

An Empirical Investigation of the Determinants of User Acceptance of Electronic Exchanges (Case Study: Buying and Selling Section of Active Companies of Iran's Textile Industry)

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Received: January 14, 2011 Accepted: February 24, 2011 doi:10.5539/ijms.v3n2p73

Abstract

Electronic commerce is being increasingly developed as the modern phenomenon of business world. But this fact should be considered that in spite of all benefits electronic commerce brings about, it should not be observed as a purpose. Certainly necessary actions must be taken with regard to accepting of electronic commerce for applying and facilitating of it in the organization. The purpose of this research is designing a comprehensive model for acceptance of electronic exchanges technology in textile industry.

The statistical population consists of all employees of buying and selling section of active companies of Iran's textile industry. We have applied random sampling method in this research. In order to test the conceptual model, structural equations' model has been used that the results of it demonstrate acceptance and confirmation of all studied factors. Amount of goodness indexes (AGFI= 0.93, GFI= 0.96) shows suitability of the model.

Keywords: Technology Acceptance Model (TAM)

1. Introduction

Given the pace of information technology (IT) change; issues of IT implementation and employee acceptance of IT have become increasingly important. However, when the additional pressure of globalization is added, these issues have the potential for becoming particularly complex and challenging.

For the last two decades, a key objective of much IS research has been to investigate the factors that motivate individuals to use information systems. Pursuing this objective; Davis and his colleagues (1989) have developed the technology acceptance model (TAM). The model asserts that the intention to use or actual use of an information system is a function of perceived ease of use and perceived usefulness. In addition, the model proposes that perceived ease of use influences perceived usefulness. From its inception, TAM has been widely applied to a diverse set of information technologies and users; and has received substantial empirical support (Adams et al, 1992). Saga and Zmud identified twenty empirical studies aimed at investigating the nature and determining factors of IT acceptance. User intention to use IT has generally been used as a dependent variable; with "system use" as a surrogate measure. Among the twenty studies; Davis's technology acceptance model (TAM) is one of the most influential. Quite a few follow-up studies have been conducted to test the validity of the model in an empirical setting.

The primary objective of this research is to examine a modified TAM based on Integration of findings obtained

in these follow-up studies. The results from empirical tests of the modified model provide valuable insights into the factors affecting IT usage behavior. First, TAM and the concept of perceived usefulness are reviewed. Based on this review, a modified TAM is proposed and described then results of a survey relating the modified TAM among employee of textile industry are reported. Details of the empirical tests of the proposed model are presented, followed by a discussion of the results.

2. Literature Review

2.1 Technology Acceptance Model (TAM)

In the late 1980s; the technology acceptance model (TAM) was developed and introduced to the IS discipline (Davis 1986; Davis et al. 1989). It was built upon the theory of reasoned action (Fishbein and Ajzen, 1975); an intention theory that has been widely accepted for the past four decades. TAM has received wide attention from IS researchers for at least three reasons. First; it has a strong foundation in psychological theory (Chau, 1996; Taylor and Todd, 1995). Second; it is parsimonious and can be used as a guideline to develop a successful information system (Venkatesh, 2000). Third; a past stream of research supports the robustness of the model across time, setting, populations and technologies (Venkatesh, 2000). TAM hypothesizes that actual system use is determined by users' behavioural intention to use (BI); which in turn is influenced by users' attitudes toward using (A). Attitude toward using is directly affected by two salient beliefs about the system: perceived usefulness and perceived ease of use. Perceived usefulness (U) is defined as "the prospective user's subjective probability that using a specific application system will increase job performance". Perceived ease of use (EOU) refers to "the degree to which the prospective user expects the target system to be free of effort". An additional relationship from U to BI in TAM is based on the assumption that intention to use could be based on an expected improvement in job performance regardless of attitude (Davis, 1986; Davis et al, 1989). TAM and the relationships of its antecedents are shown in Figure 1(Refer to notes, figure 1).

The TAM's utility is evidenced by the numerous modifications and augmentations that have been made by researchers to address the question of technology acceptance as it relates to several variables (Gibson, 2010). Several attempts have been made to enhance the explanatory and predictive utility of TAM. Taylor and Todd (1995) integrated the Theory of Planned Behavior (TPB) (Fishbein and Ajzen, 1985) to TAM and proposed a decomposed version of TPB. Later; Venkatesh and Davis (2000) proposed an extended model of TAM; which incorporates social influence processes and cognitive instrumental processes. Several researchers (Taylor and Todd, 1995) integrated variables from the Innovation Diffusion Theory (Chau, 2001) to TAM or other intention models. Recently; TAM was combined with four core determinants of IT usage (Venkatesh et al, 2003). Despite reported improvement in the explanatory power of these new models, IS researchers have maintained their interest in TAM due to its parsimony and replicability. While TAM has been used extensively in IS research, some of its variables have occasionally been omitted from the model. For example, Attitude toward Using has shown only a partial mediating impact between beliefs and intention and many studies have reported a weak link to U (Davis et al, 1989; Venkatesh and Davis, 2000). It was also claimed that excluding the attitudinal variable could perhaps help better understand the influence of U and EOU on intention (Venkatesh, 2000). While a group of IS researchers support the idea of excluding attitude from TAM, others provide supportive evidence and demonstrated benefits of preserving attitudinal variables (Chau and Hu, 2001). It is beyond the scope of this study to discuss the controversy of excluding the attitudinal variable from TAM. (Chau and Hu, 2001; Davis et al., 1989; Venkatesh, 2000; Venkatesh and Davis, 2000).

The research model was built based on TAM while introducing several modifications which were not in TAM. Information and system/service quality and Trust are some of these variables that discuss bellow.

2.2 Information and System/Service Quality and TAM

Founded on the understanding that the goal of IT is to enhance performance of system users (Gasson, 2006), quality is a difficult construct to measure due to differences in users' context of system use. Yet, interest in the construct remains high (Paul et al, 1999). In this vein; the quality of what information the system offers is important to users (Ang and Koh, 1997), especially marketers who theoretically use technology to gain competitive advantage. In fact; because demands for access to quality information (Schroeder, 1987) have not diminished as a critical component of IS success (Ang and koh, 1997); it is anticipated that this need is a core requirement for marketers. Since the applications of IT offerings should be unique to specific users (Shayo et al, 1999), marketers see IT as a basic provider of usable information. It would be expected that the higher quality of the information, the less effort that must be expended to obtain information needed to perform the user's job tasks. The information then enhances usefulness and ease of system use. Information quality is measured by a construct with the same label. It is logical for the perceptions of system/service quality to enrich the perceived

usefulness and ease of use for the system.

If the system is perceived usable, marketers who are not IT professionals; will find it functional and easy to operate. Further; users' perceptions affect their choice of product. In fact, the quality of computer systems/services has become such an issue that users often select the product based on the least number of potential problems (Stone, 2009).

2.3 TAM and Trust

Research and literature about online consumer behavior frequently cite trust as a critical factor in a consumer being willing to buy online. The model Jarvenpaa et al. (2000) tested used perceived size and perceived reputation of the online vendor as factors affecting trust in an online store. Trust then was shown to have a positive influence on an online consumer's perceived usefulness and negative relationship with perception of risk.

Koufaris and Hampton-sosa (2002) use the definition of trust proposed by Mayer (1995). define trust as the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party.

They investigated that influence of website experience on trust and propose that the way that consumers evaluate usability-based products incorporate beliefs about the interface.

The results from the Koufaris & Hampton-sosa study indicate that it is not only trust issues toward the company that influence e-commerce but also that a positive experience with the website is also important. Specifically, they determined that ease of usefulness of a company's website translated to the perception that a company is trustworthy.

Dahlberg, Mallat and Oorni (2003) have adopted Venkatesh et al.'s (2003) model to explain mobile payment solutions and introduced what they termed a "trust-enhanced" TAM model. The trust factors are perceived trust and disposition to trust. Perceived trust is the degree to which a person perceives a particular technology solution as secure and trustworthy. Disposition to trust is the extent to which a person is willing to trust others.

Dahlberg et al.'s model is summarized in figure 2. (Refer to notes)

2.4 Accessibility and TAM

Another factor that may have influence on perceived ease of use is accessibility, as suggested and empirically supported by Karahanna and Straub. In their study, accessibility is a multidimensional construct encompassing both physical terminal access and system usage ability. They argue that the more accessible an information system is the less effort is needed to use it. In the context of Internet accessibility refers to not only the physical accessibility of Internet connections; but also the global and round-the-clock nature of Internet. Karahanna argued that if the supporting technological infrastructures are easily and readily available; Internet commerce applications will become more feasible (Karahanna & Straub, 2005). Tan and Teo concurred with this argument and postulated that accessibility of Internet is a facilitator of adoption due to its capacity of allowing users to perceive the technology more favorably.

3. Conceptual Framework of Study

In line with the literature review and the purpose of the study as described at the start of the paper and Literature review, the conceptual framework of study was configured as illustrated in figure 3 (Refer to notes).

The following hypotheses were created for this study based on the conceptual framework for the study and literature review

H1: perceived Ease of use (EOU) positively influences perceived usefulness (PU).

H2: perceived trust positively influences perceived usefulness (PU).

H3: system quality positively influences perceived Ease of use (EOU)

H4: system quality positively influences perceived usefulness (PU).

H5: information quality positively influences perceived Ease of use (EOU).

H6: information quality positively influences perceived usefulness (PU).

H7: perceived usefulness (PU) positively influences intention to use.

H8: Accessibility is positively related to perceived ease of use.

4. Research Methodology

To be able to investigate the study of factors influence behavioral intention of electronic commerce users, a survey is developed and conducted in textile industry in Iran. The data is collected using 30 questions; which are submitted to employee of sell and buy departments in order to measure their perceptions and attitudes. Respondents were assured of complete anonymity and no names or other means of identification were requested. Employees are asked to fill the questionnaire using a five point Likert scale (1 as very low, 2 as low, and 3 as moderate, 4 as high and 5 as very high).

The measurement scales of PU, PEOU and ITU adapted from Venkatesh and Davis (2000) are used. fourteen-item scale was developed and used to evaluate these variables. The reliability of the scales ranged from 0.791 to 0.892. trust was measured using the five-item scale developed by Dahlberg (2003) with reliability alpha of 0.931. For the Information quality was adapted from the information usage (company sources) scale tested by Crosby and, Stephens (1987) with reliabilities of 0.84. And four-item scale was developed and used to evaluate the Information quality. Computer system/service quality created by the authors after discussions with marketing executives and a thorough review of the literature. A four-item scale was developed to measure the computer system/service quality. Accessibility was measured by a scale adapted from Culnan (2000) in assessing user perceptions of information accessibility when using computer-based IS. All the measurement scales used in this study are 5-point Likert-type scale.

4.1 Sample Selection and Date Collection

The population of this survey includes all employees of buying and selling section of active companies of Iran's textile industry. A total of 221 questionnaires were sent to a random sample the population of employee. A total of 200 usable replies were obtained; representing an effective response rate of 90 percent. Table 1 addresses the demographic characteristics of sample of employee (Refer to notes).

5. Studying Hypotheses and Conceptual Model of Research

Structural equation modeling (SEM) was used to test the hypothesized relationships in the proposed model shown in Figure 4(Refer to notes). The structural equation modeling technique enables the simultaneous estimation of multiple regression equations in a single framework. Notably; all direct and indirect relationships in the model are estimated simultaneously, and thus the method allows all the interrelationships among the variables to be assessed in the same decision context (Oh, 1999). The proposed model was analyzed via the maximum likelihood estimator of LISREL 8.5 by using the covariance matrix of the measured variables as input. Therefore we can represent the following structural equation with due attention to the output of LISREL software. Researchers have recommended that for Structure Equation Model (SEM) analysis, a sample size from 100 to 200 is appropriate (Bollen, 1989). The sample size in this study was 200, so SEM analysis could be applied.

The main proposed question is that whether this model is suitable or not. In order to answer to this question we should evaluate circumstantial evidence/ χ^2 /df and other suitability measures of the model's goodness.

The calculated amount of χ^2 / df is equal to 1.39 based on LISREL software' output. The low amount χ^2 / df shows suitable goodness of the model, because the lower the amount of χ^2 /df, the more suitable the offered model. With due attention to the following results that are obtained from the output of LISREL software:

$$0.069 = \text{RMSEA} ; 0.12 = \text{value} - ; p \ 1.39 = \frac{\chi^2}{df}$$

Amount of p-value is higher than the amount of standard significance level ($\alpha = 5\%$), so the represented model is suitable. Circumstantial evidence t is used in order to show significance of each parameters of the model. This circumstantial evidence is obtained from the proportion of each parameter's coefficient to the standard deviation error of that parameter which should be higher than 2 ($t \geq 2$) in t-test and higher than 1.96 ($z \geq 1.96$) in z-test.

With due regard to LISREL output (Refer to notes; figure 5) amount of calculated t is higher than 2 in all variables Thus, all represented estimates are significant statistically.

Table 2(Refer to notes) reports goodness of fit indices, standardized parameter estimates and their t-values for the structural model. The overall chi-square statistic is significant ($\chi^2 = 528$; $p < 0.01$). All other goodness of fit indices is within the acceptable ranges (GFI = 0.96, AGFI = 0.93, SRMR = 0.0045, CFI = 0.97, RMSEA = 0.069). All of the fit indices indicate that the proposed model exhibits a reasonably good fit to the data. In accordance with the parameter estimates shown in Table 1; perceived ease of use is positively and significantly

related to perceived usefulness (H1: $\gamma^1 = 0.91$, $P < 0.05$). In the same way, as proposed in H2, trust has a positive and significant Effect on perceived usefulness (H2: $\gamma^2 = 0.60$, $p < 0.01$); H3, system quality positively and significantly affect perceived ease of use (H3: $\gamma^3 = 0.73$, $p < 0.01$); system quality perceived usefulness (H4: $\gamma^4 = 0.38$, $p < 0.05$); information quality positively and significantly affect perceived ease of use (H5: $\gamma^5 = 0.64$, $P < 0.01$); information quality positively and significantly affect perceived usefulness (H6: $\gamma^6 = 0.55$, $p < 0.05$), perceived usefulness positively and significantly affect intention to use (H7: $\gamma^7 = 0.56$, $p < 0.01$) and at last accessibility positively and significantly affect perceived ease of use (H8: $\gamma^8 = 0.63$, $p < 0.01$).

6. Conclusion

The objective of this study was to develop a more comprehensive version of TAM that can explain the development of employees' behavioral intentions to adopt and use internet in e-commerce. For this purpose; new constructs modified from TAM were employed and the results offer help in understanding the user's attitudes and intentions toward in a new field. The measurement model was confirmed with adequate convergent and discriminate validity with respect to the measurement of the constructs in the research model. Overall; the results show that the model demonstrates good predictive power and explains behavioral intention of users of textile industry in Iran. The structural model provided a good fit to the data, and all path coefficients in the model were found statistically significant.

Our results also confirmed prior TAM research that found that perceived usefulness was a more important predictor of intended system usage than perceived ease of use (Davis, 1989; Chau et al., 2001). In accordance with research that has demonstrated the utilitarian nature of online consumers we found that a consumer's belief about the usefulness of internet affects intention to use. Many of the relationships in the theoretical model have been examined previously in the literature. It is worthwhile to compare the results presented here, relationships between both system/service quality and information quality to perceived usefulness have been previously acknowledged. Yet; relationships from these same two variables to system use have not been previously found. The results from this research expand these results. Also we found that a consumer's trust about the internet affect perceived of usefulness that confirmed previous research in this field.

We consider this study a stepping stone on the road to understanding online consumer behavior. Many issues remain unresolved and many questions unanswered. We took a first step at studying the consumer experience on the Web and found a number of metrics to be reliable and homologically valid. Future research can use these metrics to explain how and why consumers think, act, and feel when shopping on the Web.

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Table 1. Sample Demographic Characteristics

	Number		Number		Number
Age		Educational Level		Gender	
25-35	25	High school	45	Male	171
35-45	49	Diploma	35	Female	29
45-55	86	Associates	0		
55-65	35	Bachelors	105		
65 and over	5	Masters and higher	15		

Table 2. Summary of Results

Path		Hypotheses	Estimate	T-Value
Ease of use (EOU)	Usefulness (PU)	H1	0.91**	6.83
Trust	Usefulness (PU)	H2	0.60*	6.34
System quality	Ease of use (EOU)	H3	0.73*	7.6
System quality	Perceived usefulness (PU)	H4	0.38**	6.87
Information quality	Perceived Ease of use (EOU)	H5	0.64*	2.19
Information quality	Perceived usefulness (PU)	H6	0.55**	6.99
Usefulness (PU)	Intention to use	H7	0.56*	3.88
Accessibility	Perceived ease of use(EOU)	H8	0.63*	7.07

χ^2/df	1/39
GFI	0.96
AGFI	0.93
RMSEA	0.069
CFI	0.97
NFI	0.98
SRMR	0.0045

Notes: CFI = comparative fit index; GFI = goodness of fit index; AGFI = adjusted goodness of fit index; SRMR = standardized root mean square residual; RMSEA = root mean square error of approximation; *p < 0.01 (one-tailed test); **p < 0.05

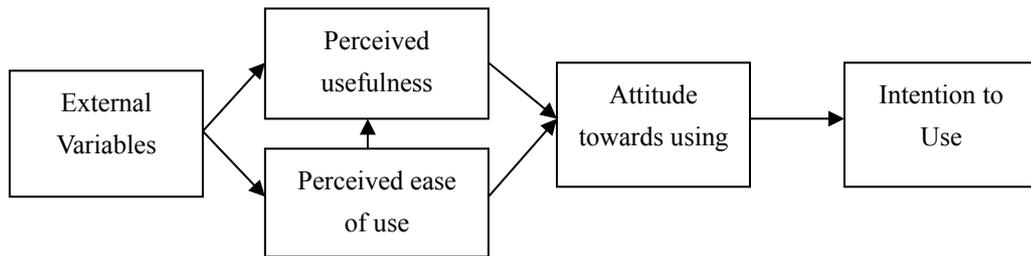


Figure 1. Technology Acceptance Model (Davis et al., 1989)

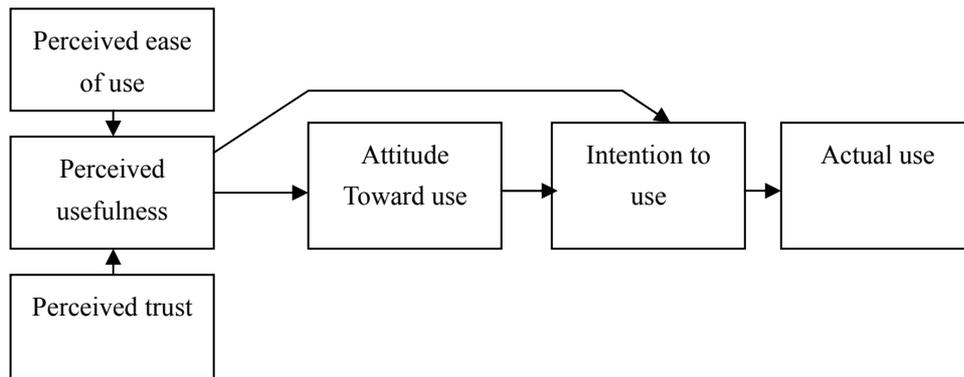


Figure 2. Trust Enhanced TAM (Dahlberg et al., 2003)

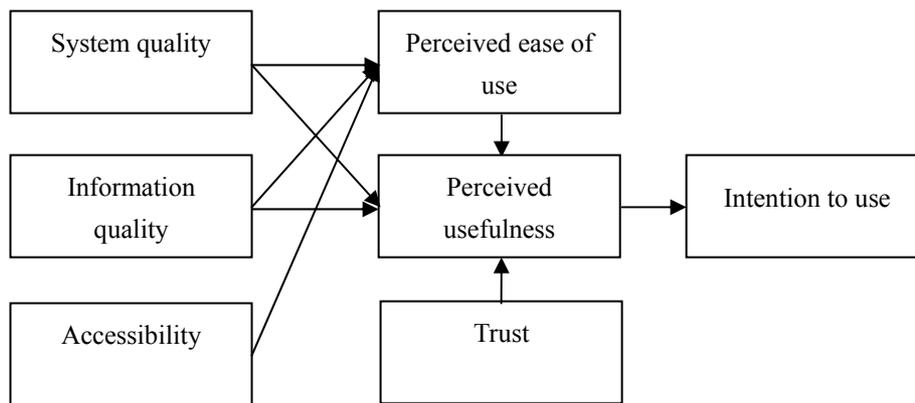


Figure 3. Conceptual Framework of Study

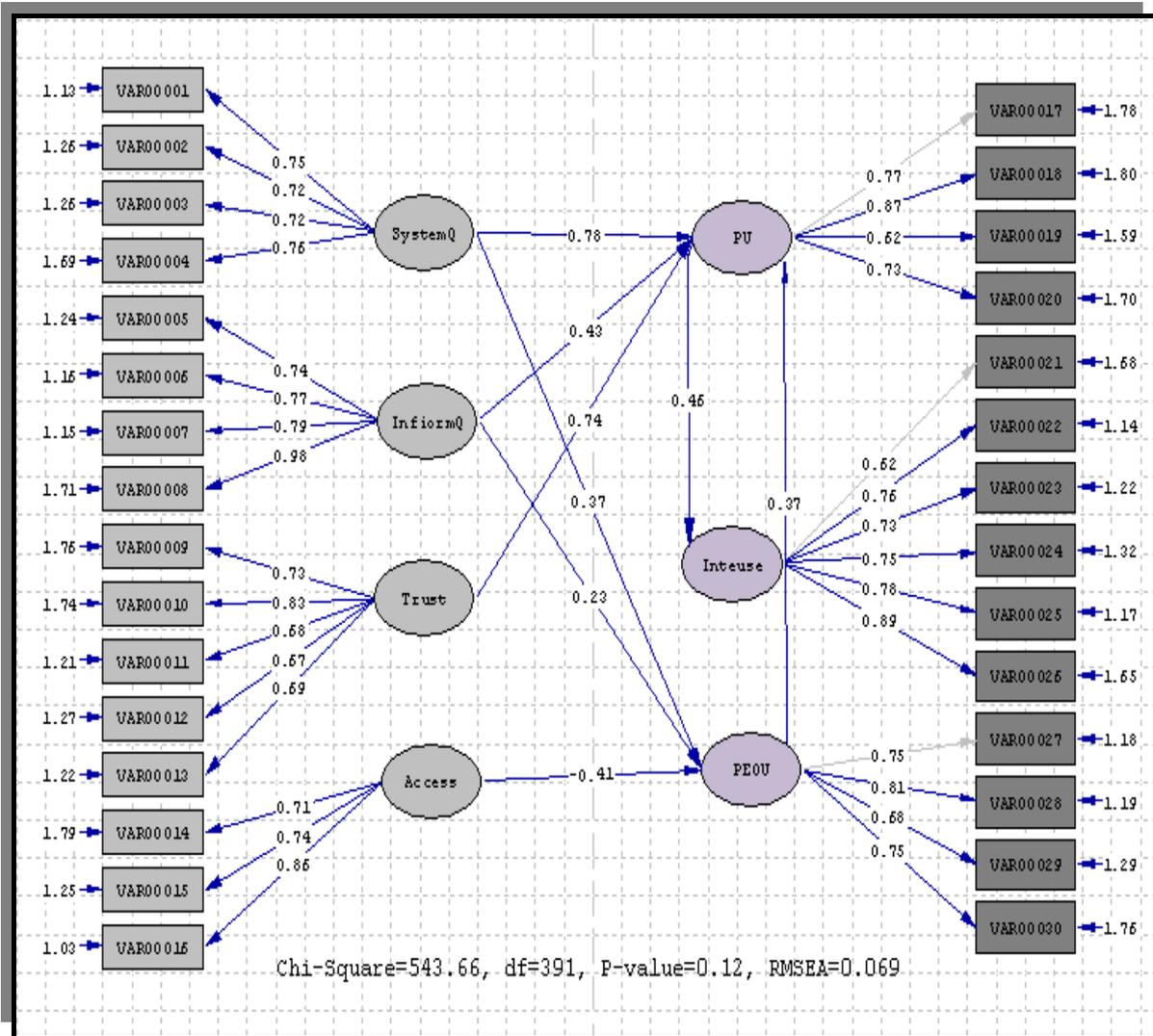


Figure 4. Principal Model of Research

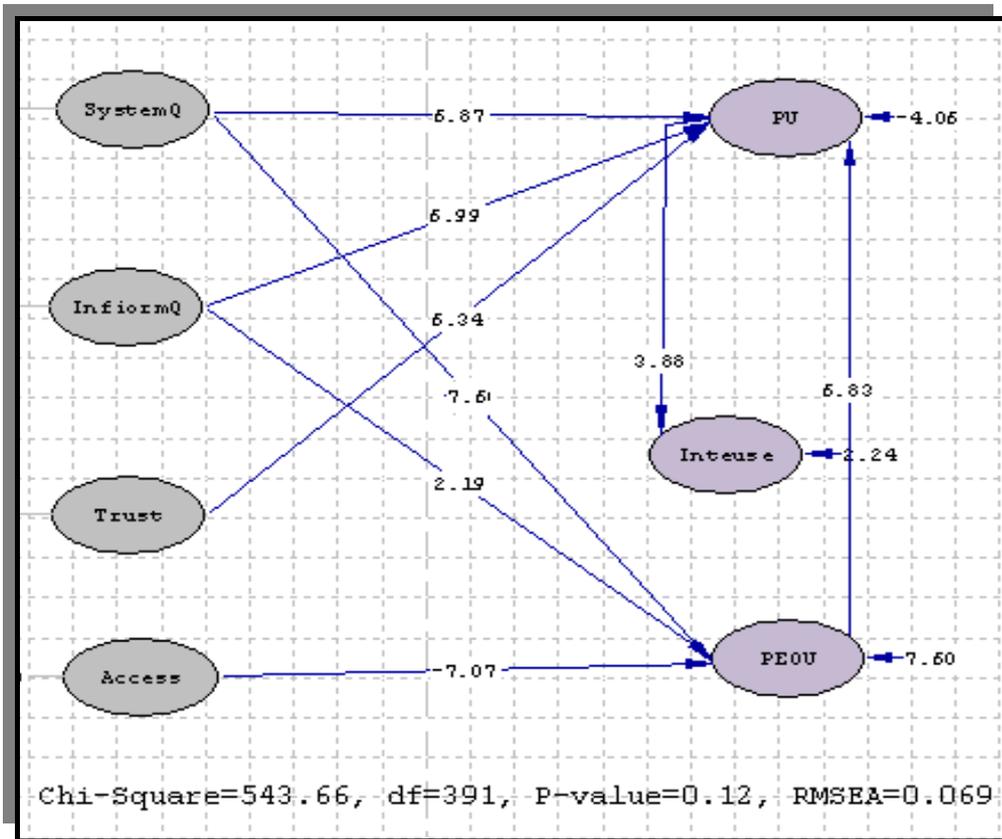


Figure 5. Model of Adjusted Index of T