The moderating role of device type and age of users on the intention to use mobile shopping applications

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ABSTRACT

This work was performed to understand the characteristics of the antecedents of m-shopping adoption using mobile applications, with respect to the age of the consumer and the type of device used. The Technology Acceptance Model (TAM) and Theory of Diffusion of Innovations (DOI) were used for the purpose. The antecedents for shopping-through-mobile-apps were perceived risk, perceived usefulness, perceived ease-of-use and perceived enjoyment. Satisfaction in using an information system and personal innovativeness were also considered to have significant influences on the intention to use mobile shopping applications. In this work, devices were classified into large and small based on the screen size and respondents were classified into young (≤35 years) and old (>35 years) based on age. An online questionnaire with 32 items, administered through survey monkey, was circulated through email to the respondents and a data set of 675 responses was taken for analysis. ANOVA was used to compare the means of the responses in terms of these variables between the classified device types and age groups. Structural Equation Modeling was used to study the factors influencing the intention to use mobile shopping applications. The moderating effects of device type and age on the intention to use mobile shopping applications were analyzed. Results showed a significant difference in the responses for the variables - perceived enjoyment, perceived usefulness, satisfaction and intention to use - between the subgroups. The study also showed the presence of moderating effects of device types and age on the intention to use mobile shopping applications. The survey, results and implications of the observations are discussed in this paper.

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1. Introduction

Nowadays, accepting and using modern technologies is a common practice, people are increasingly willing to adopt a new technology in their daily lives, making technology, now more than ever become a part of our everyday activities [1]. Over the last two decades, mobile devices have brought a deep impact on the human's daily life. The retail industry has recognized the potential of mobile technology and started to provide mobile shopping to interact closely with their customers [2]. Mobile commerce commenced with the promise of rapid development for two reasons - the extensive and rapid proliferation of cell phone services and the conspicuously favorable convenience of time and place independence.

This study assumes mobile commerce as "any transaction, involving the transfer of ownership or rights to use goods and services, which is initiated and completed by using mobile access to computer-mediated networks with the help of mobile devices" [3]. In general, mobile commerce allows its users to browse or purchase products via mobile devices anytime, and anywhere [2,4,5]. Mobile commerce transformed traditional consumer experiences and is a popular way for modern consumers to search, or pay for goods using the mobile platform [5]. A study conducted by Beaconstac [6] shows that India alone has over 600 million different e-commerce product shopping related application downloads in the smartphone market. With more than 65% of web traffic coming from mobile phones and mobile devices, India is one of the biggest emerging markets in the world of m-commerce [6].

Mobile applications are a third-party software that can be installed on mobile devices [7]. Users can install different kinds of mobile applications, such as game, music, shopping, bank payment applications, and so forth, which are delivered by the third-party

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providers [8]. By the installation of these applications, the functions of the mobile devices are expanded. The number of mobile apps has been rising, and this rise contributed to the increasing range of consumer needs that are being served by mobile apps [9].

Because of the disadvantages of websites due to their limited functionality, many companies provide mobile shopping applications to the customers [10]. To take advantages of mobile shopping, companies gradually invest in creating their mobile shopping applications. Because these apps foster discussion regarding the products; enable the consumers to recommend products to friends via social networks; enable the users to receive instant push notifications regarding special offers; obtain personalized information, in other words further enhance their shopping experiences [10]. Compared to mobile websites, mobile applications are preferred by consumers primarily because they are perceived as more convenient, faster and easier to browse [11]. Mobile shopping apps usage is growing faster comparing to most other categories of mobile apps [12].

The work by Natarajan et al. [13] was one of the earliest studies to view mobile commerce as comprising two different technologies, viz. mobile websites and mobile shopping applications, and the intentions and perceptions of customers towards these two technologies as being significantly different. The use of mobile shopping applications involves activities such as purchasing products, tracking orders, earning rewards and loyalty points, accessing saved coupons, browsing or researching products, comparing products and reading reviews through a dedicated application installed on a smartphone [13]. Customers expend less effort to search for information, place orders and process transactions using these applications than in traditional web-based interface. Unlike the web-based m-commerce interface, mobile shopping applications provide a wide range of business possibilities for the retailer such as catering to specific customers, identifying seasonal purchases and providing customized recommendations, sending promotions, introducing new products and initiating new purchases. Hence for both retailers and application users, the perception and user experience associated with mobile shopping applications are significantly different from traditional mobile commerce.

Studies by Wang et al. [14] and Natarajan et al. [13] direct future researchers to explore the intentions and experiences of consumers based on the type of mobile devices used for shopping purposes. Based on the size of the screen, mobile phones can be classified into small, normal, large and extra-large devices. Technology acceptance studies in the field of mobile commerce have empirically proven that various moderators like gender, experience, loyalty, frequency of use etc. [13,15—17] influence the intention of use of technology by customers. However, far too little attention has been paid to understand the moderating role of the type of device used by customers on the intention to use mobile shopping applications or even mobile commerce in general.

Natarajan et al. [13] direct future researchers to study the moderating effect of age on the intention to use mobile shopping applications. Various studies in the field of online shopping and information communication technology discuss the moderating effect of age [18—21]. Some studies report that youngsters are more innovative and readily accept new technologies compared to older people. However, past literature in the field has not focused on the moderating effects of age on perceptions and intentions of the user, specific to mobile shopping applications or even mobile commerce in general, and this is an interesting area to explore. This study was aimed at exploring these areas in the rapidly growing Indian market of mobile commerce.

This study aimed, in particular, at identifying the various factors that affect the intention to use mobile shopping applications and analyzing the differences in these factors in terms of the age

of the respondents (younger and older respondents) and the type of mobile device (small and large sized) used for shopping purposes. A literature review of studies based on Technology Acceptance Model (TAM), Diffusion of Innovations (DOI), Theory of Planned Behavior (TPB), Expectation Confirmation Theory (ECT) etc. was used to identify the constructs that have an effect the intention to use mobile shopping applications. Then, structural equation modeling was used to check the statistical significance of these factors on the customer's intention to use mobile shopping applications. Finally, the moderating roles of the age of the respondents and device type used for shopping purposes were tested on all relationships.

2. Theory development

2.1. Technology Acceptance Model

This section reviews various concepts, theories and models found in literature, in the area of technology adoption, that can be applied in the context of mobile shopping applications to understand the behavior of the users. Technology Acceptance Model (TAM) by Davis [22] is one of the widely accepted and applied models used to study the acceptance and intention to use of information system tools such as internet banking, mobile commerce, electronic commerce etc. TAM uses "perception of usefulness" and "ease-of-use" as important variables that play vital roles in predicting the attitude of users, which, in turn, influences the adoption of new technologies [23].

Although TAM was initially developed to explain the adoption of technology within an organization, the constructs of the model can be applied to other technologies that are used by consumers in their daily lives, including e-commerce, mobile commerce and mobile shopping applications. TAM has been both extended and modified to predict the acceptance of various technologies by the general population. In this work, TAM has been used to analyze the intention to use mobile shopping applications by consumers.

2.2. Perceived usefulness

Venkatesh and Davis posit that "perceived ease-of-use play an important role and get more attention, while the perceived usefulness is believed as equally important as ease-of-use and lean toward service-dependent" [24]. The perceived usefulness of an information system is defined as "the extent to which individuals believe that using the new technology will enhance their task performance" [25]. There are many studies in the area of information systems, that show the effects of perceived usefulness on the intention to use a particular form of technology [26,27]. The consequences of user behavior are evaluated using this core variable. The perception of usefulness greatly influences a user's inclination to use a particular tool of technology. Along these lines, perceived usefulness would impact the user's goal to adopt and use mobile shopping applications.

Earlier studies in the field of technology acceptance have empirically proven that perceived usefulness is an essential variable that influences use of a particular form of technology [17,28—36]. O'Cass and Fenech [37] argue that TAM is an excellent theory for research in areas of electronic commerce applications because electronic commerce is a subset of computer technology. Building on this theory, various studies have proven that m-commerce is a subset of e-commerce. Thus, it is appropriate to study the effect of perceived usefulness on the intention to use mobile shopping applications using TAM. The following hypothesis is proposed.