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INVESTIGATING FACTORS AFFECTING THE ADOPTION OF SMARTPHONE TECHNOLOGY BY ELDERLY PEOPLE IN IRAQ

Fouad Abdulameer
Salman¹⁺
Aziz Bin Deraman²

¹Faculty of Business Administration, Al-Bayan University, Baghdad, Iraq.
Email: fouarese@gmail.com

²Faculty of Ocean Engineering Technology and Informatics, University Malaysia Terengganu (UMT), Malaysia.



(+ Corresponding author)

ABSTRACT

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The smartphone is now essential part of daily life (business and personal) across all age bounds. The usage of it can play a part in helping the elderly in several ways in terms of healthcare information. This paper aims at developing a model for identifying substantial factors that affect elderly people's intention toward adopt smartphones. A questionnaire instrument is developed to define factors that influence smartphones adoption via elderly people. The questionnaires are distributed in terms of paper-based questionnaires individually in Iraq. 225 completed questionnaires are gathered. Using a Cronbach Alpha, the test of reliability is conducted on the obtained data. The result indicates that four factors (socioeconomic influence, facilitating conditions, performance expectancy and effort expectancy) affect older people's intention to embrace smartphones.

Contribution/Originality: This study is one of very few studies which have investigated the adoption of new technologies by older adults in Iraq. The study is investigated older adults' adoption of smartphones by adapting UTAUT with consideration of socioeconomic influence. Based on literature and obtained data, a research model is proposed and tested.

1. INTRODUCTION

Smartphones have been changing the ways of communication among people, access to a variety of information and manage their daily lives [1]. Given that smartphones are covered multiple functions such as voice communication, Internet access, games, diversity of applications and data retrieval and management [2]. However, in the literature, these functions have been studied and discussed in isolation [3, 4]. Yet, smartphones are relatively a new technology that encompasses the research areas of interpersonal and mass communication, as well as information management, and hence research adoption of smartphones can be contributed to theory building for today's communication technologies in which multifaceted aspects of communication are embedded [5].

Relatively, most world countries are experiencing a boost at their population's average age. The populace aging has become a challenge that countries have to face in the early future [6]. Fundamentally, humans undergo a lot of changes in their physical and mental capabilities as they grow up in age, particularly, aged people tend to suffer a lot from the age-related changes, such as, poor eye-sight (inability to visualize nearby objects), inability to hear (lack of hearing at higher frequencies), loss of focus, restricted movements, irregular muscular coordination, lack of power and physical sensitivity [7]. They also have problems in identifying targets; which have detrimental impacts on their capabilities in using and operating mobile devices [7]. Given all the potential returns from the usage of

smartphones in daily life and how it can be used as a beneficial tool for supporting elderly people. This research is aimed at identifying factors that influence the adoption of smartphones among elderly people in Iraq. The next sections of this paper are organized as follows: Section 2 discusses the usage of smartphones among elderly people. The research model with its hypotheses is presented in Section 3. The research method and sample size are described in Section 4. This is followed by the results in Section 5. Section 6 concludes this research.

2. THE USAGE OF SMARTPHONES AMONG ELDERLY PEOPLE

In the literature, many works have been done by researchers in studying various aspects of smartphone adoption [8-12]. For example, Verkasalo and colleagues compared users of smartphone devices against non-smartphone and came up with the technological boundaries that had adversely impact attitude control, mirroring individuals' appraisal of these being fit for utilizing the services without inconvenience [13]. As hypothesized, attitude control is particularly associated with perceived convenience, while, perceived convenience was non-exclusively found to disclose the aim to utilize smartphone applications for both smartphone users and non-smartphone users [13].

Another work carried out by Dewsbury and colleagues [14] discussed how technology such as a smartphone may be made inclusively for older people in a suitable way.

They examined the issue of design, and these issues have been addressed in a string of projects that are aimed at encouraging individuals in the community.

In their study, they developed a usable system for people who suffer from many of the normal infirmities of old age and which did not look like a conventional computer with all of the misgivings that this entails. Ma and colleagues claimed that the adoption of the smartphone can be influenced by each attitude, smugness, encouraging conditions, intention, and usability [15]. Also, they reported that younger adults with a high level of education, better financial condition and non-widowed are more prone to utilize smartphones [15]. Pan and colleagues found that entertainment utility, compatibility of smartphone and social influence people toward attitude to use [16]. That is exceptionally profitable ramifications for makers to enhance the smartphone's intuitive interface to win a greater piece of the pie [16]. Carmien and colleagues investigated the capability of the elderly people in using smartphones with distinct types of menus and pages in four different smartphones; they found that aged people consumed more than one time for performing a certain task [17]. Beck ET and colleagues studied user mobility during usability tests [18]. This study presented their individual Index of Difficulty (ID) using the distance and object size for their particular tests. They claim that there is a lack of conclusive guidelines to facilitate the definition of ID for usability testing, and hence it is necessary to do more research on the usability of smartphones. In Tung, et al. [19] Tung FC and colleagues hybrid innovation diffusion theory (IDT) with technology acceptance model (TAM) for the purpose of exploring smartphone adoption in various utilities. Self-efficacy appeared as a very powerful behavioral intention predictor through attitude. According to the research on mobile software functionality, coworkers and Mao claimed that smartphone devices can eventually become synonymous with traditional computers [20]. Lia and colleagues reviewed computer users' limitations [21]. The study's exploration reveals that few studies addressed or have discussed adoption and the use of smartphones by men and women that are older. However, despite there are much works related smartphone technology have been done in context elderly people, there is no study yet investigates the adoption of smartphones with elderly people in Iraq although smartphones become widely used in Iraq. In that, it is worth to conduct this research to better understanding elderly people's behavior intention to use smartphones in Iraq. It is interesting to note that the term of elderly people has been defined in various ways within different articles, which ranges over 50 years.

3. RESEARCH MODEL AND HYPOTHESES

In this paper, a model is developed to identify important factors that influence elderly people's intention toward adopting smartphones. The developed model see Figure 1 is derived from the UTAUT model [22] with consideration of socioeconomic influence [23]. The model contains each 'socioeconomic influence', 'facilitating conditions', 'performance expectancy' and 'effort expectancy' as independent factors and 'elderly people's intention to adopt smartphones' as a dependent factor. The socioeconomic influence factor refers to which user's age, income, occupation, gender and education level influence intention toward adoption and use the smartphone. Facilitating conditions refer to the perceived enablers or barriers in the environment that influence a person's perception of ease or difficulty of performing a task. The effort expectancy factor refers to which degree a smartphone can be used easily by elderly people. That is, to learn using new technology such as smartphones, the consumer demands time and effort, especially with elderly people. So, if the usability of smartphones satisfies end-user, he/she likely tend to adopt smartphones. The performance expectancy factor refers to which extent a smartphone can be provided benefits to the elderly people in performing their activities such as access to the Internet or obtain healthcare information. They're very likely to use and embrace smartphones once the benefits have been recognized by users.

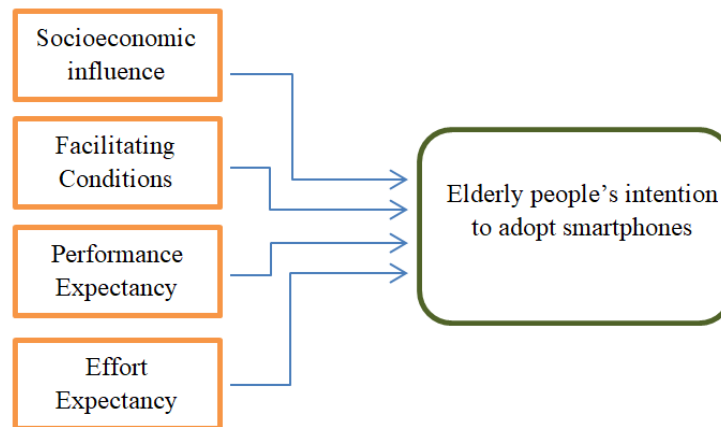


Figure-1. The research model.

Thus, four hypotheses have proposed by author:

H1: "Socioeconomic influence" has a positive effect on "elderly people's intention to adopt smartphones".

H2: "Effort expectancy" has a positive effect on "elderly people's intention to adopt smartphones".

H3: "Performance expectancy" has a positive effect on "elderly people's intention to adopt smartphones".

H4: "Facilitating conditions" has a positive effect on "elderly people's intention to adopt smartphones".

4. DATA COLLECTION TOOLS

A questionnaire instrument was developed to define factors that influence smartphones adoption via elderly people. The questionnaire instrument is comprised two sections namely the demographic information section and elderly people's intention to adopt the smartphones factors section. In the first section, participants have to provide their demographic information such as age, gender, level of education and so on. In the second section, participants have to give their opinion regarding factors that influence adopt smartphones by elderly people. It contained 20 items adapted from previous studies [24-26]. The items were measured on a five-point Likert scale ranging from "Strongly Agree" (5 point), "Agree" (4 points, "Neutral" (3 point), "Disagree" (2 point), and "Strongly Disagree" (1 point). For making the questionnaires fully comprehensible to the Iraqi participants, the items of the questionnaire were translated from the English language into the Arabic language by linguists who are competent and experienced in the use of both languages. The Arabic version of the questionnaire was piloted on 50 Iraqi old people

and the result referred acceptable reliability for all constructs. It is interesting to note that those who participated in the pilot study were not included in the current study.

Also, the test of reliability was conducted on the obtained data using a Cronbach Alpha [27] the test results are as follows: 0.930 for socioeconomic influence, 0.910 for effort expectancy, 0.830 for performance expectancy, 0.940 for facilitating conditions and 0.960 for elderly people's intention to adopt smartphones. It can be concluded that the total result of the test is considered reliable see Table 1.

Table-1. Reliability test (Cronbach Alpha).

Factor	Cronbach Alpha	No. of Items	Interpretation
Socioeconomic Influence	0.930	4	Excellent
Effort Expectancy	0.910	4	Excellent
Performance Expectancy	0.830	4	Good
Facilitating Conditions	0.940	4	Excellent
Elderly people's intention to adopt smartphones	0.960	4	Excellent

5. SAMPLES

In this paper, the data were gathered based on self-administered questionnaires from the part of Iraq. The survey was distributed in terms of paper-based questionnaires individually to May 30th, 2019 from April. 250 completed surveys were gathered, 223 of them were valid questionnaires. 49 of the participants were female, and 174 were male. Moreover, 9 percent of participants had occupations, 3 percent of admissions had part-time jobs, and 88 percent of participants had retired. What's more, the highly used featured on smartphones for its participants were: making phone calls, text messaging, and instant messaging feature (e.g., Viber, Whats up).

6. STRUCTURAL MODEL AND HYPOTHESES TESTING

Using Amos software, the structural research model was tested. The outcomes of the test are displayed in Figure 2. The R square denotes the determination coefficient. It gives a measure of just how well outcomes are most likely to be predicted by the model. The square determination coefficient is a statistical measure of how well the regression coefficients approximate the data point. Table 2 introduces the path coefficients that are standardized regression coefficients. It could be seen that all of the suggested hypotheses (H1, H2, H3, H4) were supported. The favorable effects of independent variables were very strong, according to the paths coefficient of 0.85, 0.81, 0.78, 0.84 ($p < 0.05$) accordingly. Therefore, H1, H2, H3, and H4 were accepted.

Table-2. Hypotheses testing results.

Hypotheses	Path	Direction	Results
H1	Socioeconomic → elderly people's intention to adopt smartphones	Positive	Supported
H2	Effort Expectancy → elderly people's intention to adopt smartphones	Positive	Supported
H3	Performance Expectancy → elderly people's intention to adopt smartphones	Positive	Supported
H4	Facilitating Conditions → elderly people's intention to adopt smartphones	Positive	Supported

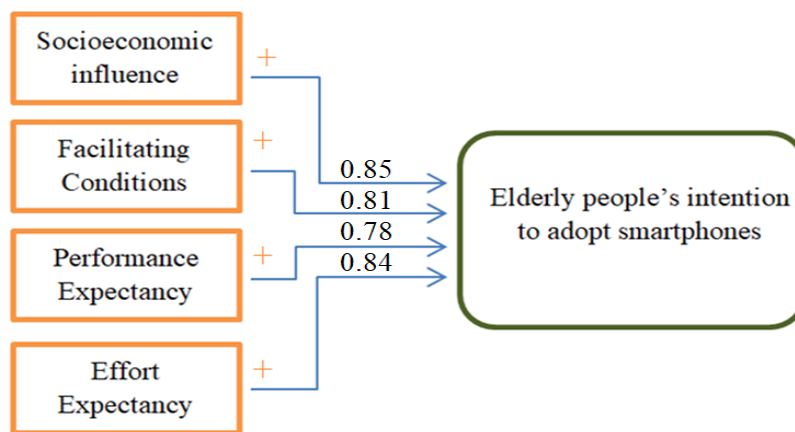


Figure-2. Testing results of the research model.

7. CONCLUSION AND FUTURE RESEARCH

This research was designed to study the adoption of smartphones with older adults in Iraq. To the best of author's knowledge, the author found very few studies concerned with older adults' intention to use smartphones in Iraq. This study investigated older adults' adoption of smartphones by adapting UTAUT with consideration of socioeconomic influence. Based on secondary data, a research model with four research hypotheses was proposed. All of the hypotheses were positively supported. Continuing with this stream of research, the author plans to further examine the applicability of the research model with other groups of users in Iraq (e.g., people below 45 years old). Future research is also needed to empirically verify the research model with larger samples across the world. The author also plans to carry out a comparative study with older adults in the Middle East countries.

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