

HOW SMARTNESS OF LEISURE-SPORTS APPLIANCES INFLUENCE TOURISTS' INTENTION TO USE

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ABSTRACT

The tourism and hospitality industries emphasize on indoor leisure-sport activities for tourists because these activities are less impacted by weather and provide enjoyment and relaxation to travelers, thereby enhancing their satisfaction. This study used the self-promotion perspective to establish a theoretical model to illustrate how the perceived usefulness of a product (in these cases, leisure-sports appliances) mediates the relationship between a tourist's self-image and intention to use. Focusing on the users of treadmill, massage chair, Nintendo Wii, and hydrotherapy machine, a sample of 384 effective respondents was collected and analyzed with structural equation modelling by using AMOS 21.0. The study revealed several essential findings. First, product features like multifunctionality and reactivity significantly associate with a user's self-image and perceived usefulness of a leisure-sports appliance. Product complexity positively relates to self-image but negatively relates to perceived usefulness, whereas automation positively relates to perceived usefulness but negatively relates to perceived self-image. Moreover, individual subjective norms significantly influence perceived usefulness and intention to use. Entertainment is not significant to an individual's perceived usefulness but is significantly associated with a tourist's intention to use. This study affirms the mediating role of perceived usefulness that connects self-image and intention to use.

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INTRODUCTION

Contemporary technology has enabled the usage of high-tech leisure-sports appliances, which facilitates more indoor activities. Engaging in indoor

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leisure sports is considered a major strategy for modern city-dwellers to promote their health and pleasure (Iwasaki et al., 2005), as such activities allow more flexibility in terms of venue, duration, and weather than outdoor activities. Therefore, for decades, hotel owners have invested in high-tech leisure-sports appliances at leisure sites to attract more travelers (Iryna & Yuriy, 2017; Van Bottenburg & Salome, 2010) who enjoy indoor leisure-sports activities during their travel (Szczechowicz, 2012). For example, hotels and resorts generally construct playgrounds, amusement spaces, or gymnasiums equipped with modern leisure-sports appliances (e.g., treadmills, weight training equipment, motion-sensing gaming consoles, or amusement equipment), which tourists can use for indoor exercises and entertainment. Prior studies have suggested that the tourism and hospitality industries should reliably provide customers with a favorable environment and popular equipment, which positively impact customer satisfaction (Gebremichael & Singh, 2019). Nevertheless, most relevant research has focused on consumers' direct perception of the spatial surroundings (Walls et al., 2011; Wu & Liang, 2009). Only a few studies have noted the association between service quality and the provision of leisure-sports appliances (e.g., Saló et al., 2014), and a limited number of prior studies have investigated how tourists feel about the product intelligence (smartness) of modern leisure-sports appliances.

The current study fills the research gaps in several aspects. First, we present the self-promotion perspective to establish a theoretical model for investigating how hotel customers perceive intelligent attributes of modern leisure-sports appliances that enhance their physical and mental pleasure. Referring to previous studies (Rijsdijk et al., 2007; Rijsdijk & Hultink, 2009), the intelligent attributes of modern appliances include multifunctionality, reactivity, complexity, and automation. Second, we propose that people with a self-promotion focus are inclined to demonstrate their positive characteristics to others. This natural tendency guides people to concentrate on attaining personal goals, seeking and fulfilling their ideals, and demonstrating their self-motivation (Higgins, 2000; Johnson & Romney, 2017; Lanaj et al., 2012). Hence, self-promoted people are likely to pursue a positive self-image. The smartness of leisure-sports appliances is regarded as a means for users to achieve the functional purposes of sports and recreation and to demonstrate their specific capabilities. Third, when people adopt certain leisure-sports appliances, they have perceptions concerning the instrumental functions, symbolism, and experiences associated with such appliances (Tjørndal & Nilssen, 2019). Instrumental symbolism can be defined as positive experiences and conceptions that are

likely to raise the perceived usefulness of appliances. In addition, the subjective norms of referential groups (e.g., friends, coworkers, and relatives) are major sources of advisory opinions (Pavlou & Fygenon, 2006) that are highly likely to influence individuals' perceived usefulness of and intention to use appliances. Finally, as people seek enjoyment and amusement from travel or other recreational activities (Figure 1), we investigate people's extent of perceived entertainment as an essential determinant of whether they perceive the usefulness of and intend to adopt leisure-sports appliances (Venkatesh, 2000).

THEORETICAL FRAMEWORK AND RESEARCH HYPOTHESES

The perspective of self-promotion refers to people who engage with others by attempting to make a good impression on them as an accomplished, capable, and smart person (Higgins, 2000; Johnson & Romney, 2017; Lanaj et al., 2012). This concept is used to illustrate the theoretical structure of the current study in terms of the direct and indirect relationships among research variables. Accordingly, we propose that people's perception of the usefulness of the product intelligence of leisure-sports appliances can mediate the variable relationships between a tourist's self-image and, subsequently, the tourist's intention to use. A person's demonstration of their capability of using intelligent appliances is considered a self-promotion tendency. Self-promotion can be used to communicate people's accomplishments to others through public mannerisms such as: high technology expertise, skillfulness, operating ability, and machine proficiency regarding intelligent leisure-sports appliances. When people are motivated by the effect of the promotion of self-image, which strengthens the feeling of perceived usefulness of these intelligent appliances, their intention to use these appliances will increase (Ahn & Hosany, 2017). By drawing others' attention, people generally self-promote their strengths. This is a natural tendency to make others recognize their remarkable personal qualities (Leary, 2019).

Mediating role of perceived usefulness between self-image and intention to use

Self-image refers to the ideas, concepts, or mindsets that people possess about themselves, including physical and mental impressions of the self. People who perceive a more positive self-image are likely to experience greater self-satisfaction when they demonstrate their personal capabilities (Kwak & Kang, 2009; Schacter et al., 2015). Additionally, possessing a

positive self-image is beneficial for cultivating and building social networks and interpersonal relationships as well as for increasing opportunities for promotion at the workplace (Suki & Suki, 2011; Venkatesh & Davis, 2000). Operating leisure-sports appliances may promote relaxation among users, enable people to participate more easily in group socialization (Lynch, 2013), generate self-assurance in human-machine interactions (Webb et al., 1989), and consequently improve users' perceived self-image. Modern smart products that contribute to the greater enhancement of users' self-image are perceived to have a higher level of instrumental usefulness.

Perceived usefulness measures the extent to which individuals believe that adopting a new technology may benefit their performance (Venkatesh, 2000), which is considered a critical purport of making decisions on such adopting behaviors (Li et al., 2018; Sigar, 2016). Thus, positive user perceptions of the intelligent attributes of appliances are regarded as both an antecedent and a prerequisite for users to accept and adopt the appliances (Davis, 1989; Davis, 1993). Unlike traditional products, new intelligent appliances require potential users to be familiar with their functions and usefulness, making it imperative for the users to learn how to use the technology (Venkatesh, 2000). Therefore, intelligent appliances are perceived to be useful if the benefit of usage meets or exceeds the users' original expectations (Venkatesh & Davis, 2000). Perceived usefulness determines the extent to which people intend to take action to use intelligent appliances to obtain their expected benefits. From the perspective of self-promotion, self-image enhancement is evaluated by utilitarian motivation (Kang et al., 2011), and perceived usefulness directly influences people's intention to use (Li et al., 2018; Sigar, 2016) leisure-sports appliances. Thus, we propose that the perceived usefulness of these appliances can mediate the relationship between a user's self-image and the intention to use. Accordingly, we propose the hypothesis below:

H1: *Self-image can be improved by adopting intelligent leisure-sports appliances, and it can indirectly influence users' intention to use these appliances through perceived usefulness.*

Product intelligence enhances self-image and perceived usefulness

Intelligent products offer modern information devices or systems (e.g., chips, artificial intelligence, and software) that deliver technology-oriented benefits according to users' needs (Di Palma et al., 2019; Lee, 2019). *Multifunctionality* refers to the ability of an appliance to perform numerous tasks to deliver various utilities expected by users (Park & Lee, 2014).

Multifunctional leisure-sports appliances can be integrated into several sports items and game styles; therefore, people can follow their individual inclinations when operating these appliances (Rijsdijk & Hultink, 2009). Based on the concept of self-interest, the greater the functionality of an object, the more beneficial it should be considered (Horberg et al., 2013). When users can play a wide selection of sports or games using leisure-sports appliances, they are pleased and experience self-promotion. This implies that when an individual has a higher ability for using a multifunctional appliance, it improves the perceived usefulness of the product and enhances the individual's self-image. Accordingly, we propose the following hypothesis:

H2: Multifunctional leisure-sports appliances positively influence (a) self-image and (b) perceived usefulness when used.

Reactivity represents the ability of a device to respond differently according to its environment. Reactive leisure-sports appliances can act based on their own sensations and judgments of variations in their physical surroundings (Miche et al., 2009; Rijsdijk & Hultink, 2009). A typical example of a reactive leisure-sports appliance is the Nintendo Wii console or Xbox series device. The signal receiver of this gaming device can collect environmental information about the player and respond with instructions in real time. Another example is an intelligent treadmill that can report users' heart rates on the screen as they use the device and, consequently, provide appropriate instructions. Thus, users engage with various functions of a treadmill and are aware of how to always operate it. If an individual benefits from the reactivity of a leisure-sports appliance, both their perceived usefulness of the appliance and their self-image are improved. Accordingly, we propose the below hypothesis:

H3: When using leisure-sports appliances, reactivity positively influences (a) self-image and (b) perceived usefulness.

Complexity is a general attribute of modern devices that are considered relatively difficult to comprehend and operate (Rijsdijk & Hultink, 2009; Trattner et al., 2019). To maximize the performance of complex leisure-sports appliances, users require time and patience to become familiar with and learn how to operate them (Thompson et al., 1991). Moreover, when users become familiar with the complexities and functions of leisure-sports appliances, they can improve their efficiency in operating them. Other people often admire users who can achieve a sophisticated use of complex devices. Such admiration may, therefore, motivate potential users to enhance their self-image by learning to control

complex intelligent leisure-sports appliances (Horberg et al., 2013). However, if operating the appliances is effortless, users can quickly discover and take advantage of their multifunctional values. Users with limited leisure time are more likely to appreciate time efficiency (Abd-Latif et al., 2012). However, when users require more time and knowledge to adapt to the complexity of leisure-sports appliances, they are more likely to experience inefficiency. The more time and effort are required to operate a complex appliance, the less perceived usefulness the device has (Davis, 1989; Moon & Kim, 2001). Therefore, we propose the hypothesis below:

H4: *A leisure-sports appliance's complexity influences (a) self-image positively and (b) perceived usefulness negatively.*

Automation represents the smart attribute of an appliance that can execute embedded functions by itself, without any user intervention (Lee, 2019; Rijdsdijk & Hultink, 2009). More automation often decreases the effort required by users to operate an appliance; thus, users do not need to exert a high degree of mental and physical effort to operate leisure-sports appliances with automatic functions. For example, it is ideal if a treadmill can turn off power automatically after several minutes if users forget to turn it off. Concerning perceived usefulness, the automation of leisure-sports appliances provides convenience to all users. However, equipping an appliance with automation means that people need to think less to operate and control it. When users adopt automatic appliances, they demonstrate less capability and expertise. Therefore, the higher the level of automation of a leisure-sports appliance, the less a user can demonstrate their competency while using it. In interpersonal settings, when using automated appliances, users' self-image may increase but may sometimes decrease as well. Therefore, we propose the hypothesis:

H5: *The automation of leisure-sports appliances influences (a) self-image negatively and (b) perceived usefulness positively.*

Subjective norms and entertainment sensation influence perceived usefulness

Subjective norms are formed based on the influence of one's interpersonal connections, such as relatives and other significant people, who influence behaviors within their social network to a considerable degree (Brown & Venkatesh, 2005). People may perceive a certain degree of social pressure to adopt or refuse certain behaviors depending on specific group expectations; thus, they may follow specific motivations of significant people (Titah & Barki, 2009), who provide a suggestive behavioral pattern. Users, for the

most part, disseminate and adopt the use of intelligent appliances with reference to their social networks; the knowledge and perspectives of significant people in their lives strongly influence users' decisions on whether to adopt a new technology (Rogers, 2003). Therefore, the subjective norms of the significant referent group influence users' perceived usefulness of leisure-sports appliances. If potential users obtain positive information about leisure-sports appliances from significant people in their lives, their attitudes toward using these appliances are likely to improve, increasing their intention to use such devices. Therefore, we propose the hypothesis below:

H6: *The subjective norms around leisure-sports appliances have a positive influence on (a) their perceived usefulness and (b) people's intention to use them.*

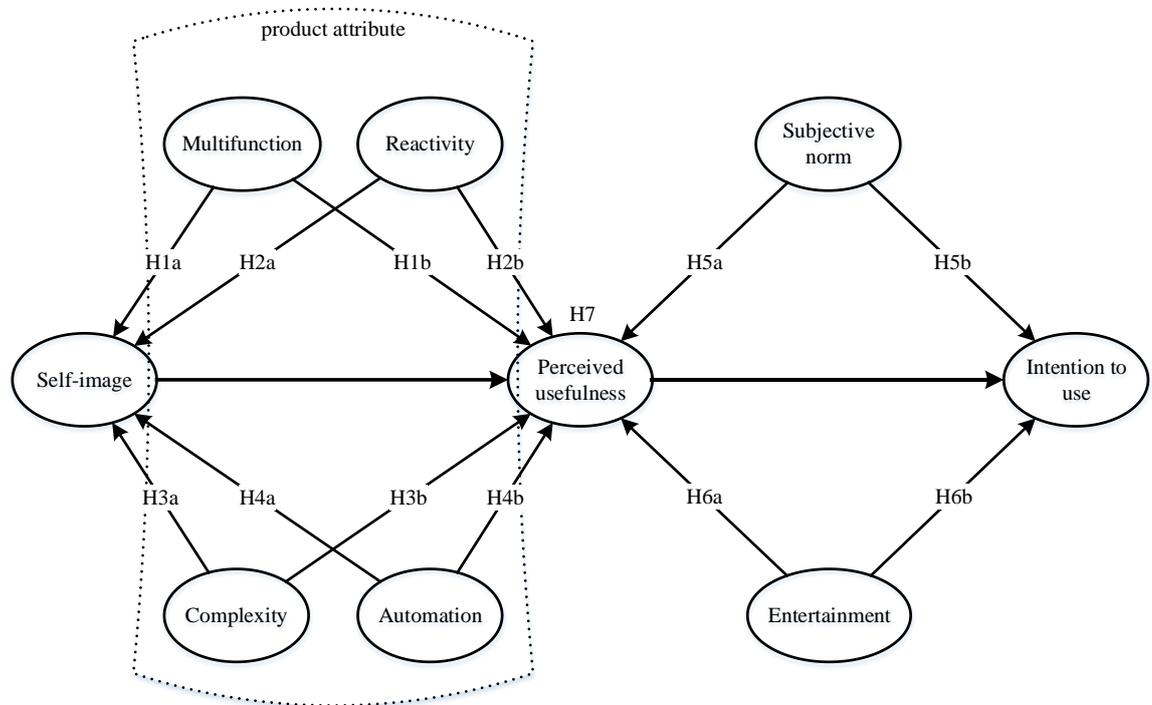


Figure 1. *Theoretical framework*

Entertainment refers to activities (e.g., games, performances, movies, and stories) intended to be fun for participants by seizing their attention and interest. Feeling entertained while using intelligent leisure-sports appliances is one manifestation of their positive effects (Lewis et al., 2003; Venkatesh, et al., 2003). A prior study has emphasized that the positive effects of an activity may stem from individual characteristics or the interaction between individuals and their surroundings (Moon & Kim, 2001). The concept of interacting with one's surroundings is inherent in users experiencing immersion when using intelligent leisure-sports

appliances. Such pleasurable and positive experiences are valued by users, whose intention to use intelligent appliances increases. Thus, the intention to use leisure-sports appliances is influenced by an individual's subjective experiences of being entertained (Kang et al., 2011). In addition, as leisure-sports appliances were originally designed to enrich the quality of indoor activities, users' enjoyable experiences when adopting such appliances are likely to increase their perceived usefulness. Therefore, we propose the hypothesis below:

H7: Entertainment derived from leisure-sports appliances positively influences (a) their perceived usefulness and (b) the intention to use them.

METHODS

Sample

We administered a cross-sectional survey by which research data were obtained through an onsite questionnaire survey. To purposively collect reliable data from the users of hotel leisure-sport appliances with smart features, we invited 32 hotel employees to be our research interviewers who worked at 32 medium-sized resorts in Taiwan. Furthermore, we collected the lists of the indoor leisure-sport appliances from these 32 hotels. Based on that, we concluded that four of the most installed types of intelligent appliances (with electronic chips) in hotels are: treadmills, massage chairs, Nintendo Wii console or Xbox series device, and hydrotherapy machines. We ensured that every invited hotel employee could successfully interpret the content of questionnaire items answered by the tourists who used leisure-sports appliances in their hotels. These invited hotel employees had helped tourists find intelligent appliances and later invited them to participate in the research survey by ensuring that the respondents understood the contents of the questionnaire survey. Of the 384 respondents who returned valid questionnaires, 74.7% were young people aged below 40 years, 55.7% were female tourists, 60.4% had a university degree or higher education, and 68.2% had exercise habits with a frequency of two to four times per month. Altogether, we obtained 75 effective samples from treadmill users, 63 from massage chair users, 149 from the users of Nintendo Wii console or Xbox series device, and 97 from the users of hydrotherapy machines.

Measures

Measures for each research dimension were adopted by examining and choosing proper measure scales from domain literature (see Appendix 1).

The questionnaire items were modified and double-interpreted by two domain experts to formulate these items so that they match the context of leisure-sports appliances involving physical activity. All items were evaluated by using a 7-point Likert-type scale (i.e., strongly disagree = 1 and strongly agree = 7). The product intelligence attributes were multifunctionality, reactivity, complexity, and automation. These four dimensions were measured using a 10-item questionnaire modified from Rijdsdijk and Hultink (2009), comprising four items related to multifunctionality, four related to reactivity, three related to complexity, and three related to automation. The internal consistency scores of the weighted dimensions of multifunctionality, reactivity, complexity, and automation were satisfactory ($\alpha = 0.89, 0.87, 0.89,$ and $0.78,$ respectively). Self-image was assessed using a 3-item questionnaire proposed by Karahanna et al. (1999), and the internal consistency score of weighted self-image was also satisfactory ($\alpha = 0.88$). The perceived usefulness scale used in this study was adapted from the scales proposed by Davis et al. (1989). It comprised four items, and the weighted internal consistency score of perceived usefulness was acceptable ($\alpha = 0.87$). The subjective norm scale used in this study was adapted from scales proposed by Taylor and Todd (1995) and Brown and Venkatesh (2005). It comprised three items; the internal consistency score of weighted subjective norm was acceptable ($\alpha = 0.80$). The entertainment scale was adapted from that proposed by Moon and Kim (2001); the internal consistency score of weighted entertainment was satisfactory ($\alpha = 0.94$). Furthermore, we adapted the intention to use scale from the scales proposed by Davis et al. (1989). The internal consistency score of weighted intention to use was satisfactory ($\alpha = 0.91$).

RESULTS AND DISCUSSION

Baseline analysis

First, ANOVA tests by using SPSS 18.0 were applied to test the significant differences among the grouped sample sets of each user characteristic items. We found several important results with regard to users' perceived smartness of intelligent leisure-sports appliances. Regarding usefulness, the results (Table 1 of Appendix 2) show that the tourists who exercise more than five times per month perceived usefulness of an appliance significantly higher than those who exercise less than once per month on average. Tourists who have more than 30,000 New Taiwan dollars (NTD) per month perceived usefulness significantly lower than the two less-income groups. About reactivity, the results (Table 2 of Appendix 2) show that the respondents who exercised the least perceived reactivity significantly lower

than the other two groups of the respondents who exercised the most. Groups with an average age between 20 and 30 years perceived reactivity significantly higher than groups with an average age between 30 and 40 years. Furthermore, tourists who have more than 30,000 NTD per month perceived reactivity significantly lower than the two less-income groups. Concerning complexity, the results (Table 3 of Appendix 2) show that the highest-exercise group perceive complexity significantly higher than the least-exercise group. Tourists with a university degree or higher education perceived complexity significantly higher than those who had a high school degree or lower education. High-income users perceived complexity significantly lower than the other, the second, low-income groups. Regarding automation, the results (Table 4 of Appendix 2) show that the group with an average age between 31 and 40 years perceived automation significantly lower than the other groups. Moreover, the highest income users perceived automation significantly lower than the low-income groups.

Second, Amos 21.0 was applied to test the factor validity of each research construct. Table 1 displays the correlation coefficients for the variables and the average variance extracted (AVE) of the measures. The AVE of automation was 0.55, which is higher than the threshold value of 0.5 (Bagozzi & Yi, 1988). Another calibration for ensuring discriminant validity is to examine if each construct's square root of the AVE is higher than the correlation values of the construct with the others (Bhattacharjee, 2002; Fornell & Larcker, 1981; Segars, 1997). Table 1 also presents the correlations between constructs and each construct's AVE, indicating that the square root of each construct's AVE (on-diagonal values) is higher than its correlation with the others (off-diagonal values). This provided our research model with supportive evidence for ensuring the discriminant validity of each selected construct.

All values of factor loadings tested for each construct were significant in the model ($p < 0.05$; the loadings ranged from 0.68 to 0.91). Moreover, the convergent validity was evaluated by using composite reliability, which represents the aggregation of the items that contain the composite (i.e., latent variables measurement; Bagozzi & Yi, 1988). We obtained a satisfactory result that the values of composite reliability of the nine latent variables reached the threshold of .6 (Bagozzi & Yi, 1988). The analytical results showed that our theoretical model illustrated a good fit to the data with the relevant values: $\chi^2 = 1136.01$, $df = 491$, $\chi^2/df = 2.31$, SRMR = 0.05, goodness of fit index (GFI) = 0.84, adjusted goodness of fit index (AGFI) = 0.80, normed fit index (NFI) = 0.87, incremental fit index (IFI) =

0.92, comparative fit index (CFI) = 0.92, and root mean square error of approximation (RMSEA) = 0.06.

Table 1. *Descriptive statistics and correlation coefficients among variables*

Variables	M	SD	1	2	3	4	5	6	7	8	9
1. Multifunction	4.71	1.14	.82								
2. Reactivity	4.74	1.28	.46***	.80							
3. Complexity	3.69	1.07	.10	.24***	.85						
4. Automation	4.83	1.13	.40***	.55***	.07	.74					
5. Self-image	3.75	1.17	.29***	.32***	.31***	.19***	.85				
6. Perceived usefulness	4.75	1.17	.49***	.59***	.12*	.50***	.35***	.80			
7. Subjective norm	4.66	1.16	.20***	.27***	.15**	.31***	.29***	.30***	.78		
8. Entertainment	5.30	1.21	.58***	.38***	-.06	.37***	.14**	.41***	.22***	.87	
9. Intention to use	4.89	1.19	.63***	.44***	.08	.36***	.26***	.52***	.19***	.59***	.81

Note: 1. N = 348; *p < 0.05, **p < 0.01, ***p < 0.001.

2. The square root of each construct's AVE are shown as bold print font in diagonal values

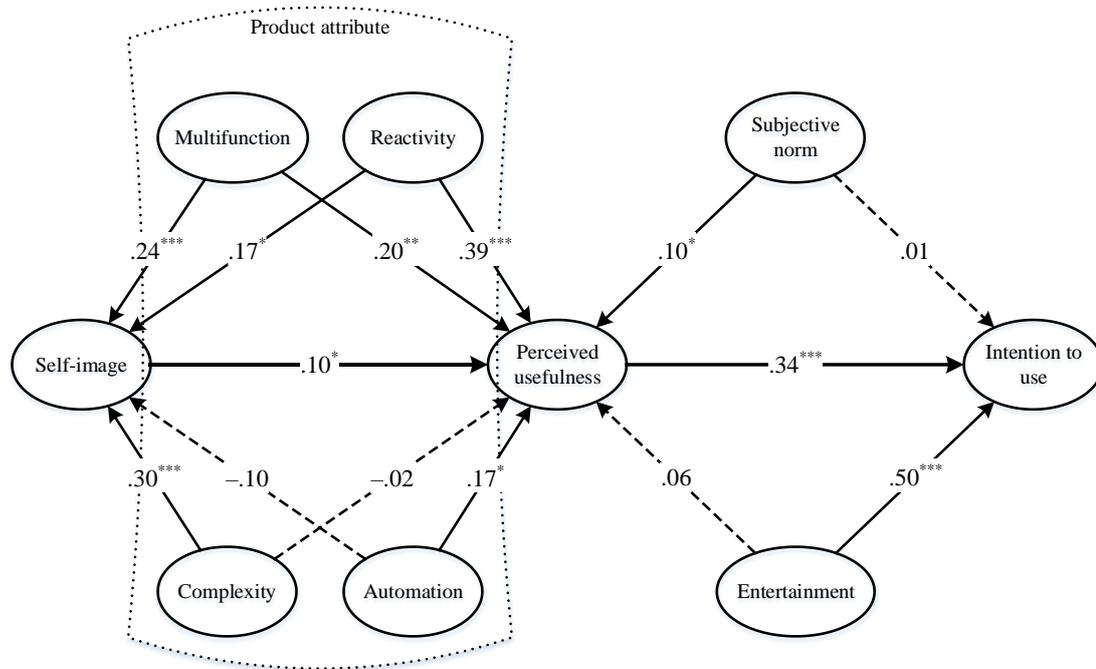


Figure 2. *The Structural Model*

Notes: 1. $\chi^2 = 1171.58$, $df = 498$, $\chi^2/df = 2.35$, SRMR = 0.06, GFI = 0.83, AGFI = 0.80, NFI = 0.86, IFI = 0.92, CFI = 0.92, RMSEA = 0.06

2. The straight line represents significant variable relationship, and dotted line represents insignificant ones.

Structural model

The paths of the proposed model are shown in Figure 2. The analytical results presented a good fit with the observed data that fits the established model well ($\chi^2 = 1171.58$, $df = 498$, $\chi^2/df = 2.35$, SRMR = 0.06, GFI = 0.83, AGFI

= 0.80, NFI = 0.86, IFI = 0.92, CFI = 0.92, and RMSEA = 0.06). As shown in Figure 2, the results revealed that the indirect path from self-image to intention to use through perceived usefulness was positive and significant ($\gamma = 0.10$, $p < 0.05$; $\beta = 0.34$, $p < 0.01$); concerning product intelligence, the path from multifunctionality to self-image and perceived usefulness was positive and significant ($\gamma = 0.24$, $p < 0.01$; $\gamma = 0.20$, $p < 0.01$); the path from reactivity to self-image and perceived usefulness was significantly positive ($\gamma = 0.17$, $p < 0.05$; $\gamma = 0.39$, $p < 0.01$); the direct path from complexity to self-image was significantly positive ($\gamma = 0.30$, $p < 0.01$), but the path from complexity to perceived usefulness was insignificant ($\gamma = -0.02$, n.s.); similarly, the direct path from automation to perceived usefulness was significantly positive ($\gamma = 0.17$, $p < 0.01$), but the path from automation to self-image was insignificant ($\gamma = 0.01$, n.s.). The results presented that subjective norm significantly predicted perceived usefulness ($\gamma = 0.10$, $p < 0.05$) and that entertainment significantly predicted intention to use ($\gamma = 0.50$, $p < 0.01$). Nevertheless, the predictive effect of subjective norms on intention to use was insignificant ($\gamma = 0.01$, $p > 0.05$) and entertainment did not directly predict perceived usefulness ($\gamma = 0.06$, $p > 0.05$).

DISCUSSION

This study explored how some characteristics of leisure-sports appliances influence the appliances' perceived usefulness and their users' self-image and intention to use. After collecting empirical data and conducting a structural equation modeling analysis, we found that the intelligent attributes of leisure-sports appliances can be used to promote users' self-image. Self-image influences the public perspectives of the perceived usefulness of modern novel technologies and, thus, increases the intention to use leisure-sports appliances. In this study, a product's smart features were not only perceived to enhance self-image but also caused tourists to perceive the usefulness of leisure-sports appliances. Users perceived that their self-image could be improved through intelligent attributes of multifunctionality, reactivity, and complexity of leisure-sports appliances because publicly demonstrating the capability to operate such appliances enhances a person's self-image. Although not all of these attributes were found to influence both self-image and perceived usefulness, both multifunctionality and reactivity significantly increased and reinforced them (Horberg et al., 2013). However, complexity only strengthened self-image, and automation only strengthened perceived usefulness. Given that when the hotel and recreational industries seek to acquire leisure-sports appliances, they anticipate enhancing both tourists' self-image and the

appliances' perceived usefulness, focusing on multifunctionality and reactivity of such appliances can result in the most positive outcome possible. Concerning complexity and automation, some adjustments must be made depending on the core target market and each distributor, dealer, retailer, agent, and so forth (Davis, 1989; Moon & Kim, 2001). For example, for a hotel whose target market mostly comprises people with a higher social status, more complex appliances should be acquired; by engaging with that complexity, tourists can enhance their sense of self-worth and, consequently, their self-image (Cheung & Lee, 2010). However, a hotel serving a more pragmatic clientele should acquire more automated appliances to facilitate the immediate perception of usefulness. This should enhance users' intention to use these appliances because perceived usefulness is more likely to affect people whose subjective norms encourage a rational perspective. However, whether usefulness is perceived may be influenced by an individual's sentiments toward entertainment. In summary, if hotels and recreational industries advertise through word-of-mouth marketing with the aim of maintaining a positive reputation, this can enhance tourists' perceived usefulness of leisure-sports appliances, which, in turn, can increase tourists' intention to use them. Moreover, if the overall surroundings and physical facilities contribute to a positive ambiance in which the appliances are used, this can enhance the entertainment value of these appliances.

CONCLUSION

Given the importance of equipping hotels with intelligent leisure-sport appliances to increase travelers' satisfaction, the current study used self-promotion to illustrate the effect of travelers' perception on their intention to adopt modern technologies (Higgins, 2000; Johnson et al., 2017; Lanaj et al., 2012). Modern leisure-sports appliances at tourism and recreational sites provide not only health-promotion functions but also entertainment and stress relief (Godbey, 2003; Kuo, 2013). When tourists engage in indoor activities using modern intelligent appliances, product smartness becomes a cue by which they recognize the product's advantageous functionality (Szymanski et al., 2007). General examples of intelligent appliances at tourism sites are gaming consoles (e.g., Nintendo Wii or Microsoft Xbox) and health and wellness equipment (e.g., treadmills, massage chairs, and hydrotherapy devices). These appliances enable tourists to engage in indoor activities during their leisure time. Nevertheless, the intelligent attributes (e.g., multifunctionality, reactivity, complexity, and automation) of such appliances (Rijsdijk & Hultink, 2009) are noteworthy because they may

influence the quality of indoor activity services at hotels and recreational sites.

Managerial implications

The effect of product intelligence (smartness) on user recognition, perception, or attitude has received increasingly attention. How satisfied users are with these intelligent/smart characteristics of modern appliances needs to be empirically examined (Lee & Shin, 2018; Lin et al., 2017; Rijdsdijk & Hultink, 2009). This study established a theoretical model to explain how users perceive the usefulness of leisure-sports appliances mediating the effect of tourists' self-image on intention to use. The three contributive implications of this study are illustrated as follows: First, this study validated the correlation between subjective norms and perceived usefulness of appliances for promoting self-image, supporting multiple other studies on technological products. All these studies reinforce the notion that leisure-sports appliances exert gradational influences on both self-image and perceived usefulness. Second, this study hypothesized the influence of the entertainment experience on intention to use that was validated by the findings. Thus, this study filled the relevant research gap. Third, this study comprehensively evaluated the attributes of leisure-sports appliances and their influence on self-image. It made a significant contribution by probing into the existing issues and clarifying the advantages (e.g., automation, reflectivity, and multi-function) as well as disadvantages (e.g., complexity) of the product intelligence of modern leisure-sport appliances.

Practical implications

Based on our research findings, we provide the following suggestions for the hotel and recreational industries: First, if hotels or recreational sites are planning to invest in leisure-sports equipment, they should determine whether priority should be given to products that enhance self-image (Ahn & Hosany, 2017) or to those that increase perceived usefulness. Especially, hotel instructors can recommend to tourists who exercise regularly to use intelligent appliances because they perceive usefulness better than other tourists. However, tourists who exercise regularly may feel that intelligent leisure-sports appliances are highly complex; thus, the onsite instructors should help them to operate the appliances successfully. Second, after hotels or recreational sites procure leisure-sports appliances, they should consider improving subjective norms through word-of-mouth marketing and maintaining a positive general reputation if tourists lack a sense of the

devices' perceived usefulness. Alternatively, perceived usefulness can be enhanced through other brick-and-mortar businesses or by organizing events to stimulate tourist entertainment. This should enhance tourists' intention to use leisure-sports appliances.

This study concluded that tourists' intention to use leisure-sports appliances is influenced by three major factors. The first factor is perceived usefulness; the utilitarian perspective is considered beneficial by a user because exercising by using leisure-sports appliances can enhance physical fitness or health and can provide therapeutic effects, relaxation, or leisure activities (Horberg et al., 2013; Kang, 2002). The second factor is the influence of subjective norms, particularly through social pressure from close relatives, friends, colleagues, managers, and other authoritative figures in a person's social group. The opinions and perceptions of significant people serve as a motivation and can affect how users socially identify with leisure-sports appliances (Cheung & Lee, 2010). The third factor is the users' entertainment experience of leisure-sports equipment. Positive emotions frequently play a critical role in establishing behavioral patterns, as validated by numerous studies; therefore, the entertainment experience is a crucial element influencing users' intention to use leisure-sports appliances (Moon & Kim, 2001; Morosan & Jeong, 2008).

Suggestions for future research

Market competition between competitors in the hotel and recreational industries is more likely to be aggressive; therefore, market segmentation should be more clearly defined and subdivided. To enhance service quality within brick-and-mortar businesses, the market should be subdivided so that one can proceed to investigate specific facilities. This study focused on leisure-sports appliances, but future studies could apply our research outcomes to interior design and decoration, the coordination of lighting and colors, landscaping design and visual angles, or ambient music (as mentioned in Brunner-Sperdin & Peters, 2009). The comprehensive design of an environment, including the traffic flow in interior design and network connection services, should also be considered. Future studies should be extended to investigating group behavior, conformity influences, and the bandwagon effect, the three levels of cultural influence, and so forth. Moreover, the influence of intention to use can be extended to entertainment more generally. Future studies should also consider whether the intention to use leisure-sports appliances is determined more by tourists' long-standing personalities or by momentary emotional influences.

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APPENDICES

Appendix 1. *Measures and Sources*

Research Construct/Items	Standardized estimates	Cronbach's α	Composite reliability (CR)	References
Multi-functionality		.89	.89	Rijsdijk & Hultink (2009)
1. Can function to achieve plentiful activities.	.74			
2. Can do a lot	.86			
3. Performs multiple tasks.	.86			
4. Fulfills multiple functional needs.	.80			
Reactivity		.87	.88	Rijsdijk & Hultink (2009); Jennings & Wooldridge (1998)
1. Keeps an eye on its environment.	.81			
2. Reacts to changes.	.86			
3. Directly adapts its behavior to the environment	.82			
4. Observes it's environment actively	.70			
Complexity		.89	.89	Rijsdijk & Hultink (2009);
1. Much help is needed in taking this appliance into use.	.80			
2. Much effort is need to learn how to use this appliance.	.89			
3. Much knowledge is needed to use this appliance.	.87			
Automation		.78	.78	Rijsdijk & Hultink (2009); Jennings & Wooldridge (1998)
1. Works independently.	.68			
2. Takes the initiative.	.76			
3. Takes decisions by itself.	.76			
Self- image		.88	.88	Karahanna et al. (1999)
1. Make me feel more popular	.81			
2. Promote my social status	.87			
3. Increase my own positive image	.85			
Perceived Usefulness		.87	.88	Davis et al. (1989); Venkatesh & Davis (2000)
1. Enable me to accomplish purposes more quickly.	.82			
2. Make it easier to complete my health plan	.88			
3. Increase my effectiveness of sports and leisure.	.73			
4. Beneficiary for my health	.77			
Subjective Norms		.80	.82	Taylor & Todd (1995); Brown & Venkatesh (2005)
1. My family think I should use the appliance.	.73			
2. My close friends think I should use the appliance.	.91			
3. My immediate supervisor thinks I should use the appliance.	.67			
Entertainment		.94	.94	Moon & Kim (2001)
1. Make me feel pleased	.82			
2. Make me feel enjoyable	.89			
3. Make my life have more fun	.90			
4. Make me feel relaxed	.88			
5. Make me feel comfortable	.85			
Intention to use		.91	.91	Davis et al. (1989)
1. I like using this appliance.	.83			
2. I will keep on using it.	.85			
3. I feel pleased when use it.	.83			
4. I persuade others to use it.	.79			
5. I actively use the appliance in my leisure time.	.77			

Appendix 2. Results

Table 1. ANOVA analysis of Usefulness (PU)

User characteristics	Types	Frequency	Test Statistic		Scheffe/ Bonferroni	
			T	F		
Exercise habits and frequency	Average frequency/per month					
	A.	0-1 time	122			
	B.	2-4 times	126			
	C.	More than 5 times	136		5.73**	C>A**
	Average duration every time					
	A.	Less than 0.5 hour	139		0.71	
	B.	1 hour	139			
	C.	More than 1.5 hours	106			
Education	A.	High school or below	152			
	B.	University or above	232	-0.78		
Age	A.	20 years old or below	83			
	B.	21-30 years old	119			
	C.	31-40 years old	85		1.84	
	D.	41 and above	97			
Gender	A.	Male	170			
	B.	Female	214	-0.48		
Monthly disposable income (NT dollars)	A.	Below 10,000	169			
	B.	10,000 -30,000	107		10.17***	A>C**, B>C**
	C.	Above 30,000	108			

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 2. ANOVA analysis of Reactivity (RE)

User characteristics	Types	Frequency	Test Statistic		Scheffe/ Bonferroni	
			T	F		
Exercise habits and frequency	Average frequency/per month					
	A.	0-1 time	122			
	B.	2-4 times	126			
	C.	More than 5 times	136		5.81**	B>A*, C>A**
	Average duration every time					
	A.	Less than 0.5 hour	139		1.90	
	B.	1 hour	139			
	C.	More than 1.5 hours	106			
Education	A.	High school or below	152			
	B.	University or above	232	-1.02		
Age	A.	20 years old or below	83			
	B.	21-30 years old	119			
	C.	31-40 years old	85		3.85**	B>C*
	D.	41 and above	97			
Gender	A.	Male	170			
	B.	Female	214	-0.21		
Monthly disposable income (NT dollars)	A.	Below 10,000	169			
	B.	10,000 -30,000	107		7.25**	A>C*, B>C**
	C.	Above 30,000	108			

Note: * $p < 0.05$, ** $p < 0.01$

Table 3. ANOVA analysis of Complexity (CX)

User characteristics	Types	Frequency	Test Statistic		Scheffe/ Bonferroni
			T	F	
Exercise habits and frequency	Average frequency/per month				
	A.	0-1 time	122		
	B.	2-4 times	126	4.15*	C>A*
	C.	More than 5 times	136		
	Average duration every time				
	A.	Less than 0.5 hour	139		
B.	hour	139	1.92		
C.	More than 1.5 hours	106			
Education	A.	High school or below	152		
	B.	University or above	232	-2.13*	B>A*
Age	A.	20 years old or below	83		
	B.	21-30 years old	119		
	C.	31-40 years old	85	2.48	
	D.	41 and above	97		
Gender	A.	Male	170		
	B.	Female	214	1.35	
Monthly disposable income (NT dollars)	A.	Below 10,000	169		
	B.	10,000 -30,000	107	3.32*	B>C*
	C.	Above 30,000	108		

Note: * $p < 0.05$

Table 4. ANOVA analysis of Automation (AU)

User characteristics	Types	Frequency	Test Statistic		Scheffe/ Bonferroni
			T	F	
Exercise habits and frequency	Average frequency/per month				
	A.	0-1 time	122		
	B.	2-4 times	126	1.15	
	C.	More than 5 times	136		
	Average duration every time				
	A.	Less than 0.5 hour	139		
B.	1 hour	139	0.04		
C.	More than 1.5 hours	106			
Education	A.	High school or below	152		
	B.	University or above	232	-0.59	
Age	A.	20 years old or below	83		D>C*/
	B.	21-30 years old	119		
	C.	31-40 years old	85	3.45*	A>C*, B>C*,
	D.	41 and above	97		D>C*
Gender	A.	Male	170		
	B.	Female	214	0.96	
Monthly disposable income (NT dollars)	A.	Below 10,000	169		
	B.	10,000 -30,000	107	5.97**	B>C**
	C.	Above 30,000	108		

Note: * $p < 0.05$, ** $p < 0.01$