M–Commerce Technology Perceptions on Technology Adoptions

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INTRODUCTION

This article presents a tool for assessing the probability of adopting a new technology or product before it is marketed. Specifically, the research offers managers in firms dealing with mobile electronic commerce a way of measuring perceptions of technology usage as an index for assessing the tendency to adopt a given technology. The article is based on an ongoing study dealing with m-commerce in Israel and internationally. It is centered on creating a research tool for predicting the usage of m-commerce in Israel, based on the PCI model. The suggested model is based on a questionnaire presented to the potential consumer, containing questions linking the consumer's perception of the various aspects of the technological innovation offered, together with his tendency to buy and therefore adopt it. The tool was found to possess high reliability and validity levels. The average score in the questionnaire is used to predict the probability of adoption of the mobile electronic commerce technology. Implications related to m-commerce technology in Israel and worldwide are discussed.

BACKGROUND

The main purpose of this study is to assess the tendency to adopt mobile electronic commerce technologies, prior to actually launching a new product or service based on cellular technology. The focus in the present study is on the general population and not on organizations.

Contrary to products or services sold to end users, the mobile electronic commerce field offers an innovative system of business ties with the client, by utilizing mediating tools such as the cellular device. The focus in the mobile electronic commerce field is on influencing consumers' preferences. This study presents a tool that examines the perceived utilization of technology advances in the field.

The focus in this study on the characteristics of using cellular phones for mobile electronic commerce is based on findings from a wide range of studies dealing with the characteristics of the perception of innovativeness itself.

Rogers (1983) studied thousands of cases of diffusion and managed to define five characteristics of innovativeness affecting its diffusion: relative advantage, compatibility, complexity, visibility, and trialability. While Rogers' characteristics were based on the perception of innovativeness itself, Ajzen and Fishbein (1980, p. 8) claimed that the attitude toward the object is different in essence from the attitude towards a certain behavior related to the object. Innovation penetrates because of accumulating decisions by individuals to adopt it. Therefore, not perceiving the efforts of innovation itself, but the perception of using innovation is the key to its diffusion. In the diffusion studies, the subject of perceptions was treated in relation to innovation itself. Nevertheless, the characteristics of the perceptions of innovation can be redesigned in terms of perceiving the use of the innovation (Moore, 1987). Rewriting the characteristics of *perceptions of innovativeness* into characteristics of the *perceptions of using the innovation* was the basis for the PCI (perceived characteristics of innovating) model, developed by Moore and Benbasat (1991) and used as a tool for studying the adoption of information technologies. The PCI model expands the conceptual framework designed by Rogers, by adding additional characteristics that may influence the decision to adopt a new technology. The tool was presented as reliable and valid.

MOTIVATION AND PURPOSE OF THE STUDY

The motivation for creating a tool for measuring the perceptions regarding cellular phone usage for mobile electronic commerce of the potential adopters of the technology originated from three main factors.

First were findings from previous research, which focused on adoption patterns of Internet and cellular technologies in various countries, in an attempt to present a methodology for analyzing diffusion (Reychav & Menipaz, 2002). Second, while carrying out the above-mentioned study, the researchers realized there was a lack in theoretical background for studying the initial adoption process of innovative technologies

such as m-commerce, as well as the understanding of how to successfully assimilate innovative technology. Third, an opportunity presented itself to examine the research model in Israel, a country in which the usage of cellular technology is widespread.

METHOD

The study took place in Israel, where the knowledge constraint towards cellular technology does not exist and apprehension on the part of the general population from adopting unknown technologies due to this constraint is nearly unknown. Outsland (1974, p. 28) suggested that perceptions of innovations by potential adopters of innovative technology might be an effective prediction measure for adoption of the innovation, more than personal factors. Based on this assumption, the current research focused on the university student population, which represents a segment in society that is essentially aware of computer and Internet technologies, and therefore its apprehension from adopting unknown technologies is relatively low. In addition, in Israel the penetration percentage of cellular technology has already reached its full potential, and the interest of the current research is to examine the tendencies to adopt usage of cellular phones for mobile electronic commerce. In order to do so, a research questionnaire was constructed, including 35 items dealing with perceptions regarding the use of mobile electronic commerce technology. Each item in the questionnaire was assessed on three time scales—perceptions of usage in the past, at present, and an estimate of usage perceptions in future.

The questionnaire was distributed amongst students from various departments at Ben Gurion University in the Negev. The distribution included most university departments. A total of 1,300 questionnaires were distributed. They were completed in the presence of the researcher and handed in directly.

CHARACTERISTICS OF THE MODEL

The model is based on the characteristics of the perceptions of innovativeness, which have been identified in previous studies, with a change in wording from "perception of innovativeness" to "perception of the use of innovation," as suggested in the PCI model (Moore & Benbasat 1991). The characteristics are as follows:

- **Relative Advantage:** The extent to which the use of an innovation is perceived as better than the use of its predecessor (based on work by Roger, 1983).
- **Compatibility:** The extent to which the use of an innovation is perceived as being persistent with other existing values, needs, and experiences of the potential adopters (Roger, 1983).
- **Ease of Use:** The extent to which individuals believe that the use of a specific system does not require investment of physical and emotional efforts (Davis, 1986).
- **Results Demonstrability:** The extent to which the results of using an innovation are tangible and presentable (Rogers, 1983, p. 232). Research has shown that merely being exposed to a product can in itself create a positive attitude toward it among individuals (Zajonc & Markus, 1982).
- **Image:** The extent to which the use of an innovation is perceived as improving the individual's status in society.
- **Visibility:** The extent to which the results of the use of an innovation are visible to others. The characteristic "Observability," which was mentioned by Rogers (1983), is presented in the PCI model via two variables (Results Demonstrability and Visibility).
- **Trialability:** The extent to which the use of an innovation can be experienced prior to its adoption.

RESULTS

Out of 1,300 distributed questionnaires, 1,005 were completed correctly (11.49% missing data). The study results point to 55.6% potential users of cellular phones for m-commerce in two years' time, compared to 34.8% two years ago and 38.9% users today. This is indicative of the fact that the questionnaire reflects the target population studied in the current research.

The percentage of explained variance obtained in the model runs is 67.732% in the past, 65.896% at present, and 61.470% in the future.

It is safe to say that the model for this study has been validated and verified. Therefore, we can conclude that in order to assess the probability of actual usage of cellular phone for m-commerce, the model for perceptions of use of cellular phone for m-commerce presented in this study may be used.

Predicting the Probability of Using M-Commerce

After verifying the model, a test was carried out to identify which variables assist in predicting the probability for *using cellular phones for mobile electronic commerce.*

The testing method used was Forward Stepwise Logistical Regression (Hosmer & Lemeshow, 2000), which first brings into the equation variables having the highest level of significance, and then re-calculates the level of significance

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