ADOPTION OF INNOVATION INFLUENCING USER DECISION ON MOBILE PHONE SERVICE PROVIDER

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ABSTRACT

Abstract—This research aimed to study the factors of the adoption of technology innovation influence the decision to use mobile phone service provider of service users in Bangkok. This research uses a quantitative research approach. The sample group is consumers who are user of mobile phone system and live in Bangkok with 400 samples selected from the population using multi-stage sampling. The data were collected by using questionnaires tested for the validity and reliability. The statistics used in the analysis were frequency, percentage, mean, standard deviation, and multiple regression analysis. The results of the research revealed that the respondents emphasized on adoption of technology innovation in the aspect of compatibility at the highest level, followed by the aspect of complexity, trainability, relative advantage, and observability, respectively. All aspects were at high level, as well as the decision to use mobile phone system service was at a high level. The results of the analysis of adoption of innovation influencing user decision on mobile phone service provider of users in Bangkok was found that the aspect of comparative advantage, compatible, complexity, and observability can jointly forecast the decision to use the mobile phone service of service users in Bangkok with the statistically significant level at .05. While the trialability aspect does not affect the decision on mobile phone service provider of users in Bangkok. All variables were able to explain the variance of the decision making of user in Bangkok by 51.98 percent. When considering multiple regression coefficients as standard scores, the predictors with the highest multiple regression coefficients were the aspect of relative advantage characteristics (β=0.407), followed by complexity characteristics (β=0.265), compatibility characteristics (β=0.224), and observability characteristics (β=0.186), respectively.

Keywords—Adoption of innovation, Decision-making, Mobile phone service provider

INTRODUCTION

Nowadays, telecommunication has become a part of the daily life of most people in society for communication that is suitable for daily life. Technology for mobile phones has continued to evolve from the earliest mobile phones that used analog to today's fast and widespread use of the Internet. However, the demand for access to these data continues to increase. Mobile operators need to find new technologies to support the growing demands and new applications to respond to the development of the digital society in the 4.0 era in Thailand.

Thailand has developed wireless communication technology since the 2G era, transitioning to 3G and 4G, enabling fast audio and video communication. Until today, the phone has become a part of the daily life of most people in society. As a result, the demand for access to these data continues to increase. It is necessary to find new technologies to support the growing demand and to support new applications in response to the development of the digital society in the 4.0 era. However, due to some limitations of current wireless communication technology that cannot fully support its application in various services, the development of these applications is still limited. In an era where IoT, AI and Big Data technologies become more and more important. 5G technology has been developed to be able to support applications that require high data rates. It can also be used in businesses that require fast and instant data transmission. Therefore, it will be able to support these applications and extend to be able to apply in various fields in commercial activities thoroughly in various sectors (Office of the National Broadcasting and Telecommunications Commission, 2020).

According to statistics from the Office of the National Broadcasting and Telecommunications Commission (2020) found that there were 50.8 million 2G mobile phone subscribers, 42.9 million 3G and 4G mobile phone

subscribers. In addition, the mobile phone market, it was found that Advanced Info Service Public Company Limited or AIS had the highest market share at 43.9%, followed by TRUE Group 32.0% market share and DTAC Group 21.6% market share, CAT group 2.40% market share, and TOT group 0.14% market share, respectively. The increasing number of mobile phone service users has forced the Office of the NBTC to increase the strict supervision of the quality of the mobile phone service system to be more efficient, take care to check the mobile phone service rates to be fair, and to protect mobile phone users to receive efficient services at reasonable prices.

However, there are many mobile operators in Thailand. Each has different strengths and market share. The mobile network operators that are currently available in Thailand are as follows: Advance Info Service Public Company Limited, Total Access Communication Public Company Limited, True Move Public Company Limited, CAT Telecom Public Company Limited, and TOT Public Company Limited. Mobile operators need to develop their networks to meet the needs of consumers. It also includes improvements in the speed of use and the quality of service, data storage, entertainment media services, wireless data transfer, data transmission, and teleconference are considered a communication technology together (Bureau of Academic Affairs and Telecommunication Resources Management, 2019). It is beneficial to consumers and may cause negative effects to operators. due to high competition. Therefore, mobile operators need to be aware of the reasons for their decision to use mobile phone service in order to analyze data and develop their own network system with new innovations. It is expected that consumers will begin to know or hear about new technologies and have a decision to accept or reject the technology.

Due to the rapid change in mobile network service technology, mobile operators are faced with changes in market structure and competition, which affects traditional service monetization. Meanwhile these changes are an opportunity for the development of mobile network technology. Mobile operators must constantly improve their quality of service by applying innovation to technology in order to create technology that is more modern and keep pace with the world. The advancement of telecommunication technology also plays a part in driving innovation. This is consistent with the concept of Everett M. Rogers (2003) described how innovation characteristics affect the acceptance of innovation. It consists of five characteristics that innovation has advantages or benefits more clearly than anything else that exists at the time or something similar (Relative advantage), innovation is consistent with existing practices and values. (Compatibility), innovation is not complicated and easy to implement (Complexity), innovations can be tried before they are accepted (Trainability), and innovations can clearly observe the results (Observability). In addition, innovation attributes correlate with consumer service decisions (Lin, Seedy & Deron, 2011).

Therefore, the researcher is interested in studying the factors of innovation and technology that affect the decision to use the mobile network service of the users in Bangkok. The objectives of this research were to study the factors of technology innovation acceptance that affect the decision to use the mobile phone system of the service users in Bangkok. The results of the study will inform those involved in the recognition of innovation and technology to apply research results to develop a modern technology system and better quality of service in order to provide users with the highest efficiency including create value for customers and society in the digital economy and society.

LITERATURE & THEORY

The Theory of Perceived Attributes

Everett M. Rogers (1995) elaborated on this theory that those who have the potential to accept innovation decide to accept it on the basis of recognition of the attributes of innovation. The attribute of innovation is a component of the diffusion of innovation. Roger (2003) stated that the process of accepting innovation is the decision to fully implement the innovation. It thinks that innovation is the best and more useful method that relies on the characteristics of innovation that influence acceptance based on the recipient's perception of innovation. The characteristics of innovation that affect the acceptance of innovation are as follows:

- *Relative Advantage* refers to what an organization or individual perceives as an innovation to be better than existing or more useful than existing. Including innovation is more useful than old ideas or even old practices measured from an economic point of view, social belief, convenience and satisfaction. An organization or individual perceives that innovation is better than the existing or more useful than the existing. For example, the comparative advantage in economics is the value or efficiency of work, or social comparative advantage in

convenience and satisfaction. The greater the benefit of innovation, the higher the rate of adoption of innovation. If the benefits outweigh the disadvantages, the acceptance of innovations is more likely to be accepted.

- *Compatibility* refers to the degree to which innovation is perceived to be in line with conventional technology or functionality. It is compatible with the values, needs and experiences of innovation recipients. This will enable the adoption of innovations to occur in a much faster time than innovations that are incompatible with social values and norms. Getting innovations that don't align with the ideology is a very slow process. Because innovation recipients must change their own values before innovation can be successful. The recipient of innovation felt that it was compatible with existing values. If any innovation is consistent with the original idea, it will make the acceptance tend to be higher. Based on past experience as well as the needs of the recipient for new ideas, the compatibility of innovation makes the acceptor feel more confident and less risky and creates a more meaningful feeling.

- *Complexity* is defined as the degree to which innovation is perceived as difficult to understand and difficult to implement, requiring some time to be accepted. If the innovation being implemented is more complex, the adoption of the innovation is very slow and acceptance will be less. If the people who are implementing those innovations have difficulty, it will create resistance. Therefore, the adoption of innovation has the opposite relationship with acceptance. If innovation is very complex, the adoption rate will decrease. But if innovation is less complex, the adoption rate will increase.

- *Trialability* is defined as the extent to which a person gets an innovation and is able to use it in a limited amount of trials. Innovations that can be tried and seen will result in a high rate of innovation. When experimented and achieved as desired, it will lead to greater acceptance of the innovation.

Purchase decision

Schiffman & Kanuk (1994) defined the purchase decision as it is the process of choosing a consumer's product. Purchasing is a mental and physical activity that can occur over a period of time causing a purchase and may make a purchase decision according to other people. Engel, Blackwell & Miniard (1990) stated that consumers will buy a particular product, there has to be a process from need to perception after using the product. The buying decision process can be divided into 5 steps as follows:

- *Problem Recognition* refers that consumers have their own internal needs. It motivates consumers to find ways to deal with the triggers. This is the first step in the buying process that recognizes one's own problems or needs. Marketers therefore stimulate products to make consumers more interested in the product.

- *Information Search* refers when consumers are aware of their own needs, consumers will seek information to support their purchasing decisions. When consumers are motivated enough, along with finding more relevant information, it is helpful to make decisions.

- *Evaluation of Alternatives* refers when consumers have received information and then analyzed the advantages and disadvantages. Consumers are assessed according to the characteristics of the product's properties, the price is suitable for the quality of the product by determining the properties to be used in the assessment such as brand, price and style, etc.

- *Purchasing Decision* refers that after evaluating the best option, decision-making is made in areas such as brand, store, and quantity. Consumers may use their own or others' experiences as an aid in most purchasing decision

- *Post-purchase Behavior* refers that after the consumer purchases the product, the attitude of the product is perceived. Consumers will evaluate the product and satisfaction depends on product features that meet consumer needs. There may be some additional behaviors such as Returning to buy products again and again or use additional services related to that product, etc.

RELATED WORKS OR DISCUSSION

Related research was used to define the conceptual framework and research hypothesis. The research of Moungkeaw (2011) study on innovation, motivation and marketing communication influencing trends in decision-making behavior of 3g technology service of mobile users in Bangkok. The results showed that the overall opinion of the factors of innovation in 3G technology was at a good level. When considering each aspect with the existing technology, the aspect of relative advantage, compatibility, complexity, trainability, and observability was at a good level. Buakajorn (2013) studied the characteristics of people and innovations that influence the behavior of

using mobile applications of consumers in Bangkok. The results showed that the attributes of innovation in terms of compatibility and complexity is related to the behavior of using applications in terms of installation channel, age, occupation, and average monthly income. The attributes of innovation in terms of relative advantage, compatibility, complexity and trainability correlated with application price, gender, age, education level, occupation, average monthly income. As well as, attributes of innovation in term of observability is related to the behavior of the application in terms of the type of application used. Moreover, the study of Waewsak (2013) on the acceptance of innovations that influence the purchasing behavior of smartphone applications among consumers in Bangkok. The results showed that acceptance of innovations in terms of relative advantage and usability were overall correlated with application purchase behavior in terms of average monthly purchase costs. As well as the adoption of innovations in term of complexity as a whole correlated with the application usage. Meanwhile, the study of Kongchom (2016) studied technology innovation and service quality affecting the decision to choose a mobile phone service provider in Bangkok was found that the innovation of observable technology affects the decision to choose a mobile phone service provider. However, the innovation of technology that did not affect the decision to choose a mobile phone service provider in Bangkok is innovation of technology in terms of compatibility, complexity and trainability.

From the findings of past researches, it can be concluded that the adoption of technology innovation in term of relative advantage, compatibility, complexity, trainability, and observability influenced on user decision on mobile phone service provider which are consistent with the theory of perceived attributes of innovation (Roger, 2003). For the hypothesis testing, the researcher analyzed the data using multiple regression analysis to determine adoption of innovation consists of the factor namely relative advantage, compatibility, complexity, trialability and observability have influenced decision on mobile phone service provider of user in Bangkok.

METHODS

Population and sampling

The target population used in this research was mobile phone service users in Bangkok. According to the data from the National Statistical Office of Thailand, found that there were 7,300,000 mobile phone users in Bangkok in 2020 (National Statistical Office of Thailand, 2020). The sample was conduct to collect data by using multi-stage sampling and convenience sampling method from mobile phone service users living in Bangkok, of 400 people. The researcher determined the sample size by calculating the sample size using Taro Yamane's formula (Yamane, 1970).

Instruments and Data collection

Tools used in this research is a questionnaire created by the researcher and in accordance with the definition of operations according to the characteristics to be measured, divided into 3 parts, consisting of demographic data, attributes of innovation adoption and user decision on mobile phone service provider. The estimation scale type of questionnaire was 5-level Likert’s scale. The generated questionnaires were used to test the validity and reliability of the questionnaires before collecting data in order to obtain accurate research results and achieve the stated objectives. In this regard, the researcher will arrange for a pre-test with preliminary questionnaire of 40 sets. The results of the confidence check were the confidence values of each question were between 0.7-1.00 and got the total confidence of 0.835, which passed the reliability criteria (Hair et al., 2010). Additionally, the questionnaires generated were subject to content review from the advisor already. Therefore, it was concluded that the questionnaires could be used to collect data. The empirical data of 400 valid responses was collecte.

Statistics and data analysis

Statistics used in data analysis, the researcher used descriptive statistics to describe the demographic characteristics such as frequency, percentage, mean and standard deviation. As well as the inferential statistical analysis was used to test research hypotheses by using Pearson correlation coefficient analysis and Multiple regression analysis.

RESULTS

Descriptive results

The demographic information of the samples group consisted of 400 samples. Most of them accounted for 51.5% were males, 21.5% were between 21-30 years of age, 45% were married, 47.0% had the highest level of education at the bachelor's level, 27.5% were engaged in private company employees, and 32.5% had their monthly personal income level between 15,001-30,000 baht.

The descriptive data on acceptance of innovative mobile phone technology among service users in Bangkok is at a high level. If considering each aspect, the first is the aspect of compatibility attributes were the most, followed by complexity attributes at a high level, trialability attributes at a high level, relative advantage attributes at a high level and observable attributes at a high level, respectively.

The decision to choose a mobile phone service was found that the overall decision to use the service was at a high level. The decision to choose a mobile phone system when it is seen that it will be more beneficial to be used in various fields is at a high level, followed by choosing a mobile phone system is easy to use, convenient, and fast is at a high level. Choosing a mobile phone system when observing that it can work as needed and others accept to use it is at a high level. The selection of a mobile phone system when the system is compatible with the implementation values is at a high level. Lastly the selection of the mobile phone system when it has been tested and saw the desired results is at a high level, respectively.

Hypothesis testing results

An analysis of the influence of all factors in deciding to use the mobile phone system of the service users in Bangkok, it was found that attributes of innovative in the aspect of the comparative advantage, compatible, complexity, trialability and observability were able to predict the decision to use the mobile phone system of the service users in Bangkok with a statistical significance at the value of F=22.451. All 5 variables could explain the variance of the users' decision to use the mobile phone system service (R^2) at 51.98%. The analysis of the adoption of technology innovation influencing the decision to use mobile phone service provider of service users in Bangkok had the statistics value as shown in Table 1.

Table 1 Multiple regression analysis of the adoption of technology innovation influencing the decision to use mobile phone service provider

Variables	**b**	**β**	**t**	**p-value**
Constant	2.412	-	17.345**	.000**
Relative advantage	.398	.407	6.237**	.000**
Compatibility	.215	.224	2.324*	.037*
Complexity	.255	.265	4.204**	.000**
Trialability	.090	.095	1.803	.082
Observability	.178	.186	2.056*	.043*
R = .721, R^2 = .5198, S.E.=.061, F=22.451, a maximum Eigen value=5.125				

** Significant level at .01, * Significant level at .05

When considering the multiple regression coefficient in the form of a standard score, it was found that the forecaster with the highest multiple regression coefficient are the relative advantage characteristics (β=0.407), complexity characteristics (β=0.265), compatibility characteristics (β=0.224), and observability characteristics (β=0.186), respectively. The forecast equation for the decision to use the mobile phone system of the service users in Bangkok is as follows:

Mobile phone service provider decision = 2.412 + .398 (Relative advantage) + .215 (Compatibility) + .255 (Complexity) +.178 (Observability)

The results of the hypothesis testing of innovations in mobile phone service technology affecting mobile phone service users' decision-making in Bangkok showed statistical testing of the coefficient of independent variables which was the acceptance of mobile phone system innovations. It was concluded that the acceptance of mobile phone system innovations that had a statistically significant influence on the decision to choose a mobile phone system among service users in Bangkok was relative comparison (t-value=6.237**), compatibility (t-

value=2.324*), complexity (t-value=4.204**), and observability (t-value=2.056*), consistent with the research hypothesis. Whereas the adoption of trialability did not influence the mobile phone service provider decision (t-value=1.803), which was inconsistent with the research hypothesis at a statistically significant level of 0.05.

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CONCLUSIONS AND FUTURE WORK

Conclusion and discussion

The overall acceptance of the mobile phone service innovation among Bangkok users is at a high level. When considered on an individual component, the adoption of compatibility attribute is the most valuable, followed by complexity attribute at a high level, trialability attribute at a high level, relative advantage attribute at a high level, respectively, and the last one is an observable attribute at a high level. This is consistent with the research of Moungkeaw (2011). It was found that the opinions on factors of technology innovation in general were at a high level when considering each aspect is also at a high level. It shows that the sample group pays attention to the characteristics of accepting innovation in various fields at the same high level. By prioritizing the compatibility attribute at the first level, it shows that the compatible attribute, which is the degree to which innovation is perceived as being consistent with technology or traditional functionality, is compatible with the values, needs and experiences of its recipients (Rogers, 1995; Lin, Seedy & Deron, 2011). This may be because cell phone systems are a type of technology in telecommunication. Nowadays, mobile phones have become part of the daily life of most people in society for communication that is suitable for daily life. Including technology for mobile phones has been continuously developed. The decision to choose a new mobile phone system to use compatibility attribute is important to decision making. The last is an observable attribute, meaning the degree of effect of innovation is visible or observable by individuals within a society (Rogers, 2003). According to the individual innovativeness theory of Roger (1995), the individual who is persuaded to be an innovator will accept innovation faster than those who have not received it or received it less. According to this theory, innovation in the individual can be divided into five groups: Early Adopters, Early majority, Late Majority, and Laggards. Therefore, observability characteristics depend on the individual innovativeness theory. The early adopter group will embrace and implement new innovations which is motivated by the newness of the product or service. It is challenging and fulfilling a deep emotional psychological need in leadership or the desire to try new things and to have new experiences before anyone else and like to use new innovations (Moore, 1995).

The results of the analysis of the influence of all factors affecting the decision to use the mobile phone system of the service users in Bangkok was consistent with the research of Buakajorn (2013), Kongchom (2016), and Auntanteyanon (2019). The results of the analysis of the influence of innovation acceptance affecting the decision to use the mobile phone system of the service users in Bangkok, was found that the comparative advantage attribute had the most effect on the decision to use the mobile phone service of most users. It shows that the vast majority of service users want something better than what is already available, or more useful than what was already by assessing the comparative advantage in economics which is value or efficiency. Including social comparative advantage is convenience or satisfaction. This is consistent with the research by Buakajorn (2013) found that the characteristics of innovation in terms of benefits from use in comparison with existing products are related to the behavior of using apps in term of the price of application used, gender, age, education level, occupation, average monthly income In addition, in line with the research of Auntanteyanon (2019), it was found that the acceptance of beneficial innovations was related to the trend of using mobile network services among consumers in Bangkok.

The results of the analysis revealed that the innovation adoption attribute in term of trialability does not influence the decision to use the mobile phone system which is inconsistent with the research hypothesis. However, in accordance with the research by Kongchom (2016), it was found that the innovation of experimental capability technology did not affect the service provider's decision to choose a mobile phone signal provider. in Bangkok. This may be due to the lack of mobile phone technology in Thailand for service providers to try the service before making decision to actually use it. As well as the recommendations from people who have used the service continuously before are still insufficient. Including the service provider's information is not enough so that user cannot compare the information of the service provider to make a choice.

Recommendations and future work

Recommendations obtained for applying the research results were that mobile phone service providers should focus on technological innovation in the field of comparative advantage or the benefits of innovation. Emphasis is placed on the development of a mobile phone system that can meet the growing demand for data transmission. The use of a mobile phone system for communication can be done efficiently. The system can facilitate more realistic use in everyday life, and creating more satisfaction in using mobile phone service in various matters. Including mobile phone service providers should focus on technological innovation in the field of trialability which focus on pre-testing before deciding to choose a service provider. There should be a system with suggestions from people who have ever used the service continuously. There should be a search system to check the quality of the mobile phone service provider and allow service users to bring information of service providers to compare with each other for decision making. In summary, mobile phone service provider should improve the innovative features of mobile phone system technology in all 5 aspects for better quality and efficiency which will increase the acceptance rate of innovations in mobile phone technology among users.

For further research should be studied in conjunction with other relevant or expected factors influencing decisions on mobile phone service provider in order to gain more insights covering all dimensions such as factors of marketing mix, brand image, service quality, etc. In addition, it should study in other population groups or other areas such as consumers in upcountry areas.

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