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The Use of Smartphone Fitness App: A Systematic Review

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Abstract – Recently the development of new technologies has produced an increase in the number of studies that try to evaluate consumer behavior towards the use of sports applications. The aim of this study is to perform a systematic review of the literature on the intention to use mobile applications (Apps) related to fitness and physical activity by consumers. This systematic review is a critical evaluation of the evidence from quantitative studies in the field of assessment of consumer behavior towards sport applications. A total of 13 studies are analyzed that propose models for evaluating the intentions to use fitness applications by sport consumers. The results revealed several key conclusions: (a) Technology Acceptance Model is the most widely used model; (b) the relationship between perceived utility and future intentions is the most analyzed; and (c) the most evaluated applications are diet/fitness. These findings could help technology managers to know the most important key elements to take into account in the development of future applications in sport organizations.

Keywords physical activity; sport application; marketing consumption; technology acceptance model; smartphone app

1. INTRODUCTION

The constant technological evolution and the development of new mobile devices such as Smartphones or tablets offer a higher level of comfort and practical use, thus making this type of device the center of life for current consumers . Globally, it is estimated that in 2019, there were 6.8 billion users worldwide and it is expected that in 2023 the number of users will increase to 7.33 billion . In particular, 90% of the time dedicated to the Smartphone is for the use of mobile applications (Apps)

Although the download rate of mobile fitness apps is high, so is the uninstall rate. The primary reasons for the users to discontinue using an app are high data entry burden, loss of interest, and hidden costs. Although these apps claim to promote positive lifestyle changes, content analysis of existing apps has identified gaps between evidence-based guidelines and app content relating to weight loss and exercise. While some of the previous systematic reviews of using smartphone apps to promote physical activity and weight loss found a non-significant difference in physical activity between the control group and smartphone intervention group, others found that smartphone apps can be effective in increasing physical activity. A more recent review suggests that app-based physical activity interventions are the most effective in the short term.

1.1 Inclusion and Exclusion Criteria

For the purposes of this review, we included empirical papers in peer-reviewed journals, excluding dissertations and abstracts. Grey literature was not included, ruling out evaluation reports, annual reports, articles in nonpeer reviewed journals and other means of publication. The inclusion criteria for the articles in the search were: (i) journal articles; (ii) publications in English; (iii) use of any type of mobile application in the sports and fitness context; and (iv) measurement of the intention to use the App through a questionnaire. As exclusion criteria have been used: (i) Congress proceedings, book chapters, books or other types of publications; (ii) no mobile Apps were used in the sports context, (iii) theoretical studies, qualitative approach or reviews; (iv) articles in a language other than English; and (v) duplicate articles.

2. Materials and Method

The search terms for Smartphone use, Fitness and Sport Apps represented the concepts of App, Physical Activity and Use, with the search strategy for the different databases presented in Table 1. Different databases were selected to include a wide range of areas related to this interdisciplinary study, including sports science, marketing, health and psychology. The databases used were Web of Science, Scopus, SPORTDiscus (EBSCO), PsycINFO (Ovid), ABI/Inform (Ovied) and

MEDLINE (Pubmed). The search was conducted between 18 March 2019 and 4 August 2020. The search covered all years and no limitations were placed on document type and language.

Table -1: Database search strategy

Category	Search Terms
App	“smartphone”, ”mobile-phone”, ”android”, ”ios”, ”application”
Physical activity	“exercise”, ”fitness” ,”walk”, ”sports”,” physical active”
Use	“App*usage”, “intent*to use”, “usability”, “attitude to

2.1 Assessment of Methodological Quality

The risk of bias was assessed using a 20-item tool adapted by the authors to the context of sports marketing study typology in which there are no intervention processes on the subjects of the Consolidated Standards of Reporting Trials (CONSORT) checklist [48]. Each study was independently scored by two reviewers evaluating the different sections that make up the studies and scoring each item with 1 if the study satisfactorily met the criterion, and with 0 if the study did not satisfactorily meet the criterion or if the item was not applicable to the study. Disagreements between the reviewers were resolved by checking and discussing the original study until consensus was reached. Reviewer A is a researcher with extensive experience specializing in the field of sports management, fitness centers and development of new technologies. Reviewer B is a predoctoral fellow in sports management with focus research on methodological and statistical aspects.The results of assessment of methodological quality were shown in Appendix A.

2.2 Data Extraction and Synthesis

Figure 1 shows the Flow Diagram proposed by Moher, Liberati, Tetzlaff, and Altman [49] following the PRISMA methodology in all points that could be common to a systematic review of these characteristics. The initial database search returned 113,537 results, reduced to 36,105 once duplicates were eliminated. One reviewer conducted a full scan of the title, then an abstract review and finally a full text review using the inclusion and exclusion criteria. Among the articles that remained at the abstract level (n = 4), a second reviewer also examined the abstracts of the articles to confirm their eligibility, and there were no discrepancies with the first reviewer.

A form was developed for data extraction that included the following aspects: (a) year of publication; (b) country of study; (c) number of participants; (d) gender; (e) age of participants; (f) type of application evaluated; (g) theory used; (h) analyses performed; (i) variables included; and (j) main results. In order to homogenize the results of the different studies and to make the data more homogeneous, the confidence intervals of each correlation (CI 95%) and the effect size with its confidence intervals (CI 95%) of each relationship were calculated through the Fisher's Z statistics [50].

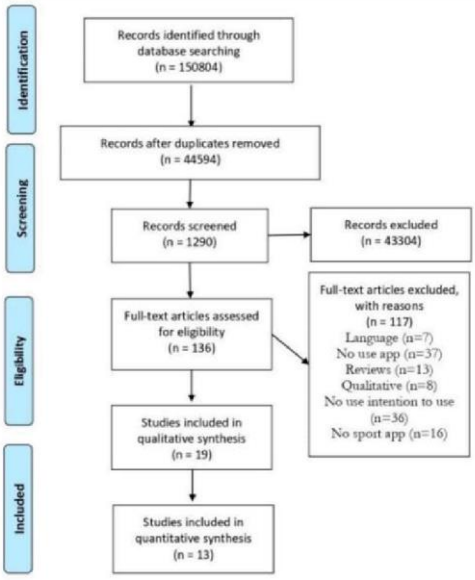

Figure 1. PRISMA flow diagram. Source: Moyer et al. [49].

2.3 Result

Analysis of the Risk of Bias in Studies

To test quality, risk of bias analysis of the 19 studies evaluated in the research showed that only three studies had a high score of 15 points or more out of 20 total [1,45,51], most studies (n = 14) had a mean score between 10 and 15 points and only two studies had a score below 10 points [52,53]. It should be noted that none of the studies analyzed carried out a calculation of the sampling required for the generalization of the results, which could be due to the fact that all the studies carried out a selection of the sample for convenience within a certain population. There are also few studies that established criteria for inclusion in the sample to be selected (n = 5) and no study indicates the author who carried out each part of the research.

2.4 Developers View point

There are many challenges and opportunities for health and fitness app developers. Currently, there is a huge gap between what users are willing to pay, versus what it costs to develop and maintain an mHealth app. Users should not need to pay a fortune to monitor their health using a mobile device. However, the looming FDA regulation might stall the use of mHealth apps in the USA or force developers to charge a lot in order to recoup the FDA certification costs. There is also a strong interest from healthcare providers with a web based solution to add myFitnessCompanion® as their mobile component. Mobile apps can collect and transmit data in a reliable and secure manner to a PHR system (e.g. Microsoft HealthVault®). Adding a mobile version to their solutions portfolio increases their market share and improves personalization and customer empowerment. Health sensor manufacturers are also very interested in mHealth apps as it offers them the opportunity to sell more

hardware devices. Mobile apps with wireless connectivity offer a perfect means to interact seamlessly and comfortably with these wireless devices. As mentioned in section 2.2, many users do use more than one app to monitor their health. It is therefore desirable, from a user's perspective, to achieve interoperability between the various Apps. The use of Microsoft HealthVault® as a central data repository is a great way to offer interoperability by allowing users to import/export data between different apps. myFitnessCompanion® is fully integrated with Microsoft HealthVault® and can seamlessly import existing physiological data reducing the need to have several mHealth apps to collect physiological data. There is a bright future for mobile app developers if the app is integrated in a total endto-end healthcare solution, and if the stakeholders (healthcare institutions, content creators, governments, mobile operators, device manufacturers, non-governmental organizations, providers, insurers, manufacturers, distributers) acknowledge the importance of the mobile aspect in their business model, and are willing to share a percentage of their profit with mHealth developers.

2.5 Discussion

The continuous technological advances have awakened the interest of marketing researchers in the intention to use Apps, especially in the field of sports. Walter [64] explained the existence of a trend towards increased interest by fitness consumers in using Apps for exercise control. Therefore, the aim of this study was to conduct a systematic review of the literature on consumers' intention to use Apps related to fitness and physical activity. The result of the systematic search has been the existence of a remarkable interest in the subject, as the studies were found in the last four years; however, studies focused on sport Apps are still limited (n = 19) with very heterogeneous methodologies. Most of the studies analyzed have tried to predict the influence of PEOU and PU on ITU, finding significant relationships between both constructs]. These relationships have been evaluated previously in the context of sport websites as a technological tool prior to the appearance of the Apps . However, the findings found are different from those proposed by different studies that concluded with a greater influence of PU on PEOU in ITU [24,38,49,65–70] or where PEOU had no significant influence on ITU [1,51,52] or in the case of Ha et al. [42] where they found that PU had no influence on ITU as opposed to PEOU. In particular, it should be noted that Davis [24] argued that PEOU is a secondary determinant construct of ITU in the perception of technology.

3. CONCLUSIONS

This systematic review responded to the need for a critical evaluation of existing research on the intentions of using sports Apps as this is an emerging field of research. The limited number of academic studies together with the deficiencies in some methodologies as can be seen in the risk analysis of research bias and the evidence found, has not allowed a more critical evaluation. These findings highlight the need for more rigorous and systematic research by researchers in the field, putting factors in common that allow a better evaluation of the context of the use of new technologies in the sports environment. At the same time, these findings have allowed the research team to identify a range of recommendations for sports organizations and researchers, which will help them to address future studies, and thus allow for a better growth and development of the evaluation of the intention to use Apps in spor.

REFERENCES

1. Kim, Y.; Kim, S.; Rogol, E. The effects of consumer innovativeness on sport team applications acceptance and usage. J. Sport Manag. 2017, 31, 241–255. [CrossRef]

2. Statista. Forecast Number of Mobile Users Worldwide from 2019 to 2023. Available online: https: //www.statista.com/statistics/218984/number-of-global-mobile-users-since-2010/ (accessed on 18 March 2020).

3. Chaffey, D. Mobile Marketing Statistics Compilation. Available online: https://www.smartinsights.com/mobi le-marketing/mobile-marketing-analytics/mobile-marketing-statistics/ (accessed on 18 March 2020).

4. Fuchs, C. Information technology and sustainability in the information society. Int. J. Commun. 2017, 11, 2431–2461. Available online: https://ijoc.org/index.php/ijoc/article/view/6827 (accessed on 17 April 2020).

5. Luque-Ayala, A.; Marvin, S. Developing a critical understanding of smart urbanism? Urb. Stud. 2015, 52, 2105– 2116. [CrossRef]
6. Vanolo, A. Smartmentality: The smart city as disciplinary strategy. Urb. Stud. 2014, 51, 883–898. [CrossRef]

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