived Behavioral Control. The following diagram (Figure 3) shows the TPB components.

Figure 3: Theory of planned behavior



INFORMATION AND COMMUNICATION TECHNOLOGY IN THE KINGDOM OF SAUDI ARABIA

According to the Information Society of KSA, the government of KSA is committed to invest in IT. This report states that "The Government implemented a multi-stage plan for restructuring the ICT sector with the objectives of encouraging effective competition, attracting local and foreign investment, as well as protecting public interest and consumer and stakeholder rights". The Saudi Telecom Company (STC) government organization was established in 1989[26]. Similarly the The Communications and Information Technology Commission (CITC) were established in 2001 as the regulatory authority with legal standing and financial and administrative independence. The Commission Statutes ("Telecommunications Act", the "Bylaw" and the "Ordinance", and the "Rules of procedures") were also enacted, which can be found on the CITC website. KSA Government initiated the steps to liberalize the market, and create a positive regulatory framework to attract investors in order to promote growth of the ICT market [26]. Another big step was that "By 2004, competition was introduced in the mobile, data and VSAT telecom areas. Competition in the fixed services and more mobile market liberalization was introduced by issuing new licenses in 2007" [26]. A number of initiatives and policies have been developed to stimulate spread and usage of the Internet. As a result, "ICT services have been improving in terms of scope, quality and lower prices to the consumers" [26]. Saudi Arabia joined the World Trade Organization (WTO) as its 149th member in December 2005. As part of the WTO commitment, Saudi Arabia is committed to liberalize its ICT sector in accordance with, the General Agreement of Trade in Services (GATS), the Agreement on Basic Telecommunications (ABT) and the Reference Paper [26].

TERMINOLOGY

1. **Personal Computer Technology (PCT):** For this research by the term IT (used in TAM) we mean Personal Computer Technology. PCT includes hardware and software that is used in an office/ business/management/class environment.
2. **Organizational Culture (OC):** Ways, in which people perform tasks, solve problems, resolve conflicts, treat customers, and treat employees.
3. **Perceived Ease of Use (PEU):** The degree to which a person believes that using a particular system would be free of effort.
4. **Perceived Usefulness (PU):** The degree to which a person believes that using a particular system would enhance his or her job performance. A distinction has been made between the two terms, Personal Utility and "Perceived Usefulness". This research defined Personal Utility as individual's personal benefits from the use of Personal Computer Technology while "Perceived Usefulness" is more contributed to organizations rather than individuals own benefits.
5. **Attitude (AT):** A person's general feeling of favorableness or unfavorableness for the concept.
6. **Behavior Intention (BI):** A person's wishing to perform a behavior.

METHODOLOGY

The research method chosen for this study is the correlation as opposed to experimental. The correlation type only seeks to look for relationships (correlations) between two or any set of variables. In experimental research, the effect of one variable is studied on another variable. Only experimental data can conclusively demonstrate causal relations between variables but correlation data cannot conclusively prove causality. This study only looked for associations between study variables not causation. The following section gives details of the methodology designed for this study.

1. As a first step, based on the literature hypotheses were designed. The hypotheses were then used to assess the Personal Computer Technology use.
2. The employees Idara office (administrative department) at IMAMU participate in the study.
3. A questionnaire was designed, based on the proposed hypotheses.
4. The measurement constructs and their scales were designed.
5. The paper based questionnaires was distributed by the responsible persons appointed in each department of the Idara office in Imam University.
6. The usable questionnaires were coded in SPSS and Excel for extensive analysis.
7. Analysis were conducted to test the proposed hypotheses

STUDY FACTORS

Based on the previous research and keeping in view the research problem that this study addresses, the following variables are selected for this study.

External Factors

1. Organizational Culture (OC)
2. Duration of Training (DOT)
3. Computer Skills (CS)
4. Level of Education (LOE)

5. System Factors (SF)

Belief Factors
1. "Perceived Usefulness" (PU)
2. "Perceived Ease of Use" (PEU)
3. "Attitude" (AT)
4. "Behavioral Intention" (BI)

INSTRUMENT DEVELOPMENT

Although it is very difficult to measure subjective constructs but we still needed it and developed some method of measuring it. Every effort was made to design easy to understand and minimum possible number of items for this study. The attempt to include minimum items per construct was because it was believed that respondents in the test environment would not pay attention to lengthy instrument. Most of the items used in this research were adopted from previous studies; however some wording changes were made to make it more easily understandable for non-native English language population selected for this study. Following are the constructs developed for this research.

Items for the construct of Organizational Culture (OC)

OC.1 In my department the use of Personal Computer Technology is helpful in getting promotion (Q10)

OC.2 My co-workers always help me using "Personal Computer Technology" at job.(Q11)

OC.3 Management of my organization encourages me to use Personal Computer Technology at my job(Q12)

OC.4 The Personal Computer Technology provided to me makes it easier for me to do my job(Q13)

Items for the construct of System Factors (SF)

SF.1 The software, which is necessary to perform my job is available to me(Q14)

SF.2 The quality of software available to me is satisfactory(Q15)

SF.3 The hardware, which is necessary to perform my job is available to me(Q16)

SF.4 The quality of hardware available to me is satisfactory(17)

Items for the construct of Perceived Usefulness (PU)

PU.1 Use of Personal Computer Technology is very helpful in achieving the goal of my department (Q18)

PU.2 Use of Personal Computer Technology has improved efficiency of my department (Q19)

Items for the construct of Perceived Ease of Use (PEU)

PEU1. It is easy to learn how to use Personal Computer Technology (Q20)

PEU2. It is difficult to become skillful using Personal Computer Technology (Q21)

PEU3. Interaction with Personal Computer Technology is clear and easy to understand (Q22)

Items for the construct of Perceived Personal Utility (PPU)

PPU: Use of Personal Computer Technology will make my job more secure (Q23)

Items for the construct of Attitude (AT)

AT.1 It is good to use Personal Computer Technology at work whenever it is of help (Q24)

AT.2 I believe that Personal Computer Technology should only be used for job related tasks (Q25)

Table 1: Items for the construct of "Behavior Intention" (BI)

BI : In the future, I will use Personal Computer Technology in as many cases as possible(Q26)

TOOLS USED:

For this study the data analysis is performed using SPSS and Excel applications.

Frequency Distribution of the survey part-1

Most employees of the IMAMU belong to the management department (59%). Very few of them participated from the CS department. The reason being that the survey was only distributed in the Idara (establishment) office of the IMAMU which is purely an administrative department. A high percentage (73%) of respondents' job function is management. Most of the respondents (73%) have received 1-4 weeks of computer training. Overall very few respondents have computer skills. Most (82%) have MS office skills. Most (47%) of the respondents have B.S as the Level of education. One interesting finding observed in this study is that a large number (97%) of respondents says that it is a requirement to use personal computer at work. This indicates that at IMAMU most of the office work is done using personal computer as opposed to manual file processing. This may also be the reason of use of PC at work for longer hours.

Frequency Distribution of respondents to each questions of part2 of the survey

Most respondents believe (33% strongly agree and 37% agree) that use of PC is helping them performing their job. The organizational culture seems to be favorable for the use of PC at work because workers are helping each other using PC and the management encourages the employees to use PC at work (figure 17). Overall the employees of Idara office of the IMAMU have a fairly good perception about the organizational culture, system factors, ease of PC use, and usefulness of PC.

HYPOTHESIS TEST RESULTS (FIGURES 4-15 ON LAST PAGE)

Ho.1 Negative association exists between "Organizational Culture" and the user's perception of "Perceived Usefulness" towards "Personal Computer Technology" use on the job. This hypothesis is rejected because their exist a positive relationship between each construct (question) of the user perception of PC usefulness and the organizational culture except the weak negative association between OC1 ("In my department the use of Personal Computer Technology is helpful in getting promotion" Q10) and PU1 ("Use of Personal Computer Technology is very helpful in achieving the goal of my department"Q18) (figure 4).

Ho.2 Negative association exists between "Organizational Culture" and the user's perception of "Perceived Personal Utility" towards "Personal Computer Technology" use on the

job. There is strong correlation between the two factors (OC and PPU) (figure 5) therefore this hypothesis is rejected. This result indicates that the organizational environment of in the Idara department of Imam University is favorable and encourages employees in using PC at job.

Ho.3 Negative association exists between "System Factors" and the user's perception of ""Perceived Ease of Use"" towards "Personal Computer Technology" use on the job. There exists a strong association between all the constructs of system factors and the user's (employees of Idara Office in Imam University) perception of ease of computer use. This finding leads us to reject the hypothesis. This result also tells us that the employees of Imam University are satisfied from the hardware and software quality available to them (figure 6).

Ho.4 Negative association exists between "System Factors" and the user's perception of "Perceived Usefulness" towards "Personal Computer Technology" use on the job. The association showed in figures 7 shows that an overall positive association exists between the two constructs of system factors and the user perception of Usefulness. We reject this hypothesis. The result indicates that there is positive but weak association between the constructs of SF1 and PU2 and SF2 and PU2.

SF.1 The software, which is necessary to perform my job is available to me (Q14)

SF.2 The quality of software available to me is satisfactory(Q15)

PU.2 Use of Personal Computer Technology has improved efficiency of my department (Q19)

Ho.5 Negative association exists between "Training" and the user's perception of "Perceived Personal Utility" towards "Personal Computer Technology" use on the job. The hypothesis is rejected because we see a positive association exists between PC training and the perception of "Perceived Personal Utility"(PPU). This means that by receiving computer training user think that they can get reward to utilize their knowledge about computer (figure 8).

Ho.6 Negative association exists between "Level of Education" and the user's perception of "Perceived Personal Utility" towards "Personal Computer Technology" use on the job. Figure 9 suggests that there is positive but week association between the factors of Education and perception of "Perceived Personal Utility". We therefore reject the hypothesis. This indicates that employees with relatively high level of education are not very satisfied from the financial benefits for the use of computer at work. Further investigation is suggested to know the reason(s) of weakness of this association.

Ho.7 Negative association exists between "Training" and user's perception of ""Perceived Ease of Use"" towards "Personal Computer Technology" use on the job. Overall positive association exists between the items of training construct and PEU. So this hypothesis is rejected. But it should be noted that there is one negative association exists between training and PEU3,"Interaction with Personal Computer Technology is clear and easy to understand" (Q22). It is also noticed that the positive associations are week. This result suggests that with computer training the perception of ease of PC use is not improving. This needs to be further investigated to find out why it is the case (figure 10).

PEU1. It is easy to learn how to use Personal Computer Technology (Q20)

PEU2. It is difficult to become skillful using Personal Computer Technology (Q21)

PEU3. Interaction with Personal Computer Technology is clear and easy to understand (Q22)

Ho.8 Negative association exists between "Level of Education" and the user's perception of "Perceived Ease of Use" towards "Personal Computer Technology" use on the job. Based on the correlation values in figure 11 the hypothesis is rejected. We see two strong associations between the two constructs of level of education and perception of ease of use (Education-PEU1, Education-PEU2) and one negative association(Education-PEU3)

PEU1. It is easy to learn how to use Personal Computer Technology (Q20)

PEU2. It is difficult to become skillful using Personal Computer Technology (Q21)

PEU3. Interaction with Personal Computer Technology is clear and easy to understand (Q22)

Ho.9 Negative association exists between "Training" and the actual use of "Personal Computer Technology" on the job. The hypothesis is rejected because there is a week but positive association between the two constructs (figure 12). This result tells us that the training of employees didn't help them much in motivating them to computer at work. It is suggested that the training program should be looked into a see if there is any problem.

Ho.10 Negative association exists between "Level of Education" and the actual use of "Personal Computer Technology" on the job. The hypothesis is accepted because there is a negative although week association between the two constructs (figure 13). This result indicates that people with high level of education do not use computer at job. This result needs to be further investigated.

Ho.11 Negative association exists between "Organizational Culture" and the actual use of "Personal Computer Technology" on the job. The hypothesis is accepted because there exists negative association between three constructs of the two factors (OC and PC use)(figure 14). Although there is one positive association exists between one construct of the two factors but this not enough for accepting the hypothesis. This needs further investigation to find the cause.

OC.1 In my department the use of Personal Computer Technology is helpful in getting promotion (Q10)

OC.2 My co-workers always help me using "Personal

Computer Technology" at job. (Q11)

OC.3 Management of my organization encourages me to use Personal Computer Technology at my job(Q12)

OC.4 The Personal Computer Technology provided to me makes it easier for me to do my job(Q13)

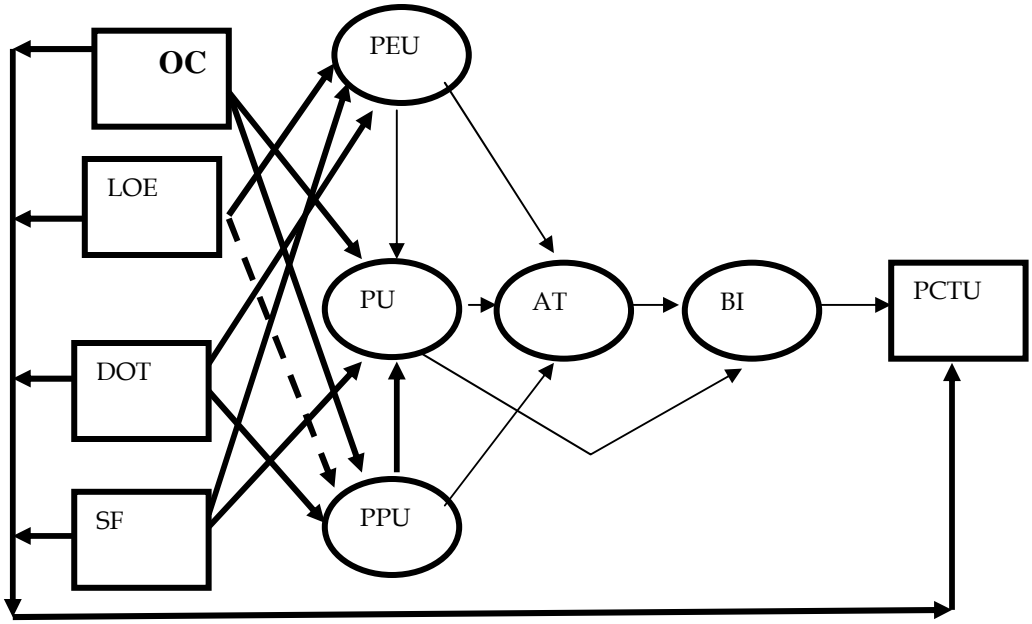
PC Use: For how many hours do you use "Personal Computer Technology" at job every day (Q8)?

Ho.12 Negative association exists between "System Factors" and the actual use of "Personal Computer Technology" on the job. The hypothesis is rejected because there is a positive association between the two constructs (figure15).

NEW MODEL (AS RESULT OF DATA ANALYSIS) FOR THE IMAM UNIVERSITY

In light the above construct, the following model shows the assessment of Personal Computer Technology use at the Idara office of the Imam Muhammad Ibn Saud Islamic University.

Figure 4



OC : Organizational Culture
LOE : Level of Education
DOT : Duration of Training
PEU : "Perceived Ease of Use"
PU : "Perceived Usefulness"
PPU : Perceived Personal Utility
BI : "Behavior Intention"
PCTU : Personal Computer Technology Use
SF : System Factors
AT : Attitude

Legends:
Null Hypothesis Accepted
Null Hypothesis Rejected
Insignificant association
Original TAM's association

Conclusion:

The result of this study indicates that overall the paths of the original TAM holds true but the associations between factors are not as strong as predicted by TAM. Plus there were also some results that do not support TAM's original paths. It was found the there is a negative co-relation between higher education and personal computer use. This result is going against the findings of TAM and indicates that people with high level of education do not use computer at job. This result needs to be further investigated in order to know the reasons behind this trend. One other finding of this study is also not according to the TAM and that is that there exists negative association between the factors of organizational culture and personal computer usage. This needs further investigation to find the cause. This result study will serve as the basic step for measuring IT utilization and can be extended to all the higher education institutions perhaps to all government organization by adjusting the study factors according to the culture and norms of the Arab world.

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References

[1]. Davis, F.D., 1986, "A Technology Acceptance Model for Empirically Testing New End-User Information Systems: Theory and Results," Doctoral Dissertation, MIT Sloan School of Management, Cambridge, MA.

[2]. Raza Ur Rehamn Qazi, 2007, " Expanding the Technology Acceptance Model (TAM): A Consideration of Personal Computer Technology (PCT) Use in Public Organizations of a Developing Country of South Asia, Pakistan

[3]. Davis, Fred D., September 1989, " Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology" MIS Quarterly, 13 (3), pp. 318-340

[4]. Davis, Fred D.; Bagozzi, Richard P.; Warshaw, Paul R., August, 1989, "User Acceptance of Computer Technology: A Comparison of Two Theoretical Models" Management Science, 35 (8), pp. 982-1003.

[5]. Ajzen, I., 1991, "The Theory of Planned Behavior: Organizational Behavior and Human Decision Processes," Vol. 50, pp.179-211.

[6]. Fishbein, M. and Ajzen, I., 1980, Understanding Attitudes and Predicting Social Behavior, Englewood Cliffs, NJ: Prentice Hall Inc.

[7]. Alavi, M., June 1984, "An Analysis of the Prototyping Approach to Information Systems Development," Communication of the ACM. 27(6), pp.556-563.

[8]. Alshibl, G. A., 1990, "A Study of the Impact of Using Automated Information Systems on Middle Managers in Large Industrial Organization", Doctoral Dissertation, the George Washington University.

[9]. Alshilash, A. Abdullah., 1997, "Study to measure the use and effects of Personal Computer Technology on Organizational Functions", Doctoral Dissertation, The George Washington University.

[10]. Alter, Steven, 1999, Information Systems, a Management Perspective, 2nd Edition

[11]. Anandarjan, Asokan; Wen, Joseph H., 1999, "Evaluation of Personal Computer Technology Investment" Management Decision; London, 37(4), pp. 329.

[12]. Armonk; Byungtae; Nirup, M. Menon, spring 2002, "Personal Computer Technology value through different normative lenses", Journal of Management Information Systems, 16(4), pp. 99-119.

[13]. Armonk; Chan, Yolande E. Spring 2000, "IT value: The great divide between qualitative and quantitative and individual and organizational measures" Journal of Management Information Systems, 16(4), pp. 225-261.

[14]. Armonk; Sumit Sircar; Joe L Turnbow; Bijoy Bordoloi, spring 2000, "A framework for assessing the relationship between Personal Computer Technology investments and firm performance", Journal of Management Information Systems, 16(4), pp. 69.

[15]. Armonk; Tallon, Paul P., Kraemer, Kenneth L., Vijay Gurbaxani, spring 2000, "Executives' perception of the business value of Personal Computer Technology: A process oriented approach", Journal of Management Information Systems, 16(4), pp. 145.

[16]. Arora, Ashish. Athreye, Suma., 2002, "The Software Industry and India's Economic Development", Vol. 14, pp. 253-273.

[17]. Avgerou, Chrisanthi, 1998, "How can IT enable economic growth in developing countries?" Personal Computer Technology for Development, 8(1), pp.15

[18]. Bailey, J.E. and Pearson, S.W., May 1983, "Development of a Tool for measuring and Analyzing Computer User Satisfaction," Management Science 29(5), pp. 530-545.

[19]. Bailey, James E; Pearson, Sammy W., May 1983 "Development of a Tool for Measuring and Analyzing Computer User Satisfaction", Management Science, 29(5), pp. 530-545

[20]. Talero, E and Gaudette, P., 1995, "Harnesing information for Development" A proposal for a World Bank group strategy", Discussion Paper No.313, The World Bank.

[21]. Dewan, Sanjeev and Kraemer, Kenneth L, 1998, "International Dimensions of the productivity paradox." Communiocation of the ACM, 41(8), pp. 56-62.

[22]. Pohjola, Matti, 2001, "Information Technology and economic growth: a cross country analysis," In Pohjola, Matti (ed)., Information Technology and Economic Development, Oxford University Press, pp. 242-256.

[23]. Heeks, R., 1998a, "Information technology and public sector corruption", Working Paper, ISPS, IDPM, 4, University of Manchester.

[24]. Kraemer, Kenneth L. and Dedrick, J., 1996, "Computing and Public Organizations", Center for Research on Information Technology and Organizations, Graduate School of Management, University of California, Irvine.

[25]. Cebi, Ferhan., Zozlu, Sitki., 2000, "The Strategic Effects of Information Technology on Organizational Performance in a Developing Environment: The Case of Turkey" Journal of Transnational Management Development, Vol 54, pp. 83

[26]. http://opencourseware.kfupm.edu.sa/colleges/cim/acctmis/mis345/files%5C5-Handouts_KSA-to-information-society.pdf

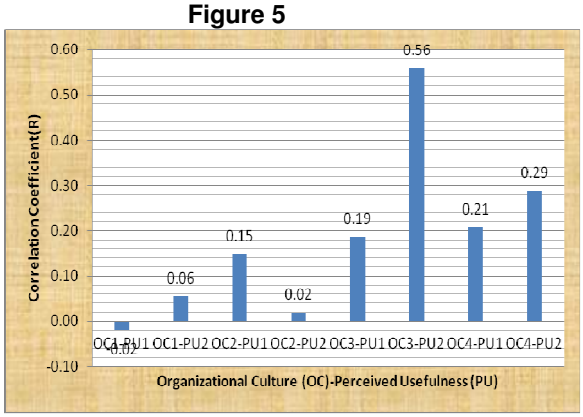
[27]. http://www.citc.gov.sa/English/AboutUs/AreasOfwork/Pages/NCIS.aspx

[28]. http://www.citc.gov.sa/English/Reportsandstudies/Studies/Pages/TheStateofICTMarketDevelopmentinSaudiArabia.aspx

[29]. http://www.oecd-ilibrary.org/education/education-at-a-glance-2012_eag-2012-en

[30]. http://www.unesco.org/new/en/education/themes/strengthening-education-systems/higher-education/reform-and-innovation/world-conference-on-higher-education/

Figure 5



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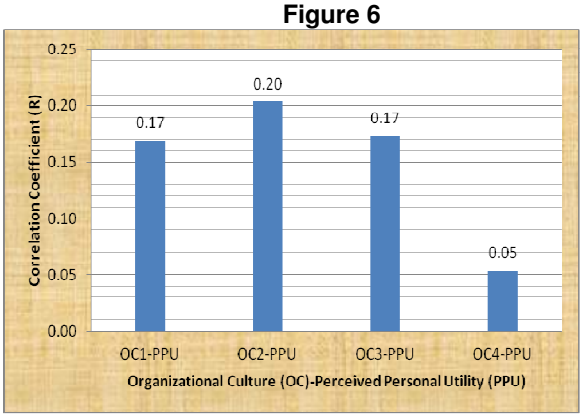

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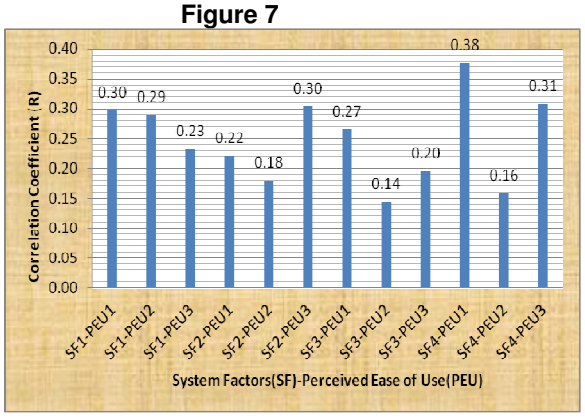

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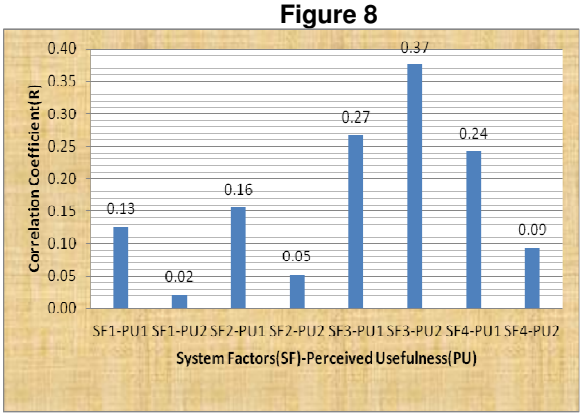

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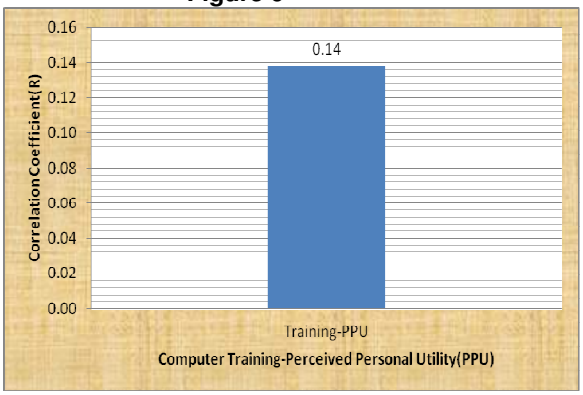

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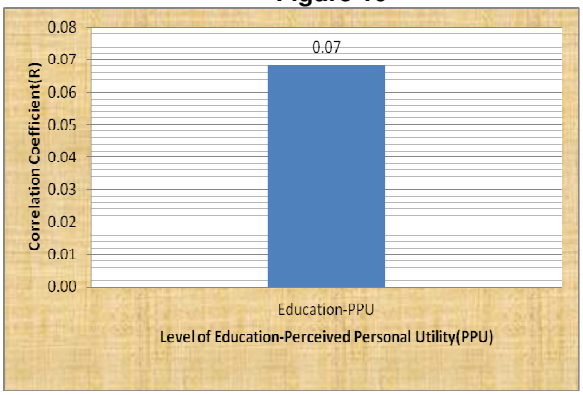

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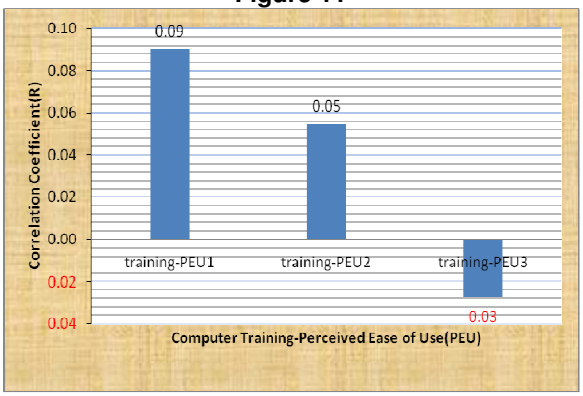

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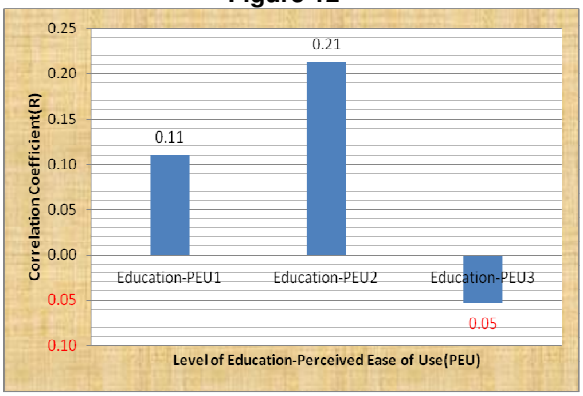

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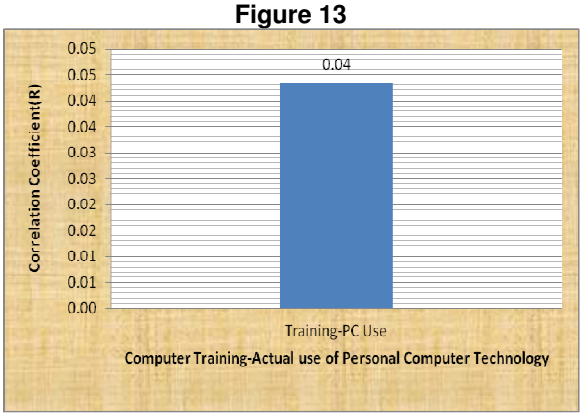

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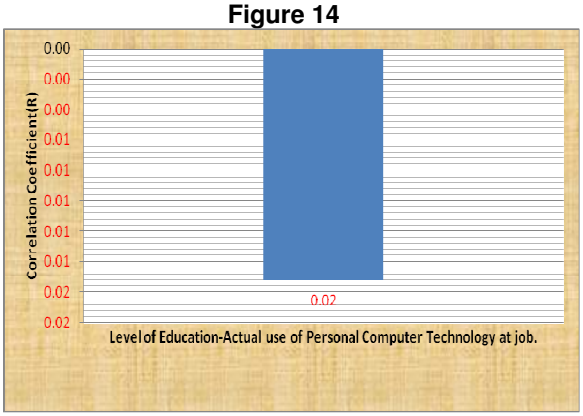

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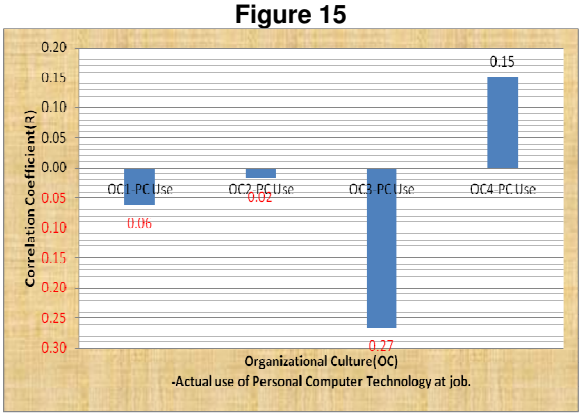
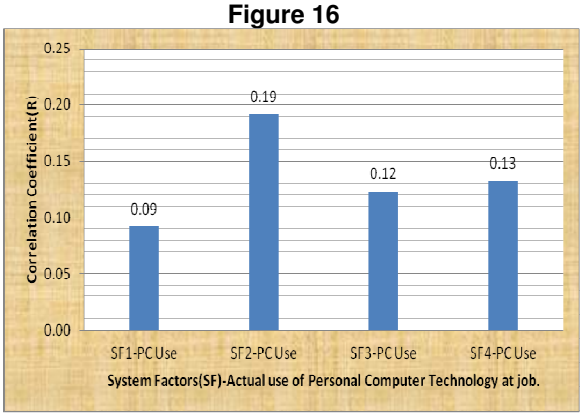
Figure 16