

Redefining the Fitness Industry: A Study of Wearable Fitness Technology Effects on Customer Experience and Data Collection

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Abstract

This paper discusses how wearable fitness trackers or smartwatches have redefined the fitness industry by transforming the customer experience by highlighting data collection. The main categories of discussion will be aimed at first defining customer experience and how it pertains to smartwatches. The following sections will introduce the various kinds of data collected and how each category provides a different experience for the user. Finally, a discussion of data security and privacy will be addressed to further the importance of maintaining a positive customer experience to aid in the success of the fitness industry. A thorough literature analysis will be performed, followed by a discussion of the findings.

Introduction

Background and Rationale

Regular physical activity is pivotal in maintaining a healthy lifestyle. According to the Centers for Disease Control and Prevention (CDC), physical activity can improve brain health, weight management, reduce the risk of disease, strengthen bones and muscles, and improve overall ability to perform everyday activities (CDC, 2022). A healthy lifestyle can increase life expectancy and improve mobility and strength.

Often, consumers desire support to help motivate them to continue practicing healthy habits. An Internet of Things (IoT) device known as a "wearable" has revolutionized the fitness industry. Wearable fitness trackers have become significant tools in helping consumers achieve their fitness goals. The devices have seamlessly integrated into everyday life and are projected to continue growing. According to the International Data Corporation, wearable devices are expected to experience a Compound Annual Growth Rate (CAGR) of 5% in 2023. Specifically, smartwatches will see a 6.8% CAGR from 2022-2027. The devices comprise 31.2% of the market share in wearable technology (International Data Corporation, 2023). In this paper, the terms "wearable fitness tracker" and "smartwatch" are used interchangeably and will serve as the primary focus of discussion.

A smartwatch is a wrist-worn device with computational power, biometric-tracking, and motion sensors that can connect to other devices or the internet and use an integrated clock (Bieber et al., 2012). Smartwatches are small, computerized devices that track, monitor, and notify users. Typically, smartwatches are paired with a mobile phone, allowing users to

conveniently collect, view, and manage data. Smartwatches use accelerometers, altimeters, and other sensors to gather information about physical activity and movement (Farrokhi et al., 2021).

Over the past decade, smartwatches have evolved to prioritize physical activity and promote a healthy lifestyle. The first modern fitness-focused smartwatch was released in 2009, known as the "Fitbit Classic." The device was the first wireless activity tracker to sync data with the internet and offer the same data on a mobile phone (Ometov et al., 2021). Prominent technology companies like Apple, Google, Samsung, and Garmin have each developed versions of fitness trackers, competing to capture a market share. As seen in Figure 1, an Apple Watch tracks a running workout and provides biometric information such as heart rate, time spent exercising, time spent in a specific zone, and average heart rate.

Figure 1

Apple Watch Running Workout Interface



Note. Adapted From *Watch - why Apple Watch*, by Apple Inc.

(<https://www.apple.com/watch/why-apple-watch/>)

Smartwatches can instantly display notifications through their connection with mobile devices, allowing users to receive real-time updates on emails, text messages, phone calls, and other application messages. Additionally, smartwatches can deliver health-related notifications, enabling users to monitor vital health indicators. Ogbanufe and Gerhart (2018) highlight that a smartwatch has a pedometer function that monitors health conditions such as blood pressure and heart rate. Health notifications are a valuable tool that assists patients in monitoring and communicating their health status with healthcare providers (Pingo & Narayan, 2019).

Wearable fitness trackers are versatile gadgets that collect, organize, manage, and monitor user information in ways the fitness industry has never seen before. With the help of these devices, interest in the fitness industry and self-tracking has increased. Self-tracking of exercise continues to grow as a social trend, focusing more attention on the fitness industry (Lupton, 2016). Participants in a study by Pingo and Narayan (2019) also wore wearable fitness trackers to understand how the user manages information from the device and what motivates them to continue using it. The study showed that activity trackers could influence behavior and attitude toward physical activity (Pingo & Narayan, 2019). Furthermore, data collected from the devices produce more information for the user and the industry. Therefore, wearable fitness trackers help redefine the fitness industry by transforming the customer experience and highlighting user data.

Methodology

The methodology employed in this study involves an in-depth exploration of existing literature on customer experience and data collection related to wearable fitness trackers and smartwatches. The literature review will serve as a foundational framework for understanding

the key concepts and themes associated with customer experience and data collection in the fitness domain. Articles, journals, and other academic works from university databases will be used for research to complete the literature review. Additional statistics and images were taken from publicly available databases. The analysis will provide additional thoughts on the material collected and examine the relationship between customer experience and data collection in wearable fitness trackers and how these topics inherently redefine the fitness industry. The final discussion will address any limitations and gaps within the research as well as provide a conclusion to the material discussed.

Literature Review

Defining Customer Experience in Fitness

"Physical fitness" and "physical activity" are used interchangeably throughout this paper, as they both refer to the level of movement equivalent to a workout or other form of exercise.

Customer Experience, as defined by Jain, Aagja, and Bagdare (2017), is a strategic process aimed at creating holistic customer value, achieving differentiation, and sustaining competitive advantage. Fitness companies recognize the importance of providing a quality customer experience because the concept helps further promote business goals. Promoting a healthy lifestyle and creating technologies to make exercise easier contribute to creating a positive customer experience in fitness.

Kuuru et al. (2019) describe customer experience with physical activity as not only limited to the individual's bodily sensations during exercise but also as the environment controlled by the service provider and the presence of other customers, significantly influencing

the overall experience. Customers' interpretation of their experience directly impacts their behavior and decision-making. Successful businesses use this concept to create and sell better products or services. Therefore, the fitness industry must focus on curating a positive customer experience that considers the sensations of exercise and the customer's interpretation of that experience to continue making a profit.

Customers are often intrigued by the latest technological advancements and are eager to participate in the latest trends. The fitness industry creates relevant devices that utilize advanced technologies to continue offering quality customer experience (Valcarce-Torrente et al., 2021). Fitness companies strive to create an environment focused on satisfaction and personal achievement while exercising; therefore, fitness companies are more likely to retain customers and expand customer loyalty while employing these ideas. Furthermore, integrating these concepts into a company's practices will contribute to a positive customer experience.

Consumer Behavior

Understanding behavior is crucial for fitness companies as it provides insight into customers' needs and wants to improve customer experience. Consumer Behavior, defined by Țicău and Hadad (2021), is "the process of understanding one's needs and wants through the selection, purchase, usage, or disposal of products, services, experiences, and ideas." Fitness companies study consumer behavior to continue developing products that promote a healthy lifestyle and address the needs of their target market. Once consumer behavior is understood, companies can offer better avenues for satisfaction.

For example, Fitbit, a well-known player in the fitness industry, created a program called "Fitbit Care" centered around gathering consumer behavior data to provide insights into the

health and well-being of users (FitBit Health Health Solutions, 2023). By considering the needs and wants of consumers, companies can attract new customers and support current relationships, ultimately providing a better customer experience within fitness.

Customer Experience and Wearable Fitness Trackers

Physically active consumers want to establish healthy routines and see positive outcomes. Smartwatches and wearable fitness trackers can support goals such as weight loss, muscle growth, and increased sleep. Țicău (2021) notes that adopting wearable fitness technologies is connected to users' desired health outcomes. Wearable fitness trackers encourage building and maintaining an active lifestyle crucial to overall health and well-being.

In a study by van Oostrom et al. (2012), participants were monitored over ten years to determine if remaining physically active in adulthood could alter a person's health-related quality of life. The study showed that adults who became active reported increased physical functioning, vitality, and general health after ten years (van Oostrom et al., 2012). Wearable fitness trackers serve as a tool for establishing a healthier lifestyle and contribute to an increased customer experience in fitness.

Data Collection

Fitness companies utilize wearable fitness technology to collect beneficial customer data such as exercise history and its relation to internal motivation, social connections, and health monitoring. By collecting and analyzing this data, fitness companies can alter their services to meet customer needs and create a more meaningful and engaging customer experience. The next section will detail the benefits of gathering smartwatch data to elevate the customer experience.

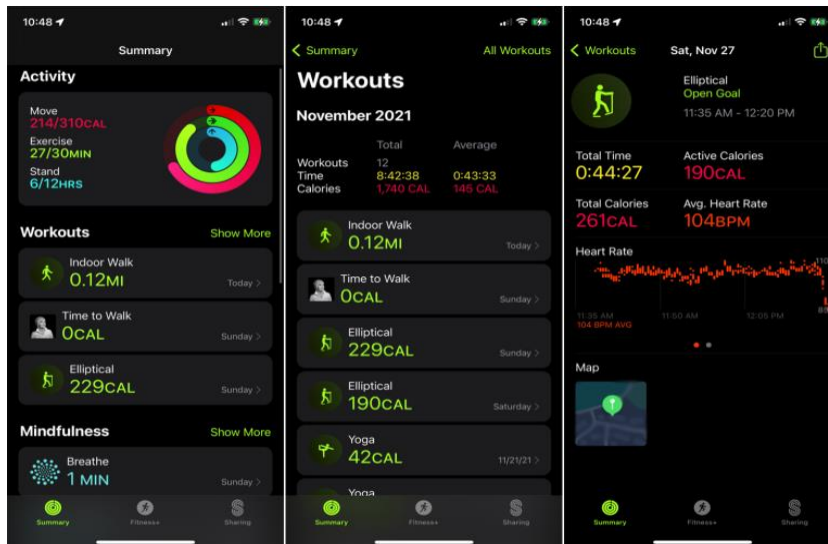
History and Motivation

Recording smartwatch data offers numerous advantages to users, including access to personalized fitness history, which encourages motivation. According to Nelson et al. (2016), smartwatches empower users to gain insights into their well-being patterns and set goals for improvements, going beyond the collection of quantifiable data on movements, calories burned, and hours of sleep. The goal-setting process encourages motivation and accountability. Aligning with the goal-setting theory proposed by Arshad, Baharun, and Zaidin (2022), which highlights that personal accountability in fitness can improve self-efficacy and engagement in reaching a goal, goal-setting theory helps individuals or groups engage in an activity. Once users have established their personal goals, a commitment to physical fitness is created. In a study by, Siepmann and Kowalczyk (2021), users approved of self-quantification and its ability to strengthen achieving fitness goals, supporting the idea that users should take responsibility for tracking their historical fitness data to set better goals that not only relate to physical outcomes but also emphasize internal motivation. Users can establish internal motivation and accountability by consistently engaging with the smartwatch.

In a study by Pingo and Narayan (2019), smartwatches were used to track activity and inspire goal setting. The findings revealed that participants perceived the activity trackers as useful tools that motivated them to monitor and optimize goals while providing records for the tracked activities (Pingo & Narayan, 2019). Past performances or workouts aid in goal setting by providing certain metrics required to set accurate and attainable goals. These metrics include heart rate, calories burned, and time spent on the exercise. Smartwatches can collect and display this data on a mobile phone through paired connection. As seen in Figure 2, users can view and then analyze historical data collected from their Apple Watch displayed on their mobile devices.

Figure 2

Apple Activity Summary Displayed on iPhone



Note. Adapted From *How to track workouts and activities on your Apple Watch*, by PCMAG (<https://www.pcmag.com/how-to/track-apple-watch-workouts-activities>)

Furthermore, smartwatches can provide positive feedback to its user once progress has been made. Users who prioritize physical fitness believe that attaining their goals and increased motivation are connected to positive feedback from their devices (Laran, 2016). Once a goal has been achieved, a sense of accomplishment and satisfaction is felt; therefore, motivation to continue using the smartwatch and following a fitness routine increases. The ability to record and analyze historical data through smartwatches gives users insights into their fitness journey and helps boost motivation to achieve fitness goals while contributing to the customer experience.

Connection

In addition to historical tracking and goal setting, social connection has also proven effective in helping users to achieve their fitness goals. Wearable fitness trackers help users connect by offering an opportunity to observe, compare, and compete in workouts with other individuals who utilize the same device. For example, Apple, one of the leading producers of smartwatches in the market, advertises that the devices can "encourage each other to be active or let your trainer track your daily progress" (Apple Inc., 2023). The interactive features of a smartwatch help engage users in a supportive environment that encourages competition and a shared interest. Another popular technology brand, Garmin, offers a similar function called "Garmin Connect" that encourages users to share fitness data, complete challenges, and cheer on friends and family (International, n.d.). Having a platform to share milestones and personal achievements with other users forms a community to provide ongoing support. An example of users sharing information on an Apple Watch is seen in Figure 3. The positive reinforcement from a community with a wearable fitness tracker can contribute to a sense of belonging and a shared commitment to physical fitness.

The influence of social interaction through smartwatches has motivated users to continue using the device and stay active. Farrokhi et al. (2021) highlight the importance of receiving support from others as it relates to influencing health and fitness behaviors. Furthermore, Rising et al. (2021) studied the likeliness of users sharing fitness data with others, reporting that the "willingness to share wearable data with family or friends was significantly associated with perceived health status, health self-efficacy, and level of physical activity." These studies show that users' activity level is linked to how likely they are to share their fitness data. Therefore, the

continued use of a smartwatch encourages users to share their data and increases customer experience.

Figure 3

Apple Watch Sharing Interface



Note. Adapted From *Share your activity with your iPhone and Apple Watch*, by Apple Inc., 2023 (<https://support.apple.com/en-us/HT207014>)

Health Monitoring

Wearable fitness trackers also offer capabilities to help monitor body vitals and detect potential health concerns. Smartwatches can notify users of health conditions such as abnormal heart rate and poor sleep habits. The devices can track irregular heart rhythms using an electrocardiogram (ECG) application. In certain models of the Apple Watch, an ECG application and an Atrial Fibrillation (AFib) application have been added to the device's functions. The features benefit users medically diagnosed with Atrial fibrillation (Apple Inc., 2022). The applications allow users to monitor their heart status and detect irregularities to help mitigate potential heart complications.

Additionally, smartwatches can monitor heart rate while exercising and be used as a training tool. Testimonials from a participant in a study by Pingo and Narayan (2019) highlighted the value of step-tracking capabilities and heart rate monitoring to achieve target zones. As stated by the participant, the tracker allowed for overnight heart rate monitoring to view resting heart rate and showed heart rate while working out to determine if the target heart rate zone was hit (Pingo & Narayan, 2019).

The ability to monitor sleep patterns is also intriguing to users who struggle with abnormal sleep. Users can track sleep patterns, gather comprehensive sleep data, and share it with their healthcare provider. When asleep, the devices can "trace variations in the human body, such as heart rate variation, drop in oxygen level, increase in body temperature, etc." (Khondakar et al., 2022), which can help users determine if medical attention is needed. Another testimonial from Pingo and Narayan's (2019) study showed that the participant wore a device during sleep, collected data to gain insight into sleep quality, and then shared the results with a healthcare provider. Additionally, a study by Turner et al. (2021) stated that 45% of users who adopted a wearable device presented their patient-generated data to a healthcare provider in 2019. Figure 4 displays the Fitbit Smartwatch version of a sleep tracker, where a rating on sleep quality, time spent asleep, and what hours were spent sleeping are displayed.

Wearable fitness trackers offer valuable capabilities for monitoring health concerns such as heart rate issues and abnormal sleep patterns. Users can optimize these functions by learning more about their conditions, sharing data with healthcare providers, and facilitating necessary health and wellness conversations. Utilizing health-related smartwatch capabilities further contributes to a refined customer experience.

Figure 4*Fitbit Smartwatch Sleep Tracker*

Note. Adapted From *Understand the impact of your sleep*, by Fitbit Technology
(<https://www.fitbit.com/global/us/technology/sleep>)

Challenges of Data Collection

A smartwatch's ability to collect data can provide valuable insights into a user's physical activity patterns. The challenges associated with data collection involve the security and privacy concerns of user data. The following section will define both areas, expose vulnerabilities, and provide recommendations for a better customer experience.

Security

In data collection, there is always inherent risk involved due to the individualized and personal information commonly collected. Cavusolgu (2003) describes technology security as managing associated risks with IT assets, including loss, disruption, and unauthorized information and system resources. Smartwatches store vast amounts of user-specific and personal data loaded onto the wearable when connected to the user's smartphone. In addition to

location and health data, sensitive information such as addresses, phone numbers, passwords, and payment information can be stored on a smartwatch. Bluetooth Low Energy (BLE) is a commonly used wireless technology in smartwatches and enables the device to establish connections with mobile devices (Gouda et al., 2020). Barcena, Wueest, and Lau (2014) highlight that BLE allows the wearable device to connect part-time or continuously to another computing device wirelessly.

The vulnerability of BLE jeopardizes customer data. BLE, due to its short-range wireless communication functions, puts wearable devices at risk because attackers can "sniff the data" or "undermine the wireless device synching mechanism" to hack into a user's smartwatch that is controlled by another computer (Barcena et al., 2014). The issues with BLE exposes customer data, putting smartwatches and their mobile devices in danger of potential hacking attempts (Gouda et al., 2020).

The risks associated with data security draw attention to safeguarding sensitive information. Tactics such as encryptions, authentication methods, and software updates are crucial for mitigating threats and protecting user data (Sampat & Pabhakar, 2017). Implementing such measures can better protect customer data and improve customer experience using a wearable fitness tracker.

Privacy

In addition, privacy is a significant concern for many smartwatch owners. Li (2011) describes privacy in the context of Information Systems as an individual's tendency to be worried about their information privacy. It is common for user data to be shared with third parties, a stipulation placed in many privacy policies of fitness companies (Sampat & Prabhakar, 2017).

Fitbit, for instance, states in its privacy policy that non-personally identifiable user data may be shared with third parties, as noted by Kang and Jung (2020).

Marketers are particularly interested in user data because it allows them to build a user profile and tailor marketing efforts accordingly (Barcena et al., 2014). For instance, if a competitive swimmer consistently uses a smartwatch to track their daily training regimens, a marketer could access information about the training session, like the time, location, and personal biometrics, including age, height, and weight. Armed with this data, the marketer can send targeted advertisements for swimming equipment based on the user's patterns and preferences. Strategies like this make user data valuable in the eyes of business professionals but also draws concerns from customers who desire privacy. Apart from business interests, other risks involved are identity theft, profiling, location of user or stalking, embarrassment, extortion, and corporate use and misuse (Barcena et al., 2014).

Currently, few restrictions govern user data collection from wearable fitness devices. However, in March of 2021, the Smartwatch Data Act was introduced to Congress to further restrict the use, sale, and sharing of personal health data stored on smartwatches. According to the Smartwatch Data Act, entities collecting personal health information from consumer devices are prohibited from transferring, selling, or allowing domestic entities to access such information to increase profits or generate commercial value (SMARTWATCH Data Act., 2021).

The risks associated with capturing and handling personal information from wearable fitness trackers highlight the importance of privacy and security measures. Prioritizing the protection of data as well as establishing clear guidelines for data collection and usage, is

essential for the continued success of wearable fitness trackers. By addressing the risks involved and promoting better privacy and security measures, customers can experience the device better.

Analysis

Curating a positive customer experience in fitness with the help of wearable devices has transformed the fitness industry. Using advanced technology to promote a healthy lifestyle adds value to the customer experience. By utilizing this concept, businesses are better able to achieve their goals, and users receive a better customer experience. Therefore, quality customer experience is crucial to the survival of the fitness industry. Companies must also emphasize understanding consumer behavior because it exposes customers' needs and wants to help advance the customer experience. Studying consumers' behavior allows companies to create better products, maintain current customers, and make room for additional buyers. The customer experience is heightened in the fitness industry with the addition of wearable fitness trackers or smartwatches. These devices have been known to help individuals achieve their desired fitness goals (Țicău, 2021) and are a useful tool for promoting longevity (van Oostrom et al., 2012).

Smartwatches serve as a compelling tool for individuals committed to lifelong physical activity. The device can track various movement patterns across different activities; a non-exhaustive list includes running, swimming, biking, and weightlifting. Regardless of the specific activity of interest, a smartwatch can provide valuable support by tracking the duration of the activity and measuring physiological indicators, such as heart rate (Pingo & Narayan, 2019). By offering such features, wearable fitness trackers can positively impact the customer fitness experience and encourage sustained physical activity.

Customer fitness experience is transformed through the utilization of data collected from wearables. Such data provides valuable information about a customer's fitness history, connections, and potential health concerns. Smartwatches collect a wealth of data that can be used in various ways. The devices can record and display a user's history, which enhances internal motivation, facilitates social connections, and monitors vital signs to detect potential health concerns. By providing multiple avenues of use, smartwatches contribute to an elevated customer experience in fitness.

Furthermore, consumers are often concerned about data security and privacy issues when using a smartwatch. Bluetooth connections can leave the devices vulnerable to hacking attempts, compromising data security. To combat this issue, companies must implement additional methods such as encryption protocols, strengthened authentication methods, and regular software updates to mitigate threats (Sampat & Pabhakar, 2017). Additionally, privacy emerges as another concern for users due to the amount of third-party access to personal information. Marketing departments are interested in user data because it enables customer profile building. Although action has been taken to improve customer privacy, additional research is necessary to enhance data protection. The fitness industry must focus on improving users' security and privacy to better customer experience.

Discussion and Conclusion

This paper seeks to address the transformation of the fitness industry brought about by wearable technologies, emphasizing customer experience and data collection. Smartwatches have the potential to cater to the diverse needs of individuals seeking a healthy lifestyle. By offering features that enable access to historical statistics that foster internal motivation, facilitate

deeper social connections, and monitor vital signs to detect health concerns, smartwatches meet a wide range of consumers invested in physical activity, health, and well-being.

Several propositions emerged upon completion of the analysis. Customer experience is crucial in establishing and maintaining success within the fitness industry. Recognizing the significance of customer experience and actively working to enhance it can lead to positive outcomes for fitness companies. Regular physical activity is a challenging yet vital commitment to maintaining a healthy lifestyle. Wearable fitness trackers are valuable tools to aid in this commitment by offering functions that enhance the experience. By acknowledging the importance of customer experience and leveraging the capabilities of wearable fitness trackers, fitness companies can support users in their fitness goals and contribute to the industry's long-term success.

Throughout the research conducted, some limitations and gaps presented themselves. The first involves a discussion centered around customer experience as it pertains to the success of companies in the fitness industry. Much research has been conducted on customer experience concerning utilizing smartwatches, but only some have touched on the success businesses gain in response to having an effective customer experience with smartwatches specifically. Further research must be conducted to bridge the gap between customer experience and business success. Additionally, the time allotted for an adequate literature review was limited to expand four months of research and writing time. Furthermore, access to additional material and database studies would benefit future research.

Smartwatches possess a unique ability to elevate physical fitness and transform the customer experience through advanced data collection. The device can translate raw data into

notable information and personalized results. Wearable fitness trackers enable users to gather and analyze a wealth of data related to their physical activity, providing valuable insights and feedback that can greatly enhance their fitness journey.

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