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An empirical investigation of users' willingness to disclose personal health information in the context of wearable fitness devices

Emergent Research Forum (ERF)

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Abstract

Wearable fitness device (WFD) has the capability to promote individuals' a healthy lifestyle because of real-time data monitoring capabilities. However, fitness device usability is a critical factor that determines whether users will be willing to disclose personal or health-related information on a large scale. The usability studies on WFDs are still limited in information systems (IS) literature. Therefore, this study investigates individuals' willingness to disclose personal health information to use WFDs, in the light of the theory of planned behavior and the health beliefs model. This study will help to "develop" a new perspective and a deeper understanding of factors influencing disclosing personal health information to use WFDs. Research data will be collected from M-Turk and the target population will be aged 18+ (years of age) and have experience in using WFDs. The results of this study will have significant implications for both IS researchers and IT managers.

Keywords

Wearable fitness devices (WFDs), Personal health information (PHI), Theory of Planned Behavior (TPB), Health Belief Model (HBM).

1. Introduction

The term wearable device refers to an IT-enabled smart Internet of Things (IoT) device which can be worn on the user's body (e.g., head, arm, and wrist) (Lee et al., 2020; Pataranutaporn et al., 2019). In recent years consumers are exhibiting increased interest in adopting wearable devices for healthcare and are more willing to share their personal and health-related data with providers or insurers (Chong et al., 2022). According to the survey from Rock Health on digital health adoption, 2018, wearable adoption increased rapidly from 24% in 2017 to 33%. More consumers are leveraging such devices to address critical health needs rather than just fitness tracking and digital health metric tracking (DeSilva, 2020).

According to their intended use and purpose, wearable devices are divided into 5 major categories: 1) wellbeing (e.g., sports and fitness and home healthcare) (Mück et al., 2019), 2) healthcare (e.g., longitudinal health monitoring outside of the clinic and prediction of health events) (Dunn et al., 2018), 3) entertainment (e.g., information, communication, leisure, lifestyle, fashion, connectivity, and gaming activities) (Bonaldi, 2018), 4) industrial revolution (e.g., improve workplace productivity, safety, and efficiency in sectors such

as manufacturing, logistics, and mining) and 5) military surveillance (e.g., biometric sensors for health monitoring and thin and flexible heaters in military clothing) (Uluagac, 2015; Son et al., 2014). In this study, we focus on wearable devices that are used for fitness and wellness, like Apple Watch, Fitbits, and smartwatches. These wearable devices are designed to collect data on users' personal health and exercise (Farivar et al., 2020). For instance, fitness wearable devices are equipped with sensors to keep track of the user's physical activity and heart rate. They provide wearers with health and fitness recommendations by syncing to various smartphone apps (Nuss and Li, 2021; Montgomery et al., 2018).

Although wearables have the potential to transform the fitness and wellness of individuals, issues such as concerns for privacy pose a challenge to the adoption of wearable devices (Banerjee et al., 2018; Cilliers, 2020). Disputes and legal wrangling over data ownership and data access is also a major obstacle to the adoption of wearable devices. As per the study conducted by Do et al., (2017), many wearables have very few, if any, security features to keep their data secure. The fact that most of the data is unsecured and that most of these devices transfer data through wireless technology such as WiFi and Bluetooth mean that cybercriminals can easily gain unauthorized access (Cilliers, 2020). Moreover, as smart wearable devices and their capabilities advance, they become more attractive targets for criminals (Jozani et al., 2020). Therefore, this study will investigate the factors affecting individuals' willingness to disclose personal health information to wearable fitness devices (WFDs) as a requirement. In addition, individuals' willingness to disclose their health information amidst (COVID-19) pandemics will be examined.

2. Literature Review

The protection of personal and health information from various threat agents has garnered considerable interest in information systems (IS) research (Ayabakan et al., 2017). The misuse of sensitive and private information/data can induce psychological stress as well as economic and social distress for an individual (Bansal and Gefen, 2010). Privacy of information has been studied in the context of physical as well as digital worlds (Sutanto et al., 2013). Studies have also found that tests concerns are heightened when sharing sensitive personal information such as social security, health, medical and financial data (Lanier Jr and Saini, 2008). In a study conducted by Kalkman et al. (2019), it was observed that patients and the public recognize the benefits of data sharing, but they are also concerned about the confidentiality and possible misuses of the data. Another review study, by Lea et al. (2018), found that in order to re-use the health data for clinical research, efforts are needed to protect privacy. In the same vein Aitken et al. (2016) and Valecha et al., (2021) found that the willingness to disclose personal medical information depended on various factors such as arrangements for data sharing, transparency, and accountability of those possessing the information. These studies indicate that health information security is a valid concern in IS security and willingness to disclose personal health information to wearable health devices as a requirement for use is key to the adoption of wearable devices.

Among many theories of health behavior, the health belief model (HBM) (Rosenstock, 2000) and the theory of planned behavior (Ajzen, 1991) are relatively mature and are widely used in the public health field (Juga et al., 2021). The HBM is used to establish one of the patterns of human health behavior and correct cognition (Wu et al., 2015). The HBM was initially adopted to predict individuals' behavioral responses to the treatments received for acute or chronic diseases (Ahadzadeh et al., 2015) and has been applied to guide general health behavior since then (Ross et al., 2010). The HBM emphasizes the importance of the individual's perceived vulnerability, severity, benefits, and barriers in predicting their health-related behavior (Zhang et al., 2017). The TPB explains behavioral intention through the individual's behavior (Kaplan et al., 2015). As per TPB behavioral intention is determined by three factors i.e., attitude, subjective norms, and perceived behavioral control (Bashirian et al., 2012).

In prior studies, the two theories (HBM and TPB) have been combined to improve the degree of interpretation of predicting users' intentions that explain and predict health behaviors (Ayabakan et al., 2017). For example, in the study of Conner and Norman (1994) researchers integrated these models were used to ascertain attendance at health checks. In another study by them in 1994, these were used models to determine uptake of health screening. Similarly, in studies conducted by Quine et al. (1998) and Lajunen and Rasenan (2004), these theories were used in conjunction to understand cycle helmet use. In Bish et al.'s (2000) study the theories were used to determine willingness to undergo cervical screenings to detect early signs of cancer. Similarly, Garcia. Mann (2003) used HBM and TPB to understand the willingness of breast self-examination to detect cancer. The HBM and TPB are two theories that are widely used in the

field of health psychology. Since both are based on the expectancy-value theory, the concepts are mutually complementary and can be mutually complementary. Therefore, consistent with prior research, this study aims to identify the impact of perceived vulnerability, perceived severity, perceived benefits, perceived self-efficacy, perceived barriers, and cues to action from HBM and attitude, subjective norms, perceived behavioral control from TPB on the individual's willingness to disclose PHI to use WFDs.

3. Methodology

This study will use a quantitative (survey) as the research framework. Data will be collected using Amazon Mechanical Turk (M-Turk). The target population will be aged 18 + (years of age). The instrument will be developed based on existing scales in the relevant literature. A set of questionnaires will be created using questions from previous literature that have shown high reliability. A five-point Likert-type scale for measuring the non-demographic variables will be employed ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Required SPSS analysis will be conducted to check the factors/items loadings, reliability, and validity. The SEM/Smart PLS analysis will be used to determine the value of independent variables in predicting the dependent variable and the correlation test will be conducted to ensure the questions correlate with the variable being measured.

3.1 Research Model and Proposed Hypotheses:

Based on the proposed research model, the proposed hypotheses will be tested:

Hypothesis (H1): Perceived vulnerability incidents is positively related to users' Attitude.
Hypothesis (H2): Perceived severity incidents are positively related to users' Attitudes.
Hypothesis (H3): Perceived benefits are positively related to users' Attitudes.
Hypothesis (H4): Perceived barriers are negatively related to users' Attitudes.
Hypothesis (H5): Cues to actions are positively related to subjective norms.
Hypothesis (H6): Self-efficacy is positively related to perceived behavioral control.
Hypothesis (H7): Perceived behavioral control has a positive influence on willingness to disclose PHI.
Hypothesis (H8): Attitude is positively related to willingness to disclose PHI.
Hypothesis (H9): Subjective norms are positively related to willingness to disclose PHI.
Hypothesis (H10a): Covid-19 risk is positively related to attitudes.
Hypothesis (H10b): Covid-19 risk is positively related to subjective norms.
Hypothesis (H10c): Covid-19 risk is perceived behavioral control.
Hypothesis (H10d): Covid-19 risk is positively related to willingness to disclose PHI.

4. Expected Contributions

This study is expected to demonstrate the role of TBP in investigating the willingness to disclose personal health information to wearable health devices as a requirement for use. The study anticipates the actual behavioral intentions to disclose personal and health-related information to use wearable health devices by verifying that attitude, subjective norm, and perceived behavioral control are positively related to the willingness to disclose personal and health information to wearable health devices as a requirement for use. Similarly, this study is likely to demonstrate that HBM is a powerful model for understanding health behaviors explaining and predicting individual changes in health behaviors or anticipating the willingness to disclose personal health information to wearable health devices as a requirement for use. The proposed integration of HBM and TBP creates a useful framework with a theoretical basis to explain the willingness to disclose personal health information to wearable health devices as a requirement for use. Also, this study is likely to provide insight into how service providers, mobile application companies, operating system developers, and mobile device manufacturers can work in tandem to develop novel and desirable applications that enhance the confidence of customers to disclose personal health information to wearable health devices as a requirement for use. Furthermore, the government department of health management can access this disclosed PHI by WFDs users and access national health statistics more realistically, this, in turn, can help in forecasting medical service demands accurately.

5. Conclusion

This study is the first empirical study to examine user willingness to disclose personal health information to wearable health devices as a requirement for use amidst the covid-19 pandemic. The goal of this paper is to investigate the aspect of an individual willingness to disclose personal health information to wearable health devices as a requirement for use.

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