Factors Affecting the Adoption of Technological Service Innovations

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Abstract. The continuous and increasing speed of technology is directly affecting human behaviour. Human nature accepts some innovations and changes as they are, while others are resisting to accept them. It is not possible to use technology effectively in the retail area without knowing the impact of technological innovations on the customers and the perspectives of customers against such innovations. For this reason, it is of enormous importance for employees and customers to adopt this innovation to achieve success and ensure sustainability of the models related to technological service innovations. The objective of this study is considering the complex structure of the adoption process of the technological service innovation by employees and customers in detail. In this context, firstly a systematic literature review was conducted and then the factors affecting the adoption of technological service innovation were identified. The extended form of The Unified Theory of Acceptance and Use of Technology (UTAUT 2), by integrating personal innovativeness (PI) factor, was developed for a technological service innovation.

Keywords: Retailing · Service innovation · Unified Theory of Acceptance and Use of Technology 2 (UTAUT2)

1 Introduction

Nowadays, service innovation implicates non-physical processes and active interactions between technological and people systems. Service innovation is either based on new service to gain more benefit effectively from changes in the new age or it refers renovation of an existing service in the organization. Benefit usually implies the added value that is presented to the customers [1]. While service innovation is recognized as the key to development and prosperity for society and countries, it is also a driving force for economic growth in the community and the sustainable development of different industrial groups [2]. In other respect, when the service innovation is evaluated from an organizational perspective, it is defined as a concept which is produced by using advanced technology compared to the market and country conditions in which the business operates, mostly focused on a different requirement of the society and creating competitive advantage against its competitors [3].

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New technologies that change dynamically and the concept of continuous innovation play a significant role in ensuring competitive advantage in the retail industry [4]. Acceptance of new technologies has always been a major concern within companies and organizations. Although there are many studies on the adoption of technological service innovation in the literature, there is a deficiency of addressing the adopting process of the technological service innovation in the retail industry in detail.

The objective of this study is to examine the complex nature of the adoption process of the technological service innovation by employees and customers in detail. For this purpose, a systematic review of literature is conducted to identify factors affecting the adoption of technological service innovation by investigating the key models related to technology user acceptance.

In the remainder of the paper, first the methodology will be explained. Then, a review of the models related to technology user acceptance will be given and the proposed model will be explained for technological service innovation. By revealing the factors that may be effective in the adoption of technological service innovations, this study also aims to provide guidance to the practitioners in this field.

2 Methodology

In this study, first a systematic review of literature is conducted to identify the factors affecting the adoption of technological service innovations by investigating the models proposed to explain the adoption of new technology by users. Then a modified version of Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) model is developed for technological service innovations by integrating personal innovativeness (PI) factor.

A large-scale systematic literature review was conducted to elucidate the factors affecting the adoption of technological service innovations. The review of literature is focused on identifying the models proposed to explain the adoption of new technology by users. Relevant keywords are used for systematic search and citation analysis is conducted to understand the development of models through time.

2.1 A Key Models Related to Technology User Acceptance

– What does acceptance mean?

On the whole, acceptance is defined as the opposite of the rejection term and the affirmative decision for using of an innovation [5]. Innovation adoption is a process that involves a number of stages leading to achieving decisions to adopt this innovation [6]. The basic conceptual framework of fundamental individual information technology acceptance model, which underlies the basis of lots of research, shows that individual reactions to using information technology not only directly affects the actual use of information technology intentions but also indirectly affects through intentions to use information technology [7].

– Types of user acceptance models of technology

A number of theories and models have been introduced to bring users to adopt new technologies, and these models and theories offer factors that can influence the use of new technologies by users [8]. The main theories and models, which have been developed over the years, are summarized below.

Theory of Reasoned Action (TRA): TRA is one of the most significant theories used to investigate users' adoption behaviour and to reveal critical factors in obtaining full benefits of information technology [9]. The most important factor that determines the behavior according to TRA is intention and it is affected by subjective norms and attitude [10]. Attitudes towards behaviour are affected by beliefs and evaluations. Subjective norm is affected by normative beliefs and motivation to comply.

Technology Acceptance Model (TAM): TAM is a theoretical model that aims to explain why people prefer to use certain technologies in their business activities [11]. In this model, two motivational variables are considered: perceived usefulness and perceived ease of use. These variables are significant for determination of behavioural intention related to use a system or technology. According to the oldest TAM, behaviour intentions are directly affected by perceived usefulness and attitude toward use [12]. In the following studies, "attitude" variable was removed from the model. Eventually Venkatesh and Davis [13] conducted the latest TAM, where behaviour intentions are directly affected by perceived usefulness and perceived ease of use. TAM model was improved by adding subjective norms and has been tested with extended and longitudinal research designs [14].

Motivational Model (MM): MM was used by Davis, Bagozzi and Warshaw [15] to understand the adaptation of new technologies by individuals. The basic components of the model are external motivation and internal motivation [9]. According to Vallerand [16] intrinsic motivation refers to pleasure or satisfaction from a particular activity or situation, and that extrinsic motivation is the behaviour exhibited in order to achieve and complete a specific purpose. Extrinsic motivation examples are subjective norm, perceived ease of use and perceived usefulness. In other respect, intrinsic motivation examples are enjoyment and computer playfulness [14, 15].

Theory of Planned Behaviour (TPB): TPB was developed by Ajzen as an extension of TRA [17]. Attitudes and subjective norms are the same as TRA in determining the behaviours of individuals. In addition to these, Ajzen added perceived behavioural control to the TRA model after a while. The conceptual model of TPB shows the indirect effect of the perceived behavioural control factor on behaviour and the direct effect on intention.

Decomposed Theory of Planned Behaviour (DTPB): Taylor and Todd [18], has put forward DTPB with the purpose of improving the TPB. In the theory, subjective norm, perceived behavioural control and attitude variables were determined by adding new sub-variables to explain the actual behaviour of the consumer. These variables are: ease of use, perceived usefulness, compatibility, peer influence, superiors' influence, self-efficacy, resource facilitating condition, and technology facilitating condition [19].

Combined TAM and TPB (C-TAM&TPB): Although the TAM is one of the most effective and most widely used models, it is recommended that the model be expanded by including new variables including human and social factors. When the literature is examined, it is seen that TAM has limitations and the model has been criticized. In this context, two different variations of the TAM and TPB have been tested to determine which model best describes the use of technology and results were compared. As a result, Taylor and Todd developed the C-TAM&TPB model in 1995 by integrating TAM and TPB models [19]. The main variables of the C-TAM&TPB model include perceived usefulness, perceived ease of use, attitude towards using, subjective norm, perceived behaviour control, behavioural intention and actual use.

Model of PC Utilization (MPCU): This model was developed by Thompson et al. [20] by using the human behaviour theory of Triandis [21] and was adapted to the information systems. The main variables of the model, which are used to predict pc utilization, are facilitating conditions, social factors, affect towards use, long-term consequences, complexity and job-fit [9].

Innovation Diffusion Theory (IDT): IDT was put forward by Everett Rogers in 1962 and has been valid until today. This model based on sociology is used to describe the innovation-decision process in detail. Innovation-decision process has the following stages; knowledge, persuasion, decision, implementation and confirmation. Moore and Benbasat [22] enlarge the factors set to study technology acceptance in the information systems field. The set consist of visibility, compatibility, relative advantage, ease of use, image, and voluntariness of use and results demonstrability. In order to better understand the IDT, it is necessary to understand what innovation and diffusion mean in theory.

Social Cognitive Theory (SCT): One of the most important theories explaining human behaviour is Bandura's Social Cognitive Theory [9]. Compeau and Higgins [23] developed this theory based on the model and implemented applications on computer use. According to SCT, individuals must have the ability and capacity to perform certain behaviour [24]. The main components of the theory are the outcome expectations-performance, outcome expectations-personal, self-efficacy, affect and the anxiety.

The Unified Theory of Acceptance and Use of Technology (UTAUT): UTAUT has been developed by assessing the strengths and weaknesses of eight different theories and models for technology acceptance [9]. In UTAUT, four basic variables are used as determinants of usage behaviour and intention. These variables are performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC). These factors play an important role since they are directly influential in the technology acceptance and use behaviour of individuals. Also, the four moderator variables included in the model are; age, gender, experience and voluntariness of use. In this model, PE, EE and SI directly affect the intention of the behaviour. However, behavioural intention and FC are effective on direct use behaviour [25]. Moderating variables which are added such as the gender and age have an impact on the PE, SI and EE. Also, the experience has influence on the FC, SI and EE. Finally, voluntariness of use only affects SI. UTAUT gave better results than the other models with regression value explaining about 70% of the behavioural intention in organizational context [25].

On the other hand, the other eight models (TRA, TAM, MM, TPB, C-TAM&TPB, MPCU, IDT, SCT) were able to explain the behavioural intention only between 17% and 53% [26].

The Extended Unified Theory of Acceptance and Use of Technology - (UTAUT2): The results of the studies conducted using UTAUT revealed the need of transformation of the individuals working in the institutions from the acceptance and use of technology to the acceptance and use of consumers. In this context, Venkatesh et al. [25] restructured UTAUT and developed the UTAUT2 model by placing the consumer at the centre. The purpose of the new model is to examine the adoption of technology in the context of the consumer. For this reason, the voluntariness of use that is one of the moderator variables included in the first model has been removed from the developed UTAUT2 and three new variables including the Hedonic Motivation (HM), Price Value (PV) and Habit (HB) are added. This new model, explains the variance in behavioural intention and technology usage variables better than UTAUT. In terms of behavioural intention, UTAUT explained 56% of the variance in the context of consumer use, while UTAUT2 explained 74% of the variance. Similarly, the variance value which was 40% in terms of technology usage increased to 52% in UTAUT2 [25]. The theories and models described above help researchers to specify the factors involved in the process of adoption, acceptance and diffusion of an innovation. Many researchers in different fields investigate, use and extend these theories and models.

2.2 The Proposed Model

In the light of the published scientific studies, a conceptual model is proposed based on the UTAUT2 model, which provides a clarification for technology acceptance and use by consumers [25] to examine in detail the complex nature of the process of adoption of technological service innovation by employees and customers. Other factors need to be included to verify the applicability of UTAUT2 in different technologies and

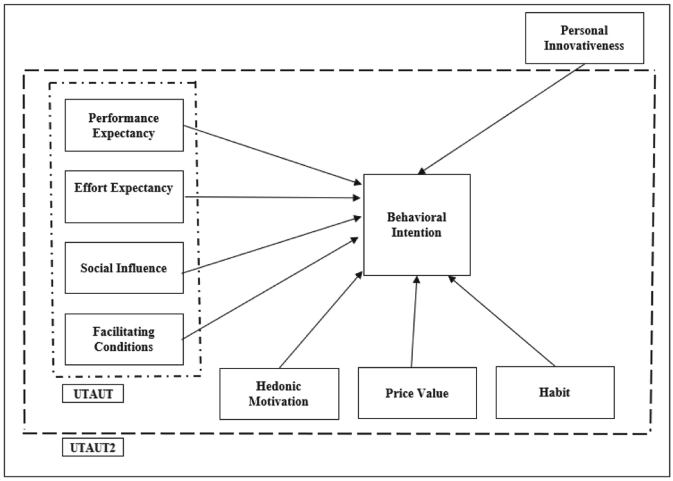

Fig. 1. The framework of proposed conceptual model.

contexts. For this purpose, in this study personal innovativeness (PI) has been added to the model to bring light on the factors affecting the adoption of technological service innovation. The proposed conceptual model is shown in Fig. 1.

Additionally, to complement the current model, moderator variables such as age, gender, income, education, marital status and occupation can be added to investigate the impact of these socio-demographic variables.

3 Conclusion

In the light of the literature a conceptual model was developed in order to present factors affecting the adoption of technological service innovations. In this study, based on the current UTAUT2 model, the factors affecting the complex adoption process of technological service innovations were determined. The conceptual model was formed by extending UTAUT2 model and involved factors such as PE, EE, SI, FC, HM, HB and PV and additionally PI. Since smart technologies provide retail customers with the opportunity to personalise all process steps that are effective in delivering superior shopping performance [4, 27, 28], personal innovativeness (PI) factor has been integrated into the existing UTAUT2 model to reveal the factors that are effective in the adoption of technological service innovations. This study aimed to bring out the factors affecting the adoption of technological service innovations. In addition, the most important factor that determines the amount of investment of companies in relation to technological innovations is the adoption and use of these innovations as planned and targeted by the target users [29]. For this reason, identifying the factors that are effective or not effective in the adoption of a new technological service innovation by store employees or managers and customers, is of great importance in developing and expanding these services to a wider audience for service companies. So, by taking the practical point of view into account, this model can shed light on the process of measuring the impact of potential innovative applications in the service sector. In the future studies, relationships between the factors in the proposed model can be investigated using real-world data.

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