Fans' intention to use AI-driven services in LIDOM stadiums: A study based on the technology adoption model

Socrates Aguasvivas University APEC, Dominican Republic, saguasvivas@adm.unapec.edu.do
Alfonso Ávila, Tec de Monterrey, México, aavilarobinson@tec.mx

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Abstract

Artificial intelligence (AI) comes with a constant development role and recent application by sports consumers. This study aims to investigate the relationships between perceived usefulness, perceived ease of use, user attitudes, and behavioral intention to use AI-based services of the Dominican baseball stadiums of the LIDOM. This work will be based on the Technology Acceptance Model (TAM). As a field method, a test of an AI-based application, "customer relationship management (CRM)" will be conducted that interacts with at least 500 Dominican baseball fans who attend LIDOM stadiums. After using the CRM, a questionnaire will be applied to capture data through testing assumptions and performing a confirmatory multi-factorial analysis to analyze the research hypotheses. The results will indicate three types of consumer considerations: perceived usefulness, perceived ease of use, and attitude of use; with this, it will be possible to determine which has the most significant impact and positively influences their attitudes towards AI. The results of this work will contribute to our knowledge about consumer perception towards AI-based sports facility services.

Keywords: artificial intelligence, innovation ecosystem, technology adoption model.

Introduction

Artificial Intelligence (AI) is an enabling technology with a wide range of applications in industries as diverse as automotive, agriculture, medicine, and entertainment. The use of AI in the sports industry is still in its infancy. Nevertheless, sports organizations recognize the potential benefits of AI-driven solutions on business models. As Chin et al. (2021) described, AI solutions allow for a better coexistence between technology and the sports consumer, greater efficiency by addressing individual needs vis-à-vis the industry, and customer experience improvement through targeted marketing strategies. Therefore, there is a need to investigate the relationship between sports and AI (Farrokhi et al., 2021).

To date, the study of the use of AI in sports has been approached from a variety of perspectives. Even fewer scientific studies have examined the use of AI in professional baseball. Previous research efforts have investigated the use of AI from a supply-side perspective. For example, Sources et al. (2019) analyzed the implementation of ICT-supported sports intelligence and sabermetrics to improve decision-making in Cuban baseball, Hallman (2022) developed a machine-learning model to measure player and team performance, and Stephan and Koseler (2018) provided a comprehensive survey of machine learning algorithms applied to baseball analytics. At present, no approach has examined the use of AI from a demand-side perspective, specifically that of baseball fans. As relevant stakeholders in the baseball innovation ecosystem, it is relevant to consider fans' influence in the baseball industry's innovation processes. Previous studies have acknowledged that adopting and accepting AI-driven products and services is increasingly popular among consumers.

To this end, this paper aims to understand the factors that influence fans' attitudes toward usage of AI-driven products and services in baseball stadiums. We use the case of the Dominican

Professional Baseball League (LIDOM). The Dominican Republic is an interesting case for this study because it is a highly relevant country for the baseball industry, especially as a source of talent (Enck-Wanzer, 2010; Staudohar, 2008). We rely on the Technology Acceptance Model (TAM) to identify the factors that influence the attitudes of baseball stadium consumers in the Dominican Republic toward AI, focusing on the perceived usefulness and ease of use of AI-based team-fan relationship services. The TAM is the most widely used theoretical framework to explain an individual's acceptance of information technology and systems (Weerasinghe & Hindagolla, 2017). In order to collect data, we will conduct a pilot experiment of an AI-based "customer relationship management (CRM)" application in LIDOM stadiums. After this experiment, we will use a questionnaire to collect data from at least 500 baseball fans. We will conduct a multilevel confirmatory factor analysis to analyze the research hypotheses.

The results of this study are expected to expand the spectrum of research through the application of TAM to study and analyze the intention of baseball consumers in the Dominican Republic to use AI technologies. We are currently in the fourth industrial revolution that foresees an exponential development of innovations in different fields of application within sport, including the use of AI technologies. In this same trend, we expect this work will contribute to other sports within the sports sector by providing knowledge about the intention to use AI by consumers.

Our paper is structured as follows. Section 2 describes the theoretical background underpinning our study, including our hypotheses. Section 3 enumerates a brief description of the materials and methods. Section 4 provides a brief list of the expected results from this study.

Theoretical background

Technology Adoption Model (TAM)

For this article, we use the Technology Acceptance Model (TAM), which was originally used to explain computer usage behavior (Figure 1).

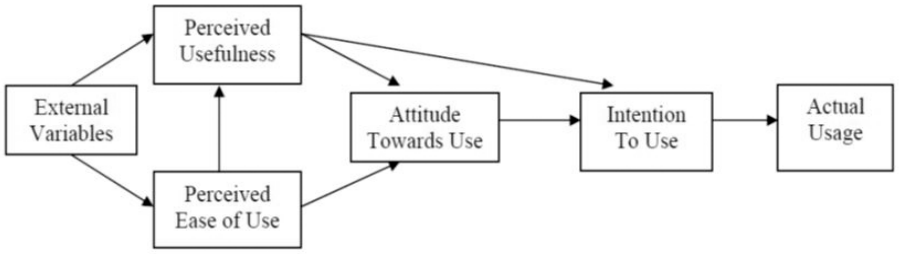

Figure 1. The Technology Acceptance Model (TAM) (Venkatesh & Davis, 1996)

The basic TAM model included and evaluated two specific beliefs: perceived usefulness (P.U.) and perceived ease of use. Perceived usefulness is defined as the potential user's subjective probability that using a given system (e.g., a single-platform electronic payment system) will improve his or her action, and perceived ease of use refers to the degree to which the Potential user expects target system to be easy (Davis, 1989). A person's belief towards a system can be influenced by other factors called external variables in TAM.

Technology adoption model (TAM) and its use in sports

For this work, we will use the Technology Acceptance Model (TAM) with the objective of identifying the factors that impact the attitudes of baseball stadium consumers in the Dominican Republic towards AI, focused on the perceived usefulness and ease of use of AI-based team-fan relationship services. The TAM is a theoretical framework most widely used to explain an individual's acceptance of an information technology or information system (Weerasinghe & Hindagolla, 2017). It is appropriate to analyze user acceptance of information systems, focusing on user perceptions of ease of use and utility (Fatma, 2015). In addition, it allows analyzing and predicting collective behavior (Davis, 1989).

In this sense, some authors have applied TAM to understand the acceptance of a technology by different users. By applying this model, it has been understood that factors such as entertainment and user interface influence the attitudes and image of baseball clubs, which in turn affects club satisfaction and loyalty (Cho & Kim, 2016). But studies have been limited to medical and sports performance approaches. The authors agree that the technological characteristics perceived by consumers should be studied, through the relationship between context-aware characteristics and the intention to use new technologies in the baseball industry (Oc & Toker, 2022). Therefore, this work seeks to expand the spectrum of research through the application of TAM extended to study and analyze the intention of baseball consumers in the Dominican Republic to use artificial intelligence.

Artificial intelligence and its use in sports

At the time of this research, few scientific studies have been conducted regarding the application of AI in professional baseball. Bowman (2021) demonstrates that Athletic Intelligence Quotient (AIQ) predicts performance outcomes in professional baseball. Sources et al. (2019) analyzes the implementation of sports intelligence and sabermetrics, supported by ICT, to improve decision-making processes in Cuban baseball. Hallman (2022) presents a machine learning model that can better measure the performance of baseball players and teams, potentially revolutionizing the way the game is analyzed. Stephan and Koseler (2018) provide a comprehensive survey of machine learning algorithms applied to baseball analysis, highlighting the dominance of support vector machines and Bayesian inference.

Hypothesis development

With the objective of developing the hypothesis structure; We base each one on lines of previous studies that relate the main components of the technological acceptance models with the application of artificial intelligence in the sports industry.

Perceived usefulness

Perceived usefulness can be defined as “the degree to which a person believes that using a specific system will increase his or her job performance” (Lin, & Bhattacherjee 2010). Because perceived usefulness can enhance an individual's current capabilities, it is considered an important factor in technology evaluation. Furthermore, perceived usefulness has been found to have both direct and indirect effects on attitudes towards technology use, which can positively influence behavioral intention to use technology (Venkatesh, 2000). For example, athletes, coaches, and spectators who positively evaluate the perceived usefulness of an electronic competition scoring system are more

likely to purchase the equipment (Ko. et al. 2016). Therefore, perceived usefulness can influence both the attitudes and purchase intention of the participants.

Perceived usefulness can help create personalized recommendations based on accumulated data (Singh, et al. 2020). AI. Systems can improve perceived usefulness by answering queries and drawing conclusions based on the collected data (Russell et al., 2020), thereby providing better service to consumers (Nica et al., 2022). Thus, the A.I. Services may offer consumer-friendly recommendations, which may result in consumers viewing these services positively. Based on this argument, the first hypothesis is the following:

Hypothesis 1: The perception of usefulness will have a positive impact on attitudes towards the use of AI-based services.

Perceived ease of use

Perceived ease of use can be defined as the degree to which users feel that using new technologies and systems does not involve significant additional physical or mental effort (Davis, 1989). Several TAM studies have shown that perceived usefulness and ease of use are crucial predictors of the intention to accept or continue using new technologies or services (Legris et al., 2003). Tanga et al. found that perceived ease of use positively affected perceived usefulness and had effects on continued intention to use (Thong, et al. 2006).

Additionally, consumers' perspectives on a product's ease of use can determine their attitudes toward a brand. For this reason, research efforts regarding the perception of ease of use of technology in sports industry services are increasing. For example, Ráthonyi et al. (2018) highlights how wearable technology, big data analytics, social media, and sensor technology have revolutionized the way sports are played, analyzed, and improved. Also, Tóth & Szabó (2018) explores the usability and feedback mechanics of sport applications, indicating the influence of info communication devices on sporting habits. Furthermore, Singh & Skrypchenko (2020) discusses the use of technology in sports and the opinions of stakeholders, supporting the idea that technology can be beneficial in improving the application of laws, rules, and regulations in sports. In this sense, we formulate the following Hypothesis 2:

Hypothesis 2: The perception of ease of use will positively affect attitudes towards AI-based services in sports facilities."

Attitude and intention to use A.I. Services

Attitude toward utilization refers to a user's subjective evaluation of the latest A.I. technologies, technology or devices. In accordance with attitude models and decision theory, research has been carried out to characterize the effects of applying the latest developments in AI. technology in user attitudes and decision-making (Miville, 2005). When people perceive the advantage of using innovative technology, their attitude toward using innovative technology is positively influenced (Kang, 2007). In this sense, it is imperative to identify people's attitudes towards the introduction of new technologies.

Studies have highlighted the role of attitudes in predicting fans to use A.I. in the sports industry. For example, Mohammadi and Isanejad (2016) present the extended technology acceptance model in sports organizations, highlighting the positive effect of attitude and perceived usefulness on the intention to use information technology. Marquez et al. (2020) investigate factors influencing spectators' adoption of digital ticketing, emphasizing the importance of trust in digital ticketing and

willingness to pay convenience fees. Lastly, Nadikattu 2020 explores the implementation of AI in sports, highlighting the benefits for fans and the growth of sports businesses through AI technology.

Behavioral intention includes word of mouth, repurchase, price sensitivity, revisit, and comprehensive concept (Yang et al., 2007). Recent researchers have classified behavioral intentions based on word of mouth, recommendations, and repeat purchases and visits (Kim et al., 2004). Based on these previous studies, our study investigated sports facility users' intentions to use A.I. services. In line with this argument, the fourth hypothesis is the following:

Hypothesis 3: The dispositions towards the adoption of artificial intelligence services will have a favorable impact on the intention to use AI-based services.

Summarizing the above discussions, Figure 2 describes the hypothesis model underlying our study.

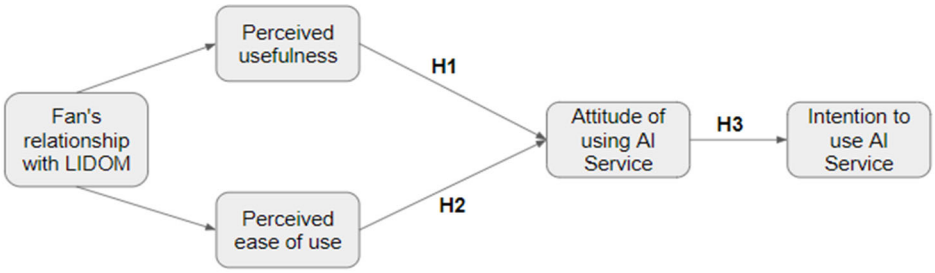

Figure 2. Hypothetical model of this study. Author's own elaboration.

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Materials and methods

Case study: Baseball in Dominican Republic

For this work, approaches have been carried out in the Dominican Republic, specifically in the Dominican Professional Baseball League (LIDOM) as it has the largest presence of fans in the country. Different investigations highlight the relevance of this country for the baseball industry. Dominicans have begun to forge a substantial presence in areas related to the economic control of gambling (Anonymous, 2007). This relevance is evidenced by Major League Baseball International's (MLB) efforts to find and train foreign talent, with the Dominican Republic as a significant source Enck-Wanzer (2010). This is because there are many foreign-born players in Major League Baseball (MLB) from the Dominican Republic. (Staudohar, 2008). Despite this, some authors considered that the presence of American Major League teams has a detrimental structural effect on the autonomy and quality of baseball in the Dominican Republic. (Small, 1989). In any case, despite the important relationship between the country and the baseball industry, there is a lack of studies on artificial intelligence and its adoption by Dominican consumers.

For this work, we have selected the fan venues, applications, and tournaments of the LIDOM institution. With this, we seek to analyze the interaction of these compounds through artificial intelligence, as presented in Figure 4.

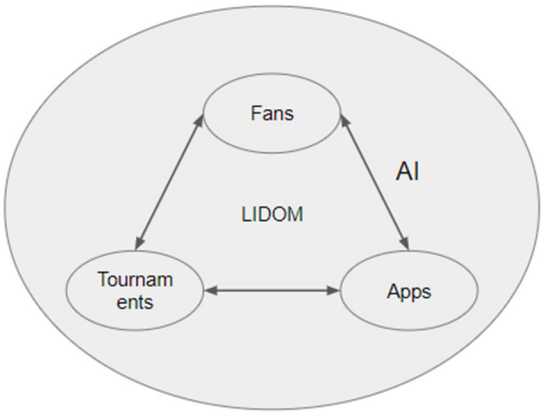

Figure. 3. Fan relationship with LIDOM through artificial intelligence. Author's own elaboration.

Research Method

To test our hypotheses, we will collect data from at least 500 Dominican baseball fans, specifically university students. We will allow them to interact with a pilot AI-based customer relationship management (CRM) system for a period of one week. After this period, we will develop a digital survey that will be shared by the CRM and linked to LIDOM. The survey will seek to demonstrate the three hypotheses to determine the average usability of AI-based LIDOM stadium services: before, during, and after visiting the stadiums in the 2023-2024 regular season.

Expected Results

After the conduction of this study, we are expecting to obtain the following results:

- We expect to observe a trend towards positive perceived usefulness of AI-based services.
- We foresee a negative trend in the perception of ease in using new AI-based services.
- We anticipate that the positive perception of usefulness will be more influential than the negative trend of perceived ease of use; to positively influence the intention to use AI-based services.

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