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Impact of Internet of Things in the Healthcare Industry

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Abstract: ***The internet of things concept had infiltrated nearly every field of our life, however, its cutting edge impact in the healthcare industry has been momentous. With tremendous penetration of Mobile health, the functionality of IoT in the healthcare industry had drastically increased. In the research, a systemic literature review was conducted to study the impact of IoT applications in the healthcare industry by analyzing the current and future research work in the field, more focusing on security and privacy in health IoT devices and how it affects different levels of health care employees and consumers' adoption towards IoT in the health care industry. The study reports research papers, which were included, based on the further filtering process by title, contents, and abstract. A total of 232 primary up-to-date studies were included in the review study. These papers were analyzed according to the research questions defined in the study.***

Keywords: Internet of things, Healthcare, mHealth, UTAUT About four key words or phrases in alphabetical order, separated by commas.

I. INTRODUCTION

Despite all the advantage that IoT offers in the healthcare industries, especially in hospital is not widespread as might be expected. Even though the effort has been made developing better and easier IoT usage, it is severely underutilized, since many users do not accept it. Several over time many technology acceptable and behavioral intention models developed. Currently, most of the studies on technology acceptance are using the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al. 2003). In this chapter, the theoretical models and results from empirical studies are discussed.Literature was revived extensively for this research. Initially, Google and Google scholar search engines were searched. The key words included were IoT, Internet of Things, Physicians, Healthcare, adoption, readiness, Willingness, Healthcare staff, patients, m-Health, Mobile Health, Healthcare technology. Databases such as Econ.lit, PsycINFO, ABI/INFORM Global, PUB MED were searched using the same keywords. Dissertations, Conference procedures and case studies were also included in the search. Statistics were obtained from published reports. Interest in IoT in state of research started to rise around 2010, at the level of published papers. However, it becomes more severe around 2008, as it is widely a new topic of research interest.

Moreover, the growth in just ten years, back the rate of the number of publications increased between 2013-2014 (Figure 1). Publications from Scopus databases were chosen to investigate the state of research in IoT to criticize journals of high quality. Of around 18 thousand papers found in Scopus, about 4.2% belong to engineering. Never less only 3.5% of them are of management science and related field. It should be mentioned to have that the majority of this paper is incorporated as interdisciplinary in social areas. Thus mentioned value does not add up to 100%. Hence the numbers suggest that there is only quite a little interest was provided. So for IoT related topics respectively in the field of management.

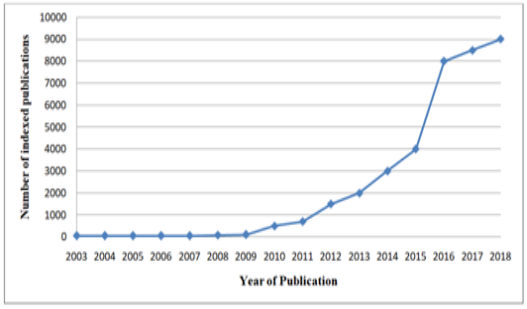

Figure 1: Scientific publications on the Internet of Things indexed in the Scopus database (Macik, 2017)

Moreover, 63.5% of publications identified in IoT are presentations on scientific conferences, which show high novelty in this topic. Unfortunately, such papers are of limited numbers, especially those that were presented empirical results of research. In addition to research articles review, papers of these articles were also published extensively, to build awareness of IoT in introducing new business opportunities (Bakhit Jaafreh,2018), counting the focus of IoT devices in the market as well as their commercial applications (Woon and Pee,2014).

II. LITERATURE REVIEW

A. Acceptance of Information technology in the context of IoT application usage

A poorly explored areas in IoT is its acceptance by users. Because it is relatively a new technology, it is more transparent to the consumers where most use simple IoT systems without even knowing about it.

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This shows that theories of traditional information technology are not adequate in explaining the applications of IoT among users.

The hierarchical approach proposed by Kim and Shin (2015) explains such phenomena very well. Kim and Shin (2015) stated that lack of motivation, skills to use; access as well as the fulfillment of previous conditions could reject the particular technology. This theory applied for significant IT applications.Generally adding new IoT devices to the already accepted IoT technologies such as Bluetooth, WIFI, NFC does not require any significant effort both emotionally and cognitively. This also eliminates the need for motivation for the usage of IoT. Still rarely need one-time approval to specific IoT technology like fully integrated building automation network requires a more complex system, which may demonstrate the users. However, control of many IoT devices, including data exchange done via mobile devices shows the feasibility of IoT use and high network towards it, as does not require gaining particular new skills. Thus as stated by Burner et al (2014) IoT usage needs neither unique skills nor breaking severe psychological barriers. Therefore the hierarchical approach of Dijk (2005) is not suitable in explaining the IoT acceptance by its users.

B. Internet of Things in the Healthcare industry

A study by Alaiad and Zhou (2017) identified numerous factors with regards to wireless-sensor-network-based smart home healthcare systems WSN-SHHS (IoT) adoption among patients. They also have developed a genetic adoption model for WSN-SHHS by incorporating unique characteristics. The author stated that traditional acceptance models lack characteristics. That is unique to healthcare technology. Moreover according to the author, the well developed UTAUT, even though focused on cognition it neglects individual emotion on the decision to adopt IoT. Thus the study attempt to incorporate PAD theory from marketing research to study a comprehensive view of different emotion in a single model. Thus this was the first study to integrate UTAUT and PAD theories to study north cognitive as well as affective factors in technological obligations. The study used a mixed-method to collect data by combining interviews and surveys. A semi-structured interview was carried out among home healthcare patients and healthcare professionals, which is further analyzed using Kvale's method. Also, 185 participants were reunited from home healthcare agencies of the eastern US, for survey questionnaires. The data were then evaluated using a partial least square (PLS) test. Compared to other studies this research had made an effort to identify the unique new construct in reaction to IoT adoption using the interview. Such constructs are life-quality expectancy, human detachment concerns, cost concerns, and privacy concerns. Those constructs were further confirmed with empirical support provided by the quantitative study. Thus it shows a complete picture of the research which can be utilized by future users without any fears. The finding of the study revealed that rather than performance expectancy Human (detachment) plays a vital role in predicting patient's adoption of IoT (WSN-SHHS). The authors also made a few suggestions with those finding to improve IoT adoption. They have pointed out how the healthcare agencies may attract home-based patients and enhance patient's interaction with the technology even though this study has numerous benefits to the society as well as to any future researches, the study its self has a specific unavoidable limitation.

The sample distribution was skewed toward the younger generation, due to their active participation in online communities. Since the older population is recruited only through the home healthcare domain, this study does not provide a complete picture of the age of the consumers as the moderating factor of adoption. Next, the research carried out on people who will or not use the system, in the future. It did not study the actual IoT users since the technology was still emerging as well as not ready for broader adoption. Moreover, even though the objective of the research to study was the IoT by both patients as well as the medical professionals' perspective, the study only focused on patients' perspectives, which is a disappointing drawback. Also, the author stated that they could not able to explore the sample to its fullest extent due to the limitations endorsed by age and gender profile. Additionally, the research model should be studied among different groups of users, and both developed as well as developing countries to validate the adoption model for IoT. Even testing this model among different cultures to investigate its influences on users via ethnical concerns, trust, and other constructs of the study is worthy of making this model as a generic one or even as an adoption theory. Furthermore, Gangon (2014) studied factors that influence physician's acceptance of Electronic Health Records (EHR). The study focused on general practitioners as well as specialties work at the Quebec province of Canada. Four theoretical models, such as TAM extended TAM, Intergraded model and psychosocial model were tested. Data were collected from 157 physicians using survey questions and were analyzed by path analysis and multiple linear regression analysis. Using multi-group analysis the socio-demographic characters were tested. The result of the study indicated that among the used model the integrated model is well suited to predict the intention of physicians to use EHR. Physicians who can perceive EHR to ease of use demonstrate a high likelihood of accepting the technology. Another study conducted by Ores et al. (2011) focused on analyzing the factors that manipulate the acceptance of patent-focused health technology by patients. The study utilized UTAUT to measure the objective of the study. The constructs such as perceived effective use and behavioral intention were tested by cross-sectional analysis from secondary data obtained from home care nursing practice among chronic cardiac diseased patients. In this study, 101 participants were included. Later variable modeling was used to analyze the results. The study concluded showing that perceived ease of use, healthcare knowledge, perceived usefulness, and subjective norm were the constructs that can predict more of the variance in the rate of acceptance of web-based self-management technology and self- report use. Even though the study sheds light on the direct relationship between the use of technology and patients, it has numerous limitations. First, the sample size is relatively smaller to other similar studies. Secondly, significant moderators were not included in the studied model; there are gender, age, education, and computer experience, and computer ownership.

Thirdly several essential factors such as intrinsic motivation, computer self-efficacy, internet skill training, and satisfaction with medical care need to be included as variables in this model, which might help in future explaining of acceptance as well as the use of technology, which was not well explored in this study. Finally, incorporating a longitudinal model could explore how the research model changes with time will be an added value in the future.

Additionally, Kuo (2013) investigated whether there is an impact of a nurse's personality trait on readiness toward technology, toward Mobile Electronic Medical Record (MEMR) using a self-administrated questionnaire. 665 responses were allocated from a hospital in Taiwan. Combined TRI and TAM models were used; four different personality traits, including technical readiness, were tested. The sample was analyzed using Structural equation modeling. The result of the study showed all four traits influence the perceived use of MEMR. However, the sample of the study was collected only from one hospital in the country, which shows a high amount of bias and less generality. Dinsen (2013) stated that the main limitation of the study was gender bias because the sample contains 98.95% of Females. Also, all nurses relatively have similar work experience. Thus even experience did not be considered as an influencing factor of the research. Next, rather a cross-sectional study, if it would be conducted longitudinally it would add more value to the study. Moreover in the future along with nurses if the study carried out on other staff members including physicians it would gain a stronger knowledge of the impact of personal dispositions on the perceived use of MEMR.

Lanseng *et al* (2017) examined the frequency of Internet use for medical purposes by patients in Switzerland. 1604 patients were studied using a self-administered questionnaire on focusing on their access to the Internet concerning searching medical information using this media. The study revealed that Age was inversely linked with the probability of having Internet access, while educational level along with English language literacy was directly associated with using. The study by Bengtsson et al., (2018) also found that patients with severe levels of disease, as well as those who go to attending urban medical practices, are keener on searching health information on the internet. The conclusion of the study showed that the percentage of patients in Switzerland who seek medical information on the Internet is parallel to that observed in European English-speaking countries. However, this study has several limitations. The study used a convenience sample, and only eight physicians participated in this study, which was very small and not representative.

Kerr et al. (2010) explored the efficiency of internet-based intervention in reducing inequalities in access to self-management of patients with coronary heart disease (CHD). Both quantitative and qualitative techniques were used to discover the web-based intervention. 168 patients with CHD, of primary care facilities diverse socioeconomic and ethnic areas of North London, United Kingdom were studied. The study by El Zouka & Hosni, (2019) revealed that greater use of this intervention observed in older patients, and in those who had home internet access and earlier internet experience Gender and stage of schooling were not statistically associated with stage of use of the intervention. Mixed quantitative and qualitative methods allowed the authors to explain the factors manipulating the use of the intervention (Burner, 2014). However, the study lacks information about a large number of patients that were eligible to participate but chose not to. This might happened due to the poor recruitment strategy in enrolling patients. Thus in-depth conclusions of the relationship between age, gender, date of recent cardiac event, CHD complication, with use of the intervention, were limited.

The study by Jacobs & Jeon, (2017) tested factors associated with seeking health information from the internet, conventional media by the healthcare specialists of the United States. A longitudinal study was carried out for three years from 2011–2014 through the Health Information National Trends Survey (HINTS). A regression analysis was performed. Findings indicated that there is an opportunity that while the internet is a readily available supply of health statistics, it can create inequalities in health statistics accessibility additionally. Thus the internet should not be measured as a substitute for health information resources. The study also found that such practice might cause disproportionate access to health information, which might end up in wrong health decisions. However, the study does have certain limitations HINTS survey only collected data at the individual level; never less the change over time cannot be assessed individually. Also, Leonet (2015) mentioned that the sample was biased as it contains mainly females and White.

C. Internet of Things in Business administration

The study by Abu et al., (2017) aimed to analyze the technology adoption by small and medium enterprises (SME) of Malaysia, focusing mainly on the food industry. The UTAUT model was used. 135 related organizations were surveyed with the developed model. The data were analyzed using Test exploratory factor analysis and SPSS. This study had incorporated a novel factor resistance to using the existing UTAUT model. The model was further modified according to Malaysian culture. In Malaysia, some SMEs are less adaptive to globalization pressure (Hong et al., 2016). Thus instead of taking the fast initiative in the present situation to improve productivity, they tend to employ professional staff and skill management to survive the competitive pressure. In such a case, SME fills to show their effort towards the use of technological adoption. Thus the effort expectancy was provided from the original UTAUT model. Kaihara, et al., (2016) stated that the new proposed UTAUT model offers more value and understanding of technology. IT also shed light on the effect of culture on moderating the variable; this is a valuable finding which may employ on different countries according to their work culture.

The study by Hsu and Lin (2016) focused on the user's perceived value to use IoT services, by examining the influence of sacrifice as well as benefits on the initiation towards using IoT services. 500 Taiwan IoT users were surveyed using structural equation modeling. The result of the research showed; perceived enjoyment, along with perceived usefulness, plays a vital role in influencing the behavioral intention via perceived value.

However, the result of the study is quite vague, where it should be interpreted with more caution because firstly the statistical analysis of the study only provided numerical relationships. Kurnia & Johnston (2019) mentioned that the interpretation of the result is subject to the author's subjective appraisal of the author. Next data were collected through an online questionnaire, where the self-selected respondent pool can create bias and limit the generality of the result. Such issues can be overcome in the future by increasing the diversity of the respondent sample number.

The respondent of the study was limited to Taiwan IoT users; therefore the study showed to be exercised in other countries to make in generalizes. However, the study was consistent with other studies that shed light on its reliability. Hence these results not only provide more understanding towards the acceptance of IoT but also provide an impetus to future researchers (Roy, 2016).

Another study by Hsu and Lin (2016) identified the factors that influence the IoT adoption, mainly in Taiwan's logistics industry. The study incorporated a combination of two models. TOE and decision-making trial and evaluation laboratory (DEMATEL) to investigate the influencing factors. Also, the factors where further dived into for the decision-making on the efficiency of IoT adoption. However, the DEMATEL model was not well suited for study IoT adoption as such decision-making is quite complicated and costly. Moreover, Voncken (2014) stated that the initially allocated resources, supporting industry, government policy is challenging issues on the decision making policy. Since the literature on DEMATEL does show more drawbacks, it could be better to incorporate weight expert opinion on the model before incorporating it in the samples. The author Hsu and Lin (2016) also studied motivations to use IoT services. The model proposed by the study was tested using survey method, from 508 IoT users. The result of the study showed that network expansion mainly influences positively on consumer's intention to use IoT. On the other hand, John (2012) mentioned privacy concerns had a week correlation with the IoT adoption. The study focused on internet users and gathered data through online surveys. This may cause a self-selection bias and cannot generalize the population of IoT users. Seto (2014) showed that the study by Hsu and Lin (2016) only gave numerical relationships that could be interpreted on the author's subjective and external network factors on influencing the behavioral intention to use IoT. More importantly, variables such as lifestyle, personality, social influence, culture, and cost were omitted in the research. Thus the finding of the study cannot be applied to industrial-based IoT adoption like logistic platforms. Hence this study may serve as the preliminary platform to IoT adoption, and future research needed to be carried out by incorporating additional factors to generalize this model.

Patil (2016) identified a vital variable on IoT usage acceptance by retail employees. It used an extended TAM model where the impact of perceived behavior control, Subjective norm, and trust was measured with related to employee attitude on IoT in the retail environment. 180 retail employees who work at malls, retail stores and hypermarkets of Pune city, India were studied using survey questionnaires. The data were analyzed using SEM, correlation matrix and exploratory factor analysis. Subjective norm (judgment of an individual that is influenced by societal rules), was considered as the most critical construct of the study. Hanley (2013) stated that on the perspective of retail stores social contact with consumers is essential. Patil (2016) had turned the research concentrating towards "subjective norm," thus even though the study enlightens the impact of the subjective norm in the usage of IoT. IT failed to shed light on the influence of other factors on IoT acceptance. Cottrell (2012) stated that the employees needed to be trained to use IoT technology to minimize service failure. On the other hand the IoT interface also quite complicated thus needed to be secure of use and perceived useful by the retail employees. Never less the study only focused on the retail industry; only cannot the result of this research be generalized to other industries. Secondly, the research model lacks many essential factors that could provide insight more in-depth on IoT adoption by the retail industry. Finally, India being a developing country, the cost and determined income play a vital role in IoT adoption (Goa and Bai, 2014).

Jaafreh (2018) studied the influencing factors of IoT acceptance among S, concentrating on Saudi Arabia. The data were collected using a qualitative method (survey questionnaire) from 130 business leaders, and staffs work in SME. The sample number of the study is quite small to represent the SME population. The proposal incorporated the TAM model as well as Hoffstader's model. Hanley (2013) stated that Hoffstader's model incorporated to explore the influence of national culture in the user's intention to accept new technology such as IoT. Thus the proposed model was an extension of the TAM model with national cultural dimensions including power distance, avoidance of uncertainty, individualism/collectivism and masculinity-feminist.

Muhayiddin (2014) proposed to use e-commerce technology behalf of the physical gold dinar as a form of payment. The research carried out to test eh adoption rate of the public on the above concept. The research framework of the study was the UTAUT model where the researcher modified the model by adding perceived creditability and anxiety as two new constructs. Using questionnaire data were collected from the public. A descriptive analysis was conducted in the study. The result showed that 75% of participants agreed with the proposed payment system. However, Kruijssen (2015) pointed out two significant limitations of the study by Jaafreh (2018). First, the data were collected only from multimedia super corridor areas of Malaysia, which show that there is a bias in sample collection. Thus to produce more significant result whole Malaysia should be considered. Secondly, they did not examine the effect of moderating variables (gender, age, and experience), which could have a significant impact on future research of this study. Moosavi et al (2020) pointed out by overcoming such issues in the future a better view on the adoption rate on the proposed payment method can be derived.

D. Internet of Things in personal care

Park et al. (2017) aim to develop a unified research model that includes both motivators and hindrances to using IoT technology in the smart home environment. The model was developed by extending the TAM model by additional potential user factors. The data were then analyzed using SMS confirmatory factor analysis (CFA).

The result showed that three positive motivators (connectedness, compatibility, and control), as well as a negative hindrance (cost), are the significant determinants of users. Contradict to Jeong & Shin, (2018), Park et al. (2017) stated, since IoT in the smart home environment still in the early market stage, cost plays an essential hindrance to user intention on the technology.

Pagliari *et al* (2015), in his study on "Do I Have to Accept Smart Fridges?" author identifies unique factors that had influence users' acceptance of a smart fridge using a semi-structured interview from 17 individuals. Thus this study had modified a unique model known as SFAM (Smart Fridge Acceptance Model) by modifying the traditional TAM model, where he added social influences, cost, and technology anxiety to the original model.

Additionally, Jeong and Shin, (2018) who studied students as well as the staff of Aberystwyth University, suggested that five factors such as social influence, cost, perceived usefulness, and perceived ease of use motivate the intention to use the smart fridge. Especially perceived usefulness was found to play a significant role in smart fridge acceptance. Because according to the third study the author stated that the more users find the technology helpful are more willing to use the smart fridge in the future. Particularly participants find useful to track items and expiry date which is very useful for the elderly population as they experience decreases in money capacity. Moreover, the study also sheds light on the satisfying level of computer experiments, and low technology anxiety increases the intention to use the smart fridge as well as spread positive word of mouth.

On the other hand, Kim (2016) discovered the psychological factors that influence the adoption of smartwatches. The study had extended the original TAM model. It mainly forced on determinants such as relativity advantages, affective quality, mobility, subcultural appeal, and availability. An online survey was conducted on 343 participate, and the obtained data then further analyzed by confirmatory factor analysis (CFA) as well as structural equation modeling (SEM), using AMOS 22 software. CFA was used to assess the reliability and validity of the measurement, whereas SEM was used to assess the direction and strength of the hypothesis. The finding of Moosavi (2020) also showed that the affective quality and relative advantage of smartwatches use to associate to perceived usefulness, whereas mobility and availability influence on higher perceived ease of technology use of smartwatches. Also, the study enlightened that the user attitude was originated from the cast and subcultural appeal, respectively. Importantly this study by Kim (2016) was the very first study on the adoption of smartwatch usage.

However, still, the study has various limitations. First according to Jackson et al. (2008) gender and race play a vital role in moderating the IoT adoption. However, in this study, the author has omitted such factors, which is a significant drawback. Next as the smartwatch adoption was on the nascent stage at the time of the study, the participants were more of the population who are self-motivated and willing to try new technology that is more distant to the primary stream consumers. Thus such a study cannot be generalized; nerveless with a longitudinal study at different time frames may make this study's findings more reliable.

Furthermore, Andersen & Newman, (2005) stated that the data were collected only on South Korea; thus the model of the research may not apply to other countries. Even though the model developed can be antecedent to other popular wearable IoT devices, including smart glasses and healthcare bracelets, still the model lack device-specific variables making it not sufficient to predict user adoption of wearable technology in general. Moosavi (2020) mentioned that future studies on diverse, international samples, as well as identification of additional influencing factors of wearable technology adoption might give a complete picture of this model. Patil, K. (2016) measured the adoption rate of ICT serves in the library. A cross-sectional survey was used, and 45 responses were collected from the University communities of Uganda. The study used a Service Oriented Unified Theory of Acceptance and Use of Technology (SOUTATUT). The result showed that 'social influence' as well as 'relevance' has a significant impact on the intention of ICT in the library. The major drawback of the research was the finding of the study may not be incorporated into other developing countries as the economic constraints and culture vary among them. Also, the study by Xu *et al* (2018) showed bias in sampling procedure as well as desirable social responses. Moreover, the study showed that the model explained only 55% of the variance; thus, other moderating, as well as dependent variables, should be modified for future use. Such modification can all be utilized to measure indirect relations of the influencing factors in the future.

E. Internet of things in urban region

According to Matthew (2017), the disruption of things is a process that distributes IoT based innovations that replace the existing market leaders. The idea of the research is to facilitate IoT adoption among the poor by incorporating unique characteristics including social acceptance, low-level technology awareness as well as consumer need. The study conducted via a survey with target users and interviews with technological and sociological experts as well as availability tests, which in turn developed a model for IoT adoption by the urban poor. Data were collected from seven low-income families in the slum of Ahmadabad, which were identified by local NGOs. Such data were collected mainly through observation for 10days and occasionally by interview. Five sources of innovation were identified by the research including finance, employment, nutrition, education, and healthcare. Melas *et al* (2019) stated that the developed model with the above five sources must satisfy three parameters of excellent services such as the benefit of using the system, training given to users regarding system use, and support is given to users. After that users satisfied such system need to leverage the system through advising, social media as well as by word of mouth. In a way, the study developed an innovative model of IoT adoption through the concept of disruption of things, Nerveless the study does have certain limitations. The analysis of Min *et al* (2018) also captured data from the slum area; however number of studied families was quite small to generalize the model to urban poor. Next on what criteria these families were chosen was not well described leading to bias in the data. Moreover, the limited empirical data, as well as the ongoing implementation, had made this paper broader in scope.

Even though this study had to realize its impactfully, it acts as grounded theory and a piloted solution to study the adoption of IoT by the urban deprived society. Norman & Skinner (2016), stated mainly for use on the influence of human factors (nontechnical) on the adoption of IoT service in the informal settlements. The IoT services studied the author are the ones that are used in life-threatening situations in the form of change in a light color, audio warning, and text message sent to the participants' cellular phone. The main human factor studied in this research were affordability as well as knowledge of technology, level of scepticism, degree of safety and security with IoT, and the benefit to cape town with relatively a small sample size. Next, the study lacked personal information including attitude and level of education which may have altered the response. Although the research by Xu *et al* (2018) considered the perceived cost as a considerable determinant, the study suggested that advanced technologies can reduce such hindrance. Notably, both connectedness and perceived compatibility play a vital role in the competitive market, and future business-enhancing such factors may lead the internet of things towards the 'intelligence of things". According to Clay and Strauss (2016), the individual characteristics of the consumer play a vital role in the user adoption of innovation; however, this study completely omitted the individual information gathered in the survey while investigating the research model. Second, the research carried out in South Korea. Therefore it cannot be applied directly to other countries. In such a case, the cultural, as well as national differences, needed to be considered (Moosavi, 2020). Thirdly the hypotheses of this study rejected the influence of perceived enjoyment and usefulness. Thus the study does not provide enough explanation to future users.

F. Role of Trust in IoT adoption

Trust is a troublesome complex that is influenced by various assessable and non-assessable factors (Woon and Pee, 2014). It is interrelated to security, as ensuring framework security and client wellbeing is essential to pick up trust. Trust encapsulates convictions that a framework has the vital components to execute, of course, in various conditions (Misbah *et al*., 2015). Mayer et al. (1995) characterized trust as the eagerness of a gathering to be helpless against the activities of another gathering dependent on the desires that the other party will play out a specific activity essential to the trustor, regardless of the capacity to screen or control that other gathering. The most recent innovation selection investigates concentrated on trust as a primary driver of innovation use practices (Gilgun, 2011). In the IoT, trust is a procedure that is started by the client dependent on his/her assessment and desire for the IoT item's skill and includes the client choosing to delegate to or depend on the trusted element to satisfy an ideal objective. The client would acknowledge every one of the dangers of getting to be powerless that are related to this trust relationship (Sreenivas, 2012). In the IoT, trust could be considered as crucial for shopper reception (Gefen et al., 2003) because it can manage two underlying circumstances of IoT frameworks, to be specific, vulnerability and danger of powerlessness (Belanche et al., 2012), as buyers must have the capacity to collaborate with interconnected IoT gadgets and frameworks securely, dependably, and instinctively. Just trust is the thing that makes individuals utilizes such gadgets, despite the majority of the conceivable dangers and the need to beat the impression of vulnerability and hazard.

Besides, trust causes clients to recognize trustworthy items and advancements from the malignant ones (Hallberg *et al*, 2015) Trust is necessary to urge individuals to receive present-day innovation, notwithstanding capricious conditions effectively. In questionable circumstances, trust helps the person to comprehend the social surroundings of the innovation and diminishes defenselessness (Mayer *et al*. 1995). Accordingly, trust is viewed as a genuine factor in studies concerning on the web administrations. Research of human conduct online has featured the noteworthiness of grasping trust in reception models to comprehend achievement factors behind buyer acknowledgment and appropriation of IoT items and administrations (Belanche et al. 2003). For example, the investigation by Gao and Bai (2014) reasoned that trust effectively affects the social expectation to embrace IoT items and administrations.

Han et al. (2014) demonstrated that trust is a fundamental factor for the reception of outsider applications. In this way, trust is fundamental to the appropriation of IoT items due to the previously mentioned reasons, rendering the spread of IoT frameworks extremely troublesome without clients' trust. Han (2014) focused on the cyber security concern on smart devices. A model incorporating the user's trust perspective and their awareness perspective were used. The finding showed that trust security apps, as well as user's technology awareness, have a positive effect on user adoption of IoT. Moreover, trust in the security app was found to be a moderating factor in the relationship between threat awareness of IoT adoption intention. The proposed model does act as a foundation to study mobile security in IoT in the future. Further research focusing on the influence of security on different OS systems may shade more light on the subject. Hallberg *et al* (2015) in their paper, examined IoT innovation selection and recognized the elements that impact this appropriation. Innovation reception is the procedure that starts with the client consciousness of the innovation, and completions with embracement and full utilization of that innovation (Renaud, and van Biljon, 2018). The writing on the specialized parts of the IoT is broader than that on the social and attitudinal angles. The writing needs successful trust models or systems to explain and control IoT innovation architects and specialist organizations of the prerequisites of the clients and the related dangers that are difficult to comprehend and oversee. The writing and industry are increasingly centered on the network, far off controlling, and other IoT gadget highlights. Trust models that illuminate shoppers' prerequisites and specialist co-ops' duties are required to guarantee that individuals can utilize IoT advancements with less concern. This shows the requirement for more examination in that field.

III. RESULTS

An extensive amount of literature has been published related to technology acceptance or adoption. However, a very lack of studies covered the topic of IoT at hospital adoption.

As an example, from 92 references used to study the adoption of IoT in the healthcare industry, using UTAUT, only one paper discussed a similar field (Park et al., 2018). Regarding the theoretical implications, this study contributed to the development of the UTAUT2 model, specifically in the field of IoT at hospital adoption. By extending UTAUT2 with other significant variables, such as perceived creditability and attitude, this study brought the novel insights into consideration for further research. UTAUT2 argued that the most influential antecedent to adoption intention was performance expectancy. This study gave a new perspective to identify trust as an influential factor driving intention to adopt IoT technology.

This study provided insights for companies, to understand better what the determinants of adopting IoT products are. From the result of the study, it could be concluded that, firstly, the company might gain more consumers' intention to adopt IoT by building trust. This trust concept consisted of two, namely trust to the company and trust in the product. To get trust in the company, it might be essential to establish proper relationships with users, offer friendly customer service, create a pleasant customer journey or convince that the company has excellent quality products. Furthermore, trust in the product might be earned by highlighting that the product is secure and created to help users.

Secondly, marketers should consider the strategical ways to promote the usefulness of the product. This could be achieved by utilizing the social influence or communicating the message through the right channels. This study argued that family, friends, and colleagues might contribute to consumers' intention to adopt IoT products. It was also substantial to note that people who are important to consumers or people who influence their behaviors played a critical role in shaping their minds.

Another finding in this study discovered that younger and innovative people are more likely to adopt IoT products. Hence, marketers might consider to target young people and reach consumers who like to explore new technologies. Besides, this study also implicated that consumers who have sufficient resources and knowledge toward IoT at home have a higher intention to adopt. The company could help to provide these facilitating conditions, such as providing the easy-to-read information about the product, the ease to deliver products to home, or guidance when consumers find difficulties. The research suggests that increasing physician's adoption towards IoT and healthcare organizations should create awareness of IoT products. This could be done in two comprehensive stages; first increase awareness among healthcare staff, which should be the focus on the way to bring business benefits to the organization. Secondly, awareness should be created among the patients, the final customers of IoT technology, which should be focused on enhancing both novelty and quality of IoT enabled healthcare products (i.e., Smartwatch). However, the IoT technology is still in its early premature stage of development and requires an intense evangelization.

IV. CONCLUSION

To a certain extent, this research had identified the critical factors that impact adoption towards IoT in the healthcare industry. The results were supported by the empirical study of the research and can be implemented both theoretical as well as managerial context to impose a radical change in the field of technology adoption of the healthcare industry.

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