

## ADOPTABILITY of IoTs IN THAILAND HEALTH CARE

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**Abstract:** *Since Technology is driving changes in everyone life around the globe, It affects most of the aspects of our daily life. Health is one of the important things that everyone concern and cannot avoid being involved with. The initiative idea of the thesis is to find out the possibility that technology can bring and offer to Thailand health care system in both public and private sectors. The development of technology in Thailand's Health Care depends on various factors such as ICT (Information and Communication Technologies) infrastructure, Human Resources skills of health specialists, world economy, Investment in IT healthcare businesses which creates new technologies that will drive consumer new behaviours, cost containment in healthcare system and businesses to deliver healthcare core value to consumers in the future. Thailand considers as a developing country, we are facing many challenges to deliver and empower core value of healthcare business to consumers from technology infrastructure, healthcare specialists to the end users or consumers. There are many unknown and uncontrollable factors in health care system that need to be taken into accounts such as personal interest, motivation to drive information and technology in healthcare to deliver core value of health care business and system to consumers that need to be discovered and develop in each individual person, communities and society as a whole in order to improve the adoptability of healthcare technology.*

**Keywords:** *Healthcare, Health Care Application, Human and Resources Skills, IoTs (Internet of Things), Patients, Thailand*

### 1. INTRODUCTION

Thailand medical health care and services has developed tremendous growth in the past five years. Thailand plays an important role as medical service provider in the global economy. Medical skills of Thai doctors domestic trained and international trained are exceptional high standard. Hospitals in Thailand have developed up state of art medical care and services. It reached international level and American Hospital Accreditation Standard.

To be successful in developing an outstanding healthcare business not only in Thailand but internationally, ICT system shall be taking into account as a platform to improve Thailand future health care system and foster health care development from high quality healthcare journals, reliable online medical information sources, software and mobile phone applications from each individual level, private and public medical providers to Thailand national health care service system.

As medical care and service is one of the important services that everyone needs to rely on not only when one facing health problems but also in prevention and takes care of one own health. To have physical strength and live life fully is what everyone desire. To have a good understanding and encourage each other to take responsibility of one own health can create tremendous effects in each individual lives and society which healthcare service provider plays an important role to develop effective and sustainable health care system.

To apply above mentioned ideas and theories and concepts to find out the possibility in improving patient satisfaction and empowerment by using Information and communication technology in the frame work of technology innovation in business and co-creation to engage customer by co – creation concept and customer centric within organization and society to create new development in business and business impact to prepare and adapt to changes in the future.

### **1.1 Purpose of the study**

To drive medical care and services business is a big challenge as the complexity itself in medical treatment cares that we cannot define how many procedures, treatments need to be performed from development of diseases and body dysfunctional that develop health problems and sicknesses. To empower customer became one of the aspects that medical providers shall take into account in order to deliver core value of health care business with technology and digital that the world has evolved and consider it as business key drive to expand the business.

## **2. LITERATURE REVIEW**

Since information and communication technology infrastructure had evolved in many developed countries for a several decades but it is new in Thailand. The information and communication infrastructure has been improving, many online applications and internet of things has been created to facilitate and delivery business value to customers. It is become a second nature of mobile internet users in their daily life.

The result from those monitoring IoTs alone and/or devices that can be linked with hospital application program to interpret certain health result used to help patient health improvement. Once patient condition is well improve by useful data that IoTs deliver to both patients and doctors. Those information can improve patient's understanding of their health problems, it is also allow doctor to use those information explain to patient and work together to reach patient health goals. IoTs can enhance doctor-relationship in this manner but it cannot be a substitution. Thus, I have chosen TAM model as it works well with technology.

### **2.1 Theoretical Framework**

The main concept of the study is to find out that Thais are ready to adopt medical technology on Internet Platform and/or Internet of Things (IoT). Figure-1 depicts the conceptual framework.

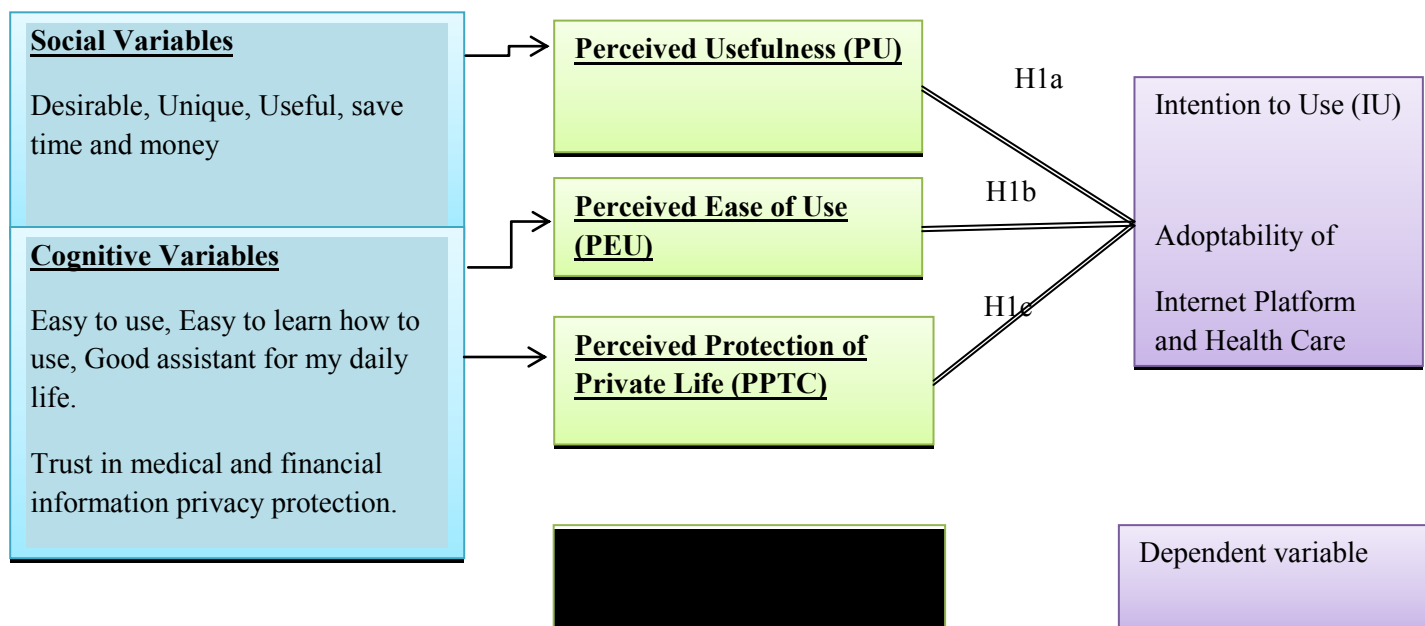


Figure-1 Conceptual Framework

### 3. METHODOLOGY

#### 3.1 Research Overview and Data

The research will be survey attitude of people who live in Bangkok, Thailand toward hospital service and hospital online platform and health internet of things. There will be questions will survey interviewers to find out factors that influence their satisfaction of hospital service and the possibility to use hospital online platform and health internet of things.

#### 3.2 Research Design

As the research will be focus on adoptability of hospital online platform and health internet of things, In order to prove the hypothesis mentioned in the previous sections there are some variables that need to be specified as dependent variables such as Perceived Usefulness (PU), Perceived Ease of Use (PEU) and Perceived Protection Private Life (PPTC) and Intention to Use (IU, Adoptability) as independent variable are associate with each other.

#### 3.3 Research tools and scales to measure

##### 3.3.1 Research Tools

The primary data that will be gathered from interview one doctor to find out information regarding scope and framework in order to instruct questionnaire. It will lead to secondary data gathering by using Google docanalysis.

The information gather will be analysed under descriptive research approach and/or statistical Analysis Approach depending on idea and questions that will constructed to prove the hypothesis by using statistical Analysis methods such as regression, ANOVA and correlation.

**3.3.2 Scales to measure**

The concepts will survey people perceptions on desirability, uniqueness, usefulness, cost efficiency, ease of use, good assistance, Trust in information private protection. Likert scale will be used to measure those concepts such as Least to Most Important, Least Satisfied to Most Satisfied, Strongly disagree to strongly agree.

**3.4 Experiment and/or data collecting survey**

As mentioned previously, the primary data that will be gathered from interview one doctor and one administrative staff to find out information regarding scope and framework in order to instruct questionnaire. It will lead to secondary data gathering by using Google doc analysis.

The questionnaire survey will be conducted to 100 people both male and female who live in Bangkok, Thailand. Those questions will be instruct the interviewers to find out factors that influence their satisfaction of hospital service and the possibility to use hospital online platform and health internet of things. The information gathered will be analyzed under descriptive research approach and/or statistical Analysis Approach depending on idea and questions that will be constructed to prove the hypothesis by using statistical Analysis methods such as regression, ANOVA and correlation.

**4. RESULTS AND DISCUSSION**

**4.1 Statistical Output**

Regression  
Descriptive Statistics

	Mean	Std. Deviation	N
IU	3.82	.878	100
PU	4.07	.747	100
PPTC	3.47	.994	100
PEU	3.87	.843	100

Correlations

		IU	PU	PPTC	PEU
Pearson Correlation	IU	1.000	.766	.697	.803
	PU	.766	1.000	.611	.798
	PPTC	.697	.611	1.000	.703
	PEU	.803	.798	.703	1.000
Sig. (1-tailed)	IU	.	.000	.000	.000
	PU	.000	.	.000	.000
	PPTC	.000	.000	.	.000
	PEU	.000	.000	.000	.
N	IU	100	100	100	100
	PU	100	100	100	100
	PPTC	100	100	100	100
	PEU	100	100	100	100

Variables Entered/Removed<sup>a</sup>

Model	Variables Entered	Variables Removed	Method
1	PEU, PPTC, PU <sup>b</sup>	.	Enter

a. Dependent Variable: IU  
 b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.845 <sup>a</sup>	.714	.705	.477

a. Predictors: (Constant), PEU, PPTC, PU

ANOVA<sup>a</sup>

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54.503	3	18.168	79.997	.000 <sup>b</sup>
	Residual	21.802	96	.227		
	Total	76.306	99			

a. Dependent Variable: IU  
 b. Predictors: (Constant), PEU, PPTC, PU

Coefficients<sup>a</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.036	.266		.137	.891		
	PU	.369	.107	.314	3.440	.001	.358	2.791
	PPTC	.205	.068	.232	3.009	.003	.499	2.006
	PEU	.405	.106	.389	3.829	.000	.289	3.464

a. Dependent Variable: IU  
 Frequency Table and Descriptive Statistic Table are exhibited in APPENDIX

**Demography Information**

The questionnaire survey had conducted to 100 people. There are 24 male and 76 female. From age 18 to older than 46 year old, most of the age range are 61 people of age 26 to 35 year old, 21 people of age over 46, 11 people from age 36 to 45 year old and 7 people age 18 to 27 year old.

**Regression**

**From Model Summary Table:**

R<sup>2</sup> of the model indicate that 0.714, which means that independent variables(x1, x2, x3) can explain or influence 71.4 % of the change in dependent variable (Y).

**From ANOVA Table**

It shows that model can predict Y by using X value as the significance is .000. It means that it is significant. Null hypothesis of no predictive value is rejected.

**From Coefficients Table**

Regression Equation can be expressed as below

Regression Equation:  $Y = 0.36 + 0.369(X1) + 0.205(X2) + 0.106(X3)$

*Dependent Variable:* IU (Intention to Use, adoptability) *Constant value* is 0.36

*Independent Variable:* PU (Perceived of Usefulness) = 0.369, PPTC (Perceived Protection Private of Life) = 0.205, PEU (Perceived Ease of use) = 0.106

*Sig. levels are .001, .003, and .000* which all are less than .05 meaning all the independent variables is significant and associated with dependent variable.

It indicates that perceived of usefulness (PUE) have relatively highest influence on intention to use (IU), after by protection private of Life (PPTC) and least influence is ease of use (EU)

## 5. CONCLUSION

“Customer lost their trust when medical treatment failed whether from medical practicing skills or hospital services.” To be able to understand customer perception and needs in health care service is essential to drive customer satisfaction and trust. Not only satisfaction and trust in medical service provider but also the perception in communication and technology system and platform affect the future health care development in Thailand and other countries. Customers shall have positive perception towards both medical skill and Information Technology system that it is useful, easy to use and secure in order to use and adopt the technology.

## REFERENCES

- Robyn Ouschan, Jillian Sweeney & Lester Johnson, (2006), "*Customer empowerment and relationship outcomes in healthcare consultations*", *European Journal of Marketing*, Vol. 40 Iss 9/10 pp. 1068 - 1086
- Allen C. Johnston, James L. Worrell, Paul M. Di Gangi & Molly Wasko, (2013), "*Online health communities*", *Information Technology & People*, Vol. 26 Iss 2 pp. 213 – 235
- Per Andersson, Lars-Gunnar Mattsson, (2015), "*Service innovations enabled by the internet of things*", *IMP Journal*, Vol. 9 Iss 1 pp. 85 – 106
- Charles Zabada, Sanjay Singh & George Munchus, (2001), "*The role of information technology in enhancing patient satisfaction*", *British Journal of Clinical Governance*, Vol. 6 Iss 1 pp. 9 – 16
- Nira Shalom, (2007), "*The health information specialist*", *Journal of Information, Communication and Ethics in Society*, Vol. 5 Iss 2/3 pp. 167 – 184
- Mattias Elg, Jon Engström, Lars Witell & Bozena Poksinska, (2012), "*Co-creation and learning in health-care service development*", *Journal of Service Management*, Vol. 23 Iss 3 pp. 328 – 343
- Ulla Isoaari, (2011), "*Power in health care organizations*", *Journal of Health Organization and Management*, Vol. 25 Iss 4 pp. 385 – 399
- K.B.C. Saxena & Sangeeta S. Bharadwaj, (2009), "*Managing business processes through outsourcing: a strategic partnering perspective*", *Business Process Management Journal*, Vol. 15 Iss 5 pp. 687 – 715
- Marc Lemire, (2010), "*What can be expected of information and communication technologies in terms of patient empowerment in health?*", *Journal of Health Organization and Management*, Vol. 24 Iss 2 pp. 167 -181
- Eddy M. & M. Adang, "*The European Journal of Health Economics*", Vol. 9, No. 4 (Nov., 2008), pp. 381-384 Published by: Springer

Nira Shalom, (2007), "The health information specialist", Journal of Information, Communication and Ethics in Society, Vol. 5 Iss 2/3 pp. 167 – 184

### **Web References:**

- "Emerging trends in healthcare", PricewaterhouseCoopers, 2015-2016 PwC, Retrieved from <http://www.pwc.com/gx/en/industries/healthcare/emerging-trends-pwc-healthcare.html>
- KOMSAN TORTERMVASANA. "Thailand rises in most recent ICT Development Index." bangkokpost.com Post Publishing PCL, 9 Dec 2015. Retrieved from <http://www.bangkokpost.com/tech/local-news/788925/thailand-rises-in-most-recent-ict-development-index>
- "ABOUT BDMS", bdms.co.th, Bangkok Dusit Medical Services (BDMS), 2016 BDMS, Retrieved from <http://www.bdms.co.th/about-bdms>
- "About Samitivej", samitivejhospitals.com, Samitivej Company Limited, 2016, Retrieved from <https://www.samitivejhospitals.com/>
- "Thailand's Telecom Market end of 2015", slideshare.net, Yozzo Co.,Ltd, Copyright © 2016, Retrieved from [http://www.slideshare.net/yozzo1/thailands-telecom-market-end-of-2015?next\\_slideshow=1](http://www.slideshare.net/yozzo1/thailands-telecom-market-end-of-2015?next_slideshow=1)
- Nathan Eddy. "Fitbit Blaze Chases Apple Watch with Luxury Touches", informationweek.com, 1 June 2016. Retrieved from <http://www.informationweek.com/mobile/mobile-devices/fitbit-blaze-chases-apple-watch-with-luxury-touches/d/d-id/1323780>
- Dan Graziano and Scott Stein. "Best wearable Tech of 2016", cnet.com, CBS Interactive Inc, 26 September 2016. Retrieved from <http://www.cnet.com/topics/wearable-tech/best-wearable-tech/>
- "Corporate Wellness 360° Smarter solutions for a healthier workplace", corporate.withings.com, 2016, Retrieved from <https://www.withings.com/us/en/products/home>
- Jeroen Tas , "How the Internet of Things is revolutionizing healthcare", philips.com, 2016, Retrieved from <http://www.philips.com/a-w/innovationmatters/blog/how-the-internet-of-things-is-revolutionizing-healthcare.html>
- Myles Gough, "IBM to invest \$3 Billion on the Internet of Things", sciencealert.com, 8 APR 2015, Retrieved from <http://www.sciencealert.com/ibm-to-invest-3-billion-on-the-internet-of-things>
- Andrew G. Simpson;" AIG Bets on Workplace Safety Wearables with Investment in Startup HCS", insurancejournal.com, January 6, 2016 Retrieved from <http://www.insurancejournal.com/news/national/2016/01/06/394158.htm>
- Bruce Harpham (2015), "How the Internet of Things is changing healthcare and transportation", cio.com; Sep 8, 2015. Retrieved from <http://www.cio.com/article/2981481/healthcare/how-the-internet-of-things-is-changing-healthcare-and-transportation.html>
- "Samitivej Hospital My Health+", samitivejhospitals.com, 2016 Samitivej PCL. Retrieved from <https://www.samitivejhospitals.com/patient-resources/samitivej-apps/myhealthplus/>
- "Samitivej Application", samitivejhospitals.com, 2016 Samitivej PCL. Retrieved from <https://www.samitivejhospitals.com/patient-resources/samitivej-apps/>