The Continuance Usage Of Physical Activity Tracking Technology With Social Media: Connecting The Dots For Singapore

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Abstract

Physical activity (PA) tracking technology can assist individual in monitoring physical activities in eHealth while gaining popularity and enjoying a flourishing market. Social media (SM) offers huge advantages to PA tracking technology (PATT). Yet, the continuance usage is the cornerstone of IT goods and services; otherwise failed. The limited knowledge of IS continuance in PATT-SM is the motive. Our purpose is to analyze the factors that drive users to continue using PATT-SM. This study demonstrated the use of expectation confirmation model (ECM) and value factors to predict CI in a variety of perspectives including social, economics, behavior, and cognitive. Through data collection, a survey method was conducted in Singapore (n=201). The proposed model has been assessed for reliability and validity. The PLS-SEM method was used to investigate the cause-effect relationship between the constructs in a multi-linear regression style. The results exhibited that the all constructs of ECM constructs had a statistically significant impact on continuance intention (CI); in addition, usefulness has an impact on CI. However, perceived influence had rather a negative impact on CI. Social value received no significant association with CI. Then, network size and complementarity had also positive and statistical significance on perceived influence whereas complementarity yielded less impact.

Keywords: ECM(expectation confirmation Model), IS Continuance, fitness tracker, social media, wearability, Quantified Self, personal informatics

1. Introduction

Under eHealth, fitness and physical activity (PA) tracking technology (PATT) can assist people in archiving and monitoring PAs with efficiency and low costs such as a wearable device, a smartphone app, and a web-based app. Besides, Karapanos, (2015) pointed out three items that can assist with behavior change such as attention, social relationship and clear instructions of the reminding system in the design of Habito, a phone-based PA app. Middelweerd et al., (2015) concluded that motivation and coaching escalated users' preferences, in which permit challenging with other users supported customized feedback for distinctively pre-defined goals. Then Gouveia et al., (2015) suggested three guidelines for the design, namely: readiness; playfulness; and engagement. The combination of Fitbit and Twitter was carried out in PA interventions and messages that saliently show competitions contributed to the increase in PA (Chung et al 2017). Many leading firms released a variety of wearable versions in the market; for example, Garmin, Samsung gear, Apple watch, Fitbit, Nike, Misft, Jawbone and so on. Social media (SM) offers considerable advantages thus PATT would inherit all SM attributes when integrated.

Though the technology is gaining in popularity and enjoying a flourishing market, PATT is being challenged with the high rate of abandon (Lazar et al., 2015). In light of the increase in market size, technology is growing more complex thereby exacerbating the situation. This, therefore, gives rise to research opportunities to explore this domain. In the cost-benefit paradigm, obtaining new customers is costlier than retaining existing customers. Continuance usage remains the cornerstone of IT products and services; otherwise, it is a failure as described by Lyytinen & Hirschheim, (1988). The purpose of the study is to understand and predict the CI of PATT-SM. In order to do so, we seek to answer 1). What are the factors that would have statistically significant influence on the CI of PATT-SM?

2. Research constructs

Table 1 Research construct definitions

Constructs	Operational definitions	References
Satisfaction(Sat)	Post-consumption state as a consequence of using PATT-SM	Bhattacherjee (2001); Hallowell (1996)
Referent network size (RNZ)	The perceived number of potential contacts using PATT-SM.	Zhang et al., (2017)
Perceived complementarity (PC)	The availability services provided to extend the use of PATT-SM.	Chiu et al., (2013); Shapiro & Varian, (1998)
Perceived usefulness (PU)	The level of which a user believes that using PATT-SM will improve performance.	Davis et al.,1989; Bhattacherjee (2001)
Confirmation (Con)	Users actually arrived at the point that the actual performance meets	Bhattacherjee (2001)

Constructs	Operational definitions	References
	the expectation in using PATT-SM.	
Social value (SS)	To communicate a social role and self-concept by using symbolism of PATT-SM.	Rintamäki et al., 2006
Utilitarian (UT)	Users experience utilitarian when task-related needs are fulfilled	Rintamäki et al., 2006
Hedonic (He)	Pleasure and enjoyment drawing from using PATT-SM.	Kim et al., (2007)
Perceived influence (PI)	The third person effect (influence from other groups than themselves) in using PATT-SM.	Perloff, (2002)
Continuance intention (CI)	Prior to using PATT-SM, thus psychologically ends up with intention to continue	Bhattacherjee (2001)

3. Research hypotheses

H_1: this study posits that satisfaction would have a statistical influence on CI.
H2a: This study posits that PU has a positive direct impact on CI.
H2b: This study posits that PU also has a positive impact on satisfaction.
H3a: This study posits that Con also has a positive impact on satisfaction.
H3b: This study posits that Con also has a positive impact on PU.
H4: This study posits that social has a statistical influence on CI.
H5: This study posits that utilitarian has a positive direct impact on CI.
H6: This study posits that hedonic has a positive direct impact on CI.
H7: This study posits that influence has a positive direct impact on CI.
H8: This study posits that referent network size has a positive direct impact on PI.
H9: This study posits that complementarity has a positive direct impact on PI.

4. Research methodology

Data collection

The initial calculation from G*power software showed the minimum (n=89) given that the number of predictors is nine (9), power = 0.95, α = 0.05 and the effect size is 0.15.
A survey was carried out and 241 respondents completed the questionnaire from both paper-based and online at 3-time windows during 09/19/2017, 11/10/2017, and 19/01/2018. After the data cleaning stage, 201 (83.4%) records are eligible to process further and due to not meeting the requirements as a result, 40(16.6%) individuals were removed from the collection. The male correspondents consisted of 101 individuals (%50.2) and the female respondents are 100(%49.8) in). The developed model of this study can be functioned as a road map to increase the understanding of the CI of a PATDA-SM in order to gain success.and most of the respondent's ages are between 21-30 (%35.8) and 31-40 (%33.3). 57(%28.4) individuals reported having 171-190 centimeters in height and 139 (%69.2) individuals reported having 151-170 centimeters in height plus the rest reported of having more than 190 centimeters are the major groups. Weight is divided into 5 groups one of which is the main group, 104(%51.7) reported of having a weight between 51-70 kilograms and the second largest group,55(%27.4) reported having 71-90 kilograms. People revealed that their health condition is good, 122(%60.7), excellent, 48(%23.9), fair, 28(%13.9) and poor,3(%1.5) respectively. Most of the respondents indicated that they are smokers,20(%10) and the rest, 181 (%90) are not smokers. PA tracking devices used are wearables, 117(%58.2), mobile devices, 82(%40.8) and and devices, 2(%1).

5. Data analysis and results

SmartPLS was used for the data analysis.

6. Hypothesis testing

Table 2 The hypotheses' results

Hypotheses	Path coeff.	T-Stat.	P-Values	Results
H_1	0.195	2.777	0.005**	S
H2a	0.200	2.079	0.038*	S
H2b	0.206	2.787	0.005**	S
H3a	0.534	8.647	0.000***	S
H3b	0.735	20.080	0.000***	S
H_4	0.016	0.230	0.818	N.S.
H_5	0.254	2.643	0.008**	S
H_6	0.263	3.371	0.001***	S
H_7	-0.069	0.894	0.372	N.S.
H_8	0.481	6.555	0.000***	S
H_9	0.166	2.028	0.043*	S

Note: p*< 0.05; p**<0.01; p***≤0.001

To investigate each construct of the structural model, this study employs composite reliability (CR), Cronbach's alpha (CA), and average variance extracted(AVE). The threshold criteria are at least 0.7 but average variance extracted(AVE) needs 0.5 as shown in **table 3**.

Table 3 Internal consistency reliability and convergent validity, AVE

| Construct	Composite Reliability (CR)	Cronbach's alpha(CA α)	Average variance extracted (AVE)
CI	0.950	0.965	0.901
Complementarity	0.910	0.932	0.774
Confirmation	0.916	0.947	0.856
Hedonic	0.932	0.938	0.835
Influence	0.932	0.957	0.880
RNZ	0.862	0.893	0.677
Satisfaction	0.952	0.965	0.874
Social	0.887	0.931	0.817
Usefulness	0.942	0.952	0.800
Utilitarian	0.861	0.912	0.776

7. Discussion and implication

This study provides practical solutions for stakeholders. The analysis results symbolize the research model used to discover interrelationships amongst the key constructs in understanding the CI of PATT-SM at the individual level.

Satisfaction is the process of making the continuance usage compared with PU. Users felt comfortable with the technology to some extent to perform PA tasks. Bhattacherjee, (2001) also addressed satisfaction is more persistent to change. PU may display Sullivan & Lachman, (2017) 's view in concerning the potential problems with the technology as critical. In addition, Bhattacherjee, (2001) expressed that the process of acceptance eventuates in PU, not CI. The need of transparency on this issue of supplying users enough information of data that will be used or transferred to third parties (Lupton, 2014). Hedonic, a form of habit, comes in an uncomplicated fashion from the enjoyment that they should comprehend.Younger users are more willing to accept technology to help them accomplish the tasks. Thus, this shows the significance of taking age levels into consideration especially the design on utilitarian. In all, the findings are that

the major ECM constructs appear to function well under the post consumption. It is clear that referent network size has a considerable impact on PI. RNZ cannot be easily controlled however, it can be measured. PI is the power that makes people behave in a typical way. In this study, PI has a negative result towards CI which means users select and use this tracking technology for their own interests. Then, influence from societies cannot cause the drive to CI due to the prevalence of technology may not be vastly enough or may be the promotion of marketing and state channels have not done in effective ways.

8. Conclusion

The developed model can be to used as a guidance to increase the understanding of the CI of PATT-SM from the integration of ECM, network externalities and value factors. Besides, the direction of PATT is transforming into IoT wearables and mounted with SM. Finally, stakeholders need to capture the technology's trend in such a way that they will not miss any relevant points. PATT-SM will take time to be fully flourished like other technologies such as a telephone, an

automobile, an airplane and a TV.

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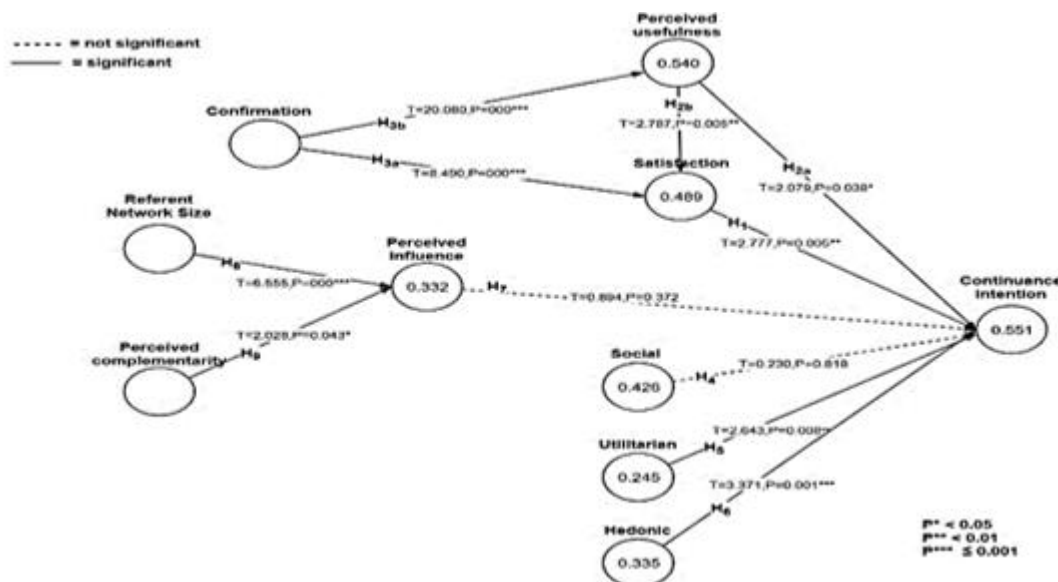
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