Phung Thi Thu Thuy
Faculty of Sport Science, Ton Duc Thang University, Ho Chi Minh City, Vietnam

Le Quang Trang
Faculty of Sport Science, Ton Duc Thang University, Ho Chi Minh City, Vietnam

Le Vo Song Huong
Faculty of Sport Science, Ton Duc Thang University, Ho Chi Minh City, Vietnam

Enhancing users' adoption of sports brand applications: An Integrated ISSM-TAM Approach

Phung Thi Thu Thuy, Le Quang Trang and Le Vo Song Huong

DOI: https://doi.org/10.22271/27084515.2024.v5.i2a.337

Abstract
Given the rapid growth of the digital fitness market and the increasing reliance on mobile applications for health and sports activities, understanding the factors that drive consumer adoption of sports brand applications is crucial. Focusing on sports apps can help businesses enhance user engagement, improve customer satisfaction, and ultimately achieve competitive advantage in a highly dynamic industry. This study explores the factors driving consumer adoption of sports brand applications by integrating the Information System Success Model with the Technology Acceptance Model. Using a quantitative approach, this study collected and analyzed 235 survey responses from users of sports brand apps, employing Smart PLS 3.0 software for data analysis. The research findings underscore the importance of information quality, system quality, self-efficacy, perceived ease of use, and perceived usefulness in influencing user perceptions and intentions, providing valuable insights for enhancing user experience and adoption of sports brand applications.

Keywords: Sports brand applications, technology acceptance model, information system success model, information quality, system quality

1. Introduction

Amidst the burgeoning growth of mobile applications, the sports and fitness industry has emerged as one of the fastest-growing segments within the app ecosystem (Grand View Research, 2021). Mobile applications, or apps, are software programs designed to run on mobile devices such as smartphones and tablets, offering a diverse range of functionalities and services to users. Fitness apps typically track, monitor, and analyze users' physical activity, providing insights into their daily routines and personalized training programs to aid in maintaining physical fitness (Edwards *et al*., 2016). The popularity of these apps is rising due to the growing awareness of the importance of maintaining a healthy lifestyle. This trend has accelerated, especially after the COVID-19 pandemic, as exercising at home through sports applications has become more popular.

The development of sports brand applications is essential for businesses to achieve strategic objectives. According to Boyd *et al*. (2019) [43], sports brand applications can support various business aspects, including communication, customer relationship management, sales, product innovation, market research, and building consumer communities within the application. This technology not only enhances operational efficiency but also elevates user experience, providing a significant competitive advantage in an increasingly competitive market. As individuals spend more time on mobile devices-87% of which is spent on applications rather than browsing websites (Torok, 2020) [32] this trend is poised to accelerate. Mobile app retention rates vary across categories. For instance, sports-related applications see higher initial user retention compared to lifestyle and health/fitness apps. However, retention for all of these categories declines after a period of time. This highlights the importance for app developers and marketers to focus on keeping users engaged.

Previous studies indicate that the design features and related benefits provided by an application influence consumers' intentions to engage with it (Hsu, 2023; Martinez and McAndrews, 2021) [18, 40]. By intergrated the Information System Success Model (ISSM) and the Technology Acceptance Model (TAM), (Davis *et al*., 1992) [41]. Studies combining different models indicate that a well-designed information system and specific features can influence users' interest in sports brand apps. Furthermore, perceived ease of use, perceived usefulness predict users' attitudes and intentions to use the app. Users of sports brand applications have different expectations compared to regular applications, as they require both sport-specific functionalities and brand-related functions.

Corresponding Author:
Phung Thi Thu Thuy
Faculty of Sport Science, Ton Duc Thang University, Ho Chi Minh City, Vietnam

Therefore, the expectations of users or the relative importance of information or system quality may have a greater impact on their user experience. Given the prominent role of sports brand applications, it is crucial to understand what influences their adoption and continued use.

Based on that, the current study aims to examine the factors influencing user adoption of sports brand applications by combination the ISSM and the TAM (Davis et al., 1989) [10]. Thus, the study proposed objectives as following: (1) examine the impact of Information Quality and System Quality on perceived usefulness, perceived ease of use of sports brand applications, (2) explore the impact of individual psychological factor self-efficacy, on perceived ease of use and perceived usefulness of sports brand applications, (3) examine the impact of perceived ease of use and perceived usefulness on the intention to use sports brand applications.

2. Literature review and hypotheses development
2.1 Information system success model (ISSM) and Technology acceptance model (TAM)
DeLone and McLean (2003) [11] developed the IS Success Model (ISSM), which includes three factors for the success of information systems: Information Quality, System Quality, and Service Quality. These factors emphasize the critical components contributing to the success of an information system. Various studies have identified the impact of these three quality aspects on user satisfaction and behavior in different contexts, such as university portals (Adeyemi et al., 2020) [1], the construction industry in Qatar (Vitente et al., 2024) [35], hospital medical record management systems. Recent studies applying the ISSM framework reveal a connection between mobile application quality and user acceptance and usage patterns (Martono, 2020; Chen et al., 2019; Chen et al., 2016) [24, 7, 8]. This study proposes a contextualized model of the success factors for sports brand applications based on the ISSM. In this model, Information Quality is represented by the quality of information provided by the sports brand application, and System Quality is represented by the quality of the sports brand application's design.

While the ISSM offers valuable insights, the Technology Acceptance Model (TAM) remains a dominant framework for understanding user adoption across various technologies. Developed by Davis (1989) [10], TAM suggests that perceived usefulness and perceived ease of use are key determinants of a user's intention to adopt a new technology. This concept has been applied successfully to explain user acceptance of wearable devices (Chang et al., 2016) [12], mobile banking apps (Munoz-Leiva et al., 2017) [24], and even social media platforms (Zhao et al., 2016) [35].

The current study integrates the Information System Success Model (ISSM) and the Technology Acceptance Model (TAM) to comprehensively examine the factors influencing the adoption of sports brand applications. By combining these two models, the study aims to understand how information quality and system quality impact perceived usefulness, perceived ease of use, and how these perceptions, in turn, influence the behavioral intention to use sports brand applications. This dual-framework approach allows for a robust analysis of both the quality dimensions of the applications and the cognitive factors affecting user acceptance.

2.2 Hypotheses development
Information quality, defined as the accuracy, relevance, and completeness of data provided by an application, significantly enhances user experience (DeLone & McLean, 2003). In sports brand applications, high-quality information ensures users can access precise and timely data on their fitness activities, simplifying their interaction with the app. Perceived ease of use, defined as the user's belief that using the system requires minimal effort (Davis, 1989) [10], influences adoption and continued usage. Real-time updates and reliable performance metrics facilitate easy navigation and use of app features, thereby increasing perceived ease of use (Zhang et al., 2013) [37]. Perceived usefulness, which measures how much users believe an app enhances their performance (Davis, 1989) [10], is critical for sports brand app adoption. Information quality directly contributes to perceived usefulness by offering insights that help users track progress and achieve fitness goals efficiently. Accurate data on workouts, nutrition, and performance metrics significantly boosts the perceived benefits of app usage (Kim et al., 2008) [19].

System quality, encompassing performance, reliability, and user interface design (DeLone & McLean, 2003) [11], shapes user perceptions and interactions. In sports brand apps, superior system quality ensures seamless operation, fast response times, and an intuitive interface, enriching user experience. Efficient loading, minimal downtime, and a user-friendly layout enhance navigation and utilization of app functionalities (Petter et al., 2008) [26]. Excellent system quality also enhances perceived usefulness by ensuring consistent performance and functionality, supporting users in achieving fitness goals effectively (Alsabawy et al., 2016) [2]. Therefore, the study proposes the following hypotheses:

H_1: Information Quality positively impacts Perceived Ease of Use.
H_2: Information Quality positively impacts Perceived Usefulness.
H_3: System Quality positively impacts on Perceived Ease of Use.
H_4: System Quality positively impacts on Perceived Usefulness.

Self-efficacy refers to an individual's belief in their ability to perform tasks or achieve goals. In the context of sports brand applications, users with high self-efficacy regarding their fitness goals are more likely to perceive the application as user-friendly. Users have greater confidence in navigating features, completing tasks, and effectively using the application to support their fitness journey (Vinnikova et al., 2020) [33]. Individuals with self-efficacy believe that the sports brand application can effectively assist in achieving their fitness goals. Their confidence translates into the perception that the application meets their needs and offers functionalities that aid their progress. This perception enhances perceived usefulness, as users view the application as a valuable tool in their fitness endeavors (Baker-Eveleth and Stone, 2020) [3].

H_5: Self-efficacy positively impacts on Perceived Ease of Use.
H_6: Self-efficacy positively impacts on Perceived Usefulness.

While users navigate sports brand applications, a seamless and effortless experience fosters a sense of control and efficiency. This positive interaction translates into a belief that the application can effectively address their fitness goals. Users are more likely to perceive the application's functionalities as valuable and instrumental in their progress when they can easily access and utilize them. This user-friendly design builds trust in the application's ability to deliver value, ultimately enhancing perceived usefulness (Venkatesh *et al*., 2003) [33].

Moreover, a user-friendly sports brand application, characterized by intuitive features and effortless task completion, fosters a positive user experience. This translates into a stronger intention to use the application regularly (Prastiawan *et al*., 2021) [27]. When users feel comfortable and confident navigating the app, they are more inclined to integrate it into their routine and leverage its functionalities for fitness goals. This positive experience translates into a heightened intention to use the application in the future (Won *et al*., 2023) [37]. When users perceive a sports brand application as a valuable tool in achieving their

fitness goals, they are more likely to express a strong intention to use it regularly (Davis, 1989) [10]. Applications that effectively cater to user needs, provide relevant information, and offer functionalities that support progress tracking, workout planning, and performance optimization are perceived as beneficial. This sense of value translates into a stronger intention to integrate the application into their fitness routine and utilize its features on an ongoing basis (Byun *et al*., 2021) [37]. Therefore, these hypotheses were suggested:

H_7: Perceived Ease of Use positively impacts on Perceived Usefulness.
H_8: Perceived Ease of Use positively impacts on Intention to Use.
H_9: Perceived Usefulness positively impacts on Intention to Use.

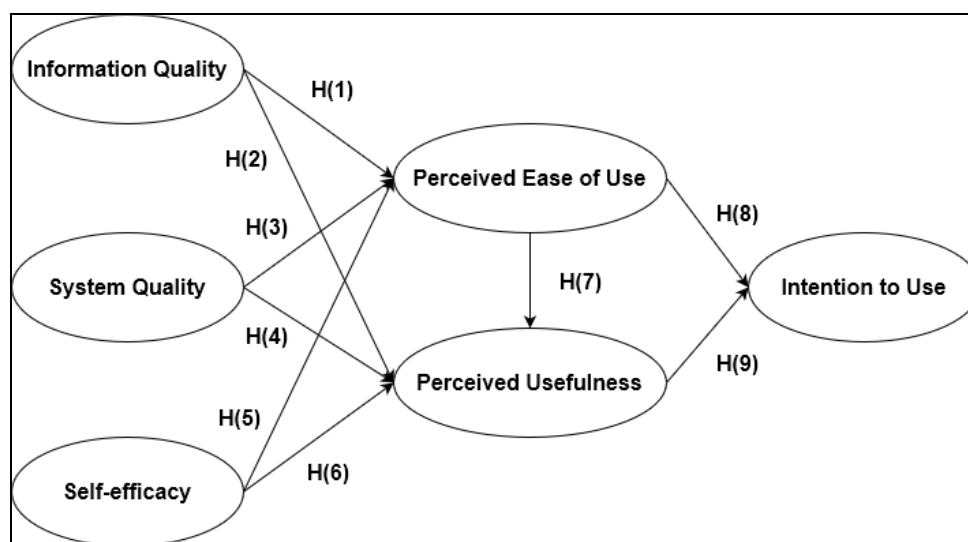Based on the previous literature review, the research has developed the research model shown in Figure 1.

Fig 1: Conceptual model

3. Methodology
This study employs a quantitative research methodology to address its research objectives. To gather data, a non-probability sampling technique, specifically convenience sampling, was employed through online channels. An initial screening question within the survey ensured that only participants with prior experience using sports brand applications were included. The survey itself was designed using Google Forms and distributed electronically via various online platforms. These platforms included social media like Facebook, Zalo, and Instagram, alongside email services like Gmail and relevant sports forums. The questionnaire consisted of seven sections and utilized a five-point Likert scale for response measurement. A total of 277 responses were collected, with 42 disqualified, total 235 valid samples for quantitative analysis. This sample size meets the Hair *et al*. (2011) [15] requirements, providing a solid foundation for reliable PLS-SEM analysis to test the proposed hypotheses and research model.
The research instrument utilized in this study encompasses several key constructs adapted from established studies. Information quality, referring to the accuracy, relevance,

and completeness of information perceived by users from sports brand applications and system quality, which evaluates the overall system quality, including reliability, layout, and navigation efficiency were assessed using questions adapted from Wang and Lin (2017) [36]. Perceived usefulness and perceived ease of use, which measure users' perceptions of the utility and user-friendliness of the apps respectively, were developed by Kim *et al*. (2017) [42]. Self-efficacy, construct measurement developed by Todd (1995) [31], refers to an individual's belief in their capability to complete tasks or achieve goals. Lastly, intent to use which refer to degree of users' willingness and intention to use the apps in the future, was based on scales from Chiu and Cho (2021) [5]. Each of these constructs was measured using a Likert-scale ranging from 1-Strongly disagree to 5-Strongly agree.

4. Research results
Table 1 presents the demographic characteristics of the respondents. The survey sample consisted of 200 respondents, with 47.5% males and 52.5% females. The most prevalent age group in the sample was 18 to 24 years

old, followed by 25 to 40 years old. In terms of occupation, there was a diverse mix with 63.5% being students, 24% office workers, 4.5% self-employed, and 2.5% trainers, while the remaining 5.5% were from other professions. Regarding income level, the highest proportion was under 3,000,000 VND, primarily students. The income range from 3 to 10 million VND represented 42%, while higher income levels such as 10 million VND to 20 million VND and over 20 million VND accounted for 14.5% and 3.5%, respectively.

Table 1: Respondents' characteristics, (N=200)

Category	Number of Respondents	Percentage (%)
Gender		
Male	112	47.5%
Female	123	52.5%
Age		
18 to 24	169	92%
25 to 40	66	8%
Occupation		
Student	149	63.5%
Office worker	56	24%
Self-employed	11	4.5%
Trainer	6	2.5%
Other	13	5.5%
Income		
Under 3 million VND	94	40%
3 million to 10 million VND	99	42%
Over 10 million to 20 million VND	34	14.5%
Over 20 million VND	8	3.5%

Table 2 presents the results assessing the reliability and convergent validity of the research model, following Hair *et al*.'s (2011) [15] criteria. Factor loadings ranged from 0.799 to 0.915, surpassing the recommended threshold of 0.7 (Chin, 1998) [9], indicating robust relationships among the constructs. Additionally, composite reliability (CR) scores for each construct ranged from 0.900 to 0.917, exceeding the 0.7 benchmark, thus affirming the internal consistency reliability of the measurement scales. Convergent validity, evaluated through average variance extracted (AVE) values ranging from 0.657 to 0.787, met the criterion of AVE being greater than 0.5 (Chin, 1998) [9]. These findings collectively validate the reliability and convergent validity of the measurement instruments employed in this study.

Table 2: Reliability measures for the measurement model

Variables/Items	Factor Loading	CR	AVE	VIF
Intention to Use (α = 0.864)		0.917	0.787	
INT1: I anticipate regular utilization of sports brand applications in the future.	0.887			2.127
INT2: Upon becoming aware of a sports brand application, I am likely to employ it.	0.880			2.225
INT3: The potential for utilizing sports brand applications is contingent upon my awareness of their existence.	0.893			2.358
Information Quality (α = 0.841)		0.904	0.759	
IQ1: Information provided on sports brand applications is consistently updated.	0.853			2.193
IQ2: The information presented on sports brand applications is highly accurate.	0.905			2.650
IQ3: The information offered on sports brand applications is comprehensive and multifaceted.	0.854			1.738
Perceived Ease of Use (α = 0.827)		0.885	0.657	
PEOU1: Sports brand applications exhibit a high degree of user-friendliness.	0.799			1.576
PEOU2: The learning curve associated with sports brand applications is remarkably gentle.	0.820			1.848
PEOU3: Interactions within sports brand applications are characterized by clarity and ease of comprehension.	0.820			1.858
PEOU4: Engagement with sports brand applications is effortless and straightforward.	0.804			1.770
Perceived Usefulness (α = 0.851)		0.900	0.691	
PU1: Utilizing sports brand applications enhances my overall exercise experience.	0.832			1.901
PU2: Employing sports brand applications contributes to improved exercise efficiency.	0.836			1.935
PU3: Leveraging sports brand applications promotes increased exercise productivity.	0.838			2.095
PU4: Utilizing sports brand applications proves highly beneficial for exercise execution.	0.819			1.972
Self-efficacy (α = 0.852)		0.915	0.692	
SE1: I can access and utilize the features of this sports brand application independently, without needing assistance from others.	0.807			1.703
SE2: I can efficiently complete my desired tasks within the sports brand application within a reasonable timeframe.	0.856			2.042
SE3: I can navigate and understand the functionalities of the sports brand application with minimal reliance on tutorials or in-app guidance.	0.846			2.148
SE4: I feel confident and comfortable using the features offered by the sports brand application.	0.818			1.993
System Quality (α = 0.844)		0.906	0.763	
SQ1: Sports brand applications are perceived as trustworthy and reliable.	0.875			2.092
SQ2: Navigation within these applications is efficient and user-friendly.	0.905			2.449
SQ3: The layout of these applications is clear and well-organized.	0.840			1.818

Note: α = Cronbach's alpha; CR = Composite reliabilities; AVE = average variance extracted; VIF= Variance inflation factor.

This research employed two methods to assess the distinctiveness of the constructs within the measurement model, ensuring they captured unique concepts. Fornell-Larcker Criterion: The square root of the Average Variance Extracted (AVE) for each construct (diagonal elements in Table 3) was compared to its correlations with other constructs (off-diagonal elements). When the square root of AVE for a construct is greater than its correlation with any other construct, it indicates adequate discriminant validity (Ringle *et al*., 2015) [16]. As shown in Table 3, this criterion was met, supporting the distinctiveness of the constructs.

Table 3: The assessment of discriminant validity by Fornell-Larcker criterion

	IN	IQ	PEOU	PU	SE	SQ
IN	0.887					
IQ	0.562	0.871				
PEOU	0.531	0.441	0.811			
PU	0.648	0.488	0.544	0.831		
SE	0.644	0.429	0.486	0.559	0.832	
SQ	0.604	0.483	0.546	0.599	0.521	0.874

Note: The diagonal values represent the square roots of AVEs, and below the diagonal are the correlation coefficients between the construct values. IN: Intention to Use, IQ: Information Quality, PEOU: Perceived Ease of Use, PU: Perceived Usefulness, SE: Self-efficacy, SQ: System Quality.

Heterotrait-Monotrait Ratio (HTMT) method was used to assess the relative amount of shared variance between constructs compared to their unique variance. Table 4 displays the HTMT values for all construct pairs. The highest HTMT value (0.752) fell below the recommended threshold of 0.9 (Henseler *et al*., 2015) [16], indicating sufficient discriminant validity within the measurement model. The analysis confirmed a well-fitting model with strong reliability for the measurement scales. Additionally, the scales demonstrated adequate convergent validity (discussed earlier) and discriminant validity as assessed by the methods described above. Before proceeding with the structural model analysis, multicollinearity was evaluated using Hair *et al*., (2015) [15] criteria. As shown in Table 2, the variance inflation factor (VIF) values ranged from 1.576 to 2.650, all well below the concerning threshold of 5. This suggests that multicollinearity was not a significant concern in the present study.

Table 4: The assessment of discriminant validity by HTMT criterion

	IN	IQ	PEOU	PU	SE	SQ
IN						
IQ	0.656					
PEOU	0.624	0.525				
PU	0.752	0.571	0.647			
SE	0.746	0.501	0.571	0.644		
SQ	0.708	0.570	0.648	0.702	0.611	

Note: IN: Intention to Use, IQ: Information Quality, PEOU: Perceived Ease of Use, PU: Perceived Usefulness, SE: Self-efficacy, SQ: System Quality.

Table 5 presents the results of the structural model analysis. The effects of various factors on user perceptions and intentions regarding sports brand applications were examined through path coefficients, t-values, and corresponding p-values. Hypotheses H1 to H6, which investigated the relationships between information quality, system quality, self-efficacy, and both perceived ease of use and perceived usefulness, were all supported. Specifically, information quality positively influenced both perceived ease of use (β = 0.177, T=2.446, P=0.007) and Perceived Usefulness (β = 0.156, T=2.307, P=0.011). Similarly, system quality positively affected perceived ease of use (β = 0.338, T=5.063, P=0.000) and perceived usefulness (β = 0.287, T=3.464, P=0.000). Self-efficacy also showed positive associations with both perceived ease of use (β = 0.233, T=3.290, P=0.001) and perceived usefulness (β = 0.245, T=4.098, P=0.000).

Table 5: Summary of hypotheses testing results.

Hypotheses	Path Coefficient	T-Values	P-Values	Results
H1: Information Quality → Perceived Ease of Use	0.177	2.446	0.007	Supported
H2: Information Quality → Perceived Usefulness	0.156	2.307	0.011	Supported
H3: System Quality → Perceived Ease of Use	0.338	5.063	0.000	Supported
H4: System Quality → Perceived Usefulness	0.287	3.464	0.000	Supported
H5: Self-efficacy → Perceived Ease of Use	0.233	3.290	0.001	Supported
H6: Self-efficacy → Perceived Usefulness	0.245	4.098	0.000	Supported
H7: Perceived Ease of Use → Perceived Usefulness	0.200	3.067	0.001	Supported
H8: Perceived Ease of Use → Intention to Use	0.253	3.743	0.000	Supported
H9: Perceived Usefulness → Intention to Use	0.510	8.985	0.000	Supported

Furthermore, H7 to H9 explored the relationships between perceived ease of use, perceived usefulness, and intention to use. These hypotheses were also supported, indicating that perceived ease of use positively influenced both perceived usefulness ($\beta = 0.200$, T=3.067, P=0.001) and intention to use ($\beta = 0.253$, T=3.743, P=0.000). Moreover, perceived usefulness significantly predicted intention to use ($\beta = 0.510$, T=8.985, P=0.000), highlighting its crucial role in shaping users' behavioral intentions toward adopting sports brand applications.

These findings underscore the importance of information quality, system quality, self-efficacy, perceived ease of use, and perceived usefulness in influencing user perceptions and intentions, providing valuable insights for enhancing user experience and adoption of sports brand applications. The study confirms that both information quality and system quality significantly enhance perceived ease of use and perceived usefulness. Suggesting that users value accurate, up-to-date information and reliable system performance when interacting with sports brand applications. Organizations developing these apps should prioritize these aspects to improve user satisfaction and adoption rates. The positive relationships found between self-efficacy and both perceived ease of use and perceived usefulness highlight the importance of users' confidence in their ability to use the app effectively. Enhancing self-efficacy through clear instructions, user-friendly interfaces, and support features could further boost user engagement and satisfaction. The study reaffirms that perceived ease of use positively influences perceived usefulness. When users find an app easy to navigate and interact with, they are more likely to perceive it as beneficial for their fitness goals. This relationship underscores the user experience design principles that prioritize simplicity and intuitive functionality.

The strong predictive power of perceived usefulness on intention to use highlights its pivotal role in users' decision-making process. If users perceive an app as useful for enhancing their exercise experience and productivity, they are more inclined to continue using it and possibly recommend it to others. These findings suggest that developers should focus not only on technical performance but also on enhancing user perceptions of utility and usability. Incorporating user feedback loops, improving data accuracy, and ensuring seamless functionality can further strengthen these perceptions.

5. Conclusions
The findings from this study provide valuable insights into the factors influencing user perceptions and intentions regarding sports brand applications. The research confirms that information quality and system quality significantly contribute to enhancing both perceived ease of use and perceived usefulness. Moreover, users' self-efficacy plays a crucial role in shaping their perceptions of usability and utility, highlighting the importance of fostering user confidence in app interaction. The study further demonstrates that perceived ease of use positively impacts perceived usefulness, which in turn strongly predicts users' intention to use these applications.

These insights underscore the importance of designing sports brand applications that not only offer reliable information and seamless functionality but also prioritize user-friendly interfaces and support features. By focusing on

these aspects, developers can enhance user satisfaction, engagement, and ultimately, the adoption of their applications. Future research could explore additional factors such as social influence and user experience over time to provide a more comprehensive understanding of app adoption dynamics. Overall, the study contributes to both theory and practice by emphasizing the critical role of quality, usability, and user confidence in shaping user behavior towards sports brand applications. Implementing these findings can guide developers and marketers in creating apps that better meet user needs and preferences in the competitive digital marketplace.

6. References
1. Adeyemi IO, Issa AO. Integrating information system success model (ISSM) and technology acceptance model (TAM): proposing students' satisfaction with university Web portal model. Record and Library Journal. 2020;6(1):69-79.
2. Alsabawy AY, Steel CA, Soar J. Determinants of perceived usefulness of e-learning systems. Computers in Human Behavior. 2016;64:843-858.
3. Baker-Eveleth L, Stone RW. User's perceptions of perceived usefulness, satisfaction, and intentions of mobile application. International Journal of Mobile Communications. 2020;18(1):1-18.
4. Boyd DE, Kannan PK, Slotegraaf RJ. Branded apps and their impact on firm value: a design perspective. Journal of Marketing Research. 2019;56:76-88.
5. Byun H, Chiu W, Bae JS. Exploring the adoption of sports brand apps: An application of the modified technology acceptance model. In: Research Anthology on Business Strategies, Health Factors, and Ethical Implications in Sports and eSports. IGI Global; c2021. p. 75-91.
6. Chang HS, Lee SC, Ji YG. Wearable device adoption model with TAM and TTF. International Journal of Mobile Communications. 2016;14(5):518-537.
7. Chen CC, Tsai JL. Determinants of behavioral intention to use the Personalized Location-based Mobile Tourism Application: An empirical study by integrating TAM with ISSM. Future Generation Computer Systems. 2019;96:628-638.
8. Chen JF, Chang JF, Kao CW, Huang YM. Integrating ISSM into TAM to enhance digital library services: a case study of the Taiwan digital meta-library. The Electronic Library. 2016;34(1):58-73.
9. Chin WW. The partial least squares approach to structural equation modeling. Modern Methods for Business Research. 1998;295(2):295-336.
10. Davis FD, Bagozzi RP, Warshaw PR. Technology acceptance model. J Manag Sci. 1989;35(8):982-1003.
11. DeLone WH, McLean ER. The DeLone and McLean model of information systems success: a ten-year update. Journal of Management Information Systems. 2003;19(4):9-30.
12. Edwards EA, Lumsden J, Rivas C, Steed L, Edwards LA, Thiyagarajan A, *et al*. Gamification for health promotion: systematic review of behaviour change techniques in smartphone apps. BMJ Open. 2016;6(10).
13. Grand View Research. Fitness app market size, share & trends analysis report by type (exercise & weight loss, diet & nutrition, activity tracking), by platform (Android, iOS), by device, by region, and segment

forecasts, 2022-2030. Available from: https://www.grandviewresearch.com/industry-analysis/fitness-app-market. Accessed 30 June 2022.

14. Hair JF, Ringle CM, Sarstedt M. PLS-SEM: Indeed a silver bullet. Journal of Marketing Theory and Practice. 2011;19(2):139-152.

15. Henseler J, Ringle CM, Sarstedt M. A new criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the Academy of Marketing Science. 2015;43:115-135.

16. Hock C, Ringle CM, Sarstedt M. Management of multi-purpose stadiums: Importance and performance measurement of service interfaces. International Journal of Services Technology and Management. 2010;14(2-3):188-207.

17. Hsu CL. Enhancing brand love, customer engagement, brand experience, and repurchase intention: focusing on the role of gamification in mobile apps. Decision Support Systems. 2023;174:114020.

18. Kim DJ, Ferrin DL, Rao HR. A trust-based consumer decision-making model in electronic commerce: The role of trust, perceived risk, and their antecedents. Decision Support Systems. 2008;44(2):544-564.

19. Kim JB. An empirical study on consumer first purchase intention in online shopping: integrating initial trust and TAM. Electronic Commerce Research. 2012;12(2):125-150.

20. Kim T, Chiu W, Chow MKF. Sport technology consumers: segmenting users of sports wearable devices based on technology readiness. Sport, Business and Management: An International Journal. 2019;9(2):134-145.

21. Liu IF, Chen MC, Sun YS, Wible D, Kuo CH. Extending the TAM model to explore the factors that affect intention to use an online learning community. Computers and Education. 2010;54(2):600-610.

22. Manis KT, Choi D. The virtual reality hardware acceptance model (VR-HAM): extending and individuating the technology acceptance model (TAM) for virtual reality hardware. Journal of Business Research. 2019;100:503-513.

23. Martono S, Nurkhin A, Mukhibad H, Anisykurlillah I, Wolor CW. Understanding the employee's intention to use information system: Technology acceptance model and information system success model approach. The Journal of Asian Finance, Economics and Business. 2020;7(10):1007-1013.

24. Munoz-Leiva F, Climent-Climent S, Cabanillas LF. Determinants of intention to use the mobile banking apps: An extension of the classic TAM model. Spanish Journal of Marketing-ESIC. 2017;21(1):25-38.

25. Petter S, DeLone W, McLean E. Measuring information systems success: Models, dimensions, measures, and interrelationships. Eur J Inf Syst. 2008;17:236-263.

26. Prastiawan DI, Aisjah S, Rofiaty R. The effect of perceived usefulness, perceived ease of use, and social influence on the use of mobile banking through the mediation of attitude toward use. APMBA (Asia Pacific Management and Business Application). 2021;9(3):243-260.

27. Ringle CM, Wende S, Becker JM. SmartPLS 3. Bönningstedt: Smart PLS; 2015. Available from: https://www.smartpls.com. Accessed 21 March 2024.

28. Sarstedt M, Ringle CM, Hair JF. Partial least squares structural equation modeling. In: Handbook of Market Research. Cham: Springer International Publishing; 2021. p. 587-632.

29. Statista. Mobile app usage: statistics and facts. Accessed 21 March 2024. Available from: https://www.statista.com/topics/1002/mobile-app-usage/.

30. Taylor S, Todd PA. Understanding information technology usage: A test of competing models. Inf Syst Res. 1995;6(2):144-176.

31. Torok G. Pandemic potential: Four app development trends in a Post-COVID-19 world. 2020.

32. Venkatesh V, Morris MG, Davis GB, Davis FD. User acceptance of information technology: Toward a unified view. MIS Quarterly. 2003;27(3):425-478.

33. Vinnikova A, Lu L, Wei J, Fang G, Yan J. The use of smartphone fitness applications: the role of self-efficacy and self-regulation. International Journal of Environmental Research and Public Health. 2020;17(20):7639.

34. Vitente LS, Ong AKS, German JD. Assessment of adoption and acceptance of building information modeling for building construction among industries in Qatar. Buildings. 2024;14(5):1433.

35. Wang EST, Lin RL. Perceived quality factors of location-based apps on trust, perceived privacy risk, and continuous usage intention. Behaviour and Information Technology. 2017;36(1):2-10.

36. Won D, Chiu W, Byun H. Factors influencing consumer use of a sport-branded app: The technology acceptance model integrating app quality and perceived enjoyment. Asia Pacific Journal of Marketing and Logistics. 2023;35(5):1112-1133.

37. Yin S, Cai X, Wang Z, Zhang Y, Luo S, Ma J. Impact of gamification elements on user satisfaction in health and fitness applications: A comprehensive approach based on the Kano model. Computers in Human Behavior. 2022;128:107106.

38. Zhao Q, Chen CD, Wang JL. The effects of psychological ownership and TAM on social media loyalty: An integrated model. Telematics and Informatics. 2016;33(4):959-972.

39. Zheng Y, Zhao K, Stylianou A. The impacts of information quality and system quality on users' continuance intention in information-exchange virtual communities: An empirical investigation. Decision Support Systems. 2013;56:513-524.

40. Martinez BM, McAndrews LE. The influence of mobile application design features on users' stickiness intentions as mediated by emotional response. International Journal of Retail & Distribution Management. 2021 Oct 6;49(11):1497-511.

41. Davis FD, Bagozzi RP, Warshaw PR. Extrinsic and intrinsic motivation to use computers in the workplace 1. Journal of Applied Social Psychology. 1992 Jul;22(14):1111-32.

42. Kim H, Lee JH, Na SH. Predictor-estimator using multilevel task learning with stack propagation for neural quality estimation. In Proceedings of the Second Conference on Machine Translation; c2017 Sep. p. 562-568.

43. Boyd PW, Claustre H, Levy M, Siegel DA, Weber T. Multi-faceted particle pumps drive carbon sequestration in the ocean. Nature. 2019 Apr 18;568(7752):327-35.