



Consumer Satisfaction Using Fitness Technology Innovation

Simona Abdo^(✉), Tahani H. Nahouli, and Karim Daye

Lebanese International University, Beirut, Lebanon
simona.abdo@gmail.com

Abstract. It is not a surprise that technology is raising increasingly within the people's fitness routine and showing a shift in customer's mindset. Hence, the technological products' companies have to keep on tracking customer's purchase intentions and loyalty for their business growth. Meanwhile, customer satisfaction is essential in determining the purchase intention. Therefore, a research is conducted to find the determinants that lead to customer satisfaction using fitness technology innovation particularly. Various theories, regarding technology, are discussed to reach customer satisfaction determinants; thereby, four of them are under study, as follows, service quality, helpfulness, friendliness, and quickness to investigate their relationship with customer satisfaction. For the benefit and purpose of this study, a quantitative research is applied and data is collected using a self-directed questionnaire. Hence, the obtained results revealed that customer satisfaction is determined by helpfulness, friendliness, and quickness of the devices, in addition to the service quality provided by the companies. However, the research methodology has its limitations and imperfections where the sample's size and selection are limited. Also, the research is not focusing on all the customer satisfaction determinants the theories discussed in the literature review. All in all, this study is vital for fitness technology companies to track the customer's satisfaction for strengthening their Research and Development to meet the customer's expectations that leads to higher satisfaction and business growth. Moreover, further research is necessary to decide whether the obtained results can be generalized across other innovative technological devices.

Keywords: Customer satisfaction · Fitness technology innovation · Friendliness · Helpfulness · Quickness · Service quality

1 Introduction

Lately, the wearable technology retail is expanding rapidly toward the leading technology sector, where smartwatch sales are driving the consumer market growth largely. The modernized wearable devices, which can provide a broad sort of features like wireless connectedness, well-being tracking, smart card payment, etc., are produced heavily by leading companies like Apple and Samsung. On the contrary, the restricted features and capabilities of the fitness trackers are making their popularity drop. Meanwhile, consumers expect wearable devices to eventually be very smart, linking technologies like

AR (Augmented Reality) and AI (Artificial Intelligence), by that rising their applicability to individuals and business users. Ed Thomas (2017), the GlobalData Analyst, declared, “The wearable tech theme incorporates more than just wrist-worn devices. Smart ear-wear, or wearable, has become a more prominent category with the emergence of devices that incorporate voice-activated virtual assistants such as Apple’s Siri and Google’s Assistant. Audible also has the potential to match, or even exceed, the performance of smart watches when it comes to providing health monitoring services”. Generally, the wearable technology market is predicted to expand at a compound annual growth rate (CAGR) of 19% to approach \$54 Billion by 2023, while in 2018 it was valued at around \$ 23 Billion, as Global Data announced (FinancialBuzz, 2020).

The demand for the fitness tech market is driven by the increase in social media usage and the customers’ willingness to stay updated with its related posts. People are using wearable devices since its accessibility is accelerating. The expanding usage of various applications is prompting the Global Wearable Device Market growth. Furthermore, the market growth in the planned period is strengthened by the increase in health awareness globally. As for personal grooming, it is a flourishing industry, for maintaining calorie intake via these devices that affects the market’s growth indirectly. On the other side, such device usage is devoted to privacy and security issues. For instance, the populated data of the user in the devices can be to be misused. Also, the constraint that prevents people from purchasing these devices is the short battery life span (Research and Markets, 2020). Therefore, companies need to work harder and enhance Research and Development to stay competitive in the industry. (Research and Markets, 2020).

Referring to Gustafsson et al. (2005), consumers nowadays are more demanding than ever since their expectation level for a product or a service is increasing. Thus, to meet and satisfy their customers, companies have to keep on recognizing and investigate their needs and expectations. Besides, the increase in competition among leading companies is driving them to maintain customer-driven policy (Drosos et al., 2011). Meanwhile, it is regarded that fitness wearable devices are becoming more saleable, lately. Hence, customer satisfaction and how it is measured will be discussed generally. Subsequently, the research will go through customer satisfaction using fitness technology innovation through various theories, diffusion theory, theory of planned behavior, and technology acceptance model, to indicate the satisfaction determinants. The demonstration of customer satisfaction determinants is beneficial for companies for Research and Development and industry competitiveness due the high demand on these innovative products that would lead to companies’ market growth. Therefore, that aim of this research is to reveal the determinants that would lead to customer satisfaction using fitness technology innovative devices. Could the service quality, helpfulness, quickness, and friendliness be from the customer satisfaction determinants?

2 Literature Review

This section aims to present a review of the literature concerning customer satisfaction regarding fitness technology innovation, and how it’s determined through various theories. It will present the theoretical framework of customer satisfaction and the pivotal theories used in this research in addition to stating the main research question and outlining the underlying hypotheses.

2.1 Customer Satisfaction

Consumer satisfaction is characterized as an "assessment of the apparent disparity among earlier desires and the actual execution and performance of the item or product". Client's satisfaction with the organization's products and services is regarded as a pivotal element that drives competitiveness and achievement.

Rogers (1995) maintains that innovation is endorsed faster than diverse products, since it is perceived as rather simple to understand and use. Customers experience would turn into positive feelings for products capable of communicating in a humanlike way. According to Homburg and Stock (2004), consumer's positive and perceptual evaluation regarding a product or service represent consumer satisfaction. Rogers (1995) asserted that satisfaction is derived from product's competitive advantage. Relatively, smart product manufacturers have to grasp the tie between product smartness and the satisfaction level among consumers, due to the expansion in the smart devices usage. Haba et al. (2017) encountered that customer satisfaction is established by the smart services' quality, since it generates the smart services' usage. Furthermore, the bond between product performance and consumer satisfaction is recognized. Spreng and Olshavsky (2003) revealed that product's perceived performance leads to consumer satisfaction. Consequently, Fornell et al. (1996) noticed that both product quality and value shape consumer satisfaction (Lee and Shin, 2018).

Measuring Customer Satisfaction: Presently, estimating consumer loyalty and satisfaction turned into an essential issue to the vast majority of business association. In such manner, Ruler Kelvin in the nineteenth century declared, "In the event that you can't quantify something, you can't comprehend it". In ongoing decades, significance of consumer satisfaction has expanded in this way numerous association considered estimating consumer satisfaction ought to be set as a parameter. "It additionally considered as dependable input and it gives as compelling, immediate, and significant and target way of the clients' inclinations and desires". Gerson (1993), Wild (1980) and Slope (1996) stated, consumer satisfaction estimation gives a feeling of accomplishment and achievement for all workers associated with any phase of the client benefit process and it spurs individuals to execute just as accomplish larger amounts of profitability. Therefore, what are the determinants that lead to customer satisfaction?

2.2 Diffusion Theory of Fitness Wearable Devices and Customer Satisfaction

In 1962, diffusion of innovation theory, one of the earliest studies, was developed by E.M. Rogers. The theory clarifies how a concept or product acquires energy and diffuses within a particular population or community over time. Thereby, it is people's adoption of a new concept, product, or behavior. Adoption is when a person acts differently than s/he used previously, as acquiring or accepting a new product, have and perform new behavior (LaMorte 2019a).

Theory's Customer Satisfaction Model In the mid-1980s, a chain of effective and multi-stepped research program was initiated by the researcher Parasuraman, concentrating on the service quality concept and measurement. The instrument development

technique toward assessing customers' evaluation of service quality achievement, in 1985 afterword the basic service quality "gaps model" conception. According to Parasuraman et al. (1991, 1994), for quantifying the customer's expectations a company meets, SERVQUAL has become logically well-known model. Nonetheless, SERVQUAL requires feedback structure where customer satisfaction count on the gap between customers' expectation and the service quality. Besides, the change in customers' expectations and technology have to be considered, as well as the continuous change of service quality evaluating method and thus customer satisfaction. This suggests that a good decision could not depend on customer satisfaction fixed evaluation. The growth and under-investment model could be considered the missing significance behind the customer satisfaction archetype (Yeon et al. 2006).

H₁: A Positive relationship exists between service quality while using of wearable fitness devices and customer satisfaction.

2.3 Theory of Planned Behavior of Fitness Wearable Devices and Customer Satisfaction

In 1980, the Theory of Reasoned Action was the foundation of the Theory of Planned Behavior (TPB) to anticipate an individual's motive to join an action at a particular place and time. The theory's objective is to clarify all actions taken by people and capable of applying self-control. Behavioral intention is viewed as the model's pivotal element. Attitude influences behavioral intention. The six TPB constructive components that display actual control of the person over the behavior are attitude, behavioral intention, subjective norms, social norms, perceived power, and perceived behavioral control (LaMorte 2019b).

According to Fishbein and Ajzen (2010), the individual's purpose to presume in behavior is the behavior's direct determinant. Ajzen (1991) revealed, that attitude, subjective norms, and perceived behavioral control unitedly predict action intention, as the TPB suggested. Regarding physical exercise, attitude relates to the degree where the individual favors the exercising evaluation. Subjective norm is the referent important idea in person's life for the agree or disagree of exercise, and anticipated social constraint to submit with community (referent). Anticipated behavioral control is the individual's degree of believing in their exercising capability and realizing if they are in control of exercising or not (Zhu et al. 2017).

During the wide presence of fitness trackers and an increasing number of individuals wearing them, it is becoming vital to interpreting the devices' role in altering the exercise intentions. Conner and Sparks (2005) suggested to understand the individuals' intention to exercise, the TPB since it is considered as a practical framework, in addition to other health behaviors, as Freberg 2013 revealed. A conducted study demonstrated social sharing and social competing as two communicative elements of wearable devices. They attempt a broad perspective as information and communication technologies to transform health communication patterns. Lately, wearable devices are influencing individuals' behavior in modern ways, due to the technological growing role that is playing in individuals' lives. Thereby, people's intention to exercise is influenced by the technological devices' social aspects. Fishbein and Ajzen (2010) submitted interventions are

altered by the recommended mediation model since its framework is used for expanding and evaluating behavior. For instance, people are realized to be more likely to exercise when their health data are shared; so, potential health campaigns and wearable fitness devices have to involve features that could alter behavior effectively (Zhu et al. 2017). Respectively, social sharing and social challenging are vital in both health communication and wearable fitness devices since they are capable of influencing the individuals' intention toward this technology.

Theory of Planned Behavior and Customer Satisfaction Relationship: Chi (2007) claimed that customers come back to the same company and eager to share their forward-looking experience when they are satisfied. Yoon (2005) stated forward-looking experiences will suggest the word of mouth recommendations in regard to marketing since it is viewed as the most honest and as one of the most seek post information for future customers. According to Opperman (1998), customer satisfaction affects the behavioral intentions, as the return and recommend intention which will be excessive for various prospects. Besides, Oliver (1997) found that the state of experience of a psychological process refers to satisfaction. Crompton (1995) indicated, the psychological result emerging from the participation in the activities is the experience that prompt satisfaction. Hence, the emotional state of mind, that derive succeeding customer's disclosure to the provider's services attribute, is referred to satisfaction. Further, referring to Blanchard (1994) and Heskett (1990), consumer's perception outcome of the value received in a relationship is consumer satisfaction. Meanwhile, Bitner (1994) argued, consumer's after purchase appraisal and emotional reaction to the experiences maintained by and united with specific products or services purchased is the satisfaction (Mohd Din et al. 2019).

2.4 Technology Acceptance Model of Fitness Wearable Device

Davis (1989) and Davis et al. (1989) stated that the Technology Acceptance Model (TAM) clarifies the client's knowledge or dismisses another innovative technology; thereby this model adjusts the contemplated activity hypothesis. So, the technology acceptance model is a standout among the most usually utilized hypotheses inside the technology perception setting; for instance, the model display is used to comprehend the consumer's acceptance, reception, utilization purpose of managing account advances, PDAs, health services' framework (Holden and Karsh 2010), online purchasing, and innovative advance. Besides, apparent usability and helpfulness are recommended as vital elements that clarify the technology acceptance. TAM indicated that its factors determine the conduct aim and approach for utilizing all technologies, in addition to genuine usage.

Perceived Usefulness: Perceived usefulness is portrayed as "the forthcoming client's abstract likelihood that utilizing an explicit application framework will expand his or her execution" (Bagozzi 1989). The observed effectiveness communicates convictions regarding buyers where the use of technology might enhance execution (Legris et al. 2003). Further, observed effectiveness was admitted to be the greatest variable to foresee the utilization of technology goal as well as acknowledgment. Discoveries of significant

examination uncover a way where apparent convenience affects the frame of mind positively for utilizing behavior goal for technology use (Davis 1989). Generally, observed effectiveness is estimated by four aspects, as follows: efficiency, adequacy, execution, as well as the new technology handiness (Taylor and Todd 1995).

Perceived Ease of Use: Perceived ease of use, in the reputation model era, is another component. It is depicted as “how lots a person trusts that using a specific framework is probably free from exertion” (Davis 1989). Albeit noted, helpfulness predicts expectancies to the use of, thereby perceived ease of use is non-obligatory and appears by means of seen particularity in reputation version era (Davis et al. 1989). Keil et al. (1995) revealed, usefulness is an extra essential issue than a consolation in deciding usage era. All of the greater strikingly, the few examinations do not reflect the consideration on perceived ease of use like the predicted future use determinant (Subramanian 1994; Hu et al. 1999). Further, perceived ease of use is envisioned via the means of the first model’s six aspects, which are: facility to look as, controllability, accuracy, resilience, smooth to turn out to be practical, and fundamental ability to use in the late era (Davis 1989). In other words, helpfulness, Friendliness, and quickness of devices could be examples of the perceived ease of use. According to Chang and Wang (2008) and Stoel and Lee (2003), a positive relationship between perceived ease of use and favorable attitude or satisfaction was affirmed through previous studies (Shah and Attiq 2016). Therefore, various hypotheses could emerge regarding the usage of fitness technology innovative devices and customer satisfaction.

H₂: A Positive relationship exists between friendliness of wearable fitness devices and customer satisfaction.

H₃: A Positive relationship exists between helpfulness of using wearable fitness devices and customer satisfaction.

H₄: A Positive relationship exists between quickness while using of wearable fitness devices and customer satisfaction (Fig. 1).

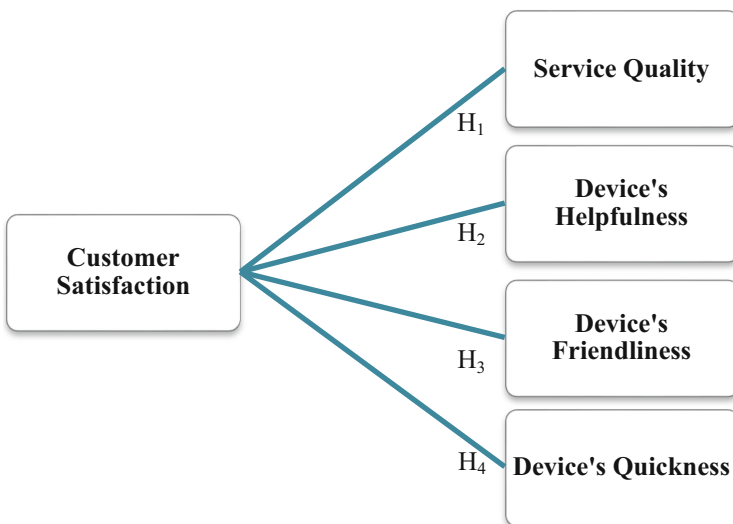


Fig. 1. Research model for the relationship between the tested variables and customer satisfaction

Attitude Towards Using Behavioral Intention to Use: Attitude is gestated as the character's advantageous or bad feeling approximated through using the brand recent technology; however, the behavioral goal belongs to the person's responsive plans to meet or not carry out a few exact subsequent behaviors (Venkatesh and Davis 2000). Specifically, the mindset assesses the user's assessment of the power of using the new era (Lederer et al. 2000). Moreover, the effect of behavioral assumption inclusive of perceived usefulness and ease of use on generation usage is assessed in phrases of customers' attitude closer to era, their goal to adopt the technology, and current usage of the technology (Baron et al. 2006).

3 Research Methodology

In the following section, the research approach will be discussed in addition to the study context, research problem and the taken steps to obtain the information and data.

3.1 Study Context and Research Approach

The aim of this study is determine the elements that affect customer satisfaction using fitness technology innovation. Based on the provided research and development theories regarding the fitness wearable devices, and it's the determinants that effect the customer satisfaction, the researcher built a methodological research. The research's model combined the independent variables (product's friendliness, helpfulness, quickness, and service quality after using the fitness devices) with the dependent variables – customer satisfaction. The data assisted in stating that there is a statistical considerable relationship between the compiled value of variables and customer satisfaction.

3.2 Research Problem

For the aim of the work and the knowledge stated and adopted assumptions of the theoretical work, a research question has been formulated as follows:

RQ: What are the determinants that would lead to customer satisfaction after using fitness technology innovation?

Answering the research question was through verifying several hypotheses. The hypotheses verification started by identifying the relationship's strength and statistical significance between the compiled variables, that included independent variables (product's friendliness, helpfulness, quickness, and service quality after using the fitness devices) and dependent variable customer satisfaction. The data assisted in stating that there is a statistical considerable relationship between the compiled value of variables and customer satisfaction.

H₁: A Positive relationship exists between service quality while using wearable fitness devices and customer satisfaction.

H₂: A Positive relationship exists between friendliness of Wearable Fitness Devices and Customer Satisfaction.

H₃: A Positive relationship exists between helpfulness of using wearable fitness devices and customer satisfaction.

H₄: A Positive relationship exists between quickness while using wearable fitness devices and customer satisfaction.

3.3 Measures and Procedures

For the prosperity and aim of this research, a quantitative methodology will be adapted. Quantitative data was collected, by the means of a questionnaire, to come-up with accurate information that represents the studied research question. The questionnaire was based on a Likert scale (7 Strongly agree – 1 Strongly disagree) since it is a well-known collecting data method and understandable by people.

3.4 Population and Sampling

The survey's sample was random since the usage of fitness technology innovative devices is becoming popular among people. The sample was chosen from North Lebanon in both urban and rural areas from both genders (males and females). The questionnaire was distributed over a 100 respondents who were mainly gym people, trainers and athletes in North Lebanon aged between 21 and 45 years. The sample size was limited to 100 respondents since it was a pilot research. The researchers chose this technique for its time and cost efficiency and many studies agreed on the increased honesty of responses collected using questionnaires.

3.5 Data Collection

The data was collected by researcher using the questionnaire technique. The questionnaire was divided into two categories: demographics, customer satisfaction toward wearable technology. The data was analyzed using SPSS. Chi-square and Pearson R correlation were used to verify the proposed hypotheses. The margin of error was calculated, where 4% was the margin of error and 95% confidence level.

4 Findings and Discussion of Results

The results from the collected data unveiled countless of findings that are generalized below. This study proved that there is a direct relationship between customer satisfaction and wearable fitness devices' friendliness, helpfulness, quickness, the service quality while using them. The four hypotheses were specified and are all revolved around this intention.

Hypothesis 1 was about the relation between "customer satisfaction" and "service quality". The results showed that there is a positive relationship between customer satisfaction and service quality of fitness wearable devices. The deduction was performed by utilizing Pearson Chi Square test and Pearson's R. After testing the correlation and significance of the dependent and independent variables "customer satisfaction" and "device's service quality", the sig = 0.000 and the Pearson's R value = 0.044. These results manifested a strong significant correlation between the tested variables. Thus,

H1 is validated; customer satisfaction is attained when the device's service quality is enhanced.

Hypothesis 2 was about the relation between "customer satisfaction" and "friendliness of wearable fitness devices". The results revealed that there is a positive relationship between customer satisfaction and friendliness of fitness wearable devices. The deduction was performed by applying Pearson Chi Square test and Pearson's R. After testing the correlation and significance of the dependent and independent variables "customer satisfaction" and "device's friendliness", the sig = 0.000 and the Pearson's R correlation value = 0.581. These results indicated a strong significant correlation between the tested variables. Thus, H2 is validated; customer satisfaction is strongly related to the customer friendliness of wearable fitness devices.

Hypothesis 3 was about the relation between "customer satisfaction" and "helpfulness of wearable fitness devices". The results showed that there is a positive relationship between customer satisfaction and helpfulness of fitness wearable devices. The deduction was performed through utilizing Pearson Chi Square test and Pearson's R. After testing the correlation and significance of the dependent and independent variables "customer satisfaction" and "helpfulness of wearable fitness devices", the sig = 0.000 and the Pearson's R correlation value = 0.768. This demonstrated a strong significant correlation between the tested variables. Hence, H3 is validated; customer satisfaction is achieved when the wearable devices are helpful.

Hypothesis 4 was about the relation between "customer satisfaction" and "device's quickness". The results exhibited that there is a positive relationship between customer satisfaction and quickness of fitness wearable devices. The deduction was performed through employing Pearson Chi Square and Pearson's R. After testing the correlation and significance of the dependent and independent variables "customer satisfaction" and "quickness of wearable fitness devices", the sig = 0.000 and the Pearson's R correlation value = 0.670. This conveyed a strong significant correlation between the tested variables. Thus, H4 is validated; customer satisfaction is attained when the wearable fitness devices are quick in use (Table 1).

Table 1. Hypotheses validation

Tested hypotheses	Results
H ₁ : A Positive relationship exists between service quality while using of wearable fitness devices and customer satisfaction.	Accepted
H ₂ : A Positive relationship exists between friendliness of wearable fitness devices and customer satisfaction.	Accepted
H ₃ : A Positive relationship exists between helpfulness of using wearable fitness devices and customer satisfaction.	Accepted
H ₄ : A Positive relationship exists between quickness while using of wearable fitness devices and customer satisfaction.	Accepted

The analysis of collected data revealed the acceptance of all the studied hypotheses. There is statistically significant relationship which is applied to studied variables:

between the independent variables (device's service quality, friendliness, helpfulness, and quickness) and the dependent variable (customer satisfaction). The relationship is relatively strong, where it was measured by Pearson Chi-Square test with $\text{sig} = 0.000$ and Pearson R' test. Therefore, a positive relationship exists between determinants related to the usage of innovative fitness technologies and customer satisfaction.

Referring to diffusion theory's customer satisfaction model, SERVQUAL is a leading model for measuring the customer's expectations a company meets. This model demands feedback structure and the gap between the customer's expectations and the service quality is the customer's satisfaction. Meanwhile, the revolution in customers' expectations and technology have to be deliberated, together with the variation of the evaluation method of service quality and thus customer satisfaction. It cannot be relied on the fixed evaluation of customer satisfaction for good decisions. Besides, growth and under-investment could be behind the customer satisfaction archetype (Yeon et al. 2006). The researcher investigated the relationship between service quality of wearable fitness devices and customer satisfaction. The results revealed a positive relationship between them. Hence, customer satisfaction of using fitness technology innovative devices can be determined by the service quality the company provides especially that these companies relies mainly on the change in technology that leads to growth, which is behind the satisfaction's archetype.

Besides, referring to the Technology Acceptance Model, prior studies proved a positive relationship between the satisfaction and perceived ease of use (Shah and Attiq 2016); thus, perceived ease of use can a determinant for customer satisfaction. However, the perceived ease of use is presented through various aspects as the facility to look as, controllability, accuracy, resilience, smooth to turn out to be practical, and fundamental ability to use in the late era (Davis 1989). These aspects could be exhibited in the shape of helpfulness, friendliness, and quickness of devices as the wearable fitness devices. The researcher conducted several hypotheses testing these aspects. The results demonstrated a positive relationship between customer satisfaction and helpfulness, friendliness, and quickness of the devices. Hence, these aspects (helpfulness, friendliness, quickness) included in perceived ease of use are determinants that lead to customer satisfaction.

5 Practical Implications

The research work is studying consumer satisfaction regarding the use of fitness technology innovation to understand how the consumer satisfaction is affected and reach the determinants that enhance this satisfaction. This study is vital for fitness technology devices companies since they have to track the customer's expectations and feedback to reach the customer satisfaction determinants. It is known that customer's expectation is not fixed yet changed with the change of technology and service quality, as well customer satisfaction. Thereby, this study could help in strengthening the companies' Research and Development to meet or exceed customer's expectations as product and service quality that is always in change. Also, as mentioned previously, according to FinancialBuzz (2020), the fitness technology devices' demand is falling due to the lack in capabilities. Therefore, enhancing customer satisfaction for such products is essential since it is capable of turning this fall into a raise in demand that leads to an increase in companies' growth rate.

6 Managerial Implications

Studying customer satisfaction is essential for better quality of service. The customer satisfaction is determined by the quality of the service. So, the quality of the service can be improved by attaining the customer satisfaction. Attaining customer satisfaction through the proved determinants and other determinants that recommended to be studied in the future would lead to a better quality of service provided by the companies. Therefore, customer loyalty would be achieved by the quality of service through customer satisfaction.

7 Conclusion

The customer satisfaction/fitness technology innovative devices were under study by different studies as the diffusion theory, theory of planned behavior, and technology acceptance model. The conducted research proved that the service quality the technology innovative devices companies provide determines the customer satisfaction since these companies depends mainly on the change in technology that leads to growth. Besides, generally, the perceived ease of use determines customer satisfaction; meanwhile, the helpfulness, friendliness, and quickness of devices that could be exhibited as elements in the perceived ease of use are verified as determinants that lead to customer satisfaction regarding the using of fitness technology innovative devices. Therefore, companies should take into consideration these elements while working on improving the wearable fitness devices in production.

Future studies would benefit from this analysis while using a wider sample in size. Forthcoming work should intend to include more determinants from the theory of planned behavior and technology acceptance model to come up with all the determinants that are cable capable of enhancing customer satisfaction in the fitness technology devices. Moreover, further research is required to generalize the results across all types of innovative technology devices through various theories since that the aim of this research is to eliminate the gap existing in the market research through studying the elements that would lead to customer satisfaction.

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