

The role of e-readiness assessment criteria in accepting e-commerce for small and medium size enterprises—Development of technology acceptance model

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Abstract: This paper develops Davis technology acceptance model by adding two criteria of e-readiness assessment. For small and medium size enterprises, the paper evaluates the credit of developed model in studying the efficient factors in internet technology acceptance, which is one of the most applicable communication tools in e-commerce. The added factors, taken from models and means of e-readiness assessment, are “existing information technology infrastructures” as well as “organization’s training”. The authors study 45 small and medium size enterprises in the city of Tehran, which are active in information technology products and services. Using Lisrel structural equation modelling, it is shown that there is a meaningful relationship between the added factors and the variables indicating internet network usage. Therefore, the better factors of e-readiness assessment lead to the higher acceptance level of electronic communication tools in e-commerce.

Key words: information technology; e-readiness; e-commerce; technology acceptance; small and medium size enterprises

1. Introduction

Considering the importance of studying the level of e-readiness, several studies have been done to rank countries from e-readiness factors’ point of viewpoint. Based on factors such as connection ability, enterprise environment, enterprise acceptance, consumer acceptance, legal environment, policy making, social and cultural environment as well as electronic services, Economist Intelligence Unit (EIU) along with IBM Company, for example, published a report on ranking countries in e-readiness each year. According to this ranking, Denmark, USA, Sweden, Holland and UK were in the 1st to 5th places in 2005. Iran, Indonesia, Vietnam, Kazakhstan, Algeria, Pakistan and Azerbaijan were at the bottom of the table. Statistics show that undeveloped and developing countries had the lowest ranks (Economic Intelligence Unit, 2005).

As the rate of technology acceptance in undeveloped and developing countries is low, it seems that there is a relationship between e-readiness and information technology acceptance. By adding two factors of evaluating the level of e-readiness to Davis technology acceptance model (1989), this paper investigates the relationship between the added factors and variables indicating internet network usage in small and medium size enterprises.

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Firstly, the subject of technology acceptance and Davis technology acceptance model will be mentioned. Then the subject of e-readiness and models of evaluating e-readiness, and finally research model, research methodology and the result of the research will be presented.

1.1 Technology acceptance

To study the technology acceptance, several models have been introduced, such as innovation diffusion theory (IDT), theory of reasoned action, theory of planned behaviour.

In technology acceptance, especially in information technology, technology acceptance model is a much more applicable one.

1.2 Technology acceptance model (TAM)

Technology acceptance model (TAM) is a modified version of Davis' theory of reasoned action (TRA) that he wrote in his PhD thesis. Fig. 1 shows Davis' technology acceptance model followed by some definition (Davis, 1989).

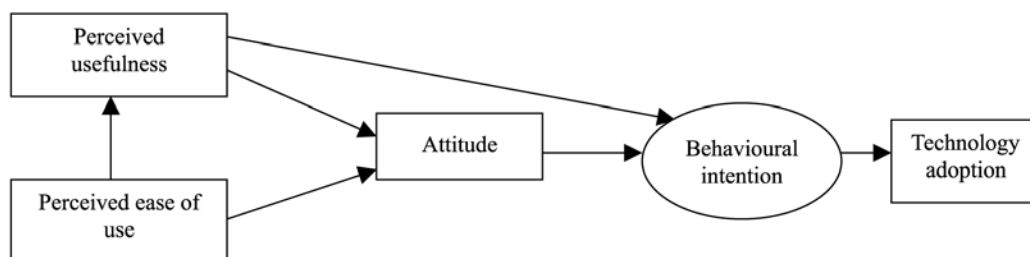


Fig.1 Technology acceptance model

(1) Perceived usefulness: “the degree, to which a person believes that using a particular system, would enhance his or her job performance” (Taylor, 1995);

(2) Perceived ease of use: “the degree to which a person believes that using a particular system would be free from effort” (Venkatesh, 2000);

(3) External variables: the external variables are also important, but when considering the amount of time and place needed, these factors are excluded;

(4) Attitude towards usage, which reflects feelings of favourableness or unfavourableness for using the technology (Fishbein, 1975).

2. E-readiness: concepts and models

Over the past years, a number of models for e-readiness assessment of countries at macro level have been developed by different organizations. On the surface, each model gauges how ready a society or economy is to benefit from IT and e-commerce; On closer examination, the models use varying definitions for e-readiness and different methods for measurement. These e-readiness assessment models are mainly grouped in four categories according to bridges website (www.bridges.org):

(1) Ready-to-use tools: There are few ready-to-use tools freely available on the web;

(2) Case studies: There are numerous case studies assessing specific countries' e-readiness, and many of these could be used as bases for e-readiness tools;

(3) Third party surveys and reports: These reports aim to rank and rate countries based on various measures held to indicate e-readiness;

(4) Other e-readiness assessment models: Except the formal tools and surveys described above, there is a range of other frameworks such as digital divide reports and position papers that can be similarly used for e-readiness assessment (Fathian, 2008).

3. E-readiness acceptance in SME

There are a number of definitions of what constitutes an SME. Some of these definitions are based on quantitative measures, such as staffing levels, turnover or assets, while others employ a qualitative approach which reflects how the business is organized and how it operates (Fathian, 2008).

The differences between SMEs and their larger counterparts are highlighted even more when their approaches to IT are considered (Nasco, 2008).

Mirchandani and Motwani (2001) investigated the factors that differentiate adopters from non-adopters of e-commerce in small businesses. The relevant factors included enthusiasm of top management, compatibility of e-commerce with the work of the company, relative advantage perceived from e-commerce, and knowledge of the company's employees about computers. The degree of dependence of the company on information, managerial time required to plan and implement the e-commerce application, the nature of the company's competition, as well as the financial cost of implementing and operating the e-commerce application were not influencing factors (Mirchandani, 2001).

4. Research model and hypotheses

This research tries to find effective factors for the acceptance of electronic tools in e-commerce for SME. To this aim, the authors used an enhanced version of TAM model by adding two factors of e-readiness assessment criteria to this model.

“Existing information technology infrastructures” is a factor which has frequently been stressed in several evaluating models such as APEC, CSPP, McConnell, EIU, ITU, USAID, CIDCM, NRI and CID. Duncan describes IT infrastructure as set of shared, tangible IT resources forming a foundation for business applications. These, composing an IT infrastructure, are platform technology (hardware and operating systems), network and telecommunication and central software applications (Anthony Bybd, 2001).

“Organization's training” includes all the training activities, such as workshops, ICDL trainings courses, seminars, aiming to improve employees' information literacy. This factor is a modified one which has been taken from APEC, CSPP, McConnell, EIU, ITU, USAID, CIDCM, NRI and CID models.

Drawing upon the literature and based on the present research context, the authors hypothesize the following:

H1: Existing information technology infrastructure will have a strong positive effect on behavioral intention of internet network usage.

H2: Organizations' training will have a strong positive effect on behavioral intention of internet network usage.

H3: Organization's policy related to the information technology will have a strong positive effect on behavioural intention of internet network usage.

H4: Perceived ease of use of internet technology has a significant positive effect on perceived usefulness of internet technology.

H5: Perceived usefulness of internet technology will have a strong positive effect on information technology

usage attitude.

H6: Perceived usefulness of internet technology will have a strong positive effect on information technology usage intention.

H7: Perceived ease of use of internet technology has a significant positive effect on information technology usage attitude.

H8: Attitude of internet network usage has a significant positive effect on behavioural intention usage of this technology.

H9: Behavioural intention usage of internet technology will have a strong positive effect on Internet network usage.

5. Research methodology

This research considers the type of aim as an “applied research” and as a matter of gathering data as a “descriptive research”. The analysis on data have been done through “path analysis” technique via Lisrel’s “structural equation modelling” and for calculating the questionnaire’s “reliability coefficient”, we used SPSS software version 11.5.

5.1 Statistical population

The statistical society of this research was the staff of a (SME) enterprise, active in information technology services in Iran. Their areas of work included software, hardware and consulting services. The units of these organisations who received the research questionnaire were: information, finance, R&D and human resource units. The main focus was on the top and medium level management who have been involve in organisation’s decision making process. The number of questionnaires received from these companies is 188.

5.2 Information gathering methodology

The questioner consists of three parts:

Part one is for gathering demographic information;

Part two is including questions for evaluating (TAM), based on Davis’s questionnaire;

Part three is including questions for evaluating e-readiness assessment criteria, based on APEC, CID, and CSPP models. A five-point Likert-type scale with anchors from “strongly agree” to “strongly disagree” was used.

5.3 Viability and reliability of the questionnaire

The viability of the questionnaire was assessed and confirmed by information technology experts and the top level managements of the mentioned organisations. To evaluate the reliability of the questionnaire the authors used Cronbach’s Alpha Coefficient and the calculated value was 85% which shows an acceptable reliability of the questionnaire.

6. Hypotheses test

The hypotheses test has been done through Lisrel’s “structural equation modelling” and the analysis was done through casual modelling.

Table 1 presents the strength of the relationship between two constructs (identified in the path column).

A relationship is confirmed if its *t*-value is greater than 2 or less than -2. If the value is greater than 2, there is a positive meaningful relationship. However, there is a negative one if it is less than -2. In view of this, Table 1 shows that there are 8 hypotheses that have been confirmed, while only one has been rejected. According to the

results, there is a meaningful relationship among added factors, existing information technology infrastructures, organization’s training and internet network usage.

Also, the results show that there is no meaningful relationship between perceived ease of use of internet technology and perceived usefulness of internet technology

Table 1 The research findings

| Hypothesis | Path | Path standard coefficients | t-value | Results |
|------------|--|----------------------------|---------|---------|
| H1 | Existing information technology infrastructures to Internet network usage. | 0.62 | 6.25 | Confirm |
| H2 | Organizations’ training to Behavioral intention of internet network usage. | 0.49 | 5.44 | Confirm |
| H3 | Organization’s policy related to the information technology to Behavioral intention of internet network usage. | 0.43 | 5.35 | Confirm |
| H4 | Perceived ease of use of internet technology to Perceived usefulness of internet technology. | 0.18 | 1.54 | Reject |
| H5 | Perceived usefulness of internet technology to Information technology usage attitude. | 0.58 | 5.48 | Confirm |
| H6 | Perceived usefulness of internet technology to Information technology usage intention. | 0.22 | 2.83 | Confirm |
| H7 | Perceived ease of use of internet technology to Information technology usage attitude. | 0.45 | 3.69 | Confirm |
| H8 | Attitude of internet network usage to behavioral intention usage of this technology. | 0.63 | 5.82 | Confirm |
| H9 | Behavioral intention usage of internet technology to Internet network usage. | 0.50 | 5.05 | Confirm |

7. Conclusion

Existing information technology infrastructures, hardware, software, applications, the web, etc., are important factors in many e-readiness assessment models such as APEC, CID, NRI, CIDCM, ITU, EIT, MCconnell, CSPP. The data analysis shows that there is a meaningful relationship between existing information technology infrastructures and internet technology acceptance. Therefore, the better existing information technology infrastructures could result in the higher acceptance level of electronic tools in e-commerce. Also, organization’s training factor, associated with NRI, USAID, ITU, EIU, MCconnell, CSPP, APEC and CID models, has a meaningful relationship with internet network usage. Therefore, enhancing employees’ knowledge and abilities in information technology will lead to achieving higher acceptance level of electronic tools in e-commerce.

For information technology usage, the relations between all paths in TAM, except the perceived ease of use of internet technology, are meaningful. Considering all the relations, we can say that better understanding of internet usage could results in both better attitude internet network usage and stronger behavioural intention of internet network usage.

As a consequence, the better factors of e-readiness assessment lead to the higher acceptance level of electronic communication tools in e-commerce. Therefore, e-readiness assessment at an SME has a strong positive effect on technology acceptance. The data analysis shows that the Davis’ TAM is a suitable model to explain electronic tools usage in SME.

From a practical point of view, this paper contributes a theory-based empirical test to future development. SMEs can use the results to understand the extent at which employees are familiarized with information

technology tools for e-commerce and adjust their industrial strategies accordingly.

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