# Influence of Health Anxiety on Road Runners' Attitudes toward Smart Wearable Devices

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***ABSTRACT:*** *The purpose of this study was to investigate road runners' customer behavior regarding smart wearable devices through an extension of the Technology Acceptance Model. A total of 314 road runners participated in the study, and a regression model was formulated to measure the relationships among variables in the conceptual model. The results revealed that perceived ease of use, perceived usefulness, and health anxiety had a significant impact on attitude toward use. To increase individuals' intention to use smart wearable devices, it is critical to encourage a positive attitude toward using the devices to acquire health knowledge. Emphasizing devising effective means to communicate the health utility of the devices to customers should be the highest priority for industry producers.*

**Keywords:** Smart Devices, Health Knowledge, Remote Health Monitoring

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## 1.Introduction

Healthcare delivery and services, such as the treatment of chronic diseases, the monitoring of aging populations, homecare treatment, and rehabilitation, have been improved by the considerable progress made in technology and science. Many people have become "health consumers" and "health conscious" by seeking products to more effectively manage health-related lifestyle aspects such as fitness activities, healthcare, sports, and rehabilitation. Substantial progress has occurred in mobile telecommunications and signal processing as well as in medical knowledge and human–computer interface technologies.

Remote health monitoring can significantly improve disease prevention, home rehabilitation practices, early diagnosis abilities, and disease treatment and management. Remote health monitoring has the potential to reduce the total cost of healthcare and to enhance the quality of health services by ensuring that those who require urgent care receive it faster and those that do not avoid unnecessary hospitalizations.

Various smart wearable devices have recently begun emerging. They provide the utility of advanced computing and offer more instantaneous connectivity than does the personal computer [1]. In addition, these devices provide a platform where people can easily access the information that they require [2] and where real-time information can be exchanged from any location [3].The ideal smart wearable device should be lightweight, have low power consumption, be reasonably priced, and not require skill to operate.

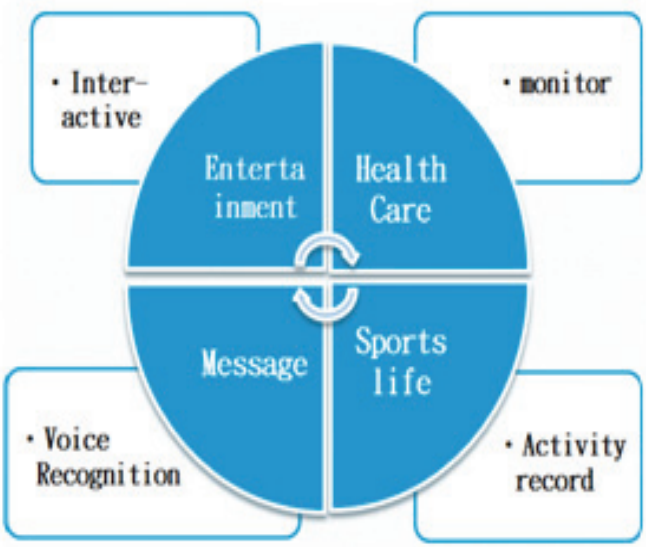


Figure 1.The function of portable smart devices

Health anxiety has frequently been observed to be related to general anxiety [4], fear [5], and increased overall worrying [6]. Most relevant studies [7] have examined the behaviors and cognitions that are related to health anxiety. Some health anxiety is related to increased functional incidences of depression and anxiety [8]. Individuals with high health anxiety levels have been reported to incur higher costs for health service providers and require more healthcare services [9].

Some studies on health anxiety have analyzed the cognitive processes implicated in health anxiety [10]. A crucial review of studies examining cognitive processes that preserved health anxiety [11] reported that people with health anxiety tend to have amplified negative emotions, a phenomenon known as indicating an illness.

People with health anxiety are referred to as safety-behavior seekers; their intention is to protect their health. Regarding safety-seeking behavior, anxiety disorders play a substantial role in health anxiety preservation [4].

Moon and Kim's (2001) definition of perceived playfulness was adopted [13]. Perceived playfulness is defined as when "the individual perceives extent that the attention is based on the interaction with the device; and finds the interaction as such interesting or enjoyable [13]." The theory of flow [14] considers playfulness an inherent motive or belief that concerns personal experience. Flow is when a person is unconsciously engaged in activities such that he or she is engrossed to the point of losing self-consciousness [15]. Flow experiences can occur in integrated activities such as sports, artistic performances, games, and performing ceremonies [14]. Similarly, experiences of concentration, enjoyment, and enthusiasm in an activity characterize the flow experience [16].

In their study of mobile services, Fang *et al*. (2006) categorized mobile tasks that could be performed on handheld devices into general types [17]. Other researchers have studied perceived playfulness on mobile Internet services. Nysveen *et al*. (2005) found that playfulness has a specific role in deciding user acceptance of mobile Internet services [18]. They found that perceived playfulness was significant when users performed gaming tasks. The results suggested that perceived playfulness played a key role in users' favorable acceptance of these services.

## 2. Experimental

The study sample consisted of road runners in Taiwan. Roadrunners from six groups of road running were invited to complete a questionnaire. A total of 314 questionnaires were returned. This study extended Davis's (1989) Technology Acceptance Model (TAM) to explore health anxiety and the acceptance of smart wearable devices [19].The TAM has become a popular theory of technology use in the information systems literature [20]. Davis *et al*. (1989) developed the TAM to specify the

relationships among perceived ease of use and perceived usefulness as well as users' attitudes, behavioral intention, and actual behavior [19]. The highly predictive model contains two predictors of attitude toward using a technology. The first predictor is perceived ease of use, which is the belief that using a particular technology will be free of effort. The second predictor is perceived usefulness, which is the belief that using a technology will cause desirable outcomes and increase individual effectiveness. Other ease of use dimensions such as time efficiency also corresponded to healthcare-related research [21].

In this study, we hypothesized that road runners' perceived health anxiety and health cognitions have a significant influence on the perceived usefulness of smart wearable devices. The degree to which smart wearable devices are easy to use, as perceived by road runners through related experience, affects both their attitude toward using the devices and their perception of the usefulness of the devices in general.

Road runners' attitudes are also affected by the level of the devices' usefulness, as perceived by health anxiety and health cognitions. Finally, the intensity of road runners' intention to use the devices can be explained and predicted by their attitude toward the devices' perceived usefulness and ease of use. The research framework is illustrated as follows:

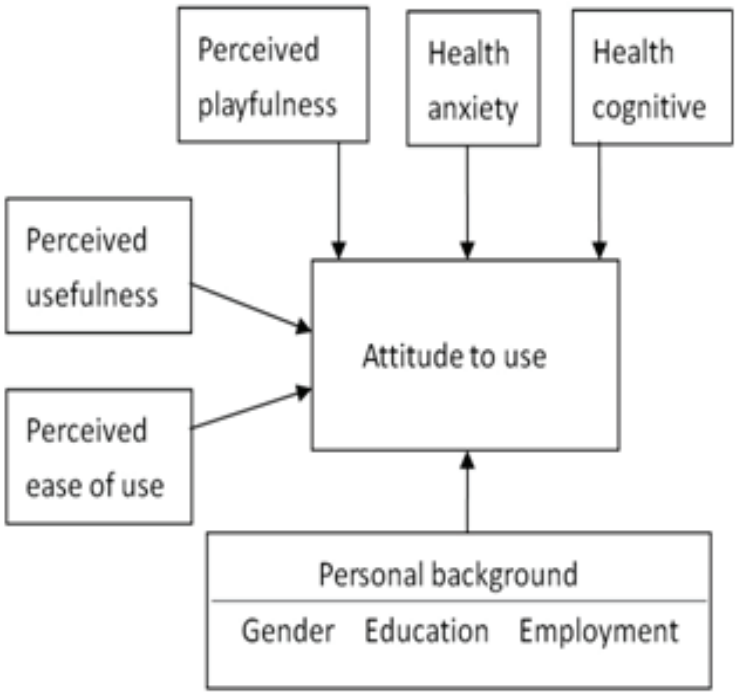


Figure 2. Research framework

SPSS 22 software analyses of the data supported most of the individual causal paths postulated by the TAM. We intended to provide an integrated theoretical basis for evaluating new generations of the TAM and indicating potential obstacles to user acceptance. Behavioral intention is predicted by both perceived usefulness and attitude. Perceived ease of use influences both attitude and perceived usefulness.

## 3. Results

Regarding the demand for smart wearable devices, 82.5% (259) of the respondents were willing to purchase the products. When asked about an acceptable cost for the smart wearable devices, 74.2% (233) of the respondents chose NT$1,000 or less. This result is consistent with previous studies. Results of are liability analysis indicated that most alpha values were greater than .70. Descriptive statistics showed that the majority of respondents that used wearable devices were males, and that people with a college education used them more than did people with other levels of education. Most of the respondents were married and employed. The type of device that the majority of the respondents wore was the sports watch. A *t* test showed significant gender differences in levels of health anxiety, with females indicating a higher degree of anxiety. ANOVA showed

that regarding smart wearable devices, perceived ease of use, attitude toward use, and perceived usefulness were significantly associated with differences in education.

Health anxiety was significantly associated with the frequency of use of smart wearable devices and the amount of health information sought using them. People who were more anxious about their health were also more likely to seek health information frequently and used smart wearable devices to do so. People with an illness generally use health information to understand their diagnosis and treatment options, and people without an illness use it for disease prevention and risk evaluation. In this study, the majority of the respondents were healthy, and for them, the purpose of using a smart wearable device was to increase their health information. A smart wearable device is also helpful for disease prevention and health promotion. The current results revealed that perceived usefulness, perceived ease of use, and health anxiety had a significant impact on attitude toward use (Table 2).We found that external variables can directly affect the attitude toward use.

| Variables | N | % |
|---|---|---|
| Gender | | |
| Male | 217 | 69% |
| Female | 97 | 31% |
| Education | | |
| University and above | 238 | 76% |
| High school and under | 76 | 24% |
| Marriage | | |
| Yes | 47 | 15% |
| No | 267 | 85% |
| Employment | | |
| Yes | 226 | 72% |
| No | 88 | 28% |

Table 1. Description of participants

**4. Conclusions**

This study examined the applicability of the TAM in explaining road runners' acceptance of smart wearable devices. The model was evaluated using data collected from Taiwanese road runners' use of the devices. Some implications can be drawn from the findings of the study. A lack of experience among the public is a barrier to the development of the smart wearable device. This survey demonstrated that road runners like the concept and the potential benefits of a smart wearable device when they receive information about it. Another barrier is the cost. Many road runners are not willing to pay for a smart wearable device unless it is inexpensive. The industry producers must consider how to enhance public awareness of smart wearable devices' benefits and convey the value of them.

From a managerial standpoint, to increase intentions to use smart wearable devices it is crucial to encourage a positive attitude about health anxiety when using them. A positive perception of the devices' usefulness is crucial, whereas the devices' ease of use may not be equally as crucial for professionals. Emphasizing devising effective methods to communicate the health benefits of the devices to road runners should be the highest priority for healthcare industry management. The public may not understand the functions of smart wearable devices and may not yet fully understand that they can be used for functions such

| Variables | B | t | p-value |
|---|---|---|---|
| Constant | 1.865 | 1.850 | 0.065 |
| Gender | 0.595 | 2.772 | 0.006** |
| Education | 0.027 | 0.488 | 0.626 |
| Employment | 0.016 | 0.075 | 0.940 |
| Perceived usefulness | 0.104 | 2.132 | 0.034* |
| Perceived ease of use | 0.115 | 2.014 | 0.045* |
| Health anxiety | 0.365 | 7.036 | 0.000** |
| Perceived playfulness | 0.201 | 4.109 | 0.000** |
| Health cognitive | 0.069 | 1.337 | 0.182 |

R=0.604; R square=0.365 * $p<0.05$ ** $p<0.01$

Independent variable: attitude to use

Table 2. Regression Model

as monitoring and raising awareness of an individual's health. Accordingly, governments and health-related organizations should offer instructions on the functions of smart wearable devices to increase their use.

**References**


[1] Chen, J., Yen, D.; Chen, K. (2009). The acceptance and diffusion of the innovative smartphone use. *Information & Management*, *46*, 241-248.

[2] Lee, T. (2005). The impact of perceptions of interactivity on customer trust and transaction intentions in mobile commerce. *Journal of Electronic Commerce Research*, *6(3)*, 165-180.

[3] Hennig-Thurau, T., Malthouse, E. C., Friege, C., Gensler, S., Lobschat, L., Rangaswamy, A., Skiera, B. (2010). The impact of new media on customer relationships. *Journal of Service Research*, *13(3)*, 311-330.

[4] Abramowitz, J. S., Moore, E. L. (2007). An experimental analysis of hypochondriasis. *Behavior Research and Therapy*, *45*, 413–424.

[5] Fergus, T. A., Valentiner, D. P., McGrath, P. B., Gier-Lonsway, S. L. (2012). Comparing Two Short-Form Versions of the Social Interaction Anxiety Scale and the Social Phobia Scale in a Clinical Sample. *The 46th Annual ABCT Convention*.

[6] Longley, P. A., Goodchild, M. F., Maguire, D. J., Rhind. D. W. (2005). Geographic Information Systems and Science. Second Edition. John Wiley, Chichester.

[7] Gramling, A. A., Schatzberg, J.W., Wallace, W. A. (1996). The role of undergraduate auditing coursework in reducing the expectations gap.*Issues in Accounting Education*, *11 (1),* 131-161.

[8] Noyes, R., Happel, R.L.,Yagla, S. J. Correl Williams, M. J., McManus, F., Muse, K., Williams, J. M. G. (1999). Mindfulness-based cognitive therapy for severe health ates of hypochondriasis in a nonclinicalpopulation.*Psychosomatics*, *40*, 461–469.

[9] Fink, P., Ørnbøl, E., Christensen, K. S. (2010). The outcome of health anxiety in primary care.A two-year follow-up study on health care costs and self-rated health. *Plos One*, *5*, 1–12.

[10] Williams, M. J., McManus, F., Muse, K., Williams, J. M. G. (2011). Mindfulness-based cognitive therapy for severe health anxiety (hypochondriasis): An interpretative phenomenological analysis of patients' experiences. *British Journal of Clinical Psychology*, *50*, 379–397.

[11] Lees, A., Mogg, K., Bradley, B. P. (2005). Healthy anxiety, anxiety sensitivity, and attentional biases for pictorial stimuli and linguistic health-threat cues. *Cognition Emotion*, *19(3)*, 453–462.

[12] Olatunji, B. O., Etzel, E. N., Tomarken, A. J., Ciesielski, B. G., Deacon, B. J. (2011). The effects of safety behaviors on health anxiety: An experimental investigation. *Behaviour Research and Therapy, 49*, 719-728.

[13] Moon, J. W., Kim, Y. G. (2001). Extending the TAM for a World-Wide-Web context. *Information & Management*, *38(4)*, 217–230.

[14] Csikszentmihalyi, M., Csikszentmihalyi, I. S. (1988). (Eds.), Optimal experience: Psychological studies of Flow in consciousness. 364–383. Cambridge University Press: New York.

[15] Chung, J., Tan, F. B. (2004). Antecedents of Perceived Playfulness: An exploratory study on user acceptance of general information-searching Websites. *Information & Management*, *41(7)*, 869–881.

[16] Agarwal, R., Karahanna, E. (2000). Time flies when you're having fun: Cognitive absorption and beliefs about information technology usage. *MIS Quarterly*, *24(4)*, 665–694.

[17] Fang, X. W., Chan, S., Brzezinski, J., Xu, S. (2006). Moderating effects of task types on wireless technology acceptance. *Journal of Management Information Systems*, *22(3)*, 123–157.

[18] Nysveen, H., Pedersen, P. E., Thorbjørnsen, H. (2005). Intentions to use mobile services: Antecedents and cross-service comparisons. *Journal of the Academy of Marketing Science*, *33(3)*, 330–346.

[19] Davis, F. D., Bagozzi, R. P., Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, *35(8)*, 982-1003.

[20] Talukder, M., Harris, H., Mapunda, G. (2008). Adoption of innovations by individuals within organizations: An Australian study. *Asia Pacific Management Review*, *13(2)*, 463-480.

[21] Gagnon, M. P., Godin, G., Gagne, C., Fortin, J. P., Lamothe, L., Reinharz, D., Cloutier, A. (2003). An adaptation of the theory of interpersonal behaviour to the study of telecare adoption by heart disease patients.*International Journal of Medical Informatics*, *71*,103–115.