How does gamification foster customer engagement and continued use of smart wearable devices for health and Wellness?

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Abstract

Smart wearable devices (SWDs) are considered the next technological development after smartphones. Due to the COVID-19 epidemic, telework has increased, and people's attention to self-health monitoring has grown, which has boosted the SWDs market's growth. Moreover, gamification has been a prominent topic owing to its motivational and engaging impacts, leading to more regular physical activity, better health, and greater fitness levels among users. Even though SWDs could monitor fitness and health metrics, many users abandon them within a few months. Therefore, this research is among the first to examine the post-adoption behaviours of recent users to improve their engagement with SWDs to improve their health and wellness through the continued use and exercise. Through an online questionnaire 234 eligible responses were obtained from smartwatch users. PLS-SEM method was performed to examine the validity and reliability of the modelling framework. and testing the research hypotheses. The results revealed that

utilitarian and hedonic motivations positively affect consumer engagement except for social interactions and perceived ease of use. In contrast, achievement showed a negative impact on customer engagement (CE).

Furthermore, results showed that the bandwagon effect has a significant impact on CE. However, healthology has shown to be insignificant in engaging customers with the smartwatch. Generally, results disclosed that gamification motivations boost customer engagement (CE) to change their behavior for the continued use and exercise to improve their health and wellness. Moreover, this research provides practical implications for the applications of wearables for wellbeing.

Keywords

Gamification, customer engagement, hedonic/utilitarian motivations, continued use, smartwatch, healthology, bandwagon effect.

1. Introduction

The whole globe is now living in an era of sustainable development. In 2015, the United Nations General Assembly unveiled the 2030 Agenda with its seventeen Sustainable Development Goals (SDGs) to guide development on a global scale. All developed and developing nations including Egypt, were encouraged to participate in this initiative to offer peace and prosperity for society and the planet both now and in the long run. Health is prominently included in the SDGs as the third goal (SDGs 3, United Nations, 2022). It broadly promotes healthy lifestyles and

well-being for people of all ages. However, the field of global health, still faces significant obstacles, making health management an essential area of study (Wang, et al., 2021).

According to the WHO (2017), being healthy means thriving in every aspect of life—physically, mentally, and socially—and not only being free from illness or disabilities (Padaliya, et al., 2022). Chronic diseases account for a sizable proportion of all deaths (Spil, et al.,2017). They typically stem from unhealthy behaviours and lifestyles, including a bad diet and a lack of physical activity. The growing attention to health, fitness, and exercise shows that people's self-care has improved in recent years in terms of self-monitoring and adopting healthy habits (Padaliya, et al., 2022), mainly with the COVID-19 pandemic and its ongoing cause of widespread human misery and suffering (United Nations, 2022). Sweeney et al. (2015) has established that urging clients to take charge of their health maintenance has a beneficial effect on their wellness.

Furthermore, as technology is growing fast, recent advancements can make self-care simple and accessible to the public, which has resulted in more people using online health-care resources (Padaliya, et al., 2022). With the rise of smartphones, mobile health apps have become a powerful way to keep track of people's health, which has made promoting health and fitness successful (Wang, et al., 2021), followed closely by smart wearable devices (SWDs) or wearables as an innovative

technology trend (Tsai, et al., 2022), including smartwatches, bracelets, rings, clothes, smart eyewear, and other wearables (Tsai, et al., 2022; Chuah, et al., 2016).

SWDs are electronic gadgets that may be worn on or affixed to a person's body. Typically, these devices vary from basic activity monitors which track everyday activities and sleeping habits to devices with various sensors that may measure heart rate, intensity of muscle contraction, hydration levels, body temperature, and far more (Barnes, 2014). Such gadgets can constantly gather information from the human's body and exercises for examination, which might not only be used to check users' health condition, but also to assist them in developing better workout regimens, becoming a part of users' daily life (Zhao, et al., 2016).

In 2022, worldwide end-user expenditure on wearable devices reached US$93.9 billion, up 15.2% from the value of US$81.5 billion in 2021 (Gartner, 2021). However, Ledger and McCafrey's (2014) research shows that just 70% of SWD users stick with them after the first six months and only 55% after the first year. Furthermore, approximately 33%–50% of users stop using their wearable gadgets after the first six months, according to other studies (Chen, et al., 2017). To be most effective, these gadgets must be worn continuously for quite some time, as they deal directly with one's health (Esmaeilzadeh, 2021). Typically, studies of SWD address functional aspects, such as accuracy and reliability that affect the person's desire to use SWDs or design-related elements (Huang,

et al., 2016; Wang C. H., 2015). The market for wearable devices is projected to be dominated by smartwatches. In addition to showing the time, smartwatches enable users to use apps for tracking their health and fitness as well as checking and responding to notifications along with expanded communication and "smart" functions (Krey, et al., 2019; Dehghani, 2018).

Additionally, most smartwatch research in recent years has focused on the devices' potential applications in certain fields such as education, design, and health, among others, and has utilized the same variables from established theories such as TAM to justify their widespread adoption (Choi & Kim, 2016). Thus, academic research on smartwatches has been more "technology driven" than "consumer driven." Since smartwatches are still in the early stages of their market dissemination and little is known about the needs of existing customers, it is important to try to understand the intents and behaviours of the actual users (Dehghani, 2018).

Moreover, Burbach et al. (2019) emphasized that most of the contemporary SWDs are built with gamified components to increase users' enjoyment of sports and self-health monitoring. The term "gamification" is used to describe the practice of employing mechanics and game design elements outside of a gaming context, such as user achievements, presentation, feedback, and teamwork (Alsawaier, 2018; Zichermann & Cunningham, 2011; Deterding, et al., 2011). However, Huotari & Hamari (2012) and Ziesemer et al. (2013) argued that that the

term "gamification" goes beyond merely "gamified" features to comprise the customer's personal "gameful" experiences. It is expected to motivate its users to do more exercise (Spil, et al., 2017). Adding gamification designs may increase the low level of users' intent to keep using SWDs. Users may readily obtain data for gamifcation apps thanks to SWDs' ability to autonomously track user data and interact with others (Stiglbauer, et al., 2019; Silverio-Fernández, et al., 2018). The idea is that by making exercise more like a game, people would be more inclined to engage in it.

Deterding et al. (2013), however, suggest that consumers are primarily driven by external incentives rather than internal motivation. As a result, gamified systems are neither purely utilitarian software nor full games. The gamification strategy incorporates the elements of games into more instrumental or utilitarian systems; doing so transforms non-game environments into a game-like system with the goal of creating entertainment and engagement with these games (Koivisto & Hamari, 2019; Deterding, et al., 2011). According to Kari and Makkonen (2014) there are several distinctive motivations for employing different wellness and sports technologies that can be both hedonic (including achievement, enjoyment, social interaction, and competition), and utilitarian (involving feedback, goals, perceived ease of use, and perceived usefulness).

Moreover, this research combined two new motivational variables, namely the bandwagon effect and healthology (Bical & Ispir, 2021). The positive results attained by individuals when they pursue the lead of their friends on social media are sometimes referred to as the "bandwagon effect" (Tsai, et al., 2022; Rohlfs, 2003). According to Dehghani (2018), the term "healthology" was proposed to describe the convergence of health problems, technology, and informatics in SWDs that aims to deliver creative methods to satisfying the healthcare requirements of individuals.

Consequently, all these motivational variables are assumed to be important for CE and the sustained use and exercise of SWDs. Gamification has been considered a motivating approach for boosting CE. According to Mulcahy et al. (2019) and Whittaker et al. (2021), CE is described as a multidimensional concept having essential cognitive, behavioural, and affective attributes that seem differently relying on the context. Accordingly, CE is considered an important determinant to consumers post-adoption behaviours.

Having said that, continued use intention was described by (Hong, et al., 2013) as the user's desire to continuously employ the current product or service. User views of a system's usability and utility have been compared by Hepola et al. (2020) and Van der Heijden (2004). According to Pal et al. (2020), consumer satisfaction and loyalty to smartwatch use increase with the number of benefits they obtain. Even though SWDs are becoming popular, only a few studies have been conducted to explore the user's desire to continue

employing a SWD, and the results of those studies have been equivocal (Tsai, et al., 2022; Dehghani, 2018).

So, the contribution of this research is that, as far as we know, this study is one of the first to empirically investigate the different hedonic and utilitarian factors, the bandwagon effect, and healthology in boosting customer engagement through gamification to encourage the continued use and exercise of SWDs for sustained health maintenance.

Consequently, this research set out first to provide a theoretical background about gamification, customer engagement, and consumer adoption of SWDs; explore the theories employed in the literature; recognize the crucial features of integrating these technologies; and provide recommendations for future research. Second, it investigates the motivating aspects that keep actual smartwatch users engaged with their devices.

2. background and hypotheses development

2.1 Theoretical Gamification and customer engagement (CE)

The proliferation of games across several platforms, like mobile phones and personal computers, has made them an integral part of people's free time (Bical & Ispir, 2021). Games have been played for generations to keep people entertained, motivated, and engaged (Dhahaka & Huseynov, 2020). Although it has its roots in the gaming industry, gamification has emerged as one of the most significant technological developments of the recent decade (Rodrigues, et al., 2021). As a result, most businesses are considering

gamification as a strategy for boosting motivation to engage customers with their products (Xi & Hamari, 2020). As a relatively new notion, "gamification," in the broadest sense, refers to the usage of several game design elements outside of traditional gaming settings (Xu, et al., 2015). These elements serve as the foundation for gamification applications (Sailer, et al., 2017). Badges, points, rewards, leaderboards, achievements, clear goals, competition, feedback, and progress are the most stated game elements of the 15 regular game design characteristics described by Werbach and Hunter (Lee, 2019).

While games and gamification may seem remarkably similar at first glance due to their shared structural components, there is a crucial difference between the two due to their intended function. Though the goal of a game is usually entertainment in and of itself, gamification is primarily instrumental. The core concept is to use game "building blocks" in non-game contexts, usually to incentivize certain actions inside the gamified environment. Most researchers see gamification as a potentially useful and ground-breaking concept with many possible applications in different contexts such as education, finance, marketing, workplace settings and healthcare (Dhahaka et al., 2020; Lee, 2019). Particularly in healthcare, gamification is receiving increased attention for its potential to, for example, encourage people to lead a healthier lifestyle and assist those with chronic illnesses in controlling their condition (Zhao, et al., 2016).

Predicated on people's rapidly increasing devotion to video games and the growing popularity of smartphone devices, wearables, and applications, gamification aims to alter people's behaviour to reinforce positive character traits (Spil, et al., 2017). Unlike Deterding et al. (2011) and Huotari & Hamari (2012) place a greater emphasis on gamification experiences and goals. They adopted an approach to gamification in the framework of "relational marketing," a strategy commonly applied in marketing literature to strengthen relationships with consumers. So, (Kari, et al., 2016) assert that gamification is the process of improving a service by adding affordances that make gamefic experiences possible to help the user generate more value. Since not all users are aware of all game-like components and have different knowledge and motivations towards gamification, Ziesemer et al. (2013), Bical & Ispir (2021), and Kari, et al. (2016) also argue that the definition of gamification should not be primarily constrained to the usage of game-like elements. They see that the term "gamification" extends beyond purely "gamified" features to include the user's own "gameful" experiences.

With the evolution of this new customer-centric marketing approach, organizations' primary interests and efforts have switched away from simply closing sales toward developing and maintaining relationships with customers. To adapt to the constantly changing social and individual aspects of

contemporary consumer behaviour, this approach relies heavily on the CE concept (Bical & Ispir, 2021).

Positive impacts of health and fitness gamification have been shown in numerous research, including those examining its impact on promoting exercise, beneficial dietary habits, and the desire to keep using the mental wellbeing system (Hamari & Koivisto, 2015a). Therefore, gamification has been thought of as a motivational means to increase customer engagement. To succeed, gamification should emotionally engage and encourage individuals to attain their goals. Game elements included in gamification, such as badges, points, rankings, levels, and other trophies, are considered external incentive mechanisms. They are meant to stimulate the user's behaviour by providing positive reinforcement (Dhahaka & Huseynov, 2020).

According to Brodie et al. (2011) and Whittaker et al. (2021), customer engagement is described as a psychological condition that happens when a customer has interactive and co-creative experiences with a main agent or object (like a gamified technology) in a main service relationship. Furthermore, according to O'Brien et al. (2018), it is a state that occurs when customers are intensely interested in a specific task or conveyed content. It also encompasses a state of mind or conduct in which individuals are determined to engage with communities, brands, goods and services, or organisations both online and offline (Oh & Kang, 2021; Dessart, et al., 2015).

Accordingly, Mulcahy et al. (2018) and Whittaker et al. (2021) have quantified CE as a multidimensional construct with contextual-specific manifestations of significant cognitive, behavioral, and emotional dimensions. Cognitive engagement concentrates attention or immersion in the gamified item (Suh, et al., 2018). Behavioral engagement happens when a user exerts energy, time, and effort during an encounter, such as with a gamified item (Hollebeek, et al., 2014). Finally, emotional engagement is characterised by positive and pleasurable sentiments when interacting with a gamified object (Whittaker, et al., 2021; Berger, et al., 2018).

Based on self-determination theory (SDT), one of the most popular human motivation's theories, an action may be either extrinsically or intrinsically driven (Deci & Ryan, 1985). From the point of view of system type dichotomy, it would be hard to classify gamification as either utilitarian or hedonic, since there are reasons to think that gamification offers both utilitarian benefits, like increased productivity, and hedonic benefits, like fun (Hamari & Koivisto, 2015). Moreover, utilitarian systems are often assumed to be extrinsically motivated, according to the notion of human motives (Van der Heijden, 2004). The user is extrinsically motivated because one is trying to achieve some objective that is not intrinsic to the service.

On the other hand, hedonic services aim to bring pleasure to the user by improving the system's entertainment value. That is to

say, the goal of a hedonic system is to make the activity enjoyable in and of itself, so that the user will want to engage with the system merely for its own purpose. Thus, despite the service's possible pragmatic benefits, users are more likely to stick with it if they love it (Van der Heijden, 2004). Hedonic systems, including games and game-like systems, are designed to make people happy by giving them a sense of control, mastery, and connection to the activity they are participating in (Ryan, et al., 2006). These instances raise the possibility that a given task is or will be performed with intrinsic motivation (Deci & Ryan, 1985). Accordingly, Deterding et al. (2013) confirmed that the goal of gamification is to create more game-like and pleasant user experiences to drive the user to act in the desired manner.

By utilising the motivating elements of these games, gamification system aims to boost user engagement (Zichermann & Cunningham, 2011). Gamification's fundamental design tenet is to merge the utilitarian objectives of a non-game environment with the hedonic motivating elements of games. Adding a gameful design to a context that is not a game results in the formation of a new, highly engaging game-like structure (Bical & Ispir, 2021). Therefore, Zichermann & Cunningham (2011) and Hamari et al. (2016) concluded that the primary goals of gamification are to attain utilitarian goals enabled by gameful behaviours to experience a state of sustained attention or flow, and to promote user engagement. Moreover, customers are

anticipated to become more engaged and devoted to the brand or business when gamification features help them achieve their goals in a gaming context (Hofacker, et al., 2016), which allows them to change their behaviour towards a particular activity (Bical & Ispir, 2021). Thus, gamification can be viewed as a hedonic means of increasing productivity (Hamari & Koivisto, 2015a). As a result, gamification could intrinsically motivate individuals and make non-gaming activities such as monotonous and exhausting daily routines (such as taking medication daily) more fun and engaging (Spil, et al., 2017).

Gamification's use in healthcare settings has the potential to reduce healthcare expenditures, increase client engagement, and boost health outcomes through superior disease management. Most research into gamification focuses on online or mobile apps, even in healthcare settings. These days, it's simple and cheap to get your hands on a variety of wearable gadgets, notably the latest crop of activity trackers. Many of them also offer an application program interface (API) that may be used by third-party developers to create additional applications. Moreover, they can be used for more than just collecting individual data because of the addition of social features and interactions (Zhao, et al., 2016). The majority of the contemporary SWDs are built with gamified components to increase users' enjoyment of athletics and self-regulation (Tsai, et al., 2022; Burbach, et al., 2019). The effects of gamification on the wearables sector, as well as the

specifics of how to incorporate gamification and wearables, are mostly currently unknown (Spil, et al., 2017). In this study, the researcher investigates the factors that may drive gamification and customer engagement to impact the continued use of smart wearable devices (SWDs) for consumers' health and wellness.

2.2 Hedonic and utilitarian motivations and Customer Engagement (CE)

Regarding the hedonic features of games and the functional aspects of gamification, this research shows that besides the hedonic (achievement, competition, enjoyment, and social interaction) and utilitarian (goals, feedback, perceived ease of use, and perceived usefulness) motivations (Bical & Ispir, 2021), two new variables—healthology and the bandwagon effect—are important for CE and the continued use and exercise of SWDs. Past research has suggested that wearable technology can motivate people to engage in physical activity (Kari, et al., 2016; Ahtinen, et al., 2008). Moreover, Kari and Makkonen (2014) have demonstrated that there are many distinct motivations for using various sports and wellness technologies and that these motivations can be both hedonistic and utilitarian. Thus, the factors that boost motivation can vary depending on the sports technology employed.

In the context of information technology use, the term "hedonic motivation" was first presented as part of the UTAUT2 paradigm. It is generally related to taking pleasure in using a particular technology (Sułkowski & Kaczorowska-Spychalska, 2021;

Dehghani, et al., 2018; Venkatesh, et al., 2012). In the current context, the hedonic motivation of smartwatches describes the extent to which the consumers regard the smartwatches to be a pleasure to wear and provide recreational amenities. Indeed, hedonic motivation has been shown to have a significant impact on IT usage in several studies relevant to TAM (Venkatesh, et al., 2012). This aspect has also been studied and proven to be a major determinant of user acceptance in the context of smartphone and wearable technologies (Kim, 2017; Yang, et al., 2016). In addition to their functional use, smartwatches can be used for fun by their owners (Pal, et al., 2020; Dehghani, et al., 2018).

2.2.1 Hedonic motivation sources

Competition

In gamification theory, the element that is most frequently emphasised is competition (Tsai, et al., 2022). Competition can be described as the initiation of a challenge to complete a specific task (Bical & Ispir, 2021). Gamified SWDs' group challenges encourage people to compete against one another and strive toward a mutual goal. Competition motivates individuals to compete and build mastery over one another to achieve the best rank in an exercise, encouraging them to improve their performance (Tsai, et al., 2021; Chen , 2019). According to research, games stimulate competitiveness, which motivates players to keep utilizing the necessary mechanisms (Mulcahy, et al., 2018).

Gamification typically includes leaderboards and rankings to entice users to compete with one another. The leaderboard is a game feature that is crucial in promoting competition by presenting the results and recognising winners (Tsai, et al., 2022; Du, et al., 2020). It enables everyone to view the summary of their own activities as well as those of others (Suh, et al., 2015). Participants see the increased interaction and interchange with others as they compete against one another, making activities more pleasurable and fun and increasing the activity's participation rate (Tsai, et al., 2022; Chen, 2019; Venkatesh, et al., 2012). Although the findings of earlier empirical research (Leclercq, et al., 2018) show that competition in gamification has no significant effect on CE, competition in gaming culture is thought to be an important motivator for playing a game in the first place (Bical & Ispir, 2021). Therefore, the researcher puts forth the following hypothesis:

H1: Competition significantly impacts customer engagement with SWDs.

Achievement

Games typically consist of complex symbol systems that track the accomplishments and development of their users. These programmes keep track of players' progress while enticing them to keep playing the game. To maintain a superior level of player engagement throughout the gaming experience, the success structures in games guarantee rewards for completing objectives

that range from simple to challenging (Bical & Ispir, 2021; Wang, et al., 2021). Points, badges, and leaderboards are common achievement-oriented gamification components (Wang, et al., 2021; Koivisto & Hamari, 2019). Users are rewarded with points or badges whenever they achieve a task or objective.

Because of the sense of accomplishment and subsequent feedback, rewards encourage consumers to immerse themselves in an activity more and more (Nelson, et al., 2019; Deterding, et al., 2011). Users find a specific activity more enticing and experience more hedonic value when participating in it with rewards (Hamari & Koivisto, 2015a). Designs that incorporate rewards offer incentives based on the activity's or objective's challenges. As a result, users must employ the SWDs more regularly and devote more time to the work at hand to fulfil more challenging activities or goals (Chen, et al., 2014). Thus, users interact with SWDs more often, increasing the likelihood that they will succeed in attaining their goals. They subsequently have a stronger belief that SWDs can assist them in achieving a particular purpose and, therefore, feel more satisfied as an outcome of utilitarian value (Tsai, et al., 2022; Adapa, et al., 2018). In their study, (Bical & Ispir, 2021) confirmed the positive effect of achievement on CE. These justifications led us to suggest the following hypothesis.

H2: Achievement significantly impacts customer engagement with SWDs.

Social Interaction

In previous research, social interaction has been a crucial determinant of customer engagement. (Lu & Ho, 2020; Hamari & Koivisto, 2015; Hamari & Koivisto, 2015a; Sailer, et al., 2017)**.** It demonstrated that people have an innate desire for social connection and approval from those closest to them. This social demand may be met via the service's internal social interaction. One effect of social contact is the induction of a feeling of recognition. The psychological immersion of a player can be enhanced via social interactions including coordination, communication, and cooperation. One of the benefits of participating in an online community is the possibility of being acknowledged for one's contributions by other members. As a result, if the service makes the user feel appreciated by others, their attitude toward it may improve. Högberg et al. (2019) stated that just being around other people was enough to make social experiences happen, like feeling accountable when others see if a goal is reached or not. When runners update friends on their running progress, they progressively encourage others to adopt a healthy lifestyle while increasing their personal running mileage and frequency.

Therefore, gamification creates new marketing strategies that encourage users to connect and share with peers to raise brand awareness among the public (Yang, et al., 2017; Huotari & Hamari, 2017). Users employ social networking features to communicate with friends and collaborate on projects. In other words, the more

users of a brand app get to know one another, the more their friends will encourage them and the more engrossed they will be in the game. Players wish to interact with their peers to brag about what they have done and be recognized for it. Interacting with others, leads to the construction of memories through shared experience, which in turn encourages enthusiastic engagement and steadfast dedication (Bical & Ispir, 2021). Socializing boosts CE and the desire to keep going with an activity, as reported by Li et al. (2015) and Eisingerich et al. (2019). In the context of gamification, offering users the chance to interact with other people might improve engagement. Bical and Ispir (2021) confirmed in their study that social interaction influence CE positively. Accordingly, the following hypothesis is presented.

H3: Social interaction significantly impacts customer engagement with SWDs.

Enjoyment

Perceived enjoyment experiences are frequently used in technology usage research to explain hedonistic customer experiences. Games are characterized as mechanisms for pure entertainment in which players are expected to have a pleasurable experience. In contrast, perceived enjoyment is associated with how playful users think a system will operate on its own without obtaining any extrinsic reward when using it (Bical & Ispir, 2021). Siepmann and Kowalczuk (2021) defined enjoyment as the extent to which using a smartwatch is thought to be

pleasurable in and of itself. By using experiential-based apps like music streaming and video games, smartwatch users are driven by the app's hedonic benefits, like amusement and leisure, rather than by outcomes such as achievements and rewards (Krey, et al., 2019). Ryan et al. (2006) emphasized that enjoyment is an intrinsic motivation that emerges when the activity being carried out meets all three of a person's fundamental psychological needs: autonomy, relatedness, and competence.

Previous smartwatch research has shown that people who find using a smartwatch enjoyable have a more favourable attitude toward it (Krey, et al., 2019; Choi & Kim, 2016). They are also more likely to be satisfied with their purchase and continue using it (Siepmann & Kowalczuk, 2021; Pal, et al., 2020). Prior research also revealed how important it is to enjoy AI wearable devices, especially for women, who show more care about solutions based on new technologies than men do (Sułkowski & Kaczorowska-Spychalska, 2021).

Furthermore, studies on gamification engagement have discovered similar positive associations between enjoyment, customer engagement, and attitude toward relevant material (Bical & Ispir, 2021; Koivisto & Hamari, 2019). Bical and Ispir (2021), Du et al. (2020) supported the claims that pleasurable experience promotes CE, and that people will keep using gamified IS if they feel increased enjoyment from interacting

with the systems. Accordingly, the following hypothesis will be proposed:

H4: Enjoyment significantly impacts customer engagement with SWDs.

2.2.2 Utilitarian motivation sources

Perceived usefulness (PU)

Regarding the technology adoption theories, perceived usefulness (PU) represents a primary antecedent for the commonly used Technology Acceptance Model (TAM). Furthermore, the users' perception of a system's usefulness indicates the degree to which they anticipate that adopting it would boost their productivity (Davis F. D., 1989). From a motivational standpoint, it serves as a gauge of users' extrinsic motivation and performance expectations (Pal, et al., 2020). Therefore, attitudes toward the adoption and usage of a technology, system, product, or service are directly affected by their perceived usefulness, and these attitudes, in turn, influence people's actions (Song, et al., 2018; Davis, 1989).

Considering smartwatches, perceived usefulness could be measured by how well users think they can be used as a supplement to their daily lives and make them more efficient by helping them be more productive and organized (Krey, et al., 2019; Dehghani, 2018; Chuah, et al., 2016). Therefore, PU is a crucial element in assessing use intentions, particularly in utilitarian frameworks and has been studied extensively by IS researchers (Bical & Ispir, 2021; Aparicio,

et al., 2021; Davis, 1989). Furthermore, users will be more satisfied and likely to keep using smartwatches if they perceive more value in them. Nonetheless, Van der Heijden (2004) discovered that PU plays a less important role in determining usage intentions in hedonistic systems.

However, as gamified systems contain a utilitarian dimension in addition to the hedonic design, the usefulness of the system is assumed to be even more critical (Hamari & Koivisto, 2015a). The IS continuity paradigm bases perceived usefulness on the user's sustained technology experience. When users think that smartwatch devices are beneficial and that the completion of tasks like handling emails and phone calls increases their productivity, it is anticipated that this will have a favorable effect on their level of satisfaction. Past research has demonstrated that after the acceptance of new technology, individuals are more concerned with the system's efficiency to increase their productivity (Ogbanufe & Gerhart, 2017). In turn, Siepmann and Kowalczuk (2021) and Pal, et al. (2020) confirmed that perceived usefulness has a substantial positive effect on both satisfaction and the intention to continue using the smart wearable device. Moreover, previous research findings showed that PU significantly impacts customer engagement (Bical & Ispir, 2021; Fang, 2017). This leads us to put forth the following hypothesis:

H5: PU significantly impact customer engagement with SWDs.

Perceived ease of use (PEU)

Perceived ease of use (PEU) has been extensively discussed in the literature on technology acceptance as one of the key drivers of technology adoption. A product's perceived ease of use (PEU), such as a smartwatch, is based on the users' perceptions of how simple and intuitive the product operates. The sophistication and user-friendliness of the interface and the users' perceptions of their level of competence all impact PEU (Choi & Kim, 2016). If gamification is seen as user-friendly, it may foster feelings of efficiency and a barrier-free system experience. These promote a more favorable attitude and a greater propensity to continue utilizing the service (Krey, et al., 2019). Furthermore, utilitarian information systems have also been shown to benefit from a focus on user friendliness, as this enhances the effectiveness of human-computer interactions and, in turn, the quantity and quality of the system's utilitarian output (Hamari & Koivisto, 2015a). Since the term "gamification" is used to describe the employment of game-like features in non-game contexts, it makes sense that gamification encourages hedonistic activities. Studies on hedonic use have revealed that ease of use has a positive effect on attitudes (Hamari & Koivisto, 2015a), and long-term use intentions (Van der Heijden, 2004). Moreover, prior research demonstrated that PEU has a favorable impact on customer engagement (Bical & Ispir, 2021; Krey, et al., 2019;

Fang, 2017). Accordingly, the researcher presents the following hypothesis:

H6: PEU significantly impacts customer engagement with SWDs.

Goal setting and feedback

Identifying and pursuing desired end states is known as goal setting (Locke & Latham, 2002). Everyone sets goals, consciously or unconsciously, although conscious goal setting may be most beneficial for self-development. One of the fundamental advantages of gamification and motivating design is guiding consumers through this process, possibly through a gameful experience (Huotari & Hamari, 2017). The extent to which regularly used gamification aspects, such as leaderboards and rewards encourage goal setting, has been examined through research (Hassan, et al., 2020). Rewarding consumers with a sense of accomplishment and subsequent feedback inspires them to become further engrossed in an activity (Tsai, et al., 2022; Nelson, et al., 2019; Deterding, et al., 2011).

Since goals are good at inspiring and directing consumers' actions and confirming continuity, Bical and Ispir (2021) think setting goals increases consumer engagement. From their point of view, the reason for setting a goal is that users will interact more with the gamification app if they exert effort to reach their objective. Thus, it is reasonable to conclude that people employ gamification to realize their instrumental (utilitarian) goals (Bical & Ispir, 2021).

Achievable goals, as proposed by the Goal Setting Theory (GST), require a commitment to the goal, feedback on progress, and challenges presented by the work at hand. These elements are present in games and gamefic constructs (Bical & Ispir, 2021).

Users establish a benchmark against which they may evaluate their performance by setting goals. Individuals may alter their conduct based on the congruence (or incongruence) between their intentions and actions. At this point, a feedback system is a metric used to compare individuals' performances and goals (Locke & Latham, 2002). In addition to their primary functions, most gamification mechanics have an additional role as a feedback mechanism. Indicators such as badges and leaderboards let users know how they are doing compared to others, while features like progress bars update them in real-time on the status of their actions. Users are motivated to interact with content when given information on how well they have accomplished their goals and what they can do to improve (Huang, et al., 2018; Huotari & Hamari, 2017).

Consequently, consumers who want a healthier and more active lifestyle may examine their smartwatches for feedback based on clear and unbiased data. Siepmann and Kowalczuk (2021) hypothesized that people who are highly motivated to pursue health and fitness goals would work harder to achieve them by exercising consistently and living a healthy lifestyle to satisfy their desire for competence. Therefore, they regard the smartwatch as a valuable device that assists them in reaching

their goals by offering feedback. Accordingly, the following hypotheses are proposed:

H7: Goal setting significantly impacts consumer engagement with SWDs.

H8: Feedback significantly impacts consumer engagement with SWDs.

Bandwagon effect

Based on the network externalities theory, the value of the network, or network effects, arises when the advantages of utilising a service or product are highly dependent on the presence of all other consumers who adopt it (Wu, et al., 2017). Since network externalities strengthen common standards and lead to the establishment of a shared group culture, sports-based SWDs include social media features (Chen, et al., 2017). Therefore, the importance of social media in getting more people to use SWDs cannot be ignored (Tsai, et al., 2022).

The term "bandwagon effect" is commonly used to describe the positive outcomes experienced by individuals when they follow the lead of their peers (Rohlfs, 2003). Tsai et al. (2022), in contrast to most previous studies Hsu (2016), Zhou et al. (2015), and Gao & Bai (2014), demonstrated that the bandwagon effect is not substantial, implying that consumers' sustained use of SWDs is unaffected by others. They confirmed that customers care more about their own unique preferences and the impression

they give off when using the devices than they do about the actions of others.

Thus, consumer demand is boosted as people in the broader public mimic one another's spending habits (Niknejad, et al., 2020). More and more people will be helped by SWDs as their use spreads across the social media community. Imitative behaviour is common because it helps individuals save time and money by reducing the need for searching or the amount of uncertainty involved in making decisions. This means that social proof of using SWDs increases the likelihood that an individual will adopt a product or service if it is used by a friend (Wu, et al., 2017). Increases in both the number of users and the switching cost are seen because of an increase in the latter. Thus, joining the bandwagon has the effect of encouraging people to keep using SWDs, and accordingly, the following hypothesis is presented.

H9: The bandwagon effect significantly impacts customer engagement with SWDs.

Healthology (HT)

Dehghani et al. (2018) described health motivation as the level of integration of an individual's health into everyday activities. It is a measure of how seriously people take their health and how actively they pursue improving it (Dehghani, 2018). According to Sweeney et al. (2015) and Lin & Windasari (2019), it has been stated that inspiring customers to actively participate in maintaining their health has a favorable effect on their health and wellbeing.

More physically active people are the ones most likely to benefit from using fitness trackers since they find them inspiring (A.Rupp, et al., 2018). People who prioritize health and wellness are more likely to take preventative measures (such as maintaining a regular exercise routine and eating a balanced diet) than those who are less health focused (Dehghani, et al., 2018). Although research revealed that interest in health and fitness raises adoption intentions for wearable fitness trackers (Lee & Lee, 2018), few academic studies have examined how factors related to health and fitness influence the continuation intent of smartwatches (Siepmann & Kowalczuk, 2021).

Moreover, when it comes to mobile devices, lifestyle enhancements might be prompted by apps that users can download. By offering extremely precise health-related indicators, wearable tech solutions empower consumers to take a more proactive part in tracking their health and fitness (Canhoto & Arp, 2017). Consequently, Dehghani (2018) claimed that smart wearable gadgets offer a new approach to assess both technology and health. Therefore, the concept of "healthology" is described as a combination of health issues, technology, and informatics that seeks to provide novel approaches to meeting individuals' specific healthcare needs (Dehghani, 2018; Dehghani, et al., 2018). Customers concerned with their health and wellness may utilise smartwatches for self-quantification thanks to the devices' built-in tracking capabilities (Siepmann &

Kowalczuk, 2021). Applications such as those that encourage users to exercise by gathering data from their smartwatches, as well as those that track calories burned and heart rate, are just a few instances of how smartwatches can be viewed by their actual users as a healthiness watch monitoring technique (Dehghani, et al., 2018). Given these concerns, we postulate the following:

H10. Healthology significantly impacts customer engagement with SWDs.

2.3 Customer engagement (CE) and the continued use of SWDs

One important determinant in many fields is the extent to which people accept and use information technology and related products (Kang, et al., 2015). Individuals' post-adoption behaviours, such as their intentions to keep using the technology and how they end up using it, have received increased focus and a wider range of theoretical perspectives (Song, et al., 2018). Kang et al. (2015) found that motivating aspects in university students' usage of athletic mobile apps, such as fanaticism, easiness, and information, impact their long-term intentions to continue using them. Therefore, the potential for continuation intention to support sustainable market expansion and the long-term survival of a product or service makes it a crucial behavioral result in consumer research (Song, et al., 2018). Hepola et al. (2020) confirmed that continuation intention is a distinct form of behavioral intention.

Consequently, (Hong, et al., 2013) defined the continued use intention as the user's desire to constantly utilize the immediate product or service presently being used. Moreover, Santos-Vijande et al. (2022), and Venkatesh et al. (2012) claimed that the unified theory of acceptance and use of technology (UTAUT/UTAUT2) is one of the many frequently used models that attempt to explain a consumer's intent to embrace wearable technologies. Even further, Van der Heijden (2004) and Hepola et al. (2020) compared how user perceptions of a system's usability and utility influence their intent to utilize it. Pal et al. (2020) claimed that the more advantages customers receive, the happier they will be and the more likely it is that they will continue to use smartwatches.

According to motivation theory, people's behavior is driven by both internal (hedonic) and external (utilitarian) factors (Hepola, et al., 2020). Research has shown that consumers' psychological outcomes, including engagement, are facilitated by motivational affordances, leading to behavioural consequences (Bitrian, et al., 2021; Koivisto & Hamari, 2019). Kim & Baek (2018) revealed that consumers intensely engaged with a mobile app are more likely to form meaningful bonds with it and view it as an integral part of their identity. Furthermore, Suzianti et al. (2019) and Tarute et al. (2017) confirmed that user engagement is significantly tied to smartphone app usage intent. It has also been discovered that engagement is a good predictor of whether a customer will stay involved with a brand's community and more

likely to recommend it to people who weren't already involved (Wu, et al., 2018).

Moreover, Hepola et al. (2020) emphasized that each domain of CE should, in theory, increase the likelihood that a customer will stick with a service once they've started using it. CE's cognitive and emotional aspects are related to enjoyable experiences that users have on their own when utilising a service or a product (Hollebeek & Chen, 2014). The cognitive domain is concerned with enjoyable distraction, whereas the emotional aspect is associated with a highly pleasant affect and the sentiments that are triggered by the encounter, (Dwivedi, 2015; Hollebeek & Chen, 2014). Therefore, it is anticipated that these psychological aspects of engagement will boost a consumer's propensity to keep using a certain service. People who use mobile apps frequently are more likely to form meaningful attachments to the brands and see themselves reflected in the apps' designs (Kim & Baek, 2018). According to previous research, engaged users are more likely to keep using mobile apps. (Suzianti, et al., 2019; Tarute, et al., 2017; Bitrian, et al., 2021).

The behavioural dimension of CE is also anticipated to be significantly associated with continuance intention because consumers want to behave constantly, implying that a consumer's preferences ought to be in line with their past behaviour and that an increased degree of activation may result in routine behaviour. Thus, shoppers will rely on habit rather than deliberate over every purchase (Hepola, et al., 2020). Lin & Windasari (2019) explained that

individuals started integrating the watch into everyday activities because of high engagement. As a result, they began to develop better habits that they had not previously had before wearing the smartwatch. Moreover, Bitrian et al. (2021) confirmed that the amount of time a user spends with the app affects how likely they are to keep using it. In addition, Fang (2017), Dwivedi (2015) and Hollebeek et al. (2014) have discovered an association between CE and behavioural intentions. Consequently, the researcher forms the following hypothesis:

H11: Customer engagement significantly impacts the continued use of SWDs.

Accordingly, the conceptual model is illustrated in figure 1:

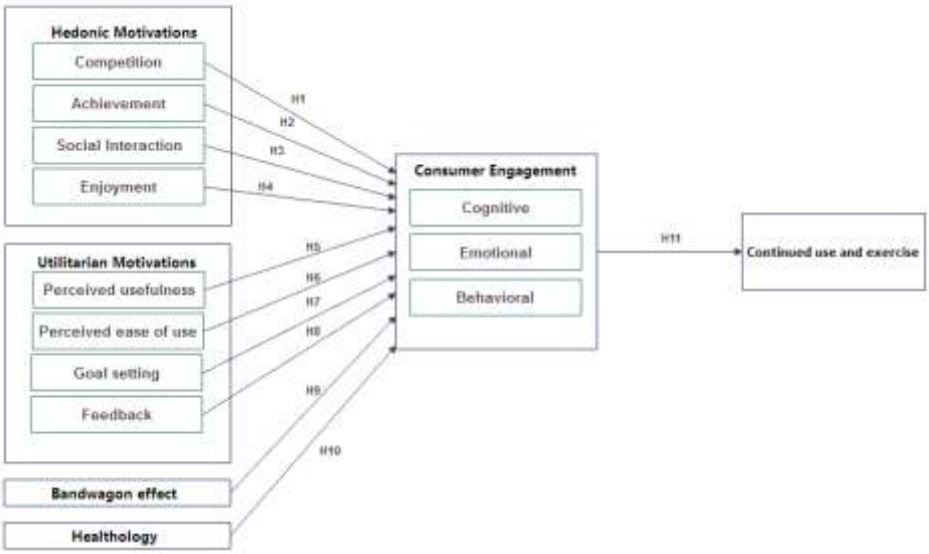


Figure 1: Research Conceptual Model

3. Research Methodology

3.1 Data Collection & sample design:

The research's main objective is to investigate the aspects of fostering customer engagement in gamification and the continued use of SWDs to improve their health and wellness. In this context, two models were developed. The first model treated each construct variable "indicator" as a main latent variable "construct" to capture the separate effects of each of these variables on consumer engagement using smartwatches. In this case, hedonic motivation is divided into four constructs: competition, achievement, social interaction, and enjoyment, while utilitarian motivation is further subdivided into four distinct constructs: perceived usefulness, perceived ease of use, goal setting, and feedback. Finally, another special construct investigated in our model is healthology and the bandwagon effect. Thus, the first model examined the effect of ten constructs on consumer engagement.

However, it was critical to test the effect of hedonistic and utilitarian motivations, as well as healthology and the bandwagon effect, as four separate constructs on customer engagement from cognitive, emotional, and behavioural dimensions to capture a more precise and more accurate picture of which dimension of engagement affects the consumer's continued use and exercise of smartwatches. In this second model, the researcher examined four constructs in each dimension of consumer engagement.

As a sampling technique, this study used the non-probabilistic convenience sampling method as proposed in several previous empirical studies in this area (Bical & Ispir, 2021; Tsai et al., 2022; Krey et al., 2019). The study determined that not everyone who wears a smartwatch has the same chance of being selected. The researcher, therefore, targeted those who are easily accessible and inexpensive. Data collection was done through Google Forms, allowing the researcher to collect the required information online and quickly. This means that people interested in participating in the study only need internet access to do so. (Celik, 2008). The questionnaire's URL was shared using various social media platforms like Facebook, LinkedIn, and WhatsApp. The tools were utilized to ensure that the link was as representative as possible.

In 1967, Nunnally noted that the appropriate sample for structural equation analysis should be ten times bigger than the researchers' variable count. Others pointed out that the two hundred questionnaires valid for the study should suffice if the variables change significantly. (Rahbar & Wahid, 2011). Similarly, other researchers, such as Hair et al. (2010), suggested that a sample size above one hundred is appropriate and that above two hundred valid questionnaires are highly adequate for reliable and credible statistical analysis. The primary basic model in this study consists of ten constructs. Thus, a sample size of 234 valid and reliable questionnaires is highly adequate to

employ the SEM model using SmartPls4. Table 1 shows an overview of the demographics of the respondents.

Table 1: Respondent's profile

Demographic Variables and category		Frequency	Percentage
Gender	Male	84	39.3%
	Female	130	60.7%
Age	16-29	100	46.7%
	30-39	72	33.6%
	40-49	21	9.8%
	50-59	15	7%
	Over 60	6	2.8%
Employ Status	Employed in public sector	44	20.6%
	Employed in private sector	100	46.7%
	Self-employed	11	5.1%
	Unemployed	20	9.3%
	Student	39	18.2%
Education	High school	6	2.8%
	University	61	28.5%
	Bachelor's, Master's (or equivalent)	147	68.7%
Income	Under 3.000	40	18.7%
	3.001-5.000	41	19.2%
	5.001-10.000	63	29.4%
	10.001-20.000	26	12.1%
	Over 20.000	44	20.6%
Smart Watch used	Apple	102	47.7%
	Samsung	36	16.8%
	Fitbit	10	4.7%
	Huawei	40	18.7%
	Garmin	8	3.7%
	Others	54	25.2%
Length of time the device was used	Under 6 months	79	36.9%
	6-12 months	39	18.2%
	Over 1 year	96	44.9%
Experience with wearable devices	Slightly experienced	69	32.2%
	Moderately experienced	88	41.1%
	Experienced	57	26.6%
Frequency of using smartwatch for health and exercising	Regularly	126	58.9%
	Not regularly	88	41.1%

Table 1 shows that 61% of the study participants were women, that most of the respondents were between the ages of

16 and 29, and that 97.5% of the respondents had a bachelor's degree or higher. Also, 46.7% of the people who filled out the survey work in the private sector. Based on the profiles of the respondents, it seems that most people who use smartwatches are around twenty years old and work in the private sector.

3.2 Instrument Measures:

The researcher used a variety of scales adopted from prior research to measure the aspects of the four primary constructs, as shown in Table 2. The researcher conducted a pilot study of forty respondents to examine the measures' validity and reliability to ensure that the questions were easy to understand. The researcher also used the respondents' feedback to modify the survey. Some questions were removed because they were confusing, others were shortened, and some were labelled repetition. All measurement items were designed on a five-point Likert scale, where one indicates "strongly disagree" and five indicates "strongly agree."

Hedonic Motivation was divided into four sub–constructs, where competition, achievements, and enjoyment were measured using three items for each of them adapted from Tsai et al. (2022) and Li et al. (2015), while social interaction was measured using four items adapted from Chang (2013). Similarly, Utilitarian motivation was also divided into four sub – constructs, where perceived usefulness measured using five items adapted from Bhattacherjee & Lin (2015) and Davis (1989), perceived ease of use was measured using four items adapted from Park et al. (2014). Moreover, both goal setting

and feedback were measured using five and four items adapted from Roberts et al. (1998) and Bical & Ispir (2021); Tuckey et al. (2002). Moreover, Healthology and Bandwagon effect were measured using two and three items adopted from Dehghani et al. (2018) and Tsai et al. (2022), respectively. Consumer engagement was measured using three, four, and two item scale measuring cognitive, emotional, and behavioral dimension of consumer engagement all adopted from Hollebeek et al. (2014). Finally, the continued intention to use was measured by 6 items adapted from Wang et al. (2021) and Pal et al. (2020). Table 2 shows the measurement variables and their sources.

Table 2: Measurement Instruments

	Latent Variables	Measurement Items	Sources
Hedonic motivations	**Competition**	CO1 "Numerous users can compete with me through the apps installed on the smartwatch."	(Tsai, et al., 2022)
		CO2 "The rankings shown on the apps installed on the smartwatch motivate me to work harder."	
		"CO3 I will use the apps installed on the smartwatch to compare my performance with that of others."	
	Achievement	"AC1: I use smartwatch to achieve a higher level in leaderboard."	(Li, et al., 2015)
		"AC2: I use smartwatch to have more points and badges than others."	
		"AC3: I use smartwatch to have points and badges which give me a higher status than other users of the application."	
	Social Interaction	"SI1: Using smartwatch gives me possibility to make friends."	(Chang, 2013)
		"SI2: Meeting the friends I made while using smartwatch is enjoyable."	
		SI3: Using smartwatch facilitate communicating with others	
		"SI4: Cooperating with others using smartwatch makes exercise more enjoyable."	
	Enjoyment	ENJ1 I'm interested in using the smartwatch	(Li, et al., 2015)
		ENJ2 I enjoy using the smartwatch	
		ENJ3The actual process of using the smartwatch is exciting	

Utilitarian motivations	**Perceived usefulness**	"PU1 Using smartwatch enables me to accomplish tasks more quickly."	(Bhattacherjee & Lin, 2015; Davis, 1989)
		"PU2 Using smartwatch improves my daily exercise's efficiency."	
		"PU3 Using smartwatch increases my productivity in exercising"	
		"PU4 Using smartwatch enhances my effectiveness in exercising"	
		"PU5 Overall, I find smartwatch useful for exercising"	
	Perceived ease of use	"PEU1: Using smartwatch's features do not require a lot of mental effort."	(Park, et al. 2014)
		"PEU2: My interaction with a smartwatch is clear and understandable."	
		"PEU3: I find it easy to access and use my smartwatch when and where I want."	
		PEU4" Overall, I find my smartwatch easy to use."	
	Goal Setting	"GS1: I reach my personal goals with my smartwatch."	(Roberts, et al., 1998)
		"GS2: I show clear personal improvement with my smartwatch."	
		"GS3: I perform to the best of my ability with my smartwatch."	
		"GS4: I overcome difficulties with my smartwatch."	
		"GS5: I master something I could not do before with my smartwatch."	
	Feedback	FB1: "The smartwatch gives me enough feedback about my actual performance compared to training goals."	Tuckey et al., 2002; Bical & Ispir, 2021
		FB2: "The smartwatch lets me know how well I am doing in terms of achieving my training goals."	
		FB3: "The feedback I received from my smartwatch helps me to improve my exercising skills."	
		FB4: "Obtaining useful feedback information via the smartwatch is very important to me."	
	Healthology	H1 "My smartwatch motivates me to exercise."	(Dehghani, 2018)
		H2 "I have better control over my daily calorie intake with my smartwatch."	
	Bandwagon Effect	B1 "I will use the smartwatch because it's popular."	(Tsai, et al., 2022)
		B2 "I use the smartwatch because it's a technological trend."	
		B3 "I choose to use the smartwatch because lots of people around me are already using it."	
Consumer Engagement	**Consumer Engagement (Cognitive)**	"CE-CG1: When I use my smartwatch I often think about its features. "	(Hollebeek & Chen, 2014)
		"CE-CG2: Using my smartwatch arouses my curiosity about its features."	
		"CE-CG3: Using my smartwatch stimulates my interest to learn more about it."	
	Consumer Engagement (Emotional)	"CE-EM1: I feel very positive when I use my smartwatch."	(Hollebeek & Chen, 2014)
		"CE-EM2: Using my smartwatch makes me happy."	
		"CE-EM3: I'm proud to use my smartwatch."	
		"CE-EM4: Overall, I feel good when I use my smartwatch."	

	Consumer Engagement (Behavioral)	"CE-BE1: I spend a lot of time using the smartwatch, compared to other fitness applications."	(Hollebeek & Chen, 2014)
		"CE-BE2: Whenever I'm using a fitness application, I usually use the smartwatch."	
	Continuance intentions for use and exercise	CIU1 "I intend to continue using my smartwatch rather than discontinue its use."	(Pal, et al., 2020; Wang, et al., 2021)
		CIU2 "I intend to continue the current frequency of exercising using my smartwatch."	
		CIU3 "I plan to increase the amount of exercise using the smartwatch rather than to decrease it."	
		CIU4 My intentions are to continue using the smartwatch to manage my health information rather than any alternative means	
		CIU5 "Overall, I plan to continue using the smartwatch more frequently."	
		CIU6 "I will recommend other people to use smartwatches on a daily basis."	

4. Results

4.1 Measurement Model Assessment

The study utilized the partial least squares method for the analysis of the structural equation modeling. It was performed using the SmartPLS4 software package. The two-step approach was then used to evaluate the validation of the model and the measurement. (Hair et al.,2012). The PLS-SEM method is a two-step process that involves validating the measurement model and then assessing the structural model. It is very different from other methods such as AMOs and LISREL. This tool It can be used with a small sample size to produce reliable and valid results. In addition, it can be utilized in the PLS-SEM software package to treat other formative and reflective indicators. (Hair et al. 2014) This eliminates the risk of errors and multi-linearity when dealing with latent factors (Fornell & Larcker, 1981).

4.1.1 Reliability and Validity of measurement instruments:

The study utilized the partial least squares method to analyze structural equation modelling. It was performed using the SmartPLS4 software package. The two-step approach was then used to evaluate the validation of the model and the measurement. (Hair et al.,2012). The PLS-SEM method is a two-step process that involves validating the measurement model and assessing the structural model. It is quite different from other methods, such as AMOs and LISREL. This tool can be used with a small sample size to produce reliable and valid results. In addition, it can be utilized in the PLS-SEM software package to treat other formative and reflective indicators (Hair et al. 2014). This eliminates the risk of errors and multi-linearity when dealing with latent factors (Fornell & Larcker, 1981).

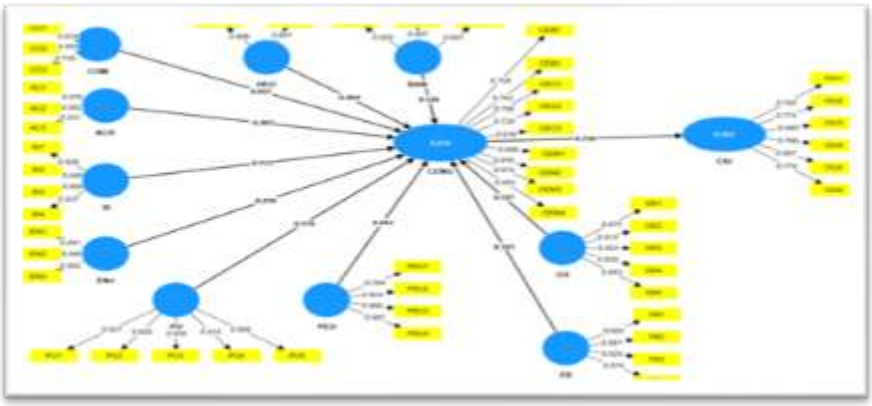
Table 3: Reliability and Validity Measures

Constructs	Indicator	Factor Loadings	AVE	CR	Cronbach's Alpha
Competition	CO1	0.814	0.644	0.750	0.726
	CO2	0.859			
	CO3	0.730			
Achievements	AC1	0.876	0.810	0.844	0.884
	AC2	0.826			
	AC3	0.931			
Social Interactions	SI1	0.826	0.686	0.897	0.850
	SI2	0.840			
	SI3	0.809			
	SI4	0.837			
Enjoyment	ENJ1	0.941	0.916	0.948	0.918
	ENJ2	0.948			
	ENJ3	0.892			
Perceived Usefulness	PU1	0.827	0.805	0.954	0.939
	PU2	0.920			

	PU3	0.930			
	PU4	0.915			
	PU5	0.888			
Perceived Ease of Use	PEU1	0.784	0.760	0.926	0.839
	PEU2	0.924			
	PEU3	0.866			
	PEU4	0.907			
Goal Setting	GS1	0.875	0.770	0.944	0.925
	GS2	0.913			
	GS3	0.922			
	GS4	0.820			
	GS5	0.853			
Feedback	FB1	0.893	0.801	0.941	0.917
	FB2	0.891			
	FB3	0.920			
	FB4	0.874			
Healthology	H1	0.906	0.807	0.893	0.762
	H2	0.891			
Bandwagon Effect	B1	0.920	0.825	0.934	0.894
	B2	0.907			
	B3	0.897			

It can be seen in figure (2) that all the outer loadings, the composite reliability, and Cronbach's alpha are all higher than 0.7, and the AVE is higher than 0.5. These findings demonstrate the reliability of the variables and the consistency of the model.

Figure (2): PLS – SEM outer loadings for model 1



To test the validity of a model, we need to ensure that the measurement items of every variable are not correlated, which is referred to as "discriminant validity" (Hair et al., 2014). For this purpose, the Fornell-Larcker criterion and the Heterotrait-Monotrait ratio of correlation (HTMT) were used to measure the inner model's validity (Fornell & Larcker, 1981). If the value of the square roots of the elements in the matrix exceeds that of other values, then the discriminant validity of the model is confirmed (Hair et al. 2010). For example, table 4 shows that the square root of the AVE variable is greater than that of another latent variable, indicating that its discriminant validity is satisfactory.

Currently, the Heterotrait-Monotrait ratio of correlations (HTMT) is regarded as the most important criterion for evaluating discriminant validity. The HTMT test is a recently created methodology for the PLS–SEM method to evaluate model validity. This test is superior to both the Fornell-Larcker criteria and cross-loadings (Henseler et al. 2016; Hair et al. 2014). The HTMT ratio is generally acceptable if the confidence interval is below 1 (Henseler et al. 2016). All values in Table 5 are less than 0.85, confirming discriminant validity for all constructs and establishing the model's validity.

Table 4: Discriminant validity of the constructs (Fornell & Larcker criteria)

	ACH	BAN	CENG	CIU	ENJ	FB	GS	HEO	PEU	PU	SI	COM
ACH	0.900											
BAN	0.484	0.908										
C ENG	0.501	0.409	0.828									
CIU	0.458	0.272	0.750	0.809								
ENJ	0.451	0.346	0.802	0.789	0.927							
FB	0.427	0.207	0.829	0.703	0.727	0.895						
GS	0.575	0.360	0.798	0.659	0.707	0.779	0.877					
HEO	0.513	0.298	0.672	0.635	0.601	0.689	0.647	0.899				
PEU	0.309	0.245	0.722	0.672	0.731	0.714	0.674	0.544	0.872			
PU	0.536	0.316	0.832	0.727	0.786	0.803	0.772	0.736	0.691	0.897		
SI	0.674	0.442	0.639	0.468	0.501	0.535	0.659	0.551	0.456	0.635	0.828	
COM	0.726	0.437	0.644	0.615	0.581	0.562	0.632	0.609	0.515	0.661	0.659	

Table 5 : Discriminant Validity (Heterotrait-Monotrait Ratio (HTMT)

	ACH	BAN	CENG	CIU	ENJ	FB	GS	HEO	PEU	PU	SI	COM
ACH												
BAN	0.541											
CENG	0.540	0.554										
CIU	0.507	0.512	0.892									
ENJ	0.493	0.446	0.862	0.870								
FB	0.462	0.402	0.849	0.776	0.846							
GS	0.632	0.382	0.815	0.720	0.806	0.864						
HEO	0.619	0.365	0.791	0.769	0.717	0.821	0.768					
PEU	0.338	0.345	0.784	0.748	0.616	0.785	0.735	0.658				
PU	0.575	0.301	0.882	0.794	0.545	0.641	0.824	0.869	0.757			
SI	0.783	0.289	0.694	0.514	0.536	0.590	0.740	0.676	0.508	0.691		
COM	0.424	0.277	0.765	0.743	0.498	0.677	0.760	0.814	0.624	0.783	0.855	

4.2 Structural Model Assessment

After confirming the reliability and validity of the inner model (measurement model), the second stage is to evaluate the hypothesised linkages inside the structural model. Since PLS–SEM lacks a single goodness of fit test, three tests were suggested by Hair et al. (2014) to evaluate the structural model's goodness of fit. These include the variance inflation factor (VIF) to assess for collinearity, the coefficient of determination (R2) to determine the model's explanatory power, and the effect size (F2).

4.2.1 Variance Inflation Factor (VIF):

The VIF test is employed to check if there is a high collinearity problem in the constructs. A value of 3.3 indicates that the structural model is reliable (Hair et al. 2014). Table 6 demonstrates that the VIF values for all constructs except enjoyment and feedback are below 3.3. This could be explained that both constructs were measured by only 2 item scale. However, in general we can tell that the model is not suffering from collinearity problem among its constructs.

Table 6: ***Variance Inflation Factor***

Construct's relation	VIF
ACH→ CENG	2.806
BAN→ CENG	1.439
CENG→ CIU	1.000
ENJ → CENG	3.421
FB → CENG	4.072
GS → CENG	2.793
HEO → CENG	2.486

PEU→ CENG	2.761
PU → CENG	4.947
SI→ CENG	2.539
COM→ CENG	2.963

4.2.2 Coefficient of determination (R^2):

The explanatory power of endogenous latent variables is described by the coefficient of determination (R2) (Hair et al., 2011). R2 values of 0.25, 0.50, and 0.75 are indicative of low, moderate, and high strengths, respectively (Henseler et al. 2009; Hair et al. 2011). R2 values of 0.2 are regarded as high and adequate in the social sciences. (Hair et al; 2011; 2014). As can be seen in Table 7, both the raw and modified R2 values are within acceptable ranges, and the model's explanatory power is modest at 0.56 (Hair et al. 2011). This finding implies that the model's independent variables account for 56% of the variance in regular usage and exercise.

Table 7: R^2 and adjusted R^2

Variable	R^2	Adjusted R^2
Consumer Engagement	0.834	0.825
Continued Use & Exercise	0.562	0.560

4.2.2 The Effect Size f^2:

The effect size f^2 quantifies the impact of each independent variable on the endogenous construct. For instance, it has been suggested that the f2 values of 0.35, 0.15, and 0.02 have large, medium, and minor effects, respectively. The study revealed that perceived ease of use and competition strongly affect consumers' engagement with smartwatches. Furthermore, the results also

indicated that the various variables had varying effects. Therefore, the model is acceptable, as shown in Table 8.

Table 8: The Effect Size

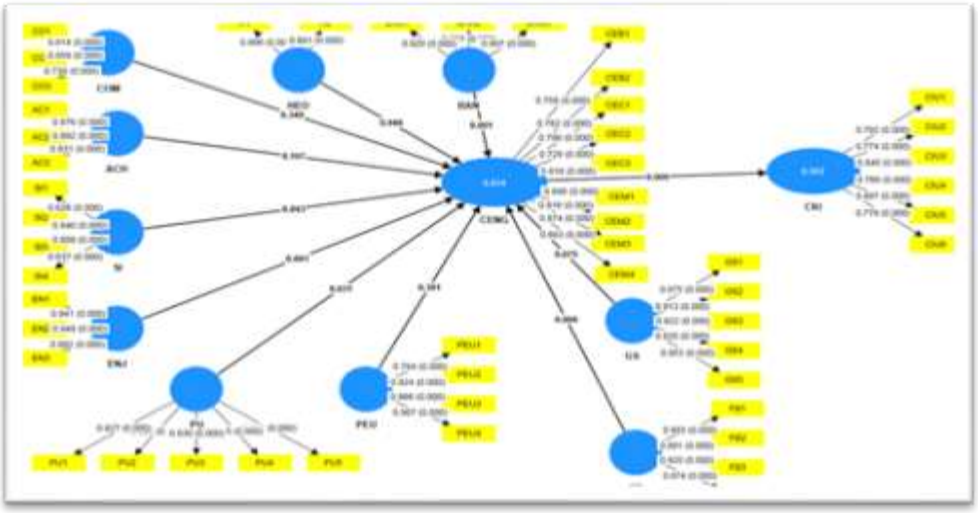
Construct's relation	f^2
ACH→ CENG	0.037
BAN→ CENG	0.067
CENG→ CIU	1.283
ENJ → CENG	0.083
FB → CENG	0.154
GS → CENG	0.026
HEO → CENG	0.061
PEU→ CENG	0.365
PU → CENG	0.030
SI→ CENG	0.038
COM→ CENG	0.453

4.3 Structural Equation Model & Hypothesis Testing:

The researcher developed eleven hypotheses for the primary model. The statistical significance level of the path coefficients was assessed using the bootstrapping resampling approach in smartPLS4 with five hundred sub-sample (Hair et al., 2014; Yi and Davis, 2003). The researcher may determine whether the path coefficients are statistically significantly using the bootstrapping technique's standard errors, t-value, and p-value. When testing a null hypothesis, a t-value of more than 1.96 indicates statistical significance at the p 0.05 level of analysis. Figure 2 displays the PLS bootstrapping for the projected model.

Figure (3) Bootstrapping for the first model

The outcomes of the hypothesis testing for the primary model



are presented in table 10, where only three are rejected out of the eleven hypotheses. The results revealed that as hedonic motivational variables, competition, achievement, and enjoyment significantly impact customer engagement, except for social interaction. The results also showed that competition and enjoyment positively affect customer engagement, while achievement has a significant negative effect. Thus H1, H2, and H4 are supported, while H3 is rejected.

Similarly, perceived usefulness, goal setting, and feedback significantly positively affected customer engagement, except for perceived ease of use. This means that only three variables of the utilitarian motivations influence customer engagement apart from

perceived ease of use came insignificant. Thus, H6, H7, and H8 are accepted, while H5 is rejected.

Moreover, the results indicated that the bandwagon effect positively impacts customer engagement; thus, H9 is retained. On the contrary, Healthology was found to have an insignificant impact on customer engagement which indicated that using health features impeded in the smartwatches does not affect the extent of their engagement and thus is not a crucial factor that affects their decision to continue to use smartwatches. Therefore, H10 is not supported. Finally, the results proved the existence of a significant positive correlation between customers' engagement and the continuous use and exercise of smartwatches, and thus hypothesis H11 is also retained. Table 10 shows the direct and indirect results.

Table 10: Significance testing results of the structural model path coefficients

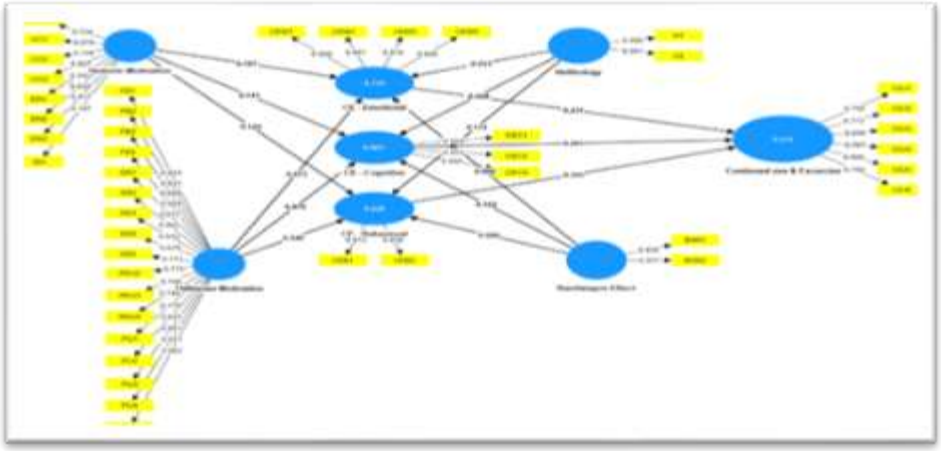
sis	Hypothe	Construct's Relationship	Original sample	Sampl e Mean	Standard deviation STDEV	T – statistic	P - value	Significanc e
	Direct Results							
	H1	COM → CENG	0.057	0.059	0.061	4.937	0.0	Significant
	H2	ACH→ CENG	-0.093	-0.089	0.058	1.612	0.107	Significant
	H3	SI→ CENG	0.113	0.111	0.056	2.023	0.0	Not Significant
	H4	ENJ → CENG	0.218	0.215	0.066	3.283	0.0	Significant
	H5	PEU→ CENG	0.043	0.048	0.050	0.858	0.3	Not Significant
	H6	PU → CENG	0.176	0.176	0.082	2.153	0.0	Significant
	H7	FB → CENG	0.323	0.322	0.076	4.230	0.0	Significant

H8	GS → CENG	0.127	0.125	0.071	1.783	0.075	Significant
H9	BAN→ CENG	0.126	0.126	0.039	3.246	0.001	Significant
H10	HE → CENG	-0.004	-0.005	0.053	0.067	0.946	Not Significant
H11	CENG→ CIU	0.750	0.750	0.046	16.204	0.000	Significant

On the other hand, it was important to test the effect of hedonic and utilitarian motivations, besides healthology and bandwagon effect as 4 separate constructs on consumer engagement from cognitive, emotional, and behavioral dimensions to capture more clear and accurate pictures on which dimension of consumer engagement affect their continuous use and exercise of smart watches. In this second model, 4 constructs were examined on each dimension of consumer engagement.

Furthermore, figure (3) shows that a subset of questions was left out of the second model. The researcher re-ran the analysis to guarantee that all outer loadings, Composite Reliability, and Cronbach's alpha were all above 0.7 and Average Validity Estimate (AVE) above 0.5. After making a few critical structural adjustments, the model was shown to be internally consistent.

Figure (4): PLS – SEM outer loadings for model



For model goodness of fit, Table 11 displays that the R2 and modified R2 values are within acceptable ranges, and that the model has a modest explanatory power of 0.58, indicating that the model is a decent match (Hair et al. 2011). The model's independent variables account for 58% of the variance in continued usage and exercise. Not only that, but there is an excessively high determination coefficient across all three measures of customer engagement.

Table 11: R^2 and adjusted R^2

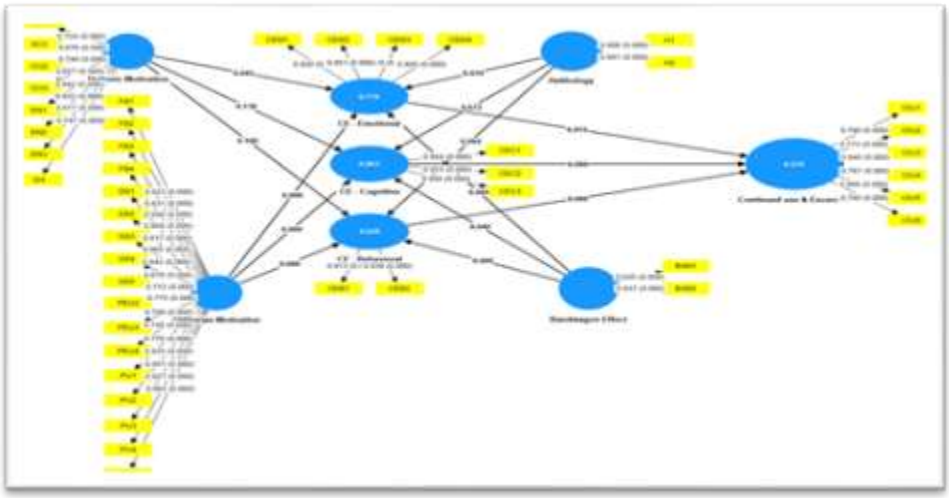
Variable	R^2	Adjusted R^2
CE – Behavioral	0.629	0.622
CE – Cognitive	0.663	0.656
CE – Emotional	0.719	0.713
Continued Use & Exercise	0.576	0.570

In the second model, the statistical significance level of the path coefficients was evaluated using the bootstrapping

resampling approach with five hundred subsamples in smartPLS4. These procedures were identical to those employed in the primary model (Yi and Davis, 2003; Hair et al., 2014). Figure 4 depicts PLS bootstrapping for the second model developed in this study.

The results of the second model are presented in table 12. The model was formulated in a way that we test the effect of each construct on consumer engagement from the three dimensions; cognitive, emotional, and behavioral to reach more conclusive results. The results revealed that hedonic motivation had a positive significant impact on consumer engagement from emotional dimension only and thus hedonic motivation has indirect effect on consumers` desire to continue use smart watches through their emotional engagement only. On the contrary, the utilitarian motivation had a positive significant impact on consumer engagement from cognitive, emotional, and behavioral dimensions.

Figure (4) Bootstrapping for the second model



Although healthology proved to have insignificant effect on consumer engagement in the first model, the breakdown of engagement into the three dimensions gave us different results. The results revealed that Healthology had a positive significant effect on consumer engagement from behavioral dimension only. Finally, the results revealed that there is a significant positive correlation between consumers' engagement and the continuous use and exercise of smart watches on all dimensions. Table 12 shows the statistical results.

Table 12: Significance testing results of the structural model path coefficients

Construct's Relationship	Original sample	Sample Mean	Standard deviation STDEV	T - stat	P - value	Significance
Direct Results						
HED → CE - BEH	0.124	0.124	0.094	1.315	0.188	Not - Significant
HED → CE - CON	0.141	0.138	0.095	1.483	0.138	Not - Significant
HED → CE - EMO	0.187	0.187	0.093	2.008	0.045	Significant
UTL → CE - BEH	0.546	0.542	0.097	5.634	0.000	Significant
UTL → CE - CON	0.670	0.675	0.105	6.360	0.000	Significant
UTL → CE - EMO	0.673	0.673	0.095	7.060	0.000	Significant
BAN → CE - BEH	0.088	0.088	0.053	1.650	0.099	Significant
BAN → CE - CON	0.102	0.101	0.050	2.057	0.040	Significant
BAN → CE - EMO	0.086	0.086	0.049	1.754	0.080	Significant
HE → CE - BEH	0.132	0.137	0.077	1.731	0.084	Significant
HE → CE - CON	-0.028	-0.030	0.067	0.424	0.672	Not - Significant
HE → CE - EMO	-0.033	-0.033	0.071	0.469	0.639	Not - Significant
CE - BEH → CIU	0.355	0.353	0.075	4.725	0.000	Significant
CE - CON → CIU	0.261	0.263	0.071	3.683	0.000	Significant
CE - EMO → CIU	0.231	0.230	0.095	2.435	0.015	Significant

5. Discussion:

This research investigates the factors fostering customer engagement in gamification, implying the hedonic and utilitarian motivations and the healthology and bandwagon effect as new determinants. Moreover, to analyze the impact of CE on the continued use of SWDs to improve their health and wellness.

The empirical results of this study revealed that all hedonic aspects of motivation, except social interaction have an impact on customer engagement in gamification. More precisely, results

showed that hedonic motivations impact CE from its emotional dimension only (Table 12). In other words, the aim of a hedonic system is to make the activity pleasurable in and of itself, so that the user will desire to use the system even if it serves no other function. So, people are more likely to continue using the service if they enjoy it, even though there may be practical benefits to doing so (van der Heijden, 2004). This result also supports the positive significant impact of enjoyment (H4). Consequently, it reveals the indirect impact of hedonic motivations in enhancing the continued use of SWDs for health and wellness through the emotional engagement in gamification. In contrast, results showed that utilitarian motivations and bandwagon effect significantly impact the three CE dimensions namely cognitive, emotional, and behavioral (Table 12).

Unexpectedly, results revealed that social interaction has no impact on customer engagement with smartwatches. One possible explanation is that almost 47% of the respondents are between the ages of 16 and 29. Younger people are more likely to use the smartwatch to motivate themselves to exercise. As a result, they may not pay attention to the interaction and recognition of others regarding their exercise performance. This result contradicts that of Li et al. (2015), Eisingerich et al. (2019), and Bical and Ispir (2021). Moreover, respondent profiles showed that 61% of the respondents were female. Females are more likely to perceive a smartwatch as a fashion accessory. As a

result, they may be more interested in the aesthetic appeal of smartwatches for demonstrating their style or taste as well as their living standards. Also, results showed that 48% of the respondents are using the smart Apple Watch, which is a symbol for uniqueness preferences. This explanation was supported by Deghani et al, (2018). Moreover, the results showed that 47% of the respondents were employed in the private sector. In this context, in Egypt, smartwatches are bought as a proof of the consumers' social status and their ability to pay for high-tech products. They might be more interested in using smartwatches to only manage their mobile functions (calls, messages, emails, and notifications). Thus, H3 is not supported.

This result was supported by the positive significant impact of the bandwagon effect on customer engagement. One possible explanation is that social media as a group culture has a strong effect on younger Egyptian customers. The smartwatch is seen among groups as a technological trend. Young people are high-tech users and are more eager to use advanced technology. Therefore, they might be more interested in imitating each other's in adopting this new technology mainly to show their style and standard. This result is consistent with prior literature (Hsu, 2016; Zhou, et al., 2015; Gao & Bai, 2014), that claimed that customers care more about their own unique preferences and the impression they give off when using the devices than they do about the actions of others and contradicts with the study of Tsai et al. (2022). Therefore, Niknejad, et al. (2020)

confirmed that consumer demand is boosted as people in the broader public mimic one another's spending habits. Accordingly, H9 is supported.

In contrast with prior studies (Bical & Ispir, 2021; Wang, et al., 2021; Deterding, et al., 2011; Nelson, et al., 2019) this research revealed negative significant impact of achievement on CE. This result comes in line with the study of Du et al. (2020). It may be explained due to the nature of the sample. According to the demographic analysis Gen Y and Z are the majority. and are using the smartwatch for more than one year with moderate experience. Younger people might lose gradually their engagement when they use their smartwatch for extended periods. Higher achievement levels may cause additional effort for exercising, discomfort, frustration, and time loss. Therefore, they might get bored and lose interest especially when they are using their device for the exercise itself and not waiting for rewards. In addition, they may place a greater emphasis on how the gamification of IS (smartwatch) facilitates their performance of exercise instead of the level of their performance in these game mechanisms. This also may explain why health effectiveness is a key user need. Consequently, H2 is supported but through a negative impact.

While some prior empirical studies (Leclercq et al., 2018; Bical & Ispir, 2021) have found that gamified competition has no significant influence on CE, this research emphasises competition as

a crucial motivator to encourage people to compete and strive for excellence in an activity, motivating them to improve their performance. This finding is consistent with earlier studies (Tsai et al., 2022; Bical & Ispir, 2021; Chen, 2019; Venkatesh, et al., 2012; Yee, 2006; Lucas & Sherry, 2004). When participants compete against each other through leaderboards and rankings, exercise gets more fun and pleasant, which boosts the exercise's engagement rate. Accordingly, this result supports H1.

Moreover, the results revealed the positive significance of enjoyment in CE. This is consistent with previous studies that showed that gamification helps in generating an enjoyable and pleasurable experience for SWD users (Bical & Ispir, 2021; Krey, et al, 2019), Users are motivated by the hedonic benefits derived from the exercise itself and not from the external outcomes like rewards and achievements (Krey, et al, 2019). Therefore, users who find their smartwatch experience enjoyable are more engaged with their device and are more willing to keep using it (Choi & Kim, 2016; Krey, et al., 2019; Pal, et al., 2020; Siepmann & Kowalczuk, 2021). Thus, H4 is supported.

In addition to the hedonic motivations, results showed that gamification fosters CE through its utilitarian aspects. They revealed that all utilitarian variables of motivation, except PEU positively influence CE. Although this result seems to be inconsistent with prior studies (Krey, et al., 2019; Bical & Ispir, 2021; Fang, 2017), that showed the importance of user friendliness in fostering CE and

their intention to continue using their smart wearable devices, PEU is not a significant determinant for Egyptians. This result was highly expected since the demographic analysis revealed that almost 80% of the smartwatch users were Gen Y and Z. In other words, younger generations were raised in a world where the internet, mobile phones, tablets, and social media were commonplace. They are well acknowledged with these advanced technologies. Accordingly, PEU might have no significance for CE. H5 is therefore not supported.

Consistent with previous research (Bical & Ispir, 2021; Siepmann & Kowalczuk, 2021; Pal et al., 2020; Fang, 2017), the findings confirmed PU's positive and significant effect on customer satisfaction, engagement, and the desire to continue using the smart wearable device. Furthermore, this result indicated that consumers' satisfaction levels would rise as they realized the benefits of wristwatch gadgets and that completing duties like handling emails and phone conversations boosted their productivity. In addition, this result was consistent with previous studies (Ogbanufe & Gerhart, 2017; Bhattacherjee, 2001), which confirmed that once consumers accept recent technologies, they become more interested in the system's efficiency as a means of boosting their productivity. Moreover, this result supports the fact that the usefulness of a gamified system is presumed to be essential for their continued use, mainly if they use it to communicate on social media or monitor their fitness and exercise performance. Accordingly, this result supports H6.

Regarding goal-setting and feedback, the results proved that SWDs wearers understand how critical it is to remain dedicated to their objectives, receive regular updates on their progress, and face new challenges at every turn. Furthermore, this research shows that these features can be found in games and gamefic constructions, such as the smartwatch. This means that they view leaderboards and awards as a gameful experience that motivates them to set a goal and then take pleasure in tracking their progress as they work toward their objective. Therefore, with the support of feedback, goal setting promotes CE. In support of H7 and H8, this finding was backed by the literature, which found that defining goals is essential to greater customer engagement and the confirmation of their usage continuity (Hassan et al., 2020). In addition, consumers are more likely to become invested in an activity if they are rewarded for their efforts and given feedback afterwards (Tsai et al., 2022; Bical & Ispir, 2021; Nelson et al., 2019; Deterding et al., 2011).

Although the fact that goal setting and feedback have a positive, significant effect, as supported by Siepmann and Kowalczuk (2021), might indicate that smartwatches can provide consumers with clear and objective data that can help them make decisions toward a healthier and more active lifestyle, especially by setting a goal to motivate themselves to exercise regularly and receiving feedback, healthology came out insignificant in our model. This result is in line with Deghani et al. (2018). One

possible explanation is that Gen. Y and Z are the main segments that use smartwatches. Therefore, these younger users care more about their health and fitness by monitoring their calories burned and distance walked, which represents their active usage of fitness features and not those of health. Moreover, Gen Y and Z are characterised by being healthy, with no chronic diseases that need to be monitored daily. Thus, health features embedded in smartwatches might be neglected or do not increase their engagement despite the importance of such elements.

In other words, these health self-monitoring features may not be sufficient to enhance customer engagement, or customers may not be well acquainted with them. Unlike the study of Tsai, et al. (2022), most Egyptian customers are not using the smartwatch for health tracking and exercise. Moreover, results revealed that the behavioral dimension of engagement significantly impacts continued use, while the cognitive and emotional dimensions are not significant (Suh et al., 2018). An instance of behavioral engagement occurs when a person invests time, attention, and effort into an interaction, such as with a gamified product (Hollebeek et al., 2014). Accordingly, H10 is not supported.

Finally, in support of H11, results revealed that customer engagement has a positive significant effect on the continued use of smart wearable devices. This result is consistent with prior research (Suzianti, et al., 2019; Tarute et al., 2017; Tarute, et al., 2017). An individual's positive mental and emotional reactions to

using a service or product are important to the concept of "consumer delight" (Hollebeek & Chen, 2014). Distraction and enjoyment are central to the cognitive domain, whereas positive emotions and feelings are at the heart of the emotional dimension (Hsieh & Chang, 2016; Dwivedi, 2015; Hollebeek & Chen, 2014). As a result, it stands to reason that a customer's inclination to continue using a service would be increased if they feel emotionally invested in it (Kim & Baek, 2018). Because consumers desire consistency in their behaviour (Trafimow & Borrie, 1999), the behavioural dimension of CE is predicted to be significantly associated with persistence intent. This means that a consumer's preferences should align with their past behaviour and that a higher level of activation may lead to routine behaviour (Hepola, et al., 2020). Therefore, smartwatch may be an integral part of the user's daily activity.

6. Conclusions and Implications

This research adds to the literature in several important ways. To begin, this research suggests a gamification model that includes hedonic and utilitarian motives, the bandwagon effect, healthology, consumer engagement, and continued use and exercise. The study model was developed after a thorough examination of several different theories and methods, including TAM (Davis, 1989) and UTAUT/UTAUT2 (Santos-Vijande, et al., 2012), hedonic/utilitarian motivation, relational marketing, GST (Locke & Latham, 2002), CE, and gamification. These

frameworks are especially relevant in this context because they are used as key foci while also being used in a variety of other contexts and settings, including marketing. Overall, findings revealed that gamification is essential to boost customer engagement to enhance the continued use and exercise of smartwatches to improve health and wellness.

Results showed that there was no significant impact between healthology and CE. They demonstrate how customers view the smartwatch as a tool for health and exercise. Customers do not see health features as a critical driver of smartwatch engagement from the emotional and cognitive dimensions, but the behavioural dimension is significant. Customers consider time, effort, and energy when they exercise. Thus, marketers should integrate more attractive health content to encourage users for more exercise and self-monitoring their health. As high-tech users, PEU has also shown an insignificant impact on CE.

Moreover, results revealed that achievement had a negative significant impact on CE. It is an unexpected result. Achievement in gamification is associated with gaining badges, points, and leaderboards. Customers with moderate to high experience prefer to use their smartwatch for the exercise itself and not for external rewards. This supports the results that indicates the importance of goal settings for the utilitarian motivations.

Most gamification design work involves adding game elements to a system. Using game elements gives users a pleasurable

experience in a space that isn't a game, just like normal games do. However, as this study demonstrates, gamification may be utilised to provide a hedonic experience by contributing game aspects and incorporating utilitarian advantages.

For a low and moderate smartwatch experience, service providers should offer extra services in simplified guides or assistants like "Siri" to increase customer awareness about different health features and activities embedded in the smartwatch. On the other hand, additional high-end features should be provided for users with high levels of experience such as a GPS that helps the user to track one's own exercise route, or a feature for monitoring blood pressure.

Furthermore, research revealed that competition could help make exercise more competitive and fun. This may help in prolonged use to enhance the interaction with other users and encourage users to exercise more to maintain health and wellness. It also emphasized that health management aims to enhance people's wellness and sustain device usage. Hence, service providers should map their target segments according to their customers' motivations and competencies. Smartwatch features should be customised according to the dynamic customer's needs.

The research provides evidence that perceived usefulness boosts continuation intent. In addition, these findings demonstrate that continuous smartwatch use is motivated not just by hedonistic factors (Dehghani et al., 2018), but also by

utilitarian aspects. This is especially true for people who intend to quantify themselves to attain health and fitness-related objectives. It also revealed that users are more motivated to pursue their goals when they get performance feedback from their goal-tracking (Zhang et al. 2019). Results suggest that smartwatches are more than just a novelty piece of technology. Instead, they can serve to inherently drive individuals to be more physically active and improve their health.

Moreover, smartwatches are considered health-monitoring devices and not only fashion accessories. Therefore, smartwatch producers should integrate game elements that motivate younger people to engage more with the device for health monitoring and exercise. Older adults should also be targeted, as they are more vulnerable to chronic diseases. Finally, marketers should promote the device to improve users' health and wellness.

7. Limitations and future research

The developed and empirically tested research model explained the determining motivational factors of customer engagement and continued use of smartwatches for gamified exercise as sample for SWDs. The results revealed that this used approach motivates consumers and engage them to continue using their devices for better health and wellness. Therefore, projected future research might investigate other important determinants such as "Fashnology". Also, other types of SWDs such as the smart bracelet or eyeglasses might be examined.

Furthermore, by investigating the motivational factors affecting customer engagement, adoption barriers were not included. Therefore, future research should examine different barriers for the continued use of smartwatches. Operational imperfections and discomfort can be employed as a moderator variable between CE and CU.

Future research might compare the smartwatch user's health status before and after the continued use of the device extended period. This will help in refining the gamification motivational factors to enhance customer engagement and continued use. Moreover, this research employed demographic factors especially age, gender, and experience as control variables. The projected future research might include these variables as moderators in the research model to test their impact on the outcome variables. Also, it might include technical characteristics for smart wearable devices such as autonomy and interactivity to enhance the functionality of the device for tracking chronic diseases for better health and wellness.

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