Assessing the Impact of Smart Watch Gamification on Athletic Performance

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A Thesis Submitted as Partial Fulfillment Degree of Masters of Business Administration

Under the Supervision of
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Abstract:

Purpose:

This study aims to assess the impact of smartwatch gamification on athletic performance in Egypt, with a specific focus on applying Flow Theory and Gamification. These theories have not been extensively explored in the context of fitness technology, offering new insights into how smartwatches influence exercise engagement and behavior change.

Design / Methodology / Approach:

The study employs an exploratory approach, using in-depth one-to-one interviews with athletes and fitness enthusiasts to examine how Flow Theory (optimal engagement) and Gamification (rewards, challenges, and leaderboards) motivate athletic performance. This methodology highlights how smartwatches trigger both intrinsic and extrinsic motivations during workouts.

Findings:

Integrating Flow Theory and Gamification within smartwatches enhances users' engagement in physical activity. Gamified features help users enter a flow state, improving exercise intensity and consistency. This unique combination fosters greater exercise intention, behavior change, and the adoption of fitness technology, particularly in Egypt's athletic community.

Key Words: Health monitoring technology, Gamification features in technology and their effect on athletic performance, Engagement with wearable technology, Motivation theory, Elaboration Likelihood Model, and Flow experience.

الملخص:

تهدف هذه الدراسة إلى تقييم تأثير الألعاب التحفيزية **(Gamification)** في الساعات الذكية على الأداء الرياضي في مصر، مع التركيز على تطبيق نظرية التدفق **(Flow Theory)**والألعاب التحفيزية بشكل مشترك. تُعتبر هذه النظريات غير مستكشفة بشكل واسع في سياق التكنولوجيا الرياضية، مما يوفر رؤى جديدة حول كيفية تأثير الساعات الذكية على زيادة المشاركة في التمارين وتغيير السلوك..

التصميم / المنهجية / النهج:

تستخدم الدراسة نهجاً استكشافياً من خلال إجراء مقابلات متعمقة مع الرياضيين والهواة لتحليل كيفية تأثير نظرية التدفق (الانغماس الأمثل في النشاط) والألعاب التحفيزية (مثل المكافآت والتحديات) على تحفيز الأداء الرياضي. تسلط المنهجية الضوء على كيفية تحفيز الساعات الذكية للدوافع الداخلية والخارجية خلال التمارين.

النتائج:

تكشف الدراسة أن دمج نظرية التدفق والألعاب التحفيزية في الساعات الذكية يعزز انخراط المستخدمين في الأنشطة البدنية. تساهم العناصر المحفزة في إدخال المستخدمين إلى حالة التدفق، مما يحسن من كثافة وانتظام التمارين. يُعد هذا الدمج فريداً في تعزيز نية ممارسة التمارين وتغيير السلوك واعتماد التكنولوجيا الرياضية، خصوصاً في مجتمع الرياضيين في مصر.

الكلمات الرئيسية:تكنولوجيا مراقبة الصحة، تكنولوجيا الألعاب وتأثيرها في اللياقة البدنية و الأداء الرياضي، التفاعل مع التكنولوجيا القابلة للارتداء، نظرية التحفيز، نموذج احتمالية التوسيع و تجربة التدفق.

Introduction:

Wearable technologies, such as smartwatches, cell phones, and other IoT-enabled devices, play a vital role across various sectors, including healthcare and transportation, by enabling data exchange without human interaction. In healthcare, these devices monitor critical health indicators, such as heart rate, blood glucose, and blood pressure, helping prevent serious health issues like cardiovascular diseases (Lamnabhi-Lagarrigue et al., 2017). Smartwatches, in particular, have emerged as advanced gadgets, promoting physical activity and healthier lifestyles. At the same time, the COVID-19 pandemic further accelerated the adoption of IoT health devices for tracking essential health metrics, reducing the likelihood of illness (Cecchinato, 2018).

Moreover, to some people, wearable fitness devices are seen as fashionable accessories, providing users with symbolic privileges (Choi & Kim, 2016), (Krey, Chuah, Ramayah, & Rauschnabel, 2019). Ongoing improvements in digital healthcare include using software applications for data protection and personal safety and developing apps similar to smartphone features. Although smartwatches are frequently used as fashion accessories, they are not generally considered essential devices (Chandel, Sharma, Kaur, Singh, & Kumar, 2022).

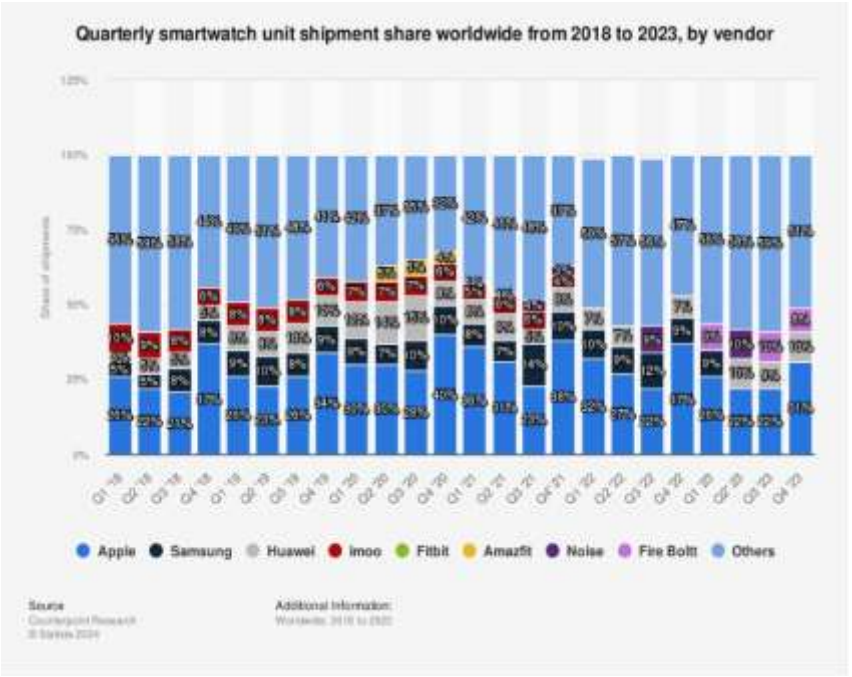


Figure 1: Quarterly smartwatch unit shipment share worldwide from 2018 to 2023 (Laricchia, 2024).

There has been an expansion in the smartwatch industry since 2018. Apple has consistently maintained a leading position in the market, with a share growing from 26% to 31% by 2023, despite their intense competition from Fitbit and Samsung, both having a significant market presence. Since Smartwatches are promoted as health monitoring devices and customer well-being accordingly, it is expected that by 2024, worldwide growth will reach around 225 million with expected further expansion, and this growth in the usage of wearable devices has been seen in India, China, and the United Kingdom (Laricchia, 2024).

In fitness, gamification fosters strong exercise intentions essential for athletic performance. Research shows that consistent exercise intentions, shaped by personal goals and perceived benefits, improve metrics such as speed, strength, and agility (Ajzen, 1991; Dickau & Rhodes, 2012). Tracking progress and receiving positive feedback in competitive environments boost self-confidence and long-term commitment to physical activity (Bandura, 1997; Weinberg, 2018). Structured planning and goal-setting are vital strategies for sustaining these behaviors and enhancing athletic performance (Zhu, Dailey, Kreitzberg, & Bernhardt, 2022).

Integrating game design elements into non-gamified activities, such as smartwatches, enhances user engagement, participation, and loyalty by making the experiences enjoyable and rewarding through scoring points, leaderboards, and

competition (Deterding et al., 2011). This gamification transforms smartwatches into interactive tools that promote physical activity and health awareness. Managers can increase loyalty by incorporating engaging, playful experiences into gamified programs, as seen in Adidas' "Run for the Oceans" initiative, which merges physical activity with environmental advocacy (Parley, 2022; Dreher & Strobel, 2023).

Research Gap:

Previous research has explored the relationship between technology and user experience, focusing on how various features influence engagement during physical activities (Oh & Kim, 2023). However, there has been limited investigation into the role of gamification and Flow theory in smartwatches to enhance the adoption of technology and improve user experience. This study builds on prior findings by analyzing the impact of smartwatch features on user motivation and performance during exercise. By focusing on how gamification features influence user motivation to outperform. The study contributes to expanding the current knowledge base and opens new pathways for further research on the intersection of fitness technology and gamification strategies.

Research Problem:

Despite the increasing popularity of smartwatches and their potential to promote physical activity, there is limited understanding of how gamification features in these devices influence user engagement, motivation, and, ultimately, the adoption of the technology. The lack of in-depth research on this subject leaves a gap in the current literature, making optimizing smartwatch features to encourage consistent use difficult. This study seeks to address this issue by exploring the connection between gamification, user experience, and the adoption of smartwatches in the context of physical activity.

This research will utilize the Adoption Model, the Elaboration Likelihood Model (ELM), and the Flow Experience Theory to explain exercise intention, with gamification as a moderator to examine how athletic motivation can enhance performance. Additionally, the UTAUT2 model was chosen for its ability to explore smartwatch features in-depth, mainly focusing on key factors such as performance expectancy, effort expectancy, social influence, and hedonic motivation. UTAUT2 is particularly suitable for understanding consumer technology adoption because it incorporates hedonic motivation, price value, and habit, which are crucial in assessing why users adopt smartwatches for fitness purposes.

Furthermore, the Flow Theory is applied to explain the relationship between gamified smartwatch features and athletic performance. This theory helps illustrate how these features can enhance user engagement and motivation, leading to improved athletic outcomes. The combination of UTAUT2 and Flow Theory provides a robust framework for understanding how smartwatch features influence technology adoption and exercise behavior in a fitness context. This approach is critical in addressing the gaps in current research regarding how technology motivates athletic performance and behavior change.

Literature Review

Athletic Performance:

Consistent engagement in physical activities benefits both physical and mental health, with research and athletes affirming these positive effects (WHO, 2020). Despite the recognized advantages, many individuals fail to meet recommended exercise standards, posing risks to public and individual well-being (Guthold et al., 2018). Perceived obstacles influence the gap between intention and action, while social support strengthens the likelihood of physical activity (Knapova et al., 2024). Smartwatches, with features like immediate feedback and progress tracking, are practical tools for motivating physical activity and enhancing exercise intention by creating an engaging, rewarding environment (Oh & Kim, 2023).

Smart Watches Adoption

Several theories have been applied to explain smartwatch adoption. The Technology Acceptance Model (TAM) is the most commonly used, emphasizing ease of use and usefulness as the main factors influencing the adoption of new technologies like smartwatches (Davis, 1989). TAM has been extended to various domains, such as e-health systems and wearables, where perceived usefulness and ease of use consistently drive adoption decisions (Holden & Karsh, 2010; Hwang, 2014). Extended versions of TAM (ETAM) add emotional and logical factors, such as relative advantage, mobility, and perceived enjoyment, making it more adaptable to emerging technologies like Augmented Reality Smart Glasses and Electric Vehicles (Kim & Shin, 2015; Rauschnabel & Ro, 2016).

However, the Unified Theory of Acceptance and Use of Technology (UTAUT) and its extended version, UTAUT2, are key models that explain technology adoption. Developed by Venkatesh et al. (2003), UTAUT is based on the Theory of Reasoned Action, Motivational Model, and Theory of Planned Behavior, which focuses on four main factors: performance expectancy, effort expectancy, social influence, and facilitating conditions. Performance expectancy and behavioral intention, as the strongest predictors of technology usage, instill confidence in the predictive power of UTAUT (Williams, Rana, & Dwivedi, 2015).

Additionally, UTAUT2 was introduced in 2012 by Venkatesh, Thong, and Xu. It adds constructs like hedonic motivation, price value, and habit to understand consumer behavior in technology adoption better, improving its explanatory power across various contexts. These models have been applied to technologies like Electric Vehicles (Alwadain et al., 2024), ChatGPT (Budhathoki et al., 2024), and ICT in tourism (Ali et al., 2024). UTAUT2 is especially relevant for studying smartwatch adoption, where factors like performance expectancy, effort expectancy, social influence, and hedonic motivation significantly influence consumers' intentions to use smartwatches for health and fitness purposes (Beh et al., 2019; Pulipaka, 2019).

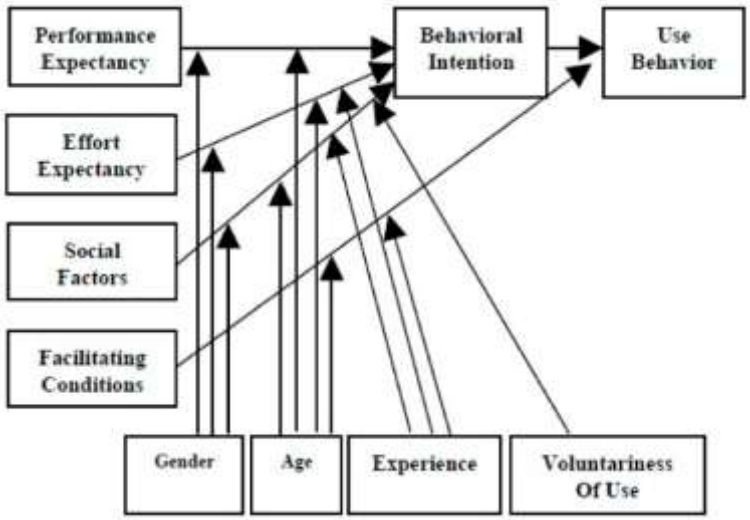


Figure 2UTAUT2 Adapted from Venkatesh et al. (2012)

Accordingly, to enhance user engagement in physical activities, the study narrows its focus to crucial smartwatch attributes such as interaction, autonomy, wearability, convenience, and experiential novelty, excluding factors like price and brand that are less relevant to this research context (Oh & Kim, 2023; Adapa et al., 2018; Gopinath & Sai, 2021).

- **Interactivity** refers to how a smartwatch enables the user to communicate with other users in the mediated environment (Oh & Kim, 2023), (Basha, Aw, & Chuah, 2022).
- **Perceived Autonomy** explains the ability of smartwatches to conduct a particular task with a specific goal automatically and independently (Oh & Kim, 2023), (Basha, Aw, & Chuah, 2022), (Cho, Lee, & Yang, 2019), (Beer, Fisk , & Rogers , 2014).
- **Wearability** is a crucial determinant of exercise experience with smartwatches (Oh & Kim, 2023), (Jeong, Kim, Kim, Lee, & Jeong, 2017).
- **Technological convenience** is one of the primary benefits of using a smartwatch compared to traditional wristwatches, as it allows users to efficiently and ubiquitously deal with their daily work (Ogbanufe & Gerhart, 2017).
- **Experiential novelty** is an important characteristic when considering using smartwatches for fitness, measuring the extent to which a smartwatch provides novel and distinctive experiences for consumers during physical activity (Oh & Kim, 2023).

Smart Watches and Flow Experience:

The flow experience, defined by deep concentration, total immersion, and inherent enjoyment (Csikszentmihalyi, 1990), is crucial for enhancing the exercise experience. Smartwatches contribute to this flow state by offering personalized features such as interaction, perceived autonomy, and wearability, allowing users to fully engage in their activities (Oh & Kim, 2023; Shrestha et al., 2024). Flow experiences are associated with numerous benefits, including positive exercise satisfaction, improved performance, mental well-being, and outstanding commitment to continuous workouts (Hortz & Petosa, 2013; Swann et al., 2019; Schüler & Brunner, 2009). Flow Theory posits that individuals perform optimally in their unique flow state, characterized by a balanced psychological state where they are neither overwhelmed nor under-stimulated (Sanderson, 2016). This subjective experience is essential for achieving intrinsic rewards and enhancing athletic performance (Oh & Kim, 2023).

Gamification and Motivation Theories:

Gamification began in the early 20th century with loyalty programs encouraging customers to collect stamps, laying the foundation for modern gamification strategies. By the 1970s and 1980s, gaming elements were integrated into non-gaming sectors, especially educational software, to enhance engagement and learning (Kapp, 2012; Hamari & Huotari, 2012). In the 1990s, "serious

games" emerged, applying game-like features to areas like military training and healthcare for educational and professional development (Michael & Chen, 2006). In 2002, Nick Pelling coined the term "gamification," which gained popularity on platforms like Khan Academy and Fitbit, using game mechanics to motivate users in learning and physical activities (Deterding et al., 2011; Zichermann & Cunningham, 2011).

Gamification encompasses social, reward, and goal-based themes linked to intrinsic and extrinsic motivational factors. Goal-based gamification is tied to intrinsic motivation, encouraging individuals to seek challenges and extend their abilities. Rewards-based gamification connects to extrinsic motivation through incentives like virtual rewards (badges) or monetary rewards (prizes). Social-based gamification can involve intrinsic and extrinsic motivation, depending on the social activities involved, such as collaboration, competition, and recognition. These strategies aim to motivate users through community engagement and reward systems (Cho, Kaplanidou, & Sato, 2021).

Research has since focused on how gamification influences behavior and boosts engagement across various fields, including education, health, and workplace productivity (Kapp, 2012; (Hamari, Koivisto, & Sarsa, 2014). By leveraging motivational components such as points, badges, and leaderboards, gamification taps into psychological needs, enhancing

performance, satisfaction, and involvement (Cho, Kaplanidou, & Sato, 2021; Oliveira et al., 2021). As a result, gamification has become an effective tool for fostering motivation and engagement in diverse settings.

Flow refers to a state of complete immersion and enjoyment in an activity, driven by intrinsic motivation and characterized by intense focus, clear goals, immediate feedback, altered time perception, and a balance of challenge and skill (Csikszentmihalyi, 1990; Csikszentmihalyi & Nakamura, 2014; Harmat, Andersen, Ullén, Wright, & Sadlo, 2016). These elements foster deep engagement and productivity, with individuals experiencing a sense of competence and intrinsic satisfaction, encouraging continuous participation. Flow activities are performed effortlessly, and the altered perception of time reflects the depth of involvement.

The updated flow model examines the causes and outcomes of flow experiences, linking elements like absorption and control to specific precursors and results (Chen, 2000). Gamification can foster flow by providing challenges that align with an individual's skill level, maintaining a balance that sustains engagement and enjoyment (Hamari, Koivisto, & Sarsa, 2014). Flow’s intrinsic rewards make it a powerful tool for enhancing productivity, creativity, and personal development.

Technological Exhaustion and Gamification:

Technological exhaustion refers to the stress and emotional fatigue individuals experience from continuously using specific technologies. It manifests through symptoms such as fatigue, depression, and other negative feelings, often observed in contexts like health management gamification (Halbesleben & Bowler, 2007; Cheng, Bao & Zefris., 2020; Dhir, Kaur, Chen & Pallesen., 2019). This psychological state can negatively affect user interactions with technology, leading to disengagement (Ayyagari et al., 2011; Tarafdar et al., 2010). Research shows that while technological exhaustion may initially decrease with increased competition, it eventually rises again as competition intensifies, causing emotional depletion (Li, Yang, & Hu, 2023).

Conceptual Model and Research Methodology

Research Statement

This study seeks to investigate the impact of smartwatch gamification on athletic performance in Egypt. It will utilize the UTAUT2 model to explore the key features of smartwatches and their role in technology adoption. It will also employ Flow Theory to explain the relationship between gamified smartwatch features and athletic outcomes, with gamification as a moderator to enhance exercise intention and motivation. The research aims to bridge gaps

in understanding how smartwatch technology influences user engagement, motivation, and performance in physical activity.

Research Objectives:

Exercise intention is crucial for athletic performance, leading a healthy lifestyle, and supporting the United Nations' sustainable goals. The gamification of smartwatches represents a method for motivating change in consumer behavior. As a result, we are conducting this study to learn more about the variables of Athletic Performance and Present development features as suggestions to the developers on motivating and leading athletes toward athletic performance.

Research Importance

Theoretical Importance

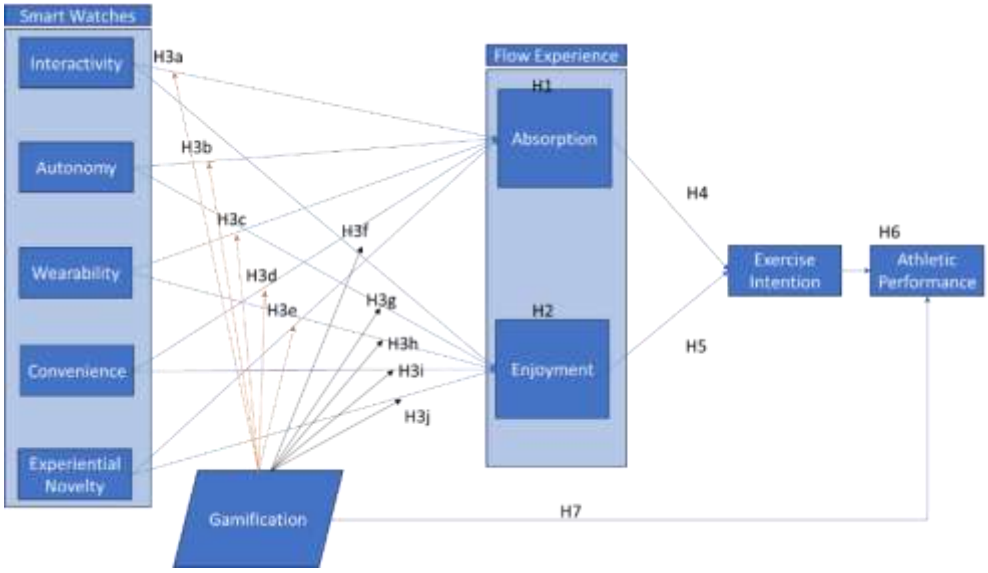
This paper contributes to Adoption, Motivation, and Consumer Behavior by probing the factors that might impact athletic performance and increase customer intention to exercise and the features that should be present in Smart Watches for athletes and athletic enthusiasts to maintain their exercise intention.

Practical Importance

The study provides managerial guidelines to app creators and Training facilities on how gamification could leverage customer intention and increase athletic performance.

Research Proposed Conceptual Model

Independent Variables: Interactivity, Autonomy, Wearability, Convenience, Experiential Novelty, Gamification.
Dependent Variable: Exercise Intention.
Moderator Variable: Exercise Involvement.
Mediating Variable: The Flow Experience (Absorption and Enjoyment) and Athletic Performance.



Research Population and Sampling

The research population of interest is athletic personnel, whether casual or professional, who are in the 25-45 age group, mainly Gen Z and late Y. As the athletic population is enormous

and distributed throughout the country, the researcher will concentrate on Great Cairo, Mansoura, and Sharqia consumers.

Exploratory Research Findings:

The researcher carried out an exploratory study to assess the impact of gamification in Smartwatches on athletic performance. The aim is to give perspective on developing gamification features to encourage exercise intentions and athletic performance appropriate for professionals and athletes based in Egypt.

Qualitative research aims to test the viability of the research assumption and gain insight into the ground opinion. The researcher holds that smartwatch gamification regarding exercise intention should lead to athletic performance.

The researcher interviewed ten experts, including professional athletes and nutritionists, using probing questions to acquire data for research on smartwatch gamification and athletic performance. Then, 40 casual athletes were asked 15 inquisitive questions to determine how much they used smartwatches and gamified apps in their workouts and how much they depended on them during training.

1- An Overview of the Expert's Insights on the Relevant Interview:

Athletic Industry and Smart Watches in Egypt:

Industry experts in Egypt's athletic sector have noted significant growth in areas like CrossFit and fitness technologies, reflecting a shift towards a more diverse sports culture beyond the traditional focus on football. While advancements are acknowledged, there are concerns about disparities in the sports sector, where football continues to dominate resources and attention, limiting support for other sports. Additionally, criticisms are directed at football's management and resource distribution, contrasting it unfavorably with more organized leagues like the Premier League in England. Ethical concerns around the use of performance-enhancing substances in bodybuilding were also raised, stressing the need for a cleaner sports environment.

Smartwatches were praised for their health monitoring capabilities, such as tracking heart rate, sleep, steps, and exercise intensity, making it easier for users to manage workout programs and maintain a health-focused lifestyle. Some respondents highlighted their usefulness in bodybuilding and football, assisting with nutrition tracking and training targets. However, practical limitations were noted, especially regarding battery life, as frequent charging every five hours was considered impractical for continuous use, reducing their motivational appeal. Additionally,

the case of footballer Ahmed Refaat was cited as an example of how real-time health monitoring could have averted a crisis.

Fashion or Practical:

The experts viewed the smartwatches as a mix of fashion and functionality, elaborating on their stylish designs and practical features. They argue that even though smartwatches are trendy, they are more inclined toward practicality, serving more beneficial purposes than being aesthetically beautiful.

When the experts were asked about smart watches as motivators for a healthy lifestyle, they advised that this effectiveness is minimal; even though smartwatches give initial motivation, it is not sustainable for a long-term lifestyle change unless the individual has a deeper motivation to maintain a healthy lifestyle.

Smartwatch Features:

a) **Interactivity and Convenience:**

When the experts were asked about the interactivity offered by the smartwatches and their convenience, they appreciated smartwatches for their health monitoring features, including heart rate, steps, and other vital health metrics. Additionally, real-time feedback and alerts on health status during low heartbeats or exhaustion help manage health better and allow proper intervention.

b) **Autonomy and Customization:**

Regarding autonomy and customization, they advised that they find that the customization options for setting and tracking fitness objectives fall short, especially when specific and measurable fitness goals cannot support intense athletic training. Alternative wearables like Whoop are mentioned for their better suitability for rigorous sports tracking.

c) Wearability and Design:

The experts elaborated that, in terms of wearability and design, better integrated and aligned software is needed to be more professional in tracking and feedback mechanisms. They also requested an addition to the hydration tracking.

d) Innovation and Updates

The Experts advised that progress is slower than expected. Every year, a new watch model is introduced to the market without any significant update.

Flow Experience:

Experts describe being fully absorbed in their workouts, often losing track of time and external distractions, with smartwatches playing a supportive role by monitoring health metrics and helping users adjust workout intensity. While smartwatches enhance workout efficiency in many cases, they

may not always be practical for every type of exercise, such as jumping rope, where minimal technological interaction is preferred. However, even in these scenarios, smartwatches can still offer support through functions like session timing or cooldown prompts. Some users, however, did not experience the same level of "flow" due to their smartwatches.

Smartwatch and Elaboration Likelihood Model:

Experts emphasize the importance of advanced health features in smartwatches, including in-depth health monitoring like blood pressure and hydration levels and detailed workout analysis, such as in-body calculations and exercise arrangements. These features appeal to those seeking to monitor their physical wellness without professional supervision. Accuracy in feedback is critical for users to track their progress and health changes over time.

When asked about desirable features, experts highlighted the need for sophisticated tracking, especially for cardio activities, incorporating detailed metrics like strain, cooldown periods, rep counting, and muscle gain tracking. Safety features, such as emergency notifications in case of a fall, were also valued, offering a crucial blend of health monitoring and safety measures directly on the wrist.

Additionally, users appreciated features that allow them to compare their daily, monthly, or real-time performance against their

targets, motivating them and providing tangible success benchmarks. Alerts and reminders for workouts or hydration help streamline athletes' routines and align them with their fitness goals.

Some respondents pointed to the value of smartwatches in professional training environments, where trainers can access real-time data to optimize workouts. This integration helps adjust training to meet specific goals, making sessions safer and more productive. However, a few also noted a gap between consumer-grade devices and the needs of professional athletes, suggesting a demand for more advanced, professional-grade equipment. Despite this, the consensus remains that smartwatches have become indispensable tools in daily athletic routines due to their comprehensive features and convenience.

Smartwatches and Gamification Features:

Experts highlighted the competitive aspects of smartwatch gamification, such as comparing achievements with peers and engaging in leaderboards. This competitive feature strongly motivates users to surpass others and improve their fitness levels by beating previous scores. Instant feedback on progress enhances motivation by offering a real-time measure of performance. Additionally, experts noted that gamification is particularly effective for engaging younger generations, like Gen Z, who are more likely to be drawn to fitness when integrated with interactive

and gamified elements. These features can increase activity levels and participation in fitness among this demographic.

2- An overview of Casual Athlete's insights on relevant suggested implementation

Casual athletes view smartwatches as essential tools for improving athletic performance and health management, with gamification helping them reach their fitness goals. Users shared personal experiences, such as how smartwatches helped monitor heart conditions and sleep cycles, emphasizing their role in health management and sports activities. Most casual athletes confirmed that smartwatches motivate them to lead a healthy lifestyle by providing essential health metrics like heart rate, calorie burn, and exercise intensity. These metrics keep them engaged and informed about their health status, particularly for those already motivated to maintain a healthy lifestyle.

However, some concerns were raised about the potential for smartwatches to lose their impact if the novelty wears off or if they demotivate users by constantly highlighting unmet goals. Additionally, some users see smartwatches as practical devices for daily life, surpassing traditional watches by offering notifications, fitness tracking, and task management. While a few view them as fashionable accessories or a short-lived trend, most users consider them essential for a connected and efficient lifestyle, valuing their functionality over traditional timepieces.

Smartwatch Features:

a) Interactivity and Convenience

Casual athletes praised smartwatches for their interactivity and convenience, especially in health monitoring features such as tracking heart rate, steps, and other vital metrics. Real-time feedback and notifications, like low heart rate or exhaustion alerts, help users manage their health and motivate them to maintain or increase physical activity. Features encouraging competition or sending motivational notifications when others are exercising were particularly appreciated, as they replicate the experience of having a personal trainer.

Additionally, many athletes valued the convenience of smartwatches, noting that they function like mobile phones on the wrist, making communication easier during workouts or in crowded spaces. Key features such as sleep tracking, synchronization with mobile devices, and quick access to calls and notifications were highlighted as essential, elevating smartwatches beyond mere fashion accessories. However, some respondents expressed concerns about the accuracy of these devices and questioned their practicality, viewing them primarily as fashion items.

Autonomy and Customization

When asked about smartwatches' autonomy and customization, users appreciated features that let them personalize their devices, such as changing wallpapers and bands and reshaping the interface. These customization options make the smartwatch more than just a tool, transforming it into a personal expression of style and preference. Additionally, users valued the ability to adjust activity levels to match their current mood and fitness ability, whether for daily wear or more intense routines.

Smartwatches with intelligent software that adapt notifications and tracking to specific activities, such as tennis, and provide tailored insights were particularly praised for enhancing focus on relevant fitness activities. However, some respondents expressed a need for more accurate goal-setting features beyond general fitness outlines, seeking precise tracking and feedback for better fitness management.

Wearability and Design

Users generally found smartwatches comfortable and essential to their daily lives, appreciating features like payment options and sleep tracking. The round shape of specific smartwatch designs, preferred over the square Apple watch design, was noted for its comfort, making it suitable for long-term wear, including during

sleep. Users also valued the ability to adjust settings based on specific needs, enhancing user-friendliness.

However, several users highlighted areas for improvement, particularly battery life and durability. Straps tend to tear during rigorous training, limiting the device's functionality, and excessive sweat can lead to inaccurate sensor readings, affecting performance during workouts.

Innovation and Updates

Many users favor features that enhance their workout experiences, particularly apps like Nike for workout programs and health-monitoring options such as heart rate, blood pressure, and oxygen tracking. Gym and HIIT workouts value these features, providing real-time data to optimize performance. Instant feedback and notifications for health metrics are especially appreciated for keeping users engaged and informed about their progress.

However, some users expressed a need for improved tracking capabilities to motivate and suggest new workouts, aiding in fitness planning and strategy improvement. Users also welcome value-added updates, such as enhanced accuracy and emergency contact features during crises.

Respondents are growing for updates that make smartwatches more autonomous, reducing reliance on smartphones. Features like

making calls or locating the device are highly desired. A few respondents noted that smartwatch promotions often emphasize the device itself rather than focusing on features and applications that meet the evolving needs of active users.

Flow Experience:

Casual athletes identified the environment as a key motivator for their workouts, especially a supportive community or positive gym atmosphere that enhances engagement. Group activities like running, lifting weights, or CrossFit sessions significantly boost their motivation, with communal dynamics playing a vital role in achieving a flow state. However, engaging in less favored activities like jumping rope can be challenging. External stimuli like music or fitness apps help sustain focus and enhance the flow experience in these cases.

Many participants viewed smartwatches as essential tools for their workouts. They appreciated features like goal setting, real-time progress tracking, and continuous feedback, which enhanced their performance and motivation. Smartwatches were particularly valuable in running, HIIT, and group workouts, helping users maintain focus, track workout intensity, and surpass fitness goals. Music integration was also highlighted as a motivator during workouts.

Smartwatches were still seen as beneficial for solitary activities like walking. They provide feedback on steps and speed and turn casual exercises into more significant achievements, such as extending a walk from 2 km to 10 km. However, some respondents noted durability issues with smartwatches, particularly during intense activities, which sometimes disrupted their flow experience.

Smartwatch and Elaboration Likelihood Model:

Casual athletes emphasized the importance of basic fitness tracking features like counting steps and monitoring heart rate in smartwatches, viewing these as fundamental tools that encourage daily activity. Specific workout tracking through dedicated apps, goal setting, and reminders were crucial for maintaining structured exercise regimes. These features make regular workouts more manageable and seamlessly integrate into the athletes' routines, keeping them on track with alarms and reminders.

Many respondents appreciated features that combine traditional watch functions with innovative capabilities, such as extended battery life, hydration tracking, calorie intake monitoring, and digital trainer connectivity. These features enhanced the smartwatch's role as a comprehensive health management tool.

When asked how smartwatches improve athletic performance, users likened the device to essential workout gear, helping them feel more engaged and motivated. Features like tracking calories burned and exercise duration push users to meet or exceed daily goals, though some admitted this could lead to over-exercising due to high engagement levels. The smartwatch is a personal coach for others, providing analytics and reminders that contribute to a more active lifestyle.

However, some users felt the smartwatch had minimal impact on their motivation or routines, viewing the reminders and alerts as helpful but not transformative. Others found certain features irrelevant to their fitness needs, indicating a gap between the smartwatch's capabilities and user expectations.

Smart Watch and Technological Exhaustion:

Casual athletes reported little to no technological exhaustion from using their smartwatches, seeing them as an integral part of their workout routine. For many, the smartwatch is a companion, helping track progress and providing motivational boosts without overwhelming them. Some even feel dependent on their smartwatch and struggle to exercise effectively without it. However, this dependency can lead to frustration if the device malfunctions or if they become too reliant on it for motivation.

On the other hand, a few users experience intermittent technological exhaustion, where constant connectivity and alerts become overwhelming, especially when they interfere with relaxation or downtime. These individuals find that the complexity of the smartwatch's features, while initially beneficial, can sometimes distract from the workout experience and cause emotional overload. Physical discomfort, like sweat affecting wearability, further contributes to this sense of exhaustion, making the device feel more like a hindrance than a help during exercise.

Smart Watch Gamification and Athletic Performance:

Casual athletes emphasized that smartwatch gamification significantly boosts athletic performance through competitive features like comparing achievements with peers and participating in leaderboards. This competitive element motivates users to surpass their previous scores and fitness levels. The instant feedback provided by smartwatches enhances the experience by offering a constant performance measure, which drives daily motivation.

Additionally, goal achievement notifications act as positive reinforcement, celebrating milestones and encouraging users to continue pursuing their fitness objectives. The rewards system in gamification, such as earning badges, points, or completing

monthly challenges, further motivates users by giving them a sense of accomplishment and tangible evidence of progress.

Contrast between the Exploratory Study and the literature: Relationship Between Smartwatch Attributes and Absorption/Enjoyment Levels

Several interviewees highlighted that smartwatch features like interactivity (notifications and connectivity), autonomy (personalized settings and goal tracking), wearability (comfort during physical activity), convenience (easy access to features), and experiential novelty (new updates) enhance their engagement and enjoyment in activities. These advanced smartwatch features contribute to a deeper level of involvement, supporting the literature that smartwatch attributes increase user engagement and pleasure during physical activities.

Gamification in Smartwatches

Responses indicated that gamification elements like rewards, challenges, and competitive features such as leaderboards significantly impact how users interact with their smartwatches and engage in physical activities. These gamification features enhance the relationship between smartwatch attributes and users' absorption and enjoyment, aligning with the literature. This suggests that incorporating game-like elements increases the

motivational effect of smartwatch features on user behavior, making activities more engaging and enjoyable.

Absorption and Enjoyment (Flow state)

The interview feedback highlights that increased absorption and enjoyment of smartwatch features motivate users to set and stick to exercise goals, supporting the literature. These findings demonstrate how much users enjoy their smartwatch and how engaging they find it, which can lead to more consistent exercise behaviors. Thus, the feedback reinforces the connection between smartwatch use and motivation for physical activity.

Exercise Intention

While direct responses to this hypothesis were not highlighted, the link between increased activity levels (stimulated by absorption and enjoyment) and improved athletic performance through regular exercise routines was implied. Users felt more compelled to exercise and perform better athletically when they regularly interacted meaningfully with their smartwatches, thus potentially supporting the literature.

Gamification and Athletic Performance

Responses highlighted that gamification features (like achieving targets, receiving badges, and tracking progress through competitive frameworks) motivate exercise and enhance athletic performance. This positive feedback loop is consistent

with the literature, underscoring the effectiveness of gamification in elevating athletic outcomes.

Accordingly, the interview responses largely support the literature, demonstrating the multifaceted role of smartwatch attributes in enhancing user experience, motivating physical activity through gamification, and ultimately improving athletic performance through increased exercise intention.

Proposed Hypothesis:

From the above findings, the researcher suggests the following hypotheses are proposed to be tested in future research.

- H1: There is a significant positive relationship between Smart Watches Attributes and Absorption levels.
  - There is a direct relationship between Interactivity and Absorption.
  - There is a direct relationship between Autonomy and Absorption.
  - There is a direct relationship between Wearability and Absorption.
  - There is a direct relationship between Convenience and Absorption.
  - There is a direct relationship between Experiential Novelty and Absorption.

- H2: There is a significant positive relationship between Smart Watches Attributes and Enjoyment levels.
    - There is a direct relationship between Interactivity and Enjoyment.
    - There is a direct relationship between Autonomy and Enjoyment.
    - There is a direct relationship between Wearability and Enjoyment.
    - There is a direct relationship between Convenience and Enjoyment.
    - There is a direct relationship between Experiential Novelty and Enjoyment.
- H3: Gamification moderates the relationship between Smartwatch attributes and Absorption in flow experience.
    - H3a: Gamification moderates between Interactivity and Absorption.
    - H3b: Gamification moderates between Autonomy and Absorption.
    - H3c: Gamification moderates between Wearability and Absorption.
    - H3d: Gamification moderates between Convenience and Absorption.
    - H3e: Gamification moderates between Experiential Novelty and Absorption.

- H4: Gamification moderates the relationship between Smartwatch attributes and Enjoyment in flow experience.
    - H4a: Gamification moderates between Interactivity and Enjoyment.
    - H4b: Gamification moderates between Autonomy and Enjoyment.
    - H4c: Gamification moderates between Wearability and Enjoyment.
    - H4d: Gamification moderates between Convenience and Enjoyment.
    - H4e: Gamification moderates between Experiential Novelty and Enjoyment.
- H5: Absorption mediates between Smartwatches Attributes and Exercise Intention.
- H6: Enjoyment mediates between Smartwatches Attributes and Exercise Intention.
- H7: Exercise Intention Mediates between Flow Experience and Athletic Performance.
    - Exercise Intention Mediates between Absorption and Athletic Performance.
    - Exercise Intention Mediates between Enjoyment and Athletic Performance.
- H8: There is a significant positive relationship between Gamification and Athletic performance.

Discussion, Conclusion, and Managerial Implications

Implications of the Exploratory Research:

The interviews conducted as part of this exploratory study on the effects of smartwatch gamification on athletic performance have several implications and provide valuable insights into product development and user engagement strategies.

1- Implications for Smartwatch Manufacturers:

The interviews indicate a strong demand for specific smartwatch design and functionality improvements. Manufacturers should consider developing more robust health monitoring features, such as hydration trackers and environmental scanners, to cater to athletes who engage in high-intensity workouts. This would improve user safety and enhance smartwatches' attractiveness to a broader athletic audience.

Athletes expressed concerns about sweat interfering with the device's functionality and needing more durable, sweat-resistant materials. Manufacturers could innovate in materials technology to create straps and casings better suited for intense physical activities, thereby increasing the device's longevity and reliability during workouts.

Extending battery life remains a critical area for development. For athletes, having a reliable device that does not

require frequent charging is essential, especially during long training sessions or competitions.

2- Implications for App Developers:

There is a clear interest in having more personalized, app-driven gamification features that act like a personal trainer. App developers should focus on creating customizable workout programs that incorporate gamification elements such as challenges, rewards, and social competition to maintain high user engagement and motivation levels.

Integrating artificial intelligence to set dynamic, personalized fitness goals based on the user's progress and conditions could revolutionize how athletes interact with their devices. AI could also help adjust workout plans in real time based on performance metrics and health indicators captured by the smartwatch.

3- Implications for Health and Fitness Industries:

The findings suggest that gamification can significantly enhance athletic performance by increasing motivation and engagement. Fitness centers and health professionals might explore ways to incorporate smartwatch data to tailor fitness programs and challenges that encourage healthier lifestyles. The expressed need for empirical research on the effectiveness of smartwatch gamification offers an opportunity for academic and industry collaborations.

4- Behavioral Implications:

Addressing technological exhaustion is crucial as smartwatches integrate into daily life and athletic routines. Features that allow users to toggle notifications or provide "quiet" periods could help reduce sensory overload and allow for disengagement when needed.

Smartwatches also contribute significantly to the United Nations Sustainable Development Goals (SDGs), particularly SDG 3 (Good Health and Well-being), SDG 11 (Sustainable Cities and Communities), and SDG 17 (Partnerships for the Goals). Promoting healthier lifestyles through real-time health monitoring, step counting, and exercise tracking helps reduce the risks of chronic diseases (Piwek et al., 2016). Additionally, they encourage active transportation, reducing traffic congestion and emissions (Wanner et al., 2012). Integrating with health apps, smartwatches enhance well-being, manage stress (Lyzwinski, Caffery & Edirippulige, 2019), and contribute to global partnerships between healthcare providers and public health organizations (Reeder & David, 2016). Furthermore, gamification boosts user engagement by fostering a motivated community through data sharing and health achievements (Zhu, Dailey, Kreitzberg, & Bernhardt, 2017; Attig & Franke, 2019).

Research Limitation

The main study limitation is the limited number of interviews. However, exploratory research will pave the way for more conclusive empirical studies.

Future Research

This research study may pave the way for new research directions in the future. In the exploratory study, experts were questioned about their opinions, and a few of them expressed concerns about the following:

- Gamification features for closed environments of various athletic locations.
- Integration of AI in setting gamified objectives for workouts.
- Empirical analysis of the gamification of smartwatches on athletic performance.
- The technological Exhaustion concept needs more review and analysis.

Conclusion

In conclusion, this exploratory study confirms the significant potential of smartwatches in enhancing athletic performance and opens new avenues for future research. There is a clear opportunity to explore how AI can be integrated to refine gamification strategies, optimize smartwatches for specific

training environments, and address technological exhaustion. By continuing to innovate and refine these devices, there is promising potential to further support athletes in achieving their health and fitness goals, thus contributing to the broader public health objectives outlined by global health authorities and the supported vision of the 2030 UN SDGs in the Sustainable Development Goals.

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