
**EXAMINING CUSTOMER PURCHASING INTENTIONS BASED ON THE
THEORY OF PLANNED BEHAVIOR FOR TELE HEALTHCARE IN
TAIWAN**

Wei-Min Huang

Graduate Institute of Healthcare Information Management, National Chung Cheng University, Taiwan

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ABSTRACT

Tele healthcare has been an important strategy to solve the growing healthcare needs in recent years, as the government's welfare budget constraints and the health and social care needs continues to grow. According to literatures, several studies suggested that the public has high satisfaction and acceptance toward this technology. However, the purchase intention is not high because the service costs. Since most of the previous telehealthcare researches focused on the technical side or the use intention, studies on purchase intentions are relatively lacking. Hence, there is a need to identify the factors that affect the purchase intention of adopting telehealthcare.

This study aims to design a model of the factors affecting the consumers' purchase intention of telehealthcare. The proposed model is based on the theory of planned behavior and includes perceived usefulness, perceived ease of use and health consciousness. Data was collected from 176 consumers through a questionnaire distributed through telehealthcare centers. SPSS and smart PLS were employed as data analysis tools to confirm our hypotheses and test against the research model.

The findings of the study reveal that attitude and perceived financial control can be critical predictors of purchase intention. The results also suggest that consumers' attitude toward purchases can be influenced by perceived usefulness, perceived ease of use and health consciousness.

Keywords: telecare, Theory of Planned Behavior (TPB), perceived financial control, health consciousness, purchase intention

1. Introduction

Disasters and pandemics pose unique challenges to health care delivery. As health care resources

continue to be stretched due to the increasing burden of the coronavirus disease (COVID-19) pandemic, telemedicine, including tele-education, may be an effective way to rationally allocate medical resources (Zhen Hong et. al, 2020).

The world population is aging, with the percentage of older people (over 65) gradually rising. The growing percentage of older people, coupled with increasing pressure on social and health care budgets, means that care providers will be increasingly challenged to cope with continuing delivery of care (Turner and McGee-Lennon, 2013). The healthcare systems in many developed countries are struggling with an increasing number of elderly people, more chronic diseases affecting them, a shortage of healthcare professionals, and healthcare spending rising faster than GDP (Dhillon, Wunsche, and Lutteroth, 2013). The role of new technologies has come to the fore in recent years, particularly as public budget constraints continue to impact on the ability of governments to meet ever increasing health and social care needs through existing care structures and standard approaches to care provision (Callan and O'Shea, 2015).

The first documented accounts of telemedicine were in the late 19th century, when telephone wires were used to transmit electrocardiograph data. Improvements in audiovisual communication technologies over the past 2 decades have allowed for expansion of telemedicine usage. Specifically, the widespread use of personal computing devices and access to high-speed videoconferencing has made remote clinical care more feasible (Makhni et. al, 2020).

In recent year, the Information and Communication Technology for prevention, medical treatment and healthcare become common, and be considered as a way to satisfy the future healthcare needs. Telehealthcare through the integration of health care, ICT technology, electronic medical equipment, and other areas, let people get health care and preventive health services in the community and home. It has become worldly medical technology and service industry trends (Department of Nursing and Health Care, 2104) .

Such as in Scotland, the government has been promoting telecare service provision since 2006 through a Telecare Development program. A Scottish strategy set out the aim that by 2010, telecare services would be available to 75,000 people across Scotland. An independent valuation of the Scottish Telecare Development program as analyzed impacts on factors such as quality of life, carers, and hospital/care admissions (Beale, Sanderson, and Kruger, 2009; Turner and McGee-Lennon, 2013). In Europe, European governments have also come together in the Europe-wide research AAL program (Ambient Assisted Living) that has been running since 2007. The Ambient Intelligence program has supported many telecare pilots in Europe. Denmark, Netherlands, Spain, France, Italy also has telecare pilots (Turner and McGee-Lennon, 2013).

According to Industrial Economics and Knowledge Center (IEK)2014, payment issues is the biggest obstacles in telecare diffusion. Who should pay for this technology and service is still part that many countries are thinking.

In the US, Medicare insurance consist by public and private health insurance. Although The Balanced Budget Act make telecare in the scope of health insurance payments, but there still has strict conditions. In addition, the insurance company is difficult to verify whether or not hospital actually provide services. Moreover, the insurance company for the hospital actually difficult to verify whether or not truthfully provide services. So, through medical insurance pay telecare is facing significant obstacles and challenges. Consumer who have this needs buy for their own is a feasible method (Zhou, 2008; IEK, 2104).

In Ireland, the health and social care system is predominantly funded by general taxation which supports the provision of state provided health and social care services. However, severe fiscal constraints, let community-based health and social care provision be a complex mix of public (state provided), private (out of pocket payment) and informal family care provision. Thus, there is growing interest in the potential of telecare (Rostgaard et al., 2012; Callan and O'Shea, 2015).

Even in the UK, National Health Service models include a more consumer-oriented approach. End users are encouraged to buy mainstream devices off the shelf from their own personal budget, and then purchase telecare services from their personal care allowance.

In addition, the DALLAS program (Delivering Assisted Living Lifestyles At Scale) which conduct in 2012-2015 is aimed at planning and designing telecare into the consumer's life. Through technology provide high-quality health care and disease prevention, assist user independent living and develop telecare of Consumer Models(Technology Strategy Board, 2011; Turner and McGee-Lennon, 2013).

In Taiwan, Ministry of Health and Welfare has conducted a series of telehealthcare programs in recent years. For example in 2007 a pilot program aimed at developing different types of telecare model, program in 2010 aims to diffuse the existing service models develop pay services and build up a business model. Through it assist patients with chronic disease and make the general public to enhance the quality of health management(Ministry of Health and Welfare, 2011; Department of Nursing and Health Care, 2104). In addition, telecare help alleviate health insurance's financial burden which is due to aging population and high prevalence of chronic disease. Ministry of Health and Welfare has stopped subsidies the telecare center which it assist establish in 2012(Ministry of Health and Welfare, 2014).Consumer in need can go to provide telecare service's hospital (eg. National Taiwan University Hospital, Taipei Medical University Hospital, Kaohsiung Medical University Chung-Ho Memorial Hospital, Mennonite Christian

Hospital) and pay for it to get this service.

At present, domestic and international telecare required hardware, network, system architecture has matured (Syu & Tang, 2008). And looking at telecare studies, most are still focused on the technical side and user's point of view- Discussion of factors affecting system usage(Julie et al., 2010; Spaulding et al., 2011; Melinda et al., 2011; Huang, 2013; Liu et al., 2013; Tsai, 2014). However, from the British, Irish, and Taiwan, we also find the telecare trends towards the development of the consumer to pay (Turner and McGee-Lennon, 2013). Which motivation will make consumers buy telecare remains to be explored.

Overview foreign literature, There are many scholars mention that consumers buy telecare will take usefulness, ease of use into considerations (Blackman, 2013; Turner and McGee-Lennon, 2013; Dhillon, Wunsche, and Lutteroth, 2013). If individuals are susceptible to a specific health problem, they try to behave healthily to decrease the risk of the health problems. Individuals are more likely to have healthy behaviours if they perceive a particular health problem as serious (Najaforkaman, Ghapanchi, and Talaie-Khoei, 2014). Therefore, the effectiveness of make more healthy or to maintain disease steady state condition are important factor affecting telecare's willingness to pay (Tsuji, Taoka, and Teshima, 2006). However, the above argument is still lack research modle to test and provide evidence to confirm that view.

The well-known Theory of Planned Behavior Model has been used for explaining the consumer behavior (Ajzen, 1991), and been widely used in examming purchase intention(Chiu, Lee, and Won, 2014). Thus, our study based on Theory of Planned Behavior and include consumer's health consciousness, systems usage, personal financial capability those related factors to examine which factors will influence telehealthcare purchase intention. The finding help us known telehealthcare consumer's characteristics, provide telehealth provider guideline in promotion, and system and equipment product design.

2. Literature Review

2.1 Telehealthcare

2.1.1 Telehealthcare

Telemedicine is considered to be the remote diagnosis and treatment of patients by means of telecommunications technology, thereby providing substantial healthcare to low income regions. Earliest published record of telemedicine is in the first half if the 20th century when ECG was transmitted over telephone lines. From then to today, telemedicine has come a long way in terms of both healthcare delivery and technology (Chellaiyan et al., 2019).

Telecare is meant to support the independent living and welfare of the elderly or people with disabilities. It involves the delivery of health and social care to individuals to their home or a wider community outside formal institutional settings, with the support of systems enabled by information and communication technology (Bayer, Barlow, & Curry, 2007 ; Sintonen and Immonen, 2013).

Telehealth (also called telemedicine or e-health) refers to remote support of health care at home. This includes remote consultation and diagnosis (typically via videoconference) as well as monitoring health parameters and vital signs (eg, blood pressure, heart rate, and disease risk) which can be sent via the Internet to a general practitioner, nurse, or clinic (Turner and McGee-Lennon, 2013).

About telecare, Telehealthcare service can be defined as using information communications technology let patient acceptable get health management in far and different places (Lin, 2010).Taiwan Ministry of Health and Welfare telehealthcare service zone (<http://mohw.telecare.com.tw/HomePage.aspx>) describe telecare as integrate medical care, ICT technology, electronic medical equipment, so that people get health care and preventive health services in a familiar environments like community and home.

2.1.2 Telehealthcare's consumer

Industrial Economics and Knowledge Center 2014 report noted that the current development of telecare in the world, European and American countries focused on home health care, disease management monitoring, remote physician / Specialist services, video diagnostic and consulting, and the Asia-Pacific region emphasis on the side of consumer's need rather than technology.

Furthermore, telecare consumers tend to accept the provider which can provide complete health care rather than a single device or single consultant. Therefore, if the medical service providers can cooperate with medical material equipment manufacturers, telecommunications companies, services and applications and other manufacturers then providing complete health care program and based on this develop business model and payment mechanisms will be an important key in telecare market development(IEK, 2014).

Research relate to telecare consumer characteristics and factors affecting willingness to purchase:

(1) Age

Callan and O'Shea (2015) through a questionnaire to explore the Irish people for telecare purchase intentions, the results showed that age doesn't have significant differences impact to

telecare purchase intention. Blackman (2013) pointed out that elderly people likewise general consumer purchase telecare. So in products and brands selection, should not distinguish by ages. In addition, whether young or elderly person will attention to product is useful or not and its design when purchasing goods(Sudbury and Simcock, 2009; Piqueras-Fiszman, Ares, Alcaide-Marzal, and Diego-Mas, 2011).

(2) Product

Some scholars mention that when consumers face buying telecare situation will take usefulness, ease of use into considerations (Blackman, 2013; Turner and McGee-Lennon, 2013; Dhillon, Wunsche, and Lutteroth, 2013).

(3) Health consciousness

And in view telecare help improve the quality of health management. Therefore, in aspect of health consciousness, Najaftorkaman et al. (2014) pointed out that when consumers think some health problems may cause life-threatening, the individual will adopt healthy behaviors to reduce the possibility of disease. According to this view, the benefits of be more healthy or let disease maintain stability is an important factor affecting consumer's willingness to pay for telecare service (Tsuji, Taoka, and Teshima, 2006).

Overview of foreign literature, the research on telecare willingness to pay's factors in still quite lacking (Turner and McGee-Lennon, 2013). And doesn't have purchase telecare included in relevant facts research through research modle examing telecare purchase intention.

2.2 Consumer behavior theory

2.2.1 Theory of Reasoned Action

Theory of Reasoned Action (TRA) was proposed by Fishbein and Ajzen in 1975 and was the first suitable theory to explain the relationship between attitudes and behaviors (Butler, 1999). Attitude is defined as an individual's positive or negative evaluation of people, things, or behavior, reflecting the individual's feeling toward person, thing, object or behavior (Fishbein and Ajzen, 1975). Subjective norm refers when individual take specific actions, the significant others for individual's actions may take (Ajzen, 1991). That is when you take the action, the social norms and the pressure you feel. It also mean when predicting personal behavior, all the important peoson or group which has important influence.

TRA proposed that attitudes predicts behavior intention rather than the behavior, but behavior intention is associate with behavior, the strength of behavior intention will determine the

behavior presents (Fishbein and Ajzen, 1975). Further, assume that a person's attitude towards Behavior, and subjective norm will affect their behavioral intentions Thus, beliefs and behavior assessment (or weight) can affect the attitude of behavior, normative beliefs and motivation to comply will affect the behavior of the subjective norm, and through these two elements decides individual's behavioral intention, as shown in Fig 2-1).

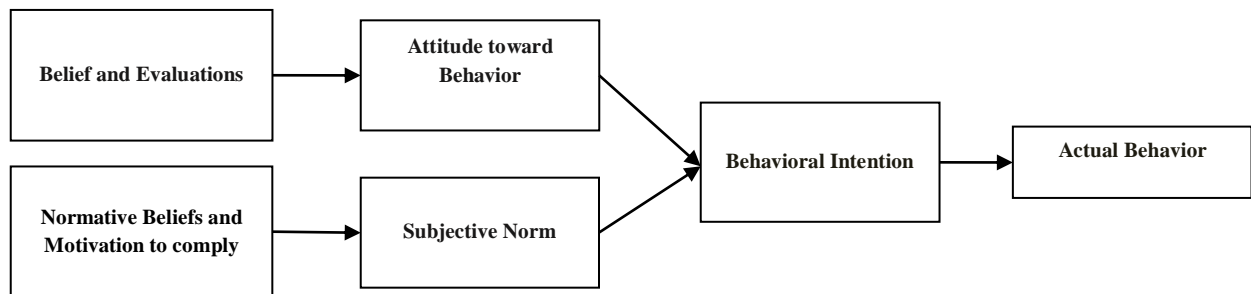


Fig 2-1: Theory of Reasoned Action
(Ajzen and Fishbein, 1980)

The value of TRA is through a simple framework to represent complex human decision-making process. The model has received broad support in empirical studies of consumer decision making and in the social psychology literature and it is widely used to explain the different aspects of the behavior intentions and behavior (Taylor and Todd, 1995). Scholars such as Butler (1999) pointed out that the theory of rational behavior has been invoked and applied in consumer behavior, female workplace adaptation, jogging training, vote, blood donation, alcohol addiction and other fields. But simple structure can be said to be the shortcomings of this model, especially assumption predicted human behavior is a fully volitional control, is considered very unrealistic and does not take into account most of people's behavior influence by some of the irrational factors. Sahni (1994) noted that consumer behavior is often examining by theory of reasoned action. But the most of consumer behavior just partially under conscious control, also influence by such as finance, time, resources, or their ability limited.

2.2.2 Theory of Planned Behavior

Ajzen (1985) found that individuals behavior sometimes influence by limitation of time, money, etc. So, the TRA can not fully predict all of behavior (Randall and Gibson, 1990). In order to increase theory of reasoned action's predictive power, Ajzen formalized an adaptation of the TRA which he calls the Theory of Planned Behavior (TPB) to account for conditions of variable volitional control. The TPB adds a new construct, Perceived behavioral control, to the subjective norm and attitudinal components of the TRA, as shown in Fig 2-2.

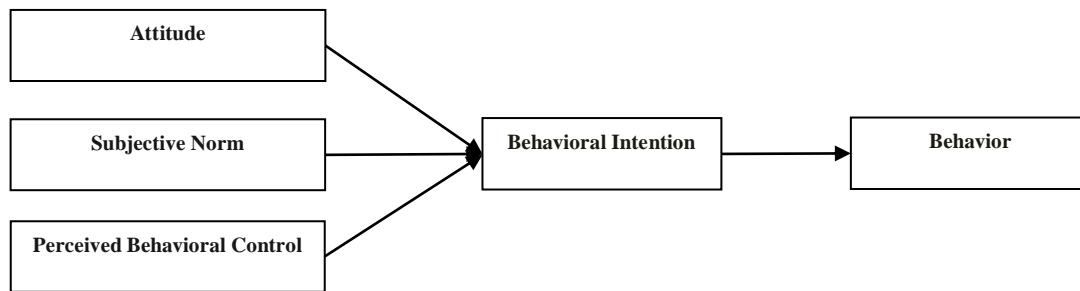


Fig 2-2: Theory of Planned Behavior
(Ajzen, 1985)

Theory of planned behavior assume that behavioral intention is determined by three independent variables, the attitude toward the behavior, subjective norm, perceived behavioral control (Sparks et al., 1997). Perceived behavioral control reflects beliefs regarding access to the resources and opportunities needed to perform a behavior(Taylor and Todd, 1995). Behavior Intention reflects an intention of individual engaged in an act, is a factor to predict behavior.

About TPB and TRA’s explaining behavior ability, Ajzen and Madden (1986) via two experiments discover TPB’s explaining ability is better than TRA.In addition, Ajzen (1991) pointed that the attitude, subjective norm, perceived behavioral control this TPB architecture can across all the different scenarios and predict their behavior and intentions. Accordingly, Stavros, Pollard, East, and Tsogas (1999) expressed the conceptual framework of the TPB can explain overall consume intentions. TPB can be used to examine consumers’ purchase intention in different contexts(Chiou, 1998). De Cannière, De Pelsmacker, and Geuens (2009) and Chiu, Lee, and Won (2014) further pointed out TPB has been widely used to explore buying behavior and verify different types of products.

But there are several researchers have pointed out this model still have ways to enhance the explanatory power, such as make attitude, subjective norm, perceived behavioral control those single belief fact according to researcher’s different research motivation decompose beliefs into multidimensional constructs(Shimp & Kavas, 1984; Grube et al., 1986; Burnkrant & Page, 1988; Taylor & Todd, 1995). Or according to the nature of behavior and purpose of research add different variable s in the model. In order to better understand the relationships between the belief structures and the intention (Ajzen, 1991; Eagly & Chaiken, 1993; Armitage & Conner, 2001; Perugini & Bagozzi, 2001).

2.3 Technology Acceptance Model

TAM is an adaptation of the TRA and proposed by Davis in 1986, as shown in Fig 2-3. Whose primary purpose is through this structure explore how external factors influence user's internal beliefs, attitudes, intentions, and therefore affect the use/adoption of information systems (Davis, 1989). In TAM, intention is determined by attitude towards usage as well as by the direct and indirect effects of perceived usefulness and perceived ease of use. The former refers to the degree to which a person believes that using a particular system would enhance his or her job performance. The latter refers to the degree to which a person believes that using a particular system would be free from effort. Furthermore, perceived ease of use will affect the perceived usefulness and system's design features and functions, differences personal traits, environmental factors ... and other external variables will directly affect these two beliefs.

Currently, the technology acceptance model has been widely used to explore consumer behavior (Koufaris, 2002; Hsu and Lu, 2007; Hodges, Watchravesringkan, and Kim, 2010; Teng and Lu, 2009; Kim, 2012; Boakye, McGinnis, and Prybutok, 2014), and also has been widely used in telecare topic (Asua, Orruño, Reviriego, and Gagnon, 2012; Wang, Tsai, and Wang, 2013; Su, Tsai, and Hsu, 2013; Liu, Tsai, and Jang, 2013; Huang, 2013; Tsai, 2014).

About TAM's perceived usefulness, ease of use apply in purchase intention relative research. Kim et al. (2007) pointed out that the technology acceptance model does not consider the user who is out of organizational environment often have to buy then use. So Teng and Lu (2009) 's research of Consumer adoption of research PDA phones, the results demonstrate that factors affecting information technology intention of use also affect information technology intention of purchase. In addition, Venkatesh and Brown (2001) and Vishwanath and Goldhaber (2003) also noted that the factor which influence technology products adoption, also influence its purchase behavior.

So far there are several researchers include perceived usefulness and perceived ease of use these two variables in electric vehicles, PDA phones, technology products, telehealthcare...etc in research model of purchase intention(Böhm, Fuchs, Pfliegl, and Kölbl, 2009; Teng and Lu, 2009; Hodges et al., 2010; Xu, Zhang, Zheng, Shen , 2010; Shih, 2011 ; Chen, Lee, Yu, Ho, Jeng, 2012).

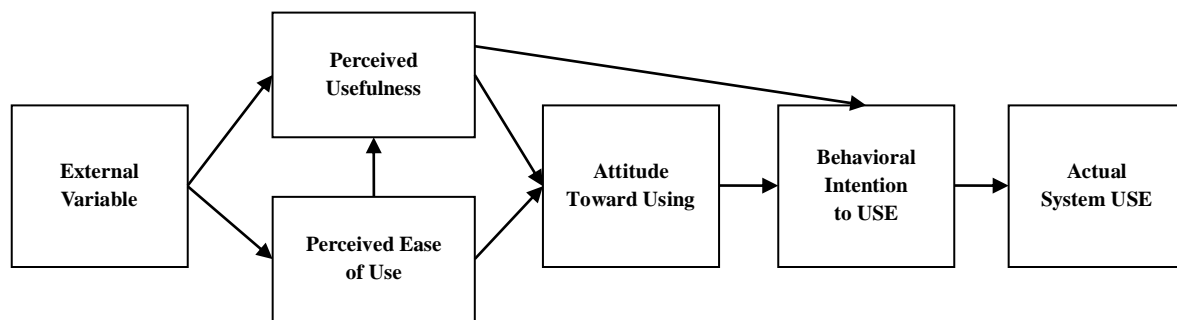


Fig 2-3: Technology Acceptance Model
(Davis et al., 1989)

2.4 Health consciousness

Health consciousness is a multiple health-oriented predictor, often used to assess the health and bodily functions, lifestyle, mental happiness, etc (Normandeau, Wins, Jutras, and Hanigan, 1998; Meland, Haugland, and Bredablik, 2007). Jayanti and Burns (1998) defined health consciousness as the integrating of health concerns into an individual's life activities (Michaelidou and Hassan, 2010). Becker et al. (1977) stated that health consciousness is an assessment of the level of readiness to have health actions. Schifferstein and Ophuis (1998) stated the the health conscious reflects individual's intention of executing health related behaviors.

Gould (1988) and Jayanti and Burns (1998) noted that base on enhancing or maintaining the health, quality of life, disease prevention motivation, people will engage in healthy behavior and pay attention to their health. Based on this view, Michaelidou and Hassan (2010) further noted that health-conscious consumers will pay attention to their health.

About the health conscious consumer research, health conscious consumers will pay attention to their own physical condition and have further promoting or maintaining the health and quality of life motivation, for example by taking healthy behaviors to prevent the occurrence of diseases and readily retain health conscious (Gould, 1988; Plank and Gould, 1990; Kraft and Goodell, 1993; Newsom et al., 2005). Therefore, in the study of consumer behavior, health consciousness have been widely used test for the impact of health-related products purchase intention (Lockie et al, 2002; Michaelidou and Hassan, 2010; Wen and Li, 2013).

Health consciousness has been researched and tested in healthcare contexts. Akamatsu and Tsuji (2013) pointed out that people view health information through the health care system and obtaining health consultation from nurses, will make them more concerned about health and

more healthconscious. Najaftorkaman, Ghapanchi, and Talaei-Khoei (2014) indicates that consumers are more likely to have healthy behaviours if they perceive a particular health problem as serious and try to behave healthily to decrease the risk of the health problems. Therefore, in the study of individual health care system adoption is also included in health consciousness this factor. And Tsuji, Taoka, and Teshima (2006) to explore e-health willingness to pay study, pointed out that healthier or make disease to maintain stability state is an important factor in e-health service's willingness to pay.

2.5 Perceived financial control

In the study of purchase intention, the theory of reasoned action as the theoretical framework used by many researchers. On this basis, Ajzen (1991) introduced the theory of planned behavior by adding a new component, "perceived behavioral control. Theory of planned behavior has also been widely used in consumer purchase intention examination. Perceived behavioral control means an individual's perceived ease or difficulty of performing the particular behavior (Ajzen, 1991).

In view of the economic ability is an important role in predicting purchase intention, the theory of planned behavior is amended by Sahni (1994), in order to increase the explanatory power of the theory of planned behavior on purchase intention. Notani (1997) also said that the theoretical framework which include attitude, subjective norm to predict purchase intention can effectively enhance the explanatory power through add perceived financial control, especially become more significant when the consumer is in the perceived the product price is relatively expensive situations. So far, there are many studies apply theory of planned behavior to explore purchase intention, and affordability have been regarded as a loop of perceived behavioral control then impact on behavior intentions (Notani 1997; Oh and Hsu 2001; Voon et al. , 2011).

Sahni (1994) proposed Perceived Financial Control and defined it as individual affordability toward product, and noted that perceived financial control that is perceived affordability, is a psychological measure whether the individual has the ability to buy. Gasiorowska (2014) also indicates that in the context of purchasing goods, consumers are affected by the perception of whether affordable, so affordability is a variable affecting the purchase intention.

3. Research model and hypotheses

3.1 Research model

Taking into account our previous argument, we develop a model based on the theory of planned behavior which proposed by Ajzen(1985), then add a variable which Sahni(1994) indicate that

can increase TPB’s explanatory power in purchase behavior - perceived financial control, and according to scholars advice decompose the single belief in order to know belief-shaping and enhance the model's explanatory power, thus add perceived usefulness, perceived ease of use and health consciousness to examining what factors have an impact on consumer ‘s purchase intentions of telehealthcare, as shown in Fig 3-1.

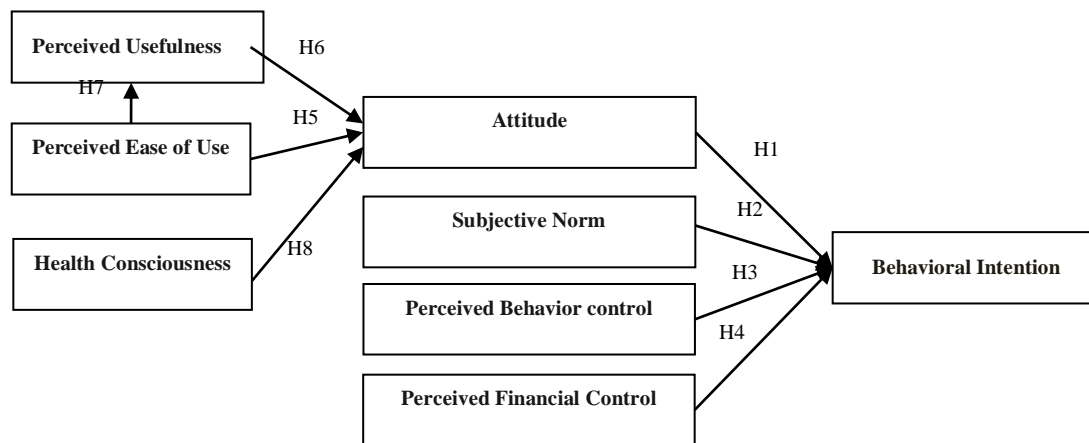


Fig 3-1: Research model

3.2 Operational Definition

Operational Definition was shown in Table 3-1

Table 3-1: Operational Definition

Variable	Oerational Definition	Reference
Perceived Usefulness	The degree to which a consumer believes that purchasing the telehealthcare would help himself / herself health management.	Davis (1989)
Perceived Ease of Use	The degree to which a person believes that using / learning the telehealthcare system would be free from effort	Davis (1989)
Health Consciousness	The integrating of health concerns into a consumer’s life activities.	Jayanti and Burns (1998)
Attitude	The individual's overall evaluation about	Ajzen and Fishbein (1980)

	purchasing telehealthcare	
Subjective Norm	The evaluation of others think he / she should or should not purchase telehealthcare to consumer.	Taylor and Todd (1995)
Perceived Behavioral Control	Consumer's evaluation toward purchase telehealth needed information, time, problem-solving ability.	Cheng, Fu, and Tu (2011)
Perceived Financial Control	The consumer's psychological measurement whether he / she afford to buy the product.	Sahni (1994)
Behavioral Intention	The consumer's perceived likelihood or "subjective probability that he or she will purchase telehealthcare	Ajzen and Fishbein (1980)

3.3 Hypotheses

Stavros et al. (1999) noted that the conceptual structure of the theory of planned behavior can comprehensively explain consumption intentions. Chiu (1998) also pointed out that the theory of planned behavior can be used to examine consumers' purchase intention in different contexts. De Canniere et al. (2009) and Chiu et al. (2014) further stated that theory of planned behavior has been widely used to explore buying behavior of different products.

Thus, researcher such as Caprara et al. (1998), Chiou (1998), Caprara et al. (2000), Robinson and Smith (2002), Arvola et al. (2008), Son et al. (2013) , Chiu et al. (2014) applied the theory of planned behavior to examine purchase intention of different types of products.

According these researches, we can find that the attitude, subjective norm, perceived behavioral control will positively affect purchase intentions. We therefore hypothesiz:

H1: Consumer's attitude toward telehealthcare purchasing is positively related to purchase intention of telehealthcare.

H2: Subjective norm toward telehealthcare purchasing is positively related to purchase intention of telehealthcare.

H3: Consumer's perceived behavioral control toward telehealthcare purchasing is positively related to purchase intention of telehealthcare.

Sahni (1994) proposed perceived financial control in the study which apply the theory of planned behavior to explore purchase intention. Perceived financial control reflect the perception of

affordability toward product and when consumer in the product price relatively expensive situation, higher perceived financial control will positively affect purchase intention (Sahni, 1994; Notani, 1997).

Since the implementation of telehealthcare is based on the high cost of equipment and professional medical personnel costs, the service has high charges characteristics (Tang, Wu, Chiang, Tsai, 2014). In addition, Sahni (1994) suggested that consumer who is in the product relatively expensive situation, higher perceived financial control will positively affect purchase intention. We therefore hypothesize:

H4: Consumer's perceived financial control toward telehealthcare purchasing is positively related to purchase intention of telehealthcare.

In telehealthcare related studies, there are many researchers apply Technology Acceptance Model to explore the adopt intention of telehealthcare (Asua et al., 2012; Wang et al., 2013; Huang, 2013; Tsai, 2014). In purchasing related studies, Venkatesh and Brown (2001) noted that the factor which influence technology products adoption, also influence purchase behavior. Teng and Lu (2009) included perceived usefulness and perceived ease of use in their consumer adoption of PDA phones research, and according the result found that these two factors play an important role in technology products purchase intention.

Therefore, in telehealthcare adoption related researches, Chen et al., (2012) applied Technology Acceptance Model and used perceived usefulness and perceived ease of use in the research model to test purchase intention of telehealthcare. Xu et al., (2010), Shih (2011) explored consumers' purchase intention of hybrid vehicles and found that the perceived usefulness, perceived ease of use significantly and positively affect attitude. Hodges et al. (2010) also found that the perceived usefulness, perceived ease of use significantly affect attitude then affect purchase intention in their study. We therefore hypothesize:

H5: Consumer's perceived ease of use toward telehealthcare is positively related to attitude of telehealthcare purchasing.

H6: Consumer's perceived usefulness toward telehealthcare is positively related to attitude of telehealthcare purchasing.

Huang (2013) indicated that perceived usefulness could be influence by perceived ease of use and have been test in many empirical studies. In addition, in people adopt telehealthcare researches, Tsai (2014) and Huang (2013) stated that perceived ease of use has significantly positive effect on perceived usefulness. Chen et al., (2012) applied Technology Acceptance

Model to explore purchase intention of telehealthcare, also found that perceived ease of use positively affect perceived usefulness. We therefore hypothesize:

H7: Perceived ease to use” positively affects a consumer’s attitude toward using.

Michaelidou and Hassan (2010) noted that health-conscious consumers will pay attention to their health. Therefore, in health related products researches, health consciousness was regarded as an important factor in purchase intention examination, such as Tarkiainen and Sundqvist (2005), Michaelidou and Hassan (2008, 2010) include it in their research.

In addition, Najaforkaman et al. (2014) indicated that in healthcare system adoption context, individual will be affected by the health consciousness. Tsuji et al. (2006) stated that the benefits of be more healthy or let disease maintain stability condition is an important factor affecting consumer’s willingness to pay for e-health service. According to the above, we can inference that when consumers’ health consciousness is higher, then the attitude toward purchase telehealthcare will be more positive. We therefore hypothesize:

H8: Consumer’s Health consciousness is positively related to attitude of telehealthcare purchasing.

3.4 Method

Since the consumer who has telehealthcare using experience is our target population. Hence, the questionnaires were distributed by telehealthcare centers. All statistical analyses such as descriptive statistics, reliability and validity, Structural Equation Modeling (SEM) were performed using SPSS 22.0 and Smart PLS 3.2.

4. Results

A total of 176 valid questionnaires were distributed and collected from telehealthcare centers. Since the questionnaire in our study included telehealthcare affordability items, in this consideration, we deducted six students and one unemployed. After that, a total of 176 valid questionnaires were distributed and collected from telehealthcare centers.

4.1 Respondent Characteristics

Descriptive statistics for each sample are given in Table 4-1. Approximately 51per cent of each sample is female and approximately 57 per cent of each sample is under 30 years old. The highest portion of the respondents has a bachelor’s degree, a total of 124 respondents, accounting for 70.5% of all respondents. Approximately 63 per cent of each sample is unmarried and 68.2

per cent of each sample hasn't has child yet. The highest portion of the respondents is in leisure and service industry.

Table 4-1: Respondent characteristics

Factor	Class	Sample size	Percentage (%)
Gender	Male	86	48.9
	Female	90	51.1
Age	Under 30	100	56.8
	31-40	28	15.9
	41-50	23	13.1
	51-60	21	11.9
	Above 60	4	2.3
Education	Illiterate	0	0.0
	Less than Junior High	0	0.0
	High School Graduate	17	9.7
	Bachelor's Degree	124	70.5
	Master's Degree	35	19.9
Marital Status	Married	64	36.4
	Unmarried	111	63.1
	Divorced	0	0.0
	Legally Separated	0	0.0
	Widowed	1	0.6
Child	Have	56	31.8
	Havn't	120	68.2
Field of Job	Leisure & Service	42	23.9
	Information Technology	35	19.9
	Medicine & bio-tech	26	14.8
	Manufacturing	18	10.2
	Government Official	16	9.1
	Business	15	8.5
	The family managing	8	4.5
	Entertainment / Publishing / Mass media / Marketing	7	4.0
	Construction Industry	2	1.1
	Others	7	4.0

4.2 Reliability and Validity Analysis

4.2.1 Reliability

Table 4-2 summarizes the Cronbach's α coefficient of each construct to validate the internal consistency. All values of Cronbach's α are greater than 0.7, indicating a high reliability.

Table 4-2: Reliability

Construct	Cronbach's α coefficient	Whole questionnaire Cronbach's α coefficient
Perceived Usefulness	0.727	0.882
Perceived Ease of Use	0.799	
Health Consciousness	0.789	
Attitude	0.870	
Subjective Norm	0.937	
Perceived Behavioral Control	0.796	
Perceived Financial Control	0.812	
Purchase Intention	0.957	

4.2.2 Validity Analysis

(1) Content Validity

The questionnaire is based on published researches of international journals. After the initial translation and integration of the research context, and then invited three experts included academics and practical realm view the items of the questionnaire.

Respectively, a professor at the department of healthcare information management in the national university with medical and information management double area of expertise; a professor at the department of department of information management, in the national university with business administration management and information management double area of expertise; a head of telehealthcare center of medical center with care, health promotion, patient instruction expertise and managing the telehealthcare center. Three experts gave directions and recommend appropriate modifications for the item, via the revision process to ensure that the item content clearly, and improve the content validity of the questionnaire of this study.

(2) Construct Validity

It refers the measurement tool ability of inferring or measuring abstract concepts or traits. Convergent and discriminant validity are the two subtypes of validity that make up construct validity.

a. Convergent validity

Convergent validity of the measures was confirmed by examining the Average variance extracted (AVE), Composite Reliability (CR), and factor loadings. Nunnally (1978) stated that the value greater than the criteria of AVE 0.5, CR 0.7, and factor loading 0.5, indicate the research concepts have convergent validity. After delete factor loading below 0.5 item HC4, all item AVE are above 0.5, CR are above 0.7, loading are above 0.5 and are significant, indicate a good fit.

Table 4-3: Convergent validity

Variable	Item	AVE	Composite Reliability	Factor loading
Perceived Usefulness	PU1	0.656	0.849	0.898
	PU2			0.648
	PU3			0.862
Perceived Ease of Use	PEOU1	0.718	0.884	0.801
	PEOU2			0.855
	PEOU3			0.884
Health Consciousness	HC1	0.647	0.880	0.857
	HC2			0.756
	HC3			0.809
	HC5			0.790
Attitude	A1	0.720	0.911	0.818
	A2			0.846
	A3			0.884
	A4			0.845
Subjective Norm	SN1	0.832	0.952	0.892
	SN2			0.933
	SN3			0.896
	SN4			0.927
Perceived Behavioral Control	PBC1	0.708	0.878	0.708
	PBC2			0.886
	PBC3			0.916

Perceived Financial Control	PFC1	0.727	0.888	0.819
	PFC2			0.804
	PFC3			0.930
Behavioral Intention	BI1	0.920	0.972	0.968
	BI2			0.957
	BI3			0.952

b. Discriminant validity

The test of discriminant validity, which compares the AVE of each construct concept and the square of correlation coefficients, also verified the validity, since the former was found to be greater than the latter. Table 4-4 exhibits the result of the test of discriminant validity and indicate each construct concept has discriminant validity in our research.

Table 4-4: Discriminant validity

Variable	PU	PEOU	HC	A	SN	PBC	PFC	BI
PU	0.810							
PEOU	0.491	0.847						
HC	0.248	0.176	0.804					
A	0.740	0.569	0.292	0.849				
SN	0.177	-0.004	0.183	0.045	0.912			
PBC	0.275	0.491	0.212	0.418	-0.108	0.842		
PFC	0.139	0.236	0.268	0.347	0.041	0.430	0.853	
BI	0.426	0.399	0.187	0.593	0.062	0.294	0.482	0.959

※ The diagonal data in bold is the value of AVE square root.
 PU: perceived usefulness; PEOU: perceived ease of use ; HC: Health consciousness; A: attitude; SN: subjective norm; PBC: perceived behavioral control; PFC: perceived financial control; BI: behavioral intention

4.3 Structural Equation Modeling analysis

4.3.1 Path coefficient test

In this study, we used BootStrap method which repeated 1000 times sampling to calculate the path coefficient (β) and t-value. One-tailed test is in our study, when $t > 1.96^*$, $t > 2.58^{**}$, $t > 3.29^{***}$ and $p < 0.05^*$, $p < 0.01^{**}$, $p < 0.001^{***}$ means significant. The result are give in Table 4-5. And show that there are two hypotheses are rejected, were H2 subjective norm to behavioral intention of purchasing telehealthcare and H3 perceived behavioral control to behavioral intention of purchasing telehealthcare, the rest hypotheses are established.

Table 4-5: Path coefficients

Hypotheses	Path Relation	Path Coefficient (β)	t-value	p-value	Result
H1	Attitude → Behavioral Intention	0.502	7.054***	$p < 0.001^{***}$	not reject
H2	Subjective Norm → Behavioral Intention	0.019	0.263	$p > 0.1$	reject
H3	Perceived Behavioral Control → Behavioral Intention	-0.057	0.778	$p > 0.1$	reject
H4	Perceived Financial Control → Behavioral Intention	0.332	4.530***	$p < 0.001^{***}$	not reject
H5	Perceived Ease of Use → Attitude	0.263	4.066***	$p < 0.001^{***}$	not reject
H6	Perceived Usefulness → Attitude	0.586	10.701***	$p < 0.001^{***}$	not reject
H7	Perceived Ease of Use → Perceived Usefulness	0.491	6.777***	$p < 0.001^{***}$	not reject
H8	Health Consciousness → Attitude	0.100	2.055*	$p < 0.05^*$	not reject

4.3.2 Model predictive power estimation

The coefficient of determination R^2 was used to test prediction degree of whole pattern. The value of R^2 is between 0 to 1, greater value means the model has more explanatory power. Table

4-6 exhibits the result of the test of model predictive power estimation.

Construct perceived usefulness's R^2 was 24.1%, indicating that the explanatory power perceived ease of use on the perceived usefulness has yet to be strengthened, its explanatory power was low reveal that there are other factors haven't been found yet. Construct attitude's R^2 was 61.2% and construct Behavioral intention's R^2 was 44.3%, both of two construct have sufficient explanatory power in our research.

Table 4-6: Model predictive power estimation

Variable	R^2
Perceived Usefulness	0.241
Attitude	0.612
Behavioral Intention	0.443

The path coefficients of the proposed model is shown in Fig. 4-1. Wherein the dotted line represents a p-value is not significant, the solid line represents a significant p-value. We found that perceived ease of use positively affect perceived usefulness, perceived usefulness, perceived ease of use, health consciousness the beliefs above will positively affect the consumers' attitude toward purchase telehealthcare, and both of attitude and perceived financial control have positive impact on purchas intention.The behavior and attitude, perceived financial control positive impact on consumer buying behavior intention of distance health care.

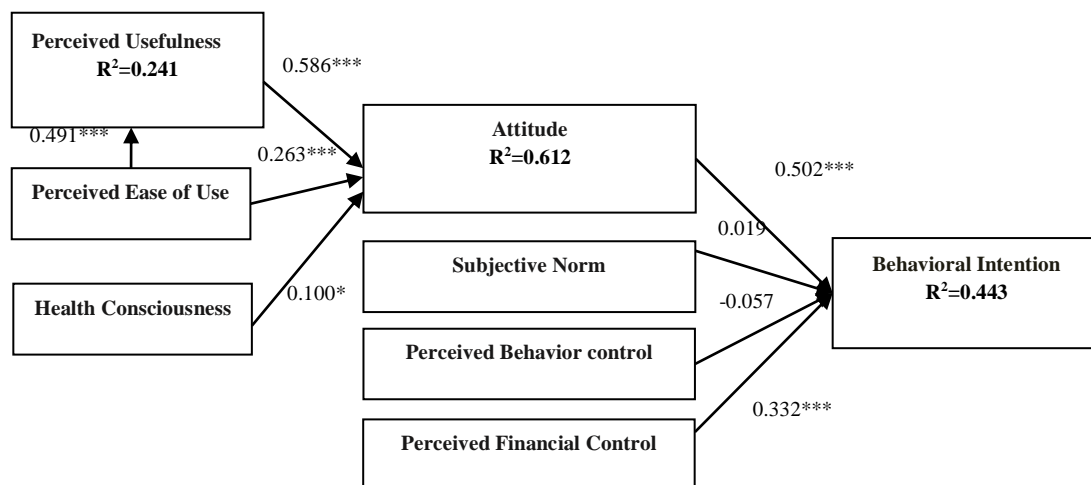


Fig 4-1: Path coefficients of the proposed model

5. Discussion and Conclusion

Research results showed that perceived ease of use of telehealthcare play an important role to perceived usefulness, however according to $R^2=24.1\%$, it's not enough to fully predict perceived usefulness. Thus, when predict perceived usefulness it should take more factors in consideration. Furthermore, we found the factors which influence attitude, the highest is perceived usefulness, second is perceived ease of use, and health consciousness also can influence it. In addition, from viewing $R^2=61.2\%$, indicates the attitude have well explanatory power. Finally, predictions on behavioral intentions, attitude is most important, second is perceived financial control. The estimated capacity of the overall model reached 44.3%.

Factors affect perceived usefulness

According to the empirical results of this study, when consumers' perceived ease of use of telehealthcare is higher, the perceived usefulness will also higher, too. Both of them have a significantly positive impact. This result is consistent with Tsai (2014), Huang (2013), and Chen et al.(2012).

Therefore, to enhance consumers' perceived usefulness, system and device developers of telehealthcare can toward simple, understandable in product design. Health advisor can teach patient how to use telehealthcare through supply clear and understandable instruction manuals or teaching video, etc, increase easy to use perception, and further enhance the usefulness perception of telehealthcare.

Factors affect perceived attitude

According to the empirical results show that perceived ease of use, perceived usefulness and health consciousness these three variable were significantly positive impact on the attitude. This results is consistent with Teng and Lu (2009), Hodges et al. (2010), and Chen et al., (2012). Since Najaforkaman et al. (2014) stated that in healthcare system adoption context, individual will be affected by the health consciousness. Therefore, we include health consciousness construct and test it in our study. And the findings demonstrated that health consciousness has significant influence on attitude toward purchase telehealthcare.

Based on the path analysis consumers' attitude are most affected by perceived usefulness than perceived ease of use and health consciousness. Through the above conclusions, the benefits of better understand self's health condition and whether it is easy to use are still the foundation of shaping consumers' attitude. Furthermore, since health consciousness also have an impact on the attitude, we suggest that the telehealthcare providers can pay more attention to the public

who aware self's health market segment in order to meet their health management demand than live alone, the elderly, chronic diseases.

Factors affect behavioral intention

According the result, consumers' attitude and perceived financial control these two variable positively affected consumers' behavioral intention for telehealthcare. In addition, the hypothesises subjective norm and perceived behavioral control will affect telehealthcare purchase intention were not supported.

First, we discuss those not be supported hypothesises. Based on the result, subjective norm does not have significant impact on purchase intention, indicating that consumers' assessment of telehealthcare purchasing were not affected by others' opinions. Possible reasons may be product characteristics related to the personal health, so hope their selves can most decide the buyind decision, hence others' opinions not be an important factors in purchasing this service. In Huang, Chao, Fu (2012) empirical research, also found most respondents want have a higher autonomy of decision-making power in buying telehealthcare decisions.

Based on the result, perceived behavioral control does not have significant impact on purchase intention, indicating that consumers' assessment of telehealthcare purchasing were not affected by the conduct this behavior needs ability of information, time, problem solving. Over viewing apply the theory of planned behavior research, we can find attitude, subjective norm, perceived behavioral control these three construct has different influence via various products in purchase intention. In fact, we can find perceived behavioral control worse than subjective norm in such as Voon et al. (2011), Taylor and Todd (1995) research.

However, the reason lead perceived behavioral control not have significant impact on purchase intention, Chiou (1998) according the empirical research suggest that it related to consumers' knowledge of product, when a high degree of product knowledge the perceived behavioral control not have significant impact on purchase intention.

According by this view, we speculated that the perceived behavioral control doesn't have significant impact on purchase intention may cause by the respondent have telehealthcare using experience, so have high degree of telehealthcare product knowledge. Hence, there is no significant relationships among perceived behavioral control and purchase intention.

Second, we discuss the hypothesises those be supported.

The higher consumers' attitude toward purchase telehealthcare the higher purchase intention

consumers' have, consist with Taylor and Todd (1995), Chiou (1998) finding.

The higher perceived financial control the higher purchase intention consumers' have, consist with also incorporate perceived financial control to explore purchase intention previous study(Sahni, 1994; Notani, 1997; Voon et al., 2011).

Through the findings above, demonstrate that telehealth purchase intention will positively affect by attitude, perceived financial control, but not be affected by the subjective norm and perceived behavioral control. That means when consumer have more positive attitude, the higher purchasing telehealthcare tendency.

Telemedicine connects the convenience, low cost, and ready accessibility of health-related information and communication using the Internet and associated technologies. Telemedicine during the coronavirus epidemic has been the doctors' first line of defense to slow the spread of the coronavirus, keeping social distancing and providing services by phone or video conferencing for mild to focus personal care and limited supplies to the most urgent cases (Vidal-Alaball et al., 2020). Medical centers are now responding to COVID-19 through rapid adoption of digital tools and technologies such as telemedicine and virtual care which refer to the delivery of healthcare services digital or at a distance using Information and Communications Technology (ICT) for treatment of patients. Telemedicine is expected to deliver timely care while minimizing exposure to protect medical practitioners and patients (Bokolo Anthony Jnr., 2020).

Therefore, we advice the telehealthcare provider can inform consumer this service can meet what their health management related needs. And compare remote monitoring or wearable device monitoring the telehealthcare has health care professionals give health advice and counseling advantages, through it to enhance the publics' perception of telehealthcare usefulness, further to increase attitude toward purchasing telehealthcare and purchase intention. In addition, about target population, besides those whom more concerned about their own health status, also focus on telehealthcare affordable segmentation, in order to receive more service member.

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