NOVA IMS Information Management School

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## The intention to use fitness and health apps: The case of online live training

Diogo José Pereira de Fortunato Antunes

Master Thesis

presented as partial requirement for obtaining the Master Degree in Information Management

**NOVA Information Management School**
**Instituto Superior de Estatística e Gestão de Informação**

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# The intention to use fitness and health apps: The case of online live training

by

Diogo José Pereira de Fortunato Antunes

Master Thesis presented as partial requirement for obtaining the Master's degree in Information Management, with a specialization in Knowledge Management and Business Intelligence.

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# STATEMENT OF INTEGRITY

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism, any form of undue use of information or falsification of results along the process leading to its elaboration. I further declare that I have fully acknowledged the Rules of Conduct and Code of Honor from the NOVA Information Management School.

*Lisboa, 30 November 2024*

*Diogo José Pereira de Fortunato Antunes*

# DEDICATION

I dedicate this thesis to my family, close friends, and girlfriend for their steady support and encouragement throughout the duration of this journey. Your belief in my work has been invaluable. Thank you.

# ACKNOWLEDGMENTS

I am deeply appreciative of the mentorship and support provided by Professor Tiago Oliveira and Professor Jorge Tavares throughout my dissertation process. Their insights and availability have been fundamental in guiding my research and educational path. Additionally, I am thankful to NOVA Information Management School for its commitment to academic excellence and for supplying the essential resources needed for my project's success.

# ABSTRACT

Digital platforms and technological advances have redefined the way people engage with sports training. As people increasingly seek flexible training solutions that accommodate their schedules and adapt to their individual needs such as training at home, digital training platforms have emerged as a versatile and convenient alternative to traditional training methods. The aim of this study is to explore the factors that lead to the intention to use online live training platforms taking in consideration the wellbeing concept. A conceptual research model was developed based on the combination of the constructs from Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) and Ubiquity. An online questionnaire was conducted in Portuguese with 146 valid responses. The partial least squares (PLS) modeling approach was used to test the model. The research model applied shows the most important drivers of the adoption to use online live training platforms. Aspects such as performance expectancy, social influence, habit and time savings are crucial to the user adoption of this technology. The growing concern of individuals about their wellbeing and health has contributed to the increased use of fitness apps and so the findings in this study highlight that behavioral intention and use behavior play a crucial role in wellbeing.



# KEYWORDS

Fitness Apps; Technology Adoption; Physical Activity; Wellbeing; UTAUT2; Ubiquity


## Sustainable Development Goals (SDG):

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# LIST OF ABBREVIATONS AND ACRONYMS

| | |
|---|---|
| AVE | Average Variance Extracted |
| BI | Behavioral Intention |
| CA | Cronbach's Alpha |
| CR | Composite Reliability |
| SD | Standard Deviation |
| EE | Effort Expectancy |
| FA | Fitness Apps |
| FC | Facilitating Conditions |
| HA | Health Apps |
| HM | Hedonic Motivation |
| HT | Habit |
| HTMT | Heterotrait-monotrait |
| I | Immediacy |
| PE | Performance Expectancy |
| PLS-SEM | Partial Least Squares Structural Equation Modelling |
| PWB | Perceived wellbeing |
| SF | Spatial Flexibility |
| SI | Social Influence |
| TS | Time Savings |
| UB | Use behavior |
| UTAUT | Unified Theory of Acceptance and Use of Technology |

# 1. INTRODUCTION

The development of technology have contributed to mobile apps growth and as smartphones and wearable devices become more prevalent in healthcare worldwide, digital health is emerging as a central element of future health and wellbeing (Ahn & Park, 2023). Health apps (HAs) and Fitness apps (FAs) have emerged as two of the most accessible methods of encouraging individuals to participate in healthier behaviors (Acikgoz et al., 2023; Azar et al., 2013; Barkley et al., 2020) in a sense that digital technologies and mobile apps have become an integral element in the daily lives of many people worldwide (Dwivedi et al., 2021). HAs and FAs can be related to the "mHealth" collective term for the use of mobile devices in private medical care (Agarwal et al., 2016). Beyond personal benefits, the usage of mHealth apps is also deemed valuable for the collective wellbeing, as it enhances overall population health (Agarwal et al., 2016) and is now part of everyday life for many citizens worldwide. According to the *Grand View Research* report, in 2022 (*Global mHealth Apps Market Size & Trends Report, 2030*, n.d.) the global market size of this type of apps was USD 43.5 billion and is expected to expand at a compound annual growth rate of 11.6% from 2023 to 2030 (*Global mHealth Apps Market Size & Trends Report, 2030*, n.d.). In addition, due to COVID-19 global pandemic, the adoption of these technologies was amplified. The confinement and consequently reduction of physical activity lead to the World Health Organization to promote the need for physical activity at home (Angosto et al., 2020). Fitness apps had a 67% jump during that period with some sports companies to adapt providing streaming workout videos and training programs (*Fitness Apps See 67% Jump in Installs during Pandemic*, 2020). That is where the interest in online live training increases in alternative to the traditional training methods. The phenomenon of the online live training is closely related to video conferencing apps (VC) which have also gained popularity during the COVID-19 pandemic (Sandhu et al., 2023) because the technology used to train online usually is the same as VC apps. Online live training is understood as the real-time streaming of workouts via digital platforms, with users typically practicing at home. Using a conceptual research model, this study aims to understand the adoption of online live training apps and what is the impact on the wellbeing of the users using this method of training. To address the study objectives, a conceptual research model was designed based on the theoretical framework of the Unified Theory of Acceptance and Use of Technology – 2 and Ubiquity. The research questions are:

- RQ1: Which are the factors that influence the adoption of online live training apps?
- RQ2: What is the impact on the wellbeing of the users?

# 2. LITERATURE REVIEW

The literature review provides insights and perspectives on empirical research in the field related to the subject to be studied. Fitness Apps, Health Apps and mHealth are topics that can be related so it is important to have in consideration all the significant and corresponding literature. Existing research focuses on those topics while studies explaining the phenomenon of online live training are scarce. The intention to use this technology in Portugal has not been studied.

## 2.1. FITNESS APPS, HEALTH APPS AND MHEALTH

Fitness apps, Health Apps and mHealth (mobile health) applications are digital tools designed to enhance personal health and wellness. Health apps focus on overall health management, offering features like symptom tracking, medication reminders, and health information. Fitness apps specialize in physical activity, providing workout tracking, exercise guidance, and fitness goal setting. Overall mHealth encompasses a broader category that includes both health and fitness apps, often integrating with medical databases and offering remote patient monitoring, thereby playing a significant role in modern healthcare delivery. To get a deep understanding of these topics, some literature gives the main insights for further research. “Mobile Apps for Healthy Living” paper discuss factors influencing the continued use of health apps, exploring user motivation, interface design and the impact of personal health goals on app retention (Yan et al., 2021). It is important to understand the determinants of mHealth success by analyzing key factors from the user perspective that contribute for that success (Birkmeyer et al., 2021). According to (Acikgoz et al., 2023) the role of subjective knowledge, innovativeness and health consciousness influences the intention to use fitness apps. In this research the TAM model was extended to include those individual psychological constructs. Based on the online review comments and applying a model to identify satisfaction in user of fitness apps, the “Usability”, “Usefulness”, “Affection”, “Hedonic Values”, “User Burden Values”, “Expectation-confirmation”, “Pragmatic Values” and “Social Values” constructs were studied (Ahn & Park, 2023). The relationship between fitness app use and physical activity behavior with the “exercise identity” as a mediator is an important contribution to know that individuals with fitness apps participates much more in physical activities then those with no fitness apps (Barkley et al., 2020).

## 2.2. THEORIES

Among the theories related to the intention to use of technologies, The Technology Acceptance Model (TAM) is a common and most used established model of technology acceptance because is simple and has a clear structure (Davis, 1989; Venkatesh & Davis, 2000). TAM is an adaptation of the psychological theory – Theory of Reasoned Action (TRA) which states that a person´s real behavior is determined by his or her intention to perform that behavior (Fishbein & Ajzen, 1975). Based on other relevant factors, the TAM was extended to include other aspects and to adapt the model to the context of the research and has been employed in a variety of areas, including finance, tourism, gaming, health and sports (Rivera et al., 2015). TAM has contributed to the development of the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) that proposes four constructs: performance expectation, social influence, effort expectation and facilitation conditions. The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) is an extension of the original UTAUT model developed specifically to understand technology acceptance and usage in consumer contexts, with a focus on individual consumers rather than organizational users. Unlike the original UTAUT model, which was centered on organizational environments, UTAUT2 incorporates

constructs relevant to consumer motivations and behaviors, acknowledging that personal factors and consumer contexts significantly impact technology adoption(Venkatesh et al., 2012). UTAUT2 was used successfully to predict the adoption of health and fitness apps, making it a relevant theory to be used in our research (Yuan et al., 2015). Still the specificity of online live training potentially requires the support of another theory to study adoption.

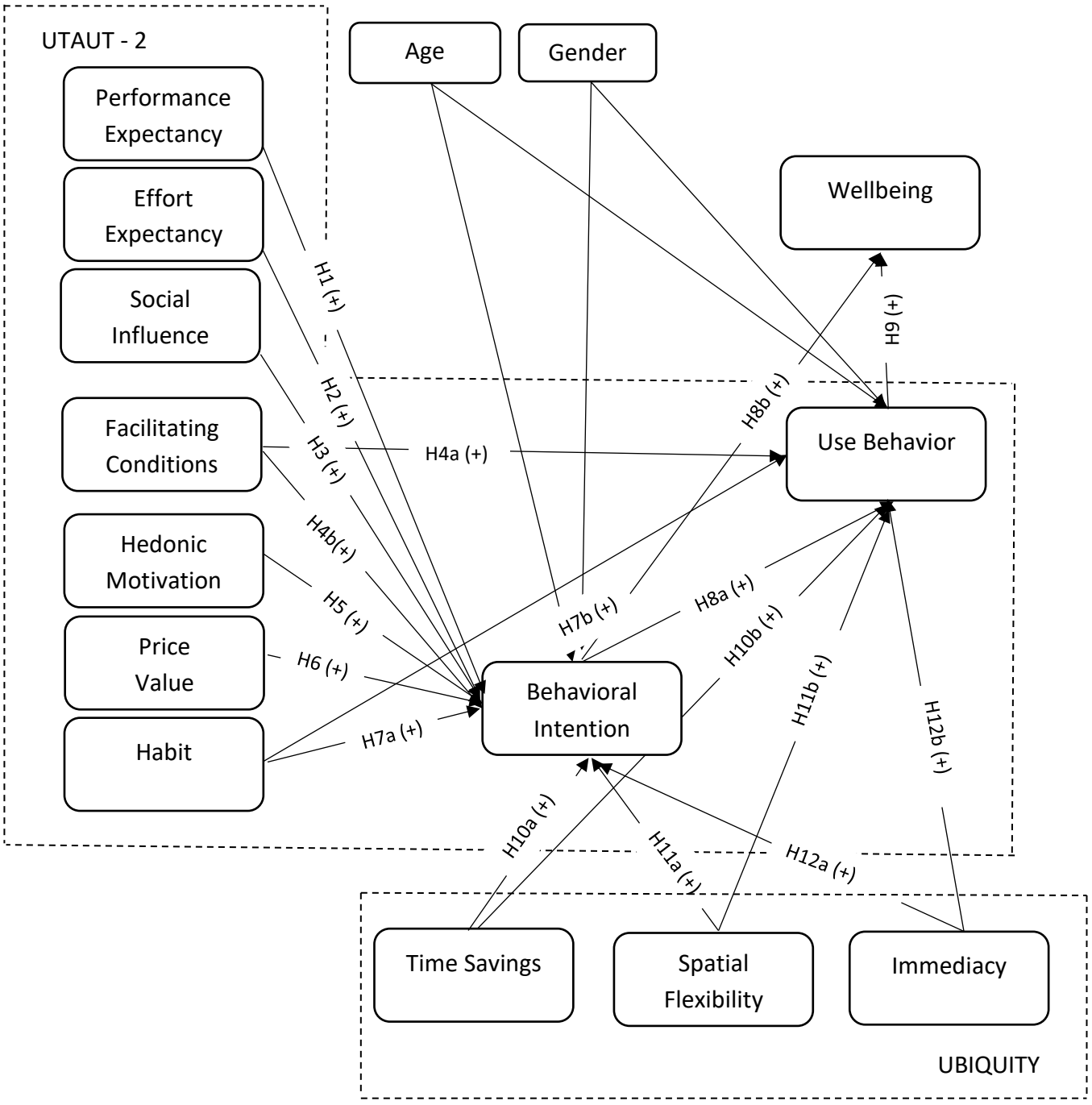
Ubiquity was added as an important factor in this research. Ubiquity encompasses constructs such as Time Savings, Spatial Flexibility and Immediacy (Okazaki & Mendez, 2013). By considering Ubiquity, we can better capture how the pervasive availability and consistent accessibility of a technology enhance its overall utility and user experience (Beckwith, 2003). This addition is relevant because it provides a more comprehensive understanding of how and why users engage with a technology across different contexts and situations, ultimately influencing their acceptance and usage patterns. Furthermore, understanding the concept of ubiquity allows us to examine how digital transformation reshapes business processes and consumer behaviors (Iansiti & Lakhani, 2014). The continuous access to technology dissolves spatial and temporal boundaries, fostering greater integration into users' daily lives. Moreover, ubiquity emphasizes not just the presence of technology but its role in enhancing decision-making processes and behavioral habits by offering immediate feedback and adaptive experiences (Doll et al., 2012). Consequently, incorporating ubiquity into our model acknowledges the importance of these constructs in shaping a more nuanced and context-sensitive understanding of user interactions with technology. Lastly, the wellbeing was added. The ultimate objective of fitness apps is to assist users to establish a healthy lifestyle and improve the wellbeing of app users(Hu et al., 2023). Regular physical activity may benefit people across different age groups by improving their well-being and quality of life (Hu et al., 2023; Mandolesi et al., 2018). Subjective well-being is important to both the physical and phycological health of individuals because it increases life expectancy, decreases the risk of disease, illness, and injury, and is associated with positive health behaviors (Hu et al., 2023; Mandolesi et al., 2018).

# 3. RESEARCH MODEL AND HYPOTHESIS

## 3.1. RESEARCH MODEL

This research was designed to examine the interconnectedness of various factors influencing the intention to use online live training. In this study, we adapted UTAUT2 by integrating different factors, including constructs from the Ubiquity as Time Savings, Spatial Flexibility and Immediacy as shown on Table 1.

**Figure 1 -** Conceptual research model



## 3.2. HYPOTHESIS

**Extended Unified Theory of Acceptance and Use of Technology Constructs**

Performance expectancy is defined as the degree to which using a technology will provide benefits to consumers in performing certain activities (Venkatesh et al., 2003, 2012). In general the users who adopt this technology of training know their benefits by using it (Angosto et al., 2020).

H1: Performance expectancy will positively influence behavioral intention.

A study within health and fitness apps demonstrated that performance expectancy can influence positively their adoption (Yuan et al., 2015).

Effort expectancy is the degree of ease associated with consumers' use of technology (Venkatesh et al., 2003, 2012) If a technology is perceived as easy to understand and use, it's more likely to be accepted by the users, including the ones of online live training apps (Venkatesh et al., 2003, 2012).

H2: Effort expectancy will positively influence behavioral intention.

Social influence is the extent to which consumers perceive that important others (e.g., family and friends) believe they should use a particular technology (Venkatesh et al., 2003, 2012). It's about social pressure or influence in decision-making of using this technology of training by the peers (Angosto et al., 2023).

H3: Social influence will positively influence behavioral intention.

Facilitating conditions refer to consumers' perceptions of the resources and support available to perform a behavior (Venkatesh et al., 2003, 2012) These are external factors that make it easier to use a technology, such as organizational and technical infrastructure support.

H4a: Facilitating conditions will positively influence use behavior.

H4b: Facilitating conditions will positively influence behavioral intention.

Hedonic motivation is defined as the fun or pleasure derived from using technology (Venkatesh et al., 2012). This construct focuses on the pleasure or fun derived from using the technology. It emphasizes that the enjoyment aspect can be a significant driver of technology adoption. It proved that can positively influence the adoption of health and fitness apps (Yuan et al., 2015).

H5: Hedonic motivation will positively influence behavioral intention.

The price value is a consumers' cognitive tradeoff between the perceive benefits of the applications and the monetary cost for using them (Dodds et al., 1991). The price value is positive when the benefits of using a technology are perceived to be greater than the monetary cost and such price value has a positive impact on intention (Dhiman et al., 2019; Venkatesh et al., 2012). Price-value have shown to influence positively the adoption of health and fitness apps (Yuan et al., 2015).

H6: Price value will positively influence behavioral intention.

Habit can be described as the degree to which people tend to perform behaviors automatically due to learning (Tavares & Oliveira, 2018). According to the literature habit can positively influence health and fitness apps (Yuan et al., 2015).

H6(a): Habit will positively influence behavioral intention.

H6(b): Habit will positively influence use behavior.

Behavioral intention has been recognized in the literature affirming that the driver of use and adoption of health and fitness apps is preceded by the behavioral intention to use them (Yuan et al., 2015). It represents a user's intention or plan to use a technology. Behavioral intention is often used as a predictor of actual technology use (Venkatesh et al., 2012).

H8a: Behavioral intention will positively influence use behavior.

H8b: Behavioral intention will positively influence perceived wellbeing.

Use behavior is driven by behavioral intention to use the system and is moderated by facilitating conditions, reflecting how external factors and the individual's intentions align to drive actual usage (Venkatesh et al., 2003). The frequency and intensity of use behavior significantly contribute to physical health and psychological well-being, demonstrating that the regular engagement with such technologies enhances users' perceived well-being (Suh & Li, 2022).

H9: Use behavior will positively influence perceived well-being.

**Ubiquity Constructs**

Time savings relate to the mental calculation the user performs regarding the time saved when using a mobile service (Okazaki et al., 2012).

H10a: Time savings will positively influence behavioral intention.

H10b: Time savings will positively influence use behavior.

Spatial flexibility relates to the perceived mobility that a mobile service provides to the users by releasing them from geographical constraints and enabling them to use the services anytime, anywhere (Okazaki et al., 2012).

H11a: Spatial flexibility will positively influence behavioral intention.

H11b: Spatial flexibility will positively influence use behavior.

Immediacy refer to the quickness of an action or occurrence (Okazaki & Mendez, 2013). Immediacy is defined as one's perceived amount of time between an action and its resulting consequences. Immediacy is directly related to the issues of timing, responsiveness, and customer wait times (Okazaki & Mendez, 2013).

H12(a): Immediacy will positively influence behavioral intention.
H12(b): Immediacy will positively influence use behavior.

# 4. METHODS

## 4.1. MEASUREMENT

The scales of all the variables in this study were used taking into account the relevant literature. Minor modifications were carried out according to adjust to the characteristics of our study topic. The scale items presented in the model were measured using a range scale from "1 – Strongly disagree" to "7 - Strongly agree". Demographic questions about age and gender were made. Age was measured in years and the gender in three possible answers "Male", "Female" and lastly "Prefer not to say" with 0 results. Gender was coded as a dummy variable, with 1 for Male and 0 for Female. An additional item in our questionnaire denominated "Duration" was measured in total number of hours. The questionnaire was developed in English. Once the questionnaire was finalized, and since our survey was implemented in Portugal, a translator translated the questions into Portuguese. Then, another translator was responsible for doing a back-translation and comparing it with the original English version to ensure accuracy (Wild et al., 2005).

## 4.2. DATA COLLECTION

Data collection was based on a questionnaire made available on a platform designed for this purpose, called Qualtrics. A pilot test was performed with 10 people, to whom our questionnaire was shared. No issues were found or reported. With this assurance we started the main data collection for this research. The questionnaire was distributed and shared in social media platforms of personal trainers, athletes, and companies that use these platforms. The reason we did this sampling approach is that according to the literature, the technology that we are studying is not frequent in the Portuguese population, that is also one of the populations in Europe that less practice sports (*Sport and Physical Activity - Setembro 2022 - - Eurobarometer Survey*, n.d.). We are therefore sampling a group of people that could be defined as a non-frequent population (constitutes a small share of the total population), and particular sample strategies can be used for these groups, like our study target population (Kalton & Anderson, 1986; Picot et al., 2001). As a result, we focused our sampling strategy on places where our target population (users of online live training digital platforms) is easier to reach out, and we therefore selected the previously mentioned social media platforms. Regarding the format of the questionnaire, an introductory note is initially presented that outlines the objectives and characteristics of the study. Only adults with an age equal or higher than 18 years old were eligible to answer the questionnaire. Subsequently, a consent form is presented to ensure confidentiality and anonymity for all respondents; those who did not give consent did not proceed with the questionnaire. Due to the special particularity of the subject under study, 146 responses were obtained from 15 June 2024 to 14 August 2024.

## 4.3. DATA ANALYSIS

Partial least squares structural equation modeling (PLS-SEM) was used to assess the model given its complexity and numerous constructs. The aim was to pinpoint the primary driver constructs and so the SmartPLS 4 software was utilized for model estimation. PLS-SEM method is oriented to explain variance of the research model and to detect statistically significant constructs on the research (Hair Jr. et al., 2021). We also used PLS-SEM because we have formatively measured constructs are part of the structural model. Prior to analyzing the structural model, first was evaluated the integrity of the measurement model.

# 5. RESULTS

## 5.1. SAMPLE CHARACTERISTICS

The sample characteristics results are displayed in Table 1. The sample average age was approximately 38,5 years, and the number of the inquired by gender were practically the same with 51% for Man and 49% for Woman.

**Table 1** - Demographic data (n= 146).

| Characteristics | Participants |
|---|---|
| **Age (years), n (%)** | |
| 18-29 | 45 (30.8) |
| 30-44 | 50 (34.2) |
| 45-59 | 43 (29.5) |
| 60 and above 60 | 8 (5.5) |
| **Gender, n (%)** | |
| Female | 75 (51.4) |
| Male | 71 (48.6) |

## 5.2. MEASUREMENT MODEL

In this model there is one formative construct, and the rest are all reflective. In order to measure the quality of this model, different measures are applied on the two different types of constructs. The starting point were the reflective constructs and the first criterion to be assessed is construct reliability or internal consistency reliability (Tavares & Oliveira, 2018). This can be evaluated by Cronbach's alpha which is a measure of internal consistency reliability that assumes similar thresholds, but produces lower values than composite reliability (Hair et al., 2018). As shown on Table 2, all constructs display Cronbach's alpha and composite reliability scores above 0.7, proof of reliability (Hair et al., 2018). Also, to provide acceptable reliability it is important to examine the indicator loadings. Loadings above 0.7 are recommended (Hair et al., 2018). This is shown on Appendix B. One more step of reflective measurement model assessment, addresses the convergent validity of each construct measure (Hair et al., 2018). The metric used for evaluating a construct's convergent validity is the average variance extracted (AVE). An acceptable AVE is 0.50 or higher indicating that the construct explains at least 50 per cent of the variance of its items (Hair et al., 2018). All the constructs met this criterion. One more step is to assess discriminant validity, which is the extent to which a construct is empirically distinct from other constructs in the structural model (Hair et al., 2018). It is traditionally assessed based on the cross-loadings and the Fornell and Larcker criterion (Table 3). Specifically, an indicator's outer loading on the associated construct should be greater than any of its cross-loadings as confirmed in Appendix B. Fornell and Larcker metric suggests that each construct's AVE should be compared to the inter-construct correlation of that same construct and all other reflectively measured constructs in the structural model (Hair et al., 2018) shown on table 3. The shared variance for all model constructs should not be larger than their AVEs (Hair et al., 2018), confirmed on table 3. Recent research suggests the use of an alternative criterion, the heterotrait-montrait ratio (HTMT) of the correlations (Hair et al., 2018) (Tavares & Oliveira, 2018). The HTMT is defined as the mean value of the item correlations across constructs relative to the (geometric) mean of the average correlations for the items measuring the same construct (Hair et al., 2018). Discriminant validity problems can occur when HTMT values are high, above 0.9 (Hair et al., 2018), information on Table 2. In addition to these guidelines, bootstrapping can be applied to test whether the HTMT value is significantly different from 1.00 (Hair et al., 2018), shown on Appendix C. This approach is particularly useful when an HTMT value crosses 0.9. We have one case with 0.9. None of the confidence intervals includes 1 (Hair et al., 2018).

**Table 2 -** Indicators of reflective constructs.

| Construct | Mean | SD[a] | CA[b] | CR[c] | AVE[d] | HTMT[e] | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | BI | EE | FC | HM | HT | I | PE | PV | PWB | SF | SI | TS |
| Behavioral Intention (BI) | 4.265 | 1.844 | 0.970 | 0.971 | 0.944 | | | | | | | | | | | | |
| Effort Expectancy (EE) | 5.414 | 1.561 | 0.957 | 0.961 | 0.886 | 0.556 | | | | | | | | | | | |
| Facilitating conditions (FC) | 5.517 | 1.575 | 0.910 | 0.919 | 0.788 | 0.448 | 0.802 | | | | | | | | | | |
| Hedonic Motivation (HM) | 4.582 | 1.712 | 0.934 | 0.935 | 0.883 | 0.790 | 0.641 | 0.529 | | | | | | | | | |
| Habit (HT) | 3.616 | 2.036 | 0.920 | 0.928 | 0.862 | 0.904 | 0.493 | 0.387 | 0.761 | | | | | | | | |
| Immediacy (I) | 4.751 | 1.614 | 0.872 | 0.876 | 0.796 | 0.613 | 0.644 | 0.593 | 0.690 | 0.522 | | | | | | | |
| Performance Expectancy (PE) | 5.005 | 1.608 | 0.936 | 0.936 | 0.840 | 0.735 | 0.601 | 0.558 | 0.749 | 0.622 | 0.745 | | | | | | |
| Price Value (PV) | 4.530 | 1.468 | 0.921 | 0.934 | 0.863 | 0.602 | 0.677 | 0.557 | 0.634 | 0.536 | 0.689 | 0.595 | | | | | |
| Perceived Wellbeing (PWB) | 4.345 | 1.763 | 0.938 | 0.939 | 0.890 | 0.767 | 0.548 | 0.425 | 0.708 | 0.742 | 0.560 | 0.673 | 0.525 | | | | |
| Spatial Flexibility (SF) | 5.468 | 1.580 | 0.847 | 0.857 | 0.766 | 0.588 | 0.728 | 0.697 | 0.574 | 0.452 | 0.746 | 0.843 | 0.674 | 0.558 | | | |
| Social Influence (SI) | 3.909 | 1.844 | 0.947 | 0.947 | 0.940 | 0.728 | 0.367 | 0.300 | 0.718 | 0.709 | 0.623 | 0.573 | 0.538 | 0.590 | 0.430 | | |
| Time Savings (TS) | 5.135 | 1.612 | 0.890 | 0.910 | 0.818 | 0.631 | 0.645 | 0.603 | 0.627 | 0.493 | 0.684 | 0.850 | 0.569 | 0.583 | 0.846 | 0.439 | |

[a]SD: Standard deviation. [b]CA: Cronbach's alpha. [c]CR: Composite reliability. [d]AVE: Average variance extracted. [e]HTMT: Heterotrait-monotrait

**Table 3 -** Fornell and Larcker criterion. Correlations and square roots of all average variance extracted in the model. Diagonal elements are square roots of all average variance extracted, and off-diagonal elements are correlations.

| Constructs | BI | EE | FC | HM | HT | I | PE | PV | PWB | SF | SI | TS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Behavioral intention (BI) | **0.972** | | | | | . | | | | | | |
| Effort expectancy (EE) | 0.538 | **0.942** | | | | | | | | | | |
| Facilitating conditions (FC) | 0.421 | 0.749 | **0.888** | | | | | | | | | |
| Hedonic motivation (HM) | 0.753 | 0.606 | 0.486 | **0.940** | | | | | | | | |
| Habit (HT) | 0.856 | 0.470 | 0.359 | 0.709 | **0.929** | | | | | | | |
| Immediacy (I) | 0.564 | 0.589 | 0.528 | 0.621 | 0.470 | **0.892** | | | | | | |
| Performance expectancy (PE) | 0.700 | 0.570 | 0.516 | 0.698 | 0.581 | 0.675 | **0.916** | | | | | |
| Price value (PV) | 0.575 | 0.637 | 0.531 | 0.593 | 0.501 | 0.619 | 0.557 | **0.929** | | | | |
| Perceived wellbeing (PWB) | 0.732 | 0.521 | 0.393 | 0.663 | 0.692 | 0.508 | 0.630 | 0.492 | **0.943** | | | |
| Spatial flexibility (SF) | 0.535 | 0.651 | 0.611 | 0.509 | 0.408 | 0.639 | 0.749 | 0.599 | 0.499 | **0.875** | | |
| Social influence (SI) | 0.698 | 0.351 | 0.279 | 0.677 | 0.661 | 0.567 | 0.540 | 0.507 | 0.556 | 0.387 | **0.951** | |
| Time savings (TS) | 0.591 | 0.600 | 0.545 | 0.578 | 0.461 | 0.604 | 0.774 | 0.522 | 0.534 | 0.726 | 0.410 | **0.905** |

Use behavior (UB) was measured as a formative construct in the research model (Hair et al., 2018). By calculating the variance inflation factor the evaluation of collinearity among indicators of the formative construct was made. The "variance inflation factor" values (Table 4) were below the value of 5 (Hair et al., 2018), which meant no collinearity issue.

Lastly, a bootstrapping approach with 5000 resamples was made to identify the statistical significance of each path (Table 5). The most significant outer weights were presented on UB1 and UB7 (Table 4). Although the others didn't had a significant outer weight they had p values greater than 0.5 meaning that all use behavior (UB) items are considered relevant (Hair et al., 2018).

**Table 4 -** Indicators of formative construct – Use behavior.

| Use behavior (UB) | VIF[a] | Outer weights | *P* values (Outer weights) | Outer loadings | *P* values (Outer loadings) |
|---|---|---|---|---|---|
| UB1: In online live training apps, I can see the training schedule. | 3.320 | 0.472 | <.001 | .934 | <.001 |
| UB2: In online live training apps, I can see the different types of training methods and choose the one who fits me better. | 4.079 | 0.188 | 0.144 | 0.870 | <.001 |
| UB3: In online live training apps, I can get some tips of training to improve my physical activity. | 3.678 | 0.025 | 0.846 | 0.794 | <.001 |
| UB4: I use online live training apps to access pre-recorded training videos. | 2.390 | 0.143 | 0.132 | 0.726 | <.001 |
| UB5: I use online live training apps integrated with other mobile devices (wearables). | 2.850 | -0.141 | 0.258 | 0.703 | <.001 |
| UB6: I use online live training apps for challenges and competitions (gamification). | 2.214 | 0.080 | 0.389 | 0.664 | <.001 |
| UB7: I use online live training apps to access reports and statistics about my progress and training. | 2.607 | 0.368 | 0.003 | 0.860 | <.001 |

[a]VIF: Variance inflation factor.

## 5.3. STRUCTURAL MODEL

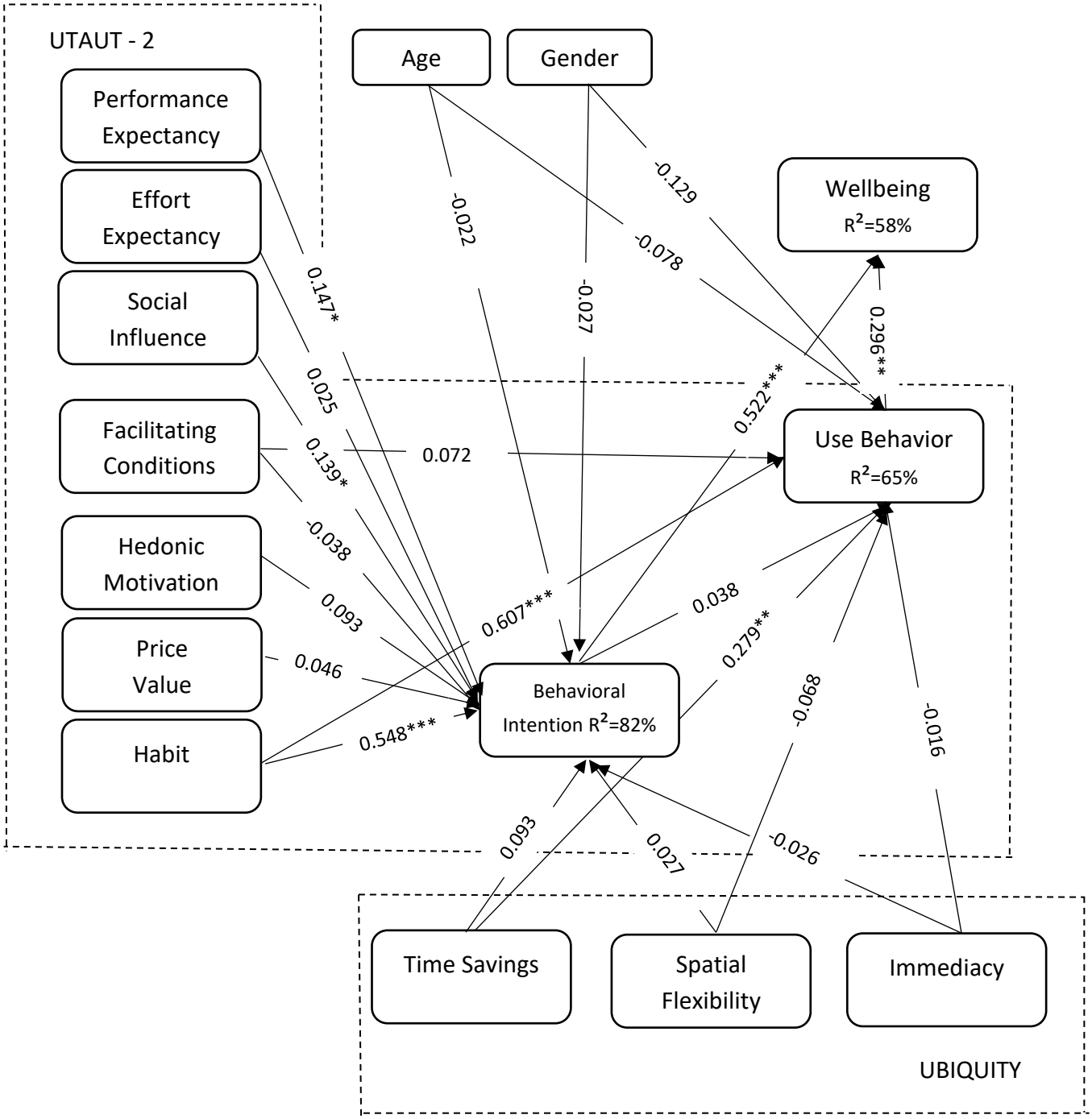
When the measurement model assessment is satisfactory, the next step in evaluating PLS-SEM results is assessing the structural model (Hair et al., 2018). Significance levels of the structural model path were estimated by using a bootstrap with 5000 iterations of resampling to obtain the maximum possible consistency in the results (Tavares & Oliveira, 2018). Previously, the structural model was checked for collinearity issues by examining the variance inflation factor values of all constructs. It can be confirmed that collinearity is not an issue in the structural model because the shown values are below the threshold of 5 (Hair et al., 2018). If collinearity is not an issue, the next step is examining the $R^2$ value of the endogenous constructs. The $R^2$ measures the variance, which is explained in each of the endogenous constructs and is therefore a measure of the model's explanatory power. The model shows 82% of the variance in behavioral intention, 65,4% in use behavior, and 58% in perceived wellbeing (Table 5) (Hair et al., 2018). The goal of our study is to identify the drivers of on-line training, it is a new approach, so the nature of the study is more exploratory than confirmatory. Also, the sample size is relatively small for a model with higher complexity. All together and according to the literature recommendations for these situations we considered as significant *p* values < 0.1 (Hair, J.F. et al., 2017).

**Table 5 -** Structural model results and findings regarding hypothesis.

| Dependent and independent variables | Hypothesis | Results | beta | *p*-value | $R^2$ | $R^2$ adj |
|---|---|---|---|---|---|---|
| **Behavioral intention** | | | | | **0.820** | **0.803** |
| Performance expectancy | H1 | Supported | 0.147* | 0.070 | | |
| Effort expectancy | H2 | Not supported | 0.025 | 0.701 | | |
| Social influence | H3 | Supported | 0.139* | 0.059 | | |
| Facilitating conditions | H4b | Not supported | -0.038 | 0.479 | | |
| Hedonic Motivation | H5 | Not supported | 0.093 | 0.234 | | |
| Price value | H6 | Not supported | 0.046 | 0.469 | | |
| Habit | H7a | Supported | 0.548*** | <0.001 | | |
| Time savings | H10a | Not supported | 0.093 | 0.200 | | |
| Spatial flexibility | H11a | Not supported | 0.027 | 0.723 | | |
| Immediacy | H12a | Not supported | -0.026 | 0.686 | | |
| Age | | | -0.022 | 0.580 | | |
| Gender | | | -0.027 | 0.741 | | |
| **Use Behavior** | | | | | **0.654** | **0.634** |
| Facilitating conditions | H4a | Not supported | 0.072 | 0.334 | | |
| Habit | H7b | Supported | 0.607*** | <0.001 | | |
| Behavioral intention | H8a | Not supported | 0.038 | 0.765 | | |
| Time savings | H10b | Supported | 0.279** | 0.003 | | |
| Spatial flexibility | H11b | Not supported | -0.068 | 0.414 | | |
| Immediacy | H12b | Not supported | -0.016 | 0.852 | | |
| Age | | | -0.078 | 0.117 | | |
| Gender | | | -0.129 | 0.312 | | |
| **Perceived wellbeing** | | | | | **0.580** | **0.574** |
| Behavioral intention | H8b | Supported | 0.522*** | <0.001 | | |
| Use behavior | H9 | Supported | 0.296** | 0.001 | | |

* $p$ <0 .1.
** $p$ < 0 .05.
*** $p$ < 0.01.

**Figure 2**. Conceptual research model with path coefficients



# 6. DISCUSSION

The model results of this study advocates that the use of this integrated model in the online training apps field. Good results of $R^2$ were achieved in behavioral intention (82%), use behavior (65%) and perceived wellbeing (58%). Overall, the use of the 2 theories was a success because constructs with statistical significance were identified from both theories (Table 5).

## 6.1. THEORETICAL IMPLICATIONS

In this model, performance expectancy is statistically significant to behavior intention. This suggests that the users of this technology know the benefits of training online via digital platforms, as shown on literature (Angosto et al., 2020) supporting H1. Effort expectancy doesn't have a statistically significant impact on behavioral intention, which does not support H2. This shows the opposite results from earlier studies that used effort expectancy from UTAUT 2 (Tavares & Oliveira, 2018). Social influence has a statistical significance and a positive impact on the behavioral intention. This proves the importance that the social pression has on decision-making and several studies indicate that social influence significantly impacts users' appraisal of a technology's usefulness (Beldad & Hegner, 2018). Facilitating conditions has no significant effect on behavioral intention (H4b) or in use behavior (H4a) so the users perceptions of the resources and support available are not important when using this technology (Venkatesh et al., 2012). Hedonic motivation has no statistically significant effect on behavioral intention and does not support H5 which contradicts the previous studies assuming that It proved that can positively influence the adoption of health and fitness apps (Yuan et al., 2015). Price value (H6) has no statistical significance on behavioral intention which contradicts the current literature (Dhiman et al., 2019; Yuan et al., 2015) . Habit is statistically significant to behavioral influence (H7a) but not to use behavior (H7b) supported by the literature (Yuan et al., 2015). Behavioral intention has a statistically significant impact on the wellbeing (H8b) but not on use behavior (H8a). As proved by literature, use behavior have a statistically impact on wellbeing (H9) (Suh & Li, 2022). Time savings is one of the constructs with statistical significance to use behavior (H10b) but no impact on behavior intention (H10a). Both hypothesis of spatial flexibility - H11a and H11b – have no statistical significance. As shown on table 5, the construct of immediacy is not statistically significant either to behavioral intention(H12a) or to use behavior(H12b).

## 6.2. MANAGERIAL IMPLICATIONS

This study identifies areas that may influence the intention to use online live training apps by their users. As this topic is very specific to digital training applications, it is clear that the use of these apps for online training is supported by the notion that it contributes to the wellbeing of the users. Performance expectancy is a significant driver in the adoption of these training technologies. Users are aware that this particular feature (online live training) in the apps will bring a benefit in conducting more efficient training sessions and in achieving specific training results. To improve the performance expectancy by the users, things like a better time response, a more intuitive application and the possibility of tracking their performance in those apps are crucial. The adoption of these technologies by sports practitioners in general makes the topic increasingly "trending" as a substitute or alternative to traditional training methods. In the case of increasing users, social influence plays a decisive role in the pressure or influence that the social component has on users (Venkatesh et al., 2012). Being a digital application, the use of digital advertising is decisive, being leveraged by social networks and "digital influencers" who promote it.

Habit influences both the behavioral intention and the use behavior and has been defined as the degree to which individuals tend to perform behaviors automatically due to learning (Venkatesh et al., 2012). This can be supported by initiatives to explain usage such as informational videos, customer support, free first classes, etc. A statistically significant contributor to use behavior is time savings. Time savings relate to the mental calculation the user performs regarding the time saved when using a mobile service (Okazaki et al., 2012). This is one of the most relevant outcomes of these digital applications as the ease of adhering to workouts results in flexibility and time savings compared to traditional training methods (gym's). It is a consequence of technological portable devices like mobile phones and tablets and can be improved with the optimization of app usability to make them more intuitive and faster when a user is looking for the service. The suggestions made are relevant for increasing the adoption of online live training apps and increasing the usage frequency of current users.

## 6.3. LIMITATIONS AND FUTURE RESEARCH

One of the limitations of this study was that the sample size of questionnaire responses was relatively small (n=146) for our modelling approach. This is due to the fact that, although it is an expanding technology, it still has few users on a broader scale and particularly in Portugal which is the European Union country with the highest percentage of people (73%) who do not practice sports (*O Desporto em Portugal*, 2024). Using a sampling strategy suitable to low prevalence populations, we focused our sampling on social media platforms of personal trainers and athletes, where our target population is more concentrated. This is a good strategy to target rare populations, but is also potentially biased, as it reflects the opinion of only the users of selected platforms (Picot et al., 2001). There are many studies done regarding fitness apps and health apps (Angosto et al., 2023), but not specifically for online live training platforms, and thus it is difficult to compare literature and results with this specific topic. Being one of the first studies regarding online live training apps, it is important to reinforce its exploratory nature, and that it can be used as a reference for future research. It is recommended that future studies should analyze a larger sample of users. To conclude, future lines of research might use different models than UTAUT2 and Ubiquity to address the same topic in the Portuguese population or others.

## 7. CONCLUSION

Online live training is a promising phenomenon in the future of the digital sports era. It is a specific component that serves as an alternative or complement to traditional training methods. This type of technology attracts new users as it presents conditions and specificities commonly found in fitness apps and health apps. By applying the technology adoption models UTAUT2 and Ubiquity, it is possible to differentiate that aspects such as performance expectancy, social influence, habit, and time savings are determining factors that lead users to utilize these services. In addition to these, the study achieves good R2 results in the dependent variables of behavioral intention (82%), use behavior (65%), and perceived wellbeing (58%). It is understood that although it is recognized as a new technology that could be for the younger generations, this study finds that age and gender have little influence on the adoption of these platforms. Lastly, we verify that, with this model, online live training platforms have a positive impact on the wellbeing of users, being a viable alternative of their fitness needs.

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# 8. APPENDIXES

## 8.1. APPENDIX A - STUDY QUESTIONNAIRE (ENGLISH VERSION).

| Content and constructs | Questions and reference |
|---|---|
| Introduction | This questionnaire is an integral part of the final dissertation for the Master's degree at NOVA IMS in Information Management, with a specialization in Knowledge Management and Business Intelligence. The dissertation's theme is "The intention to use fitness and health apps: The case of online live training," whose main objective is to assess users' intentions to use digital applications (fitness apps/health apps) for online live training considering awareness of wellbeing. The concept of live online training involves using mobile devices like a smartphone/tablet to train in real-time with a coach via video conference. The use of apps for training and promoting physical exercise has been increasing exponentially, becoming an alternative to traditional methods (gyms). This work specifically focuses on the study of the use of apps with live online training and is directed at users of these apps only, who should respond to this questionnaire.<br>There are no associated risks in responding to this questionnaire as your participation is entirely voluntary and anonymous. The average time to complete is 10 to 15 minutes, and all responses will only be used for this academic purpose.<br>Thank you for your availability and collaboration in this study. |
| Consent Form | I declare that I have been informed that my participation in this study is entirely voluntary and that I can withdraw from the questionnaire at any time without any consequences. I have also been assured that all data collected in this study will be treated as confidential. I understand that I will be responsible for evaluating the responses and that this study does not involve significant risks. (If selection is "I do not agree to participate in this questionnaire", the questionnaire ends)<br>• I agree to participate in this questionnaire.<br>• I do not agree to participate in this questionnaire. |
| Gender | What's your gender?<br>• Male<br>• Female<br>• Prefer not to say |
| Age | What is your age?<br>• _____ |
| Time savings<br><br>(Okazaki et al., 2012) | (from 1 - Strongly Disagree to 7 - Strongly Agree)<br>• TS1. Using online live training apps is an effective way to manage my time.<br>• TS2. Using online live training apps makes my life easier in terms of sports activity.<br>• TS3. Using online live training apps fits my schedule. |
| Spatial flexibility<br><br>(Okazaki et al., 2012) | (from 1 - Strongly Disagree to 7 - Strongly Agree)<br>• SF1. Using online live training apps enables me to find information at any place.<br>• SF2. Using online live training apps gives me the ability to overcome spatial limitations.<br>• SF3. Using online live training apps fits any location, wherever I go. |
| Immediacy<br>(Brown et al., 2010) | (from 1 - Strongly Disagree to 7 - Strongly Agree)<br>•I1. Online live training apps enable me to quickly reach my coach.<br>•I2. When I communicate with the coach using online live training apps, they usually respond quickly.<br>•I3. When my coach communicates with me using online live training apps, I try to respond immediately. |
| Performance expectancy<br>(Venkatesh et al., 2012) | (from 1 - Strongly Disagree to 7 - Strongly Agree)<br>•PE1. I find online live training apps useful in my daily life.<br>•PE2. Using online live training apps increases my chances of achieving things that are important to me.<br>•PE3. Using online live training apps helps me accomplish things more quickly.<br>•PE4. Using online live training apps increases my productivity.<br>•PE1. I find online live training apps useful in my daily life. |
| Effort expectancy<br>(Venkatesh et al., 2012) | (from 1 - Strongly Disagree to 7 - Strongly Agree)<br>• EE1. Learning how to use online live training apps is easy for me.<br>• EE2. My interaction with online live training apps is clear and understandable.<br>• EE3. I find online live training apps easy to use.<br>• EE4. It is easy for me to become skillful at using online live training apps. |
| Social influence<br>(Venkatesh et al., 2012) | (from 1 - Strongly Disagree to 7 - Strongly Agree)<br>• SI1. People who are important to me think that I should use online live training apps. |

| | |
|---|---|
| | • SI2. People who influence my behavior think that I should use online live training apps.<br>• SI3. People whose opinions that I value prefer that I use online live training apps. |
| Facilitating conditions<br>(Venkatesh et al., 2012) | (from 1 - Strongly Disagree to 7 - Strongly Agree)<br>• FC1. I have the resources necessary to use online live training apps.<br>• FC2. I have the knowledge necessary to use online applications.<br>• FC3. Online live training apps is compatible with other technologies I use.<br>• FC4. I can get help from others when I have difficulties using online live training apps. |
| Hedonic motivation<br>(Venkatesh et al., 2012) | (from 1 - Strongly Disagree to 7 - Strongly Agree)<br>• HM1. Using online live training apps is fun.<br>• HM2. Using online live training apps is enjoyable.<br>• HM3. Using online live training apps is very entertaining. |
| Price value<br>(Venkatesh et al., 2012) | (from 1 - Strongly Disagree to 7 - Strongly Agree)<br>• PV1. Online live training apps are reasonably priced.<br>• PV2. Online live training apps are a good value for the money.<br>• PV3. At the current price, online live training apps provides a good value. |
| Behavioral intention<br>(Venkatesh et al., 2012) | (from 1 - Strongly Disagree to 7 - Strongly Agree)<br>• BI1. I intend to continue using online live training apps in the future.<br>• BI2. I will always try to use online live training apps in my daily life.<br>• BI3. I plan to continue to use online live training apps frequently. |
| Use behavior<br>(Venkatesh et al., 2012) | (from 1 - Never to 7 - Always)<br>• UB1. In online live training apps, I can see the training schedule.<br>• UB2. In online live training apps, I can see the different types of training methods and choose the one who fits me better.<br>• UB3. In online live training apps, I can get some tips of training to improve my physical activity.<br>• UB4. I use online live training apps to access pre-recorded training videos.<br>• UB5. I use online live training apps integrated with other mobile devices (wearables).<br>• UB6. I use online live training apps for challenges and competitions (gamification).<br>• UB7. I use online live training apps to access reports and statistics about my progress and training. |
| Perceived wellbeing<br>(El Hedhli et al., 2013) | (from 1 – Strongly Disagree to 7 – Strongly Agree)<br>• PWB1. Online live training apps would satisfy my overall fitness needs.<br>• PWB2. Online live training apps would play a very important role in my leisure well-being.<br>• PWB3. Online live training apps would play a very important role in enhancing the quality of life regarding my fitness needs. |
| Additional question<br>(Marker Variable) | Please tell us: (from 1 - Strongly Disagree to 7 - Strongly Agree)<br>• I am very familiar with NOVA University and all of its schools.<br>• I'm a classical music enthusiast. |

## 8.2. APPENDIX B - OUTER LOADINGS, CROSS-LOADINGS

**Table AB.1.** The value of outer loading (printed with bold) and cross-loading.

| Constructs | BI | EE | FC | HM | HT | I | PE | PV | PWB | SF | SI | TS | UB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **BI1** | **0.957** | 0.523 | 0.450 | 0.718 | 0.820 | 0.592 | 0.725 | 0.577 | 0.671 | 0.578 | 0.677 | 0.623 | 0.665 |
| **BI2** | **0.977** | 0.523 | 0.384 | 0.739 | 0.833 | 0.529 | 0.650 | 0.547 | 0.730 | 0.489 | 0.685 | 0.540 | 0.680 |
| **BI3** | **0.980** | 0.522 | 0.396 | 0.739 | 0.843 | 0.526 | 0.667 | 0.551 | 0.732 | 0.496 | 0.673 | 0.561 | 0.727 |
| **EE1** | 0.481 | **0.950** | 0.704 | 0.550 | 0.426 | 0.554 | 0.528 | 0.591 | 0.434 | 0.615 | 0.277 | 0.557 | 0.498 |
| **EE2** | 0.557 | **0.949** | 0.659 | 0.607 | 0.507 | 0.553 | 0.555 | 0.582 | 0.510 | 0.578 | 0.377 | 0.578 | 0.537 |
| **EE3** | 0.474 | **0.932** | 0.698 | 0.532 | 0.386 | 0.536 | 0.529 | 0.599 | 0.472 | 0.635 | 0.294 | 0.579 | 0.484 |
| **EE4** | 0.505 | **0.935** | 0.766 | 0.588 | 0.442 | 0.576 | 0.534 | 0.630 | 0.540 | 0.631 | 0.367 | 0.543 | 0.515 |
| **FC1** | 0.369 | 0.617 | **0.868** | 0.398 | 0.284 | 0.450 | 0.476 | 0.461 | 0.305 | 0.546 | 0.211 | 0.455 | 0.341 |
| **FC2** | 0.351 | 0.685 | **0.906** | 0.398 | 0.321 | 0.409 | 0.406 | 0.407 | 0.331 | 0.531 | 0.202 | 0.425 | 0.358 |
| **FC3** | 0.419 | 0.743 | **0.942** | 0.472 | 0.353 | 0.486 | 0.502 | 0.506 | 0.393 | 0.560 | 0.269 | 0.585 | 0.446 |
| **FC4** | 0.352 | 0.607 | **0.832** | 0.454 | 0.312 | 0.530 | 0.443 | 0.506 | 0.361 | 0.533 | 0.307 | 0.453 | 0.368 |
| **HM1** | 0.683 | 0.605 | 0.516 | **0.946** | 0.610 | 0.621 | 0.689 | 0.554 | 0.626 | 0.490 | 0.597 | 0.570 | 0.516 |
| **HM2** | 0.696 | 0.619 | 0.507 | **0.952** | 0.627 | 0.610 | 0.720 | 0.579 | 0.649 | 0.565 | 0.611 | 0.620 | 0.539 |
| **HM3** | 0.741 | 0.490 | 0.356 | **0.922** | 0.755 | 0.524 | 0.564 | 0.538 | 0.594 | 0.384 | 0.696 | 0.445 | 0.577 |
| **HT1** | 0.833 | 0.525 | 0.394 | 0.666 | **0.932** | 0.451 | 0.600 | 0.508 | 0.680 | 0.464 | 0.612 | 0.552 | 0.756 |
| **HT2** | 0.734 | 0.343 | 0.263 | 0.623 | **0.896** | 0.403 | 0.457 | 0.377 | 0.591 | 0.291 | 0.616 | 0.284 | 0.610 |
| **HT3** | 0.813 | 0.429 | 0.334 | 0.684 | **0.957** | 0.452 | 0.552 | 0.500 | 0.651 | 0.370 | 0.615 | 0.427 | 0.753 |
| **I1** | 0.522 | 0.530 | 0.509 | 0.574 | 0.428 | **0.903** | 0.678 | 0.529 | 0.411 | 0.616 | 0.559 | 0.562 | 0.392 |
| **I2** | 0.525 | 0.540 | 0.458 | 0.557 | 0.446 | **0.905** | 0.600 | 0.609 | 0.523 | 0.537 | 0.510 | 0.571 | 0.436 |
| **I3** | 0.460 | 0.506 | 0.446 | 0.532 | 0.380 | **0.867** | 0.523 | 0.514 | 0.421 | 0.559 | 0.446 | 0.479 | 0.382 |
| **PE1** | 0.651 | 0.550 | 0.449 | 0.662 | 0.547 | 0.611 | **0.903** | 0.555 | 0.632 | 0.691 | 0.477 | 0.743 | 0.570 |
| **PE2** | 0.625 | 0.515 | 0.442 | 0.603 | 0.498 | 0.624 | **0.936** | 0.514 | 0.526 | 0.682 | 0.482 | 0.744 | 0.487 |
| **PE3** | 0.654 | 0.519 | 0.526 | 0.604 | 0.535 | 0.604 | **0.925** | 0.494 | 0.546 | 0.713 | 0.465 | 0.706 | 0.513 |
| **PE4** | 0.634 | 0.504 | 0.473 | 0.689 | 0.548 | 0.633 | **0.900** | 0.479 | 0.605 | 0.659 | 0.555 | 0.643 | 0.537 |
| **PV1** | 0.451 | 0.559 | 0.462 | 0.482 | 0.411 | 0.562 | 0.447 | **0.914** | 0.406 | 0.510 | 0.407 | 0.425 | 0.387 |
| **PV2** | 0.567 | 0.583 | 0.494 | 0.561 | 0.471 | 0.559 | 0.557 | **0.931** | 0.494 | 0.562 | 0.444 | 0.524 | 0.438 |
| **PV3** | 0.568 | 0.629 | 0.519 | 0.595 | 0.505 | 0.603 | 0.536 | **0.942** | 0.461 | 0.589 | 0.550 | 0.496 | 0.451 |
| **PWB1** | 0.691 | 0.450 | 0.391 | 0.645 | 0.634 | 0.506 | 0.636 | 0.462 | **0.923** | 0.533 | 0.525 | 0.494 | 0.573 |
| **PWB2** | 0.678 | 0.493 | 0.369 | 0.578 | 0.650 | 0.454 | 0.553 | 0.430 | **0.951** | 0.451 | 0.508 | 0.504 | 0.637 |
| **PWB3** | 0.703 | 0.529 | 0.355 | 0.651 | 0.672 | 0.479 | 0.596 | 0.497 | **0.955** | 0.433 | 0.540 | 0.512 | 0.675 |
| **SF1** | 0.421 | 0.564 | 0.485 | 0.437 | 0.300 | 0.543 | 0.636 | 0.487 | 0.396 | **0.819** | 0.332 | 0.629 | 0.357 |
| **SF2** | 0.450 | 0.613 | 0.598 | 0.435 | 0.320 | 0.580 | 0.688 | 0.548 | 0.408 | **0.906** | 0.298 | 0.676 | 0.381 |
| **SF3** | 0.526 | 0.540 | 0.521 | 0.463 | 0.438 | 0.556 | 0.646 | 0.535 | 0.498 | **0.898** | 0.380 | 0.607 | 0.417 |
| **SI1** | 0.657 | 0.351 | 0.277 | 0.648 | 0.597 | 0.607 | 0.528 | 0.498 | 0.535 | 0.384 | **0.944** | 0.420 | 0.459 |
| **SI2** | 0.661 | 0.303 | 0.257 | 0.651 | 0.639 | 0.521 | 0.485 | 0.459 | 0.495 | 0.328 | **0.971** | 0.354 | 0.405 |
| **SI3** | 0.672 | 0.348 | 0.262 | 0.632 | 0.649 | 0.491 | 0.525 | 0.488 | 0.556 | 0.391 | **0.937** | 0.394 | 0.460 |
| **TS1** | 0.552 | 0.582 | 0.524 | 0.537 | 0.427 | 0.551 | 0.713 | 0.502 | 0.441 | 0.679 | 0.372 | **0.915** | 0.497 |
| **TS2** | 0.578 | 0.564 | 0.470 | 0.590 | 0.479 | 0.556 | 0.701 | 0.488 | 0.531 | 0.621 | 0.433 | **0.930** | 0.589 |
| **TS3** | 0.460 | 0.471 | 0.492 | 0.420 | 0.324 | 0.534 | 0.692 | 0.420 | 0.474 | 0.685 | 0.288 | **0.868** | 0.395 |
| **UB1** | 0.641 | 0.489 | 0.382 | 0.553 | 0.708 | 0.438 | 0.536 | 0.424 | 0.642 | 0.395 | 0.424 | 0.510 | **0.934** |
| **UB2** | 0.663 | 0.436 | 0.329 | 0.536 | 0.686 | 0.407 | 0.531 | 0.447 | 0.573 | 0.382 | 0.449 | 0.507 | **0.870** |
| **UB3** | 0.563 | 0.410 | 0.361 | 0.454 | 0.620 | 0.396 | 0.454 | 0.404 | 0.535 | 0.374 | 0.410 | 0.446 | **0.794** |
| **UB4** | 0.549 | 0.377 | 0.357 | 0.424 | 0.550 | 0.287 | 0.471 | 0.360 | 0.475 | 0.396 | 0.299 | 0.505 | **0.726** |
| **UB5** | 0.563 | 0.393 | 0.301 | 0.466 | 0.592 | 0.358 | 0.376 | 0.438 | 0.432 | 0.331 | 0.440 | 0.351 | **0.703** |
| **UB6** | 0.536 | 0.285 | 0.173 | 0.418 | 0.579 | 0.285 | 0.359 | 0.247 | 0.407 | 0.230 | 0.462 | 0.239 | **0.664** |
| **UB7** | 0.618 | 0.533 | 0.421 | 0.484 | 0.662 | 0.396 | 0.455 | 0.423 | 0.552 | 0.395 | 0.412 | 0.448 | **0.860** |

Notes: Behavioral intention (BI); Effort expectancy (EE); Facilitating conditions (FC); Hedonic motivation (HM); Habit (HT); Immediacy (I); Performance expectancy (PE); Perceived wellbeing (PWB); Spatial flexibility (SF); Social influence (SI); Time savings (TS); Use behavior (UB).

## 8.3. APPENDIX C - BOOTSTRAPPING HTMT

**Table AC.1.** Bootstrapping HTMT

| | Original sample (O) | Sample mean (M) | 2.5% | 97.5% |
|---|---|---|---|---|
| EE <-> BI | 0.556 | 0.555 | 0.414 | 0.677 |
| FC <-> BI | 0.448 | 0.448 | 0.282 | 0.590 |
| FC <-> EE | 0.802 | 0.802 | 0.687 | 0.895 |
| HM <-> BI | 0.790 | 0.790 | 0.705 | 0.861 |
| HM <-> EE | 0.641 | 0.639 | 0.501 | 0.755 |
| HM <-> FC | 0.529 | 0.529 | 0.375 | 0.666 |
| HT <-> BI | 0.904 | 0.904 | 0.850 | 0.948 |
| HT <-> EE | 0.493 | 0.493 | 0.363 | 0.605 |
| HT <-> FC | 0.387 | 0.388 | 0.241 | 0.527 |
| HT <-> HM | 0.761 | 0.761 | 0.659 | 0.844 |
| I <-> BI | 0.613 | 0.612 | 0.485 | 0.721 |
| I <-> EE | 0.644 | 0.642 | 0.490 | 0.767 |
| I <-> FC | 0.593 | 0.593 | 0.461 | 0.712 |
| I <-> HM | 0.690 | 0.688 | 0.570 | 0.788 |
| I <-> HT | 0.522 | 0.522 | 0.380 | 0.649 |
| PE <-> BI | 0.735 | 0.735 | 0.639 | 0.812 |
| PE <-> EE | 0.601 | 0.598 | 0.424 | 0.741 |
| PE <-> FC | 0.558 | 0.557 | 0.403 | 0.703 |
| PE <-> HM | 0.749 | 0.748 | 0.628 | 0.845 |
| PE <-> HT | 0.622 | 0.622 | 0.499 | 0.733 |
| PE <-> I | 0.745 | 0.744 | 0.625 | 0.842 |
| PV <-> BI | 0.602 | 0.602 | 0.439 | 0.743 |
| PV <-> EE | 0.677 | 0.675 | 0.539 | 0.788 |
| PV <-> FC | 0.577 | 0.575 | 0.429 | 0.705 |
| PV <-> HM | 0.634 | 0.633 | 0.491 | 0.758 |
| PV <-> HT | 0.536 | 0.537 | 0.370 | 0.681 |
| PV <-> I | 0.689 | 0.688 | 0.551 | 0.805 |
| PV <-> PE | 0.595 | 0.593 | 0.436 | 0.730 |
| PWB <-> BI | 0.767 | 0.767 | 0.679 | 0.844 |
| PWB <-> EE | 0.548 | 0.546 | 0.406 | 0.665 |
| PWB <-> FC | 0.425 | 0.425 | 0.257 | 0.573 |
| PWB <-> HM | 0.708 | 0.708 | 0.605 | 0.794 |
| PWB <-> HT | 0.742 | 0.743 | 0.623 | 0.845 |
| PWB <-> I | 0.560 | 0.560 | 0.411 | 0.684 |
| PWB <-> PE | 0.673 | 0.673 | 0.551 | 0.776 |
| PWB <-> PV | 0.525 | 0.526 | 0.351 | 0.686 |
| SF <-> BI | 0.588 | 0.588 | 0.444 | 0.706 |
| SF <-> EE | 0.728 | 0.724 | 0.558 | 0.851 |
| SF <-> FC | 0.697 | 0.697 | 0.517 | 0.840 |
| SF <-> HM | 0.574 | 0.571 | 0.409 | 0.708 |
| SF <-> HT | 0.452 | 0.452 | 0.298 | 0.588 |
| SF <-> I | 0.746 | 0.744 | 0.607 | 0.854 |
| SF <-> PE | 0.843 | 0.843 | 0.744 | 0.922 |
| SF <-> PV | 0.674 | 0.672 | 0.517 | 0.801 |
| SF <-> PWB | 0.558 | 0.557 | 0.396 | 0.689 |
| SI <-> BI | 0.728 | 0.727 | 0.625 | 0.813 |
| SI <-> EE | 0.367 | 0.365 | 0.196 | 0.515 |
| SI <-> FC | 0.300 | 0.300 | 0.138 | 0.449 |
| SI <-> HM | 0.718 | 0.718 | 0.611 | 0.807 |
| SI <-> HT | 0.709 | 0.707 | 0.583 | 0.816 |
| SI <-> I | 0.623 | 0.624 | 0.486 | 0.740 |
| SI <-> PE | 0.573 | 0.573 | 0.427 | 0.699 |
| SI <-> PV | 0.538 | 0.538 | 0.380 | 0.674 |
| SI <-> PWB | 0.590 | 0.589 | 0.458 | 0.707 |
| SI <-> SF | 0.430 | 0.428 | 0.260 | 0.570 |
| TS <-> BI | 0.631 | 0.632 | 0.483 | 0.746 |
| TS <-> EE | 0.645 | 0.643 | 0.491 | 0.766 |
| TS <-> FC | 0.603 | 0.600 | 0.451 | 0.726 |
| TS <-> HM | 0.627 | 0.627 | 0.492 | 0.739 |
| TS <-> HT | 0.493 | 0.494 | 0.343 | 0.623 |
| TS <-> I | 0.684 | 0.683 | 0.533 | 0.802 |
| TS <-> PE | 0.850 | 0.850 | 0.773 | 0.914 |
| TS <-> PV | 0.569 | 0.569 | 0.398 | 0.716 |
| TS <-> PWB | 0.583 | 0.583 | 0.432 | 0.712 |
| TS <-> SF | 0.846 | 0.846 | 0.728 | 0.942 |
| TS <-> SI | 0.439 | 0.439 | 0.263 | 0.590 |

Notes: Behavioral intention (BI); Effort expectancy (EE); Facilitating conditions (FC); Hedonic motivation (HM); Habit (HT); Immediacy (I); Performance expectancy (PE); Perceived wellbeing (PWB); Spatial flexibility (SF); Social influence (SI); Time savings (TS); User behavior (UB).

## 8.4. APPENDIX D - ETHICS COMMITTEE REPORT

This is to certify that
Project No.: **INFSYS2024-11-218185**
Project Title: **The intention to use fitness and health apps: The case of online live training**
Principal Researcher: **Diogo José Pereira de Fortunato Antunes**

according to the regulations of the Ethics Committee of NOVA IMS and MagIC Research Center this project was considered to meet the requirements of the NOVA IMS Internal Review Board, being considered **APPROVED** on 11/21/2024.

It is the Principal Researcher's responsibility to ensure that all researchers and stakeholders associated with this project are aware of the conditions of approval and which documents have been approved.

The Principal Researcher is required to notify the Ethics Committee, via amendment or progress report, of
- Any significant change to the project and the reason for that change;
- Any unforeseen events or unexpected developments that merit notification;
- The inability of the Principal Researcher to continue in that role or any other change in research personnel involved in the project.

Lisbon, 11/21/2024

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