Journal of Advanced Sport Technology
DOI: 10.22098/jast.2025.17265.1414

Received: 24 Apr 2025	Accepted: 03 Nov 2025

Journal of Advanced Sport Technology

ORIGINAL ARTICLE

Open Access

Economic Sustainability in Sports Ticketing: The Role of Technology Acceptance Factors and Blockchain Capabilities

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How to cite:Fatahi Milasi, S., Benar, N., Nazarian, A. Economic Sustainability in Sports Ticketing: The Role of Technology Acceptance Factors and Blockchain Capabilities. *Journal of Advanced Sport Technology*, 2026; 10(2): 25-42. doi: 10.22098/jast.2025.17265.1414

A B S T R A C T

Background: This study aims to investigate the simultaneous role of technology acceptance factors and blockchain capabilities (BC) in achieving economic sustainability (ES) within the context of digital ticketing in the Iranian Premier Football League.

Methods: The study population comprised managers and experts associated with the Iranian Premier Football League, selected through purposive and convenience sampling (N=184). Data were collected using standardized questionnaires on technology acceptance factors, BC, and ES. The validity of the questionnaires was confirmed by eight sports management professors, and reliability was assessed using Cronbach's alpha and composite reliability. Descriptive statistics were analyzed using SPSS version 27, and structural equation modeling was performed with Smart PLS version 3.2.

Results: The results indicated that adoption intention for digital ticketing had a positive and significant effect on ES (β=0.209, t=2.726). BC positively and significantly influenced both adoption intention for digital ticketing (β=0.186, t=2.771) and ES (β=0.574, t=8.369). Complexity positively affected perceived ease of use (β=0.616, t=12.265). Extrinsic motivation and perceived usefulness significantly influenced adoption intention for digital ticketing (β=0.351, t=5.748; β=0.369, t=5.352). However, perceived ease of use had no significant effect on adoption intention (β=0.05, t=0.649, p=0.517). Relative advantage significantly impacted perceived usefulness (β=0.565, t=10.573).

Conclusion: The findings highlight that successful implementation of innovative technologies like blockchain in the sports industry requires addressing both technical aspects and user perceptions. BC and technology acceptance factors are critical drivers of ES in digital ticketing. Future strategies should focus on enhancing user motivation and simplifying technology use to maximize adoption and sustainability.

K E Y W O R D S : Sports Economy, Sporting Events, Sustainability, Technology, Sports Industry

Introduction

The sports industry, as one of the most dynamic sectors of the global economy, plays a significant role in economic and social development by attracting millions of fans and generating substantial revenues [1]. Ticketing, a cornerstone of revenue generation for sports events, not only covers event costs but also stimulates sectors such as transportation and tourism, contributing to economic growth [2]. However, traditional ticketing systems face challenges such as fraud, black markets, and high operational costs, which threaten the economic sustainability of the industry [3]. Economic sustainability, emphasizing resource optimization and long-term revenue assurance, requires innovative solutions to address these challenges [4]. Emerging technologies, particularly blockchain, with capabilities such as transparency, security, and cost reduction, offer significant potential to transform sports ticketing and enhance economic sustainability [5]. This study focuses on technology acceptance factors and blockchain capabilities to explore how economic sustainability in sports ticketing can be improved in the context of Iran, where infrastructural limitations and local issues like black-market ticketing pose significant challenges.

Traditional ticketing systems, whether paper-based or digital, face numerous structural issues. Paper tickets are easily forged, and centralized digital platforms are vulnerable to hacking and misuse [6]. The black market, profiting from reselling tickets at inflated prices, undermines fan trust and reduces organizers' revenue [7]. Blockchain, as a decentralized technology, ensures transparency through a distributed ledger for immutable transaction records. Its security, based on advanced cryptography, minimizes fraud risks, while smart contracts automate processes like ticket issuance and dynamic pricing, reducing intermediary costs [8, 9]. Economic sustainability in this study refers to reducing costs associated with ticket printing, distribution, and monitoring, as well as increasing long-term revenues through transparency and trust. Technology acceptance factors, including relative advantage (blockchain's superiority over traditional methods), complexity (perceived difficulty of use), perceived usefulness (positive impact on performance), perceived ease of use (usability), extrinsic motivation (external rewards like improved experience), and adoption intention (readiness to adopt), are defined based on models such as TAM, TPB, and IDT [10-12]. These factors shape users' perceptions of blockchain adoption and are critical to its success in sports ticketing.

Recent studies have explored blockchain applications across industries, including supply chains, finance, and sports, confirming its capabilities in enhancing transparency, security, and cost reduction [13, 14]. In sports, research such as Nugraha, Daniel [15] and Milasi, Benar [16] demonstrates that integrating blockchain with complementary technologies like RFID and IoT can improve ticketing efficiency and enhance fan experiences in multi-sport events by ensuring compliance with health protocols. Similarly, studies by Milasi, Benar [16] and Berkani, Moumen [5] emphasize the synergistic potential of blockchain and IoT in enhancing real-time fan data management, stadium operations, and personalized services. Feulner, Sedlmeir [17] highlight blockchain's potential to reduce fraud and black-market activities in ticketing, fostering fan trust. Popp, Simmons [18] emphasize the role of fan behavior and perceptions, including trust, loyalty,

and service satisfaction, in adopting digital technologies. Alzubaidi and Kumar [19] and Principe, Ribeiro [20] provide theoretical frameworks for blockchain adoption in sports management, yet comprehensive empirical analyses based on real-world data remain scarce. Megala and Venkatesan [21] underscore the role of smart contracts and tokenization (e.g., NFTs) in automating ticketing processes and reducing fraud. Additionally, Vidal-Tomás [22] shows that fan tokens and NFTs create new revenue streams for sports organizations and enhance fan engagement. More recent studies Ante, Saggu [23], Manoli, Dixon [24] explore how tokenized assets and fan-centered blockchain ecosystems increase loyalty, interactivity, and long-term monetization through gamification and digital collectibles. Jin, Wei [25] highlight blockchain's ability to protect sensitive data, such as athletes' health information, which can extend to transparent management of digital tickets. Furthermore, Lv, Wang [26] demonstrate that sports organizations leveraging blockchain achieve superior innovation efficiency, though legal barriers and resistance to technology adoption, as noted by Asiabar, Asiabar [27], pose challenges to widespread implementation. Collectively, these studies underscore blockchain's transformative potential in sports ticketing, fan engagement, and integrated digital ecosystems, but the lack of empirical analyses in local contexts and comprehensive studies on fan behavior and complementary technology integration remain significant research gaps.

Despite these advancements, notable research gaps persist. Most studies are limited to theoretical or case-based frameworks, with empirical analyses based on real-world data in contexts with local challenges, such as Iran's black-market ticketing and distrust in digital systems, being rare Alzubaidi and Kumar [19] and Principe, Ribeiro [20]. Moreover, contradictory findings in prior technology acceptance research suggest that constructs such as perceived ease of use and perceived usefulness can exhibit varying degrees of influence across different regional and cultural contexts—typically demonstrating stronger effects in developed economies compared to developing ones [9, 18]. While technologically advanced countries such as Germany, South Korea, and the United States have successfully integrated digital and blockchain-based ticketing systems—benefiting from high digital trust, institutional readiness, and robust technological infrastructures—the Iranian context presents unique structural, regulatory, and cultural challenges. In contrast to these countries, the adoption of blockchain in Iran is shaped by barriers such as low digital literacy, ambiguous policy frameworks, and stakeholder resistance [28]. These differences underscore the importance of conducting localized research to understand how technology acceptance factors and blockchain capabilities interact under structurally distinct conditions. Accordingly, future comparative studies that benchmark Iran's progress against globally successful models could provide deeper insights into context-specific adoption pathways and inform more effective implementation strategies in emerging markets [5].

User behavior and perceptions, particularly trust in regions with cultural resistance, are underexplored [18]. Integrated empirical models analyzing technology acceptance factors (e.g., perceived usefulness and relative advantage) alongside blockchain-specific capabilities, such as transparency and security, are rarely developed [9, 21]. The role of blockchain in linking

technology acceptance factors to economic sustainability is also underexplored [17]. Moreover, the impact of environmental constraints, such as inadequate infrastructure and legal regulations in Iran, on blockchain adoption has received limited attention [5]. These gaps highlight the need for comprehensive research to analyze technology acceptance factors, blockchain capabilities, and local challenges to enhance economic sustainability in sports ticketing.

Addressing these gaps is significant from both theoretical and practical perspectives. Theoretically, this study contributes to scientific frameworks like TAM and IDT by proposing an integrated model combining technology acceptance factors and blockchain capabilities, providing deeper insights into behavioral and technical interactions in technology adoption. Practically, the findings can offer strategies for sports managers and event organizers to reduce fraud, optimize costs, and enhance fan trust, thereby strengthening economic sustainability. In Iran, where black-market ticketing and infrastructural limitations pose serious challenges, this study can inform effective policymaking for ticketing digitization. Additionally, integrating blockchain with complementary technologies can improve fan experiences and enhance the competitiveness of sports organizations. This study examines technology acceptance factors (relative advantage, complexity, perceived usefulness, perceived ease of use, extrinsic motivation, and adoption intention) and blockchain capabilities, proposing an integrated framework. Thus, the study aims to answer the following question: Can blockchain technology significantly enhance economic sustainability in sports event ticketing?

Material and Methods

This applied research adopted a quantitative approach to test the research hypotheses, targeting managers and experts associated with the Iranian Premier Football League as the statistical population, given their role in organizational decision-making and direct influence on economic sustainability outcomes (e.g., cost reduction, transparency) [29]. For data analysis, structural equation modeling with a partial least squares approach (PLS-SEM) was employed, following the 10-times rule proposed by [30, 31], which set a minimum sample size of 110. However, to enhance result accuracy and reliability, the sample size was increased to 184, deemed appropriate given the complexity of multivariate analyses and the maximum likelihood method's requirement for larger samples in cases of non-normality [32]. Sampling was conducted using purposive and convenience methods, with questionnaires distributed through communication channels of Premier League clubs, resulting in 184 responses. To address potential selection bias from purposive and convenience sampling, which may favor participants with higher technical knowledge, a post-hoc analysis of demographic diversity (40% managers, 35% sports experts, 25% IT experts) confirmed varied representation across roles, though less technically inclined staff may be underrepresented. The questionnaire was designed in two sections: the first section collected participants' demographic information, while the second section assessed technology acceptance factors based on [10, 11, 28, 33, 34], including relative advantage (RA1-5), complexity (C1-3), extrinsic motivation (EM1-3), perceived usefulness (PU1-3), perceived ease of use (PEOU1-3), and adoption intention (AI(DT)1-3), blockchain capabilities (BC1-7), based on [8, 35], and economic

sustainability (ES1-3), based on [29]. A five-point Likert scale (from very low to very high) was selected for its precision and ease of response [36], avoiding issues associated with seven-point scales [37]. The questionnaire underwent bidirectional translation (English to Persian and vice versa) by two independent translators fluent in both languages. Discrepancies were resolved through consensus discussions with a sports management expert to ensure cultural and linguistic equivalence, particularly for technical terms unfamiliar to Iranian respondents. Its validity was confirmed by eight sports management professors, and reliability was assessed using Cronbach's alpha and composite reliability (SPSS 27). Data analysis was conducted using Smart PLS version 3.2.8 [38] with the PLS-SEM method, suitable due to its lack of requirement for data normality [39]. The structural model evaluation included path coefficients, their statistical significance, and explained variance (R^2) using a 5,000-sample bootstrap [39]. The predictive relevance criterion (Q^2)Chin [40] was also assessed to ensure the model's quality and the accuracy of variable relationships.

Results

The research findings are reported below.

Measurement Model

To assess the validity of the measurement model, three criteria were used: factor loadings, Cronbach's alpha, and composite reliability [41]. Factor loadings were accepted with a minimum value of 0.4. All model variables exhibited Cronbach's alpha values above 0.80 and composite reliability values above 0.90, indicating high model reliability. Convergent validity was evaluated based on the Fornell and Larcker [42] criterion, which confirmed that the Average Variance Extracted (AVE) values for all study dimensions exceeded 0.50. Additionally, discriminant validity was assessed using the Fornell-Larcker criterion, which compares the square root of the AVE for each construct with its highest correlation with other constructs. The results showed that the square root of the AVE for all variables was higher than the correlations between the respective latent variables, confirming the discriminant validity of the model [41].

Table 1. Measurement model.

Measure	Factor load	α	rho_A	CR	AVE
Relative Advantage		0.824	0.832	0.875	0.584
I believe that using blockchain technology for digital ticket sales in sports events provides a relative advantage in reducing costs and improving economic efficiency.	.774				
I believe that using blockchain technology in digital ticket sales has improved financial settlements and reduced related costs.	.765				
I believe that using blockchain technology in digital ticket sales has improved service quality and increased economic efficiency.	.742				
I believe that using blockchain technology in digital ticket sales has increased sales speed and reduced operational costs.	.821				
I believe that using blockchain technology for purchasing digital tickets is more attractive in terms of economic sustainability.	.746				
Complexity		0.723	0.752	0.844	0.646

I believe that using blockchain in the digital ticket purchasing process is more complex compared to purchasing other (physical) tickets.	.848				
I believe that using blockchain in the digital ticket purchasing process may cause technical issues or system errors.	.871				
I believe that using blockchain in the digital ticket purchasing process requires training and learning specific terminologies.	.679				
Extrinsic Motivation		0.733	0.809	0.848	0.657
I believe that learning and using blockchain in the digital ticket purchasing process can bring innovation and transformation to sports ticket sales.	.609				
I believe that using blockchain in the digital ticket purchasing process can ensure security and prevent fraud in sports ticket sales.	.917				
I believe that the digital ticket purchasing process using blockchain enables access to virtual tickets anytime and anywhere.	.872				
Perceived Usefulness		0.805	0.811	0.885	0.719
I believe that customers are generally satisfied with using blockchain technology for digital ticket sales in sports events.	.840				
I believe that customers feel that using blockchain technology for digital ticket sales in sports events brings greater speed and accuracy.	.888				
I believe that customers perceive the digital ticket purchasing process as simpler due to the use of blockchain technology.	.815				
Perceived ease of use		0.797	0.806	0.881	0.712
I believe that using blockchain technology for digital ticket sales will be simple and convenient for organization staff.	.848				
I believe that remembering and performing tasks related to digital ticket sales through blockchain technology is easy for me.	.871				
I believe that blockchain technology in digital ticket sales is completely clear and understandable to me.	.679				
Adoption intention digital ticket		0.74	0.737	0.853	0.659
I predict that in the future, clubs or sports organizations will regularly use blockchain technology for digital ticket sales.	.749				
Our organization will use blockchain technology for digital ticket sales in the future.	.838				
I expect that sports organizations will use blockchain technology for digital ticket sales instead of traditional methods in the future.	.845				
Blockchain Capabilities		0.879	0.882	0.906	0.58
I believe that using blockchain in ticket sales increases trust in the ticket sales process.	.752				
I believe that transaction verification in blockchain fosters a sense of trust among spectators in the ticket sales process.	.777				
I believe that using blockchain in ticket sales for sports events can reduce costs paid to intermediaries.	.750				
I believe that all information related to the ticket sales process in blockchain is accessible to all network members.	.747				
I believe that the refund and ticket change request processes in blockchain are transparent.	.704				
I believe that the user authentication process in ticket sales using blockchain is more secure.	.776				
I believe that using blockchain can prevent fraud and corruption in ticket sales for sports events.	.822				
Economic sustainability		0.778	0.779	0.871	0.692
I believe that using digital tickets can reduce costs related to printing and distributing paper tickets.	.837				

I believe that using digital tickets can reduce the time and costs associated with processing entry tickets.	.829
I believe that using blockchain and digital tickets improves the quality and efficiency of the ticket sales process.	.831

Table 2. Discriminant validity (Fornell-Larcker Criterion)

Construct	AI(DT)	BC	C	ES	EM	PU	PEOU	RA
AI(DT)	0.812							
BC	0.653	0.762						
C	0.563	0.535	0.804					
ES	0.583	0.71	0.507	0.832				
EM	0.688	0.596	0.458	0.43	0.811			
PU	0.713	0.619	0.525	0.594	0.551	0.848		
PEOU	0.584	0.591	0.616	0.551	0.469	0.702	0.844	
RA	0.595	0.672	0.701	0.582	0.517	0.565	0.57	0.764

Note: "AI(DT)" stands for "Adoption intention digital ticket", "BC" for "Blockchain capabilities", "ES" for "Economic sustainability", "C" for "Complexity", "EM" for "Extrinsic Motivation", "PU" for "Perceived Usefulness", and "PEOU" for "Perceived ease of use", "C" for " Complexity"

Structural model

The structural model of the research was evaluated using the criteria of the coefficient of determination (R^2), predictive relevance (Q^2), and significance coefficient (T-values) [31, 41] (Table 5). The R^2 value ranges from zero to one and indicates the structural model's fit at three levels: weak (0.25), moderate (0.50), and strong (0.75) [30, 43]. In this study, the R^2 values for most research variables were above 0.25 (Table 5), indicating that the structural model has a strong fit. Following Stone and Geisser (1975), the Q^2 criterion was used to determine the model's predictive power. The Q^2 values for all dimensions of the study were above zero, suggesting that the research model possesses predictive power (Table 3).

Table 3. Structural model.

Construct	R Square	R Square Adjusted	Q^2 (=1-SSE/SSO)
AI(DT)	0.638	0.632	0.389
BC	0.318	0.314	0.159
ES	0.508	0.503	0.33
PU	0.32	0.316	0.216
PEOU	0.379	0.376	0.248

Model fit

The evaluation of model fit (Goodness-of-Fit or GoF) is a fundamental aspect of model assessment. This evaluation can be conducted using statistical tests such as dULS and dG, as well as fit indices like SRMR. Bootstrap-based tests compare empirical and model-based correlation matrices, where the absence of significant differences between the two indicates a good model fit [44]. According to [45], SRMR values below 0.08 suggest a good model fit. In this study, the SRMR value was 0.071, indicating a favorable model fit. These indices assess both the estimated and saturated models, with the saturated model assuming free correlations among constructs.

Additionally, the GoF criterion was calculated as 0.856, confirming a "strong" overall model fit (Formula 1).

$$\text{GOF} = \sqrt{\overline{communalities} \times \bar{R}^2}$$

$$\text{GOF} = \sqrt{0.815 \times 0.432} = 0.593 \textbf{ strong overall fit.}$$

Testing of hypotheses

The results of the path analysis using the SEM-PLS method revealed that Adoption Intention Digital Ticket has a positive and significant effect on Economic Sustainability (H1: β = 0.209, t = 2.726, p = 0.007); thus, this hypothesis is accepted. Additionally, Blockchain Capabilities has a positive and significant effect on both Adoption Intention Digital Ticket and Economic Sustainability (H2: β = 0.186, t = 2.771, p = 0.006; H3: β = 0.574, t = 8.369, p = 0.001), indicating the acceptance of these hypotheses. The effect of Complexity on Perceived Ease of Use was positive and significant (H4: β = 0.616, t = 12.265, p = 0.001). Furthermore, Extrinsic Motivation and Perceived Usefulness had positive and significant effects on Adoption Intention Digital Ticket (H5: β = 0.351, t = 5.748, p = 0.001; H6: β = 0.369, t = 5.352, p = 0.001). However, the effect of Perceived Ease of Use on Adoption Intention Digital Ticket was not significant (H7: β = 0.05, t = 0.649, p = 0.517), and this hypothesis was rejected. Finally, Relative Advantage had a positive and significant effect on Perceived Usefulness (H8: β = 0.565, t = 10.573, p = 0.001), confirming the acceptance of this hypothesis (Table 4).

Table 4. Testing the direct hypotheses

Hypothesis	Constructs	Path Coefficient	T statistics	P values	Decision
H1	AI (DT) → ES	0.209	2.726	0.007	Supported
H2	BC → AI (DT)	0.186	2.771	0.006	Supported
H3	BC → ES	0.574	8.369	0.001	Supported
H4	C → PEOU	0.616	12.265	0.001	Supported
H5	EM → AI (DT)	0.351	5.748	0.001	Supported
H6	PU → AI (DT)	0.369	5.352	0.001	Supported
H7	PEOU → AI (DT)	0.05	0.649	0.517	Not Supported
H8	RA → PU	0.565	10.573	0.001	Supported

Ultimately, the relationships between the components of the research model were depicted as follows (Figure 1).

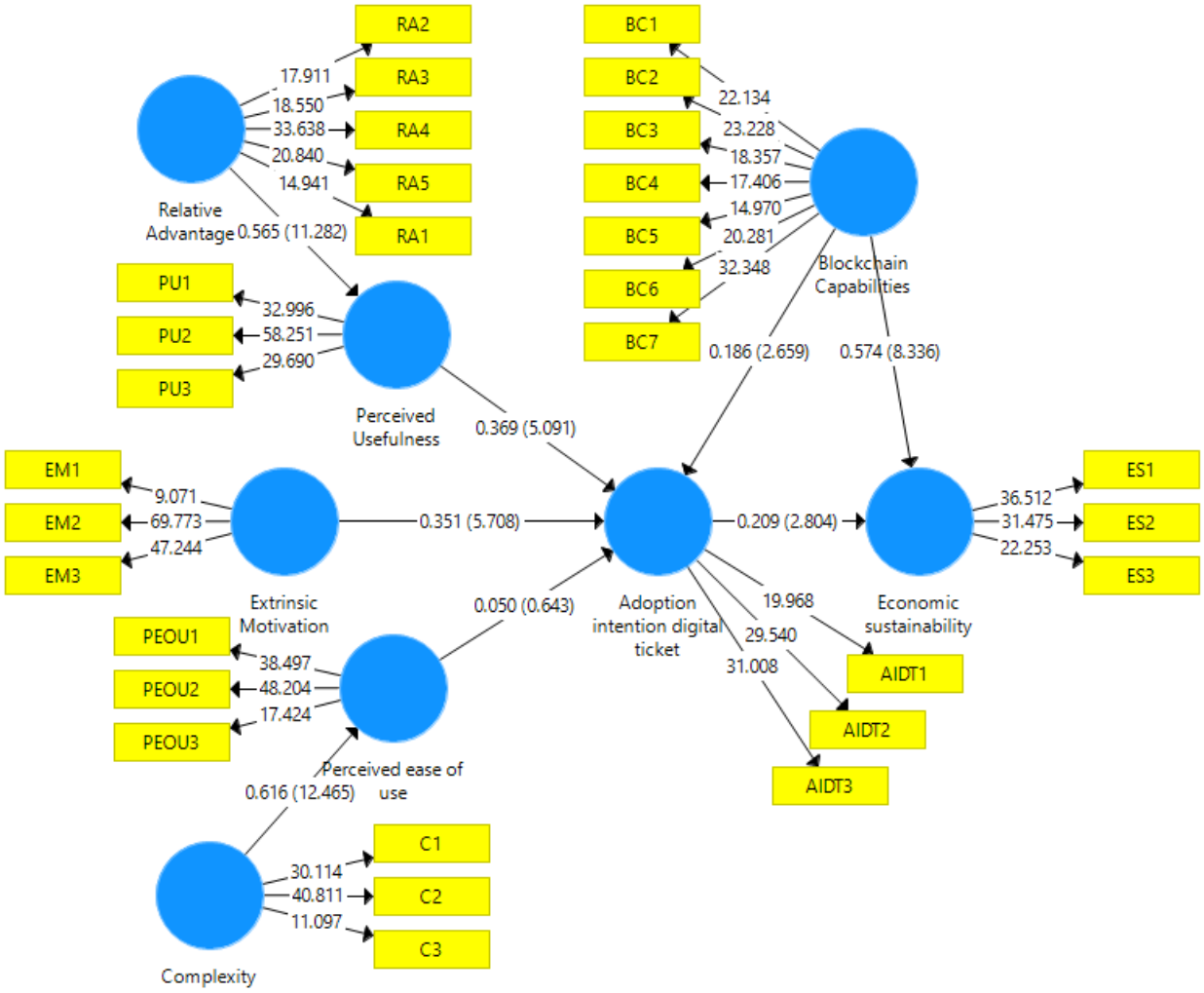

Figure 1. Value of significance statistic, T value, for research model

Discussion

This study was conducted within the context of the Iranian football industry, analyzing the impact of technological acceptance factors and blockchain capabilities on economic sustainability. The results demonstrate significant findings in testing the research hypotheses. The findings indicate that Blockchain Capabilities (BC) have a positive and significant effect on Economic Sustainability (ES) in sports ticketing, representing the strongest effect in the examined model. This suggests that blockchain's key features, such as transparency, security, decentralization, and cost reduction, not only optimize ticketing processes but also contribute to economic sustainability in the Iranian football industry by reducing operational costs and enhancing user trust. This finding aligns with prior studies by Munir, Habib [46] and Saberi, Kouhizadeh [14], which demonstrated that blockchain enhances economic sustainability across various systems by improving efficiency and reducing resource waste through intermediary elimination. It is also consistent Feulner, Sedlmeir [17] and Aldweesh [47], who emphasized transparency and cost reduction in blockchain adoption. A likely reason for this strong effect is the critical need for transparency and security in

transactions in Iran, where traditional systems face challenges like fraud and black-market ticketing. Blockchain, with its distributed ledger and advanced cryptography, minimizes these risks, as supported by Tackmann's [48] trust theory, which highlights the role of data immutability in fostering trust. This finding has significant implications for sports organizations, indicating that integrating blockchain capabilities into ticketing systems can serve as an effective strategy for increasing profitability and reducing costs, particularly in pursuit of economic sustainability goals.

Adoption Intention Digital Ticket (AI(DT)) has a positive and significant effect on Economic Sustainability (ES). This finding suggests that users' willingness to adopt blockchain-based digital ticketing directly contributes to economic sustainability by improving transparency and efficiency, addressing the need to rebuild trust and reduce costs in traditional systems. This result is consistent with Vazquez Melendez, Bergey [49], who showed that adopting innovative technologies can enhance economic sustainability by increasing trust and reducing costs, and is complemented by Li, Niu [50], who emphasized the role of technology adoption in reducing fraud. A key underlying factor is the history of black-market and fraudulent ticketing challenges in Iran, which encourages users to seek more reliable systems. Blockchain addresses this need by enabling secure ownership verification [17]. This finding has practical implications, as organizations can create sustainable revenue streams and improve fan experiences by promoting digital ticket adoption through education and awareness campaigns.

Blockchain Capabilities (BC) have a positive and significant effect on Adoption Intention Digital Ticket (AI(DT)), with a notable path coefficient. This indicates that blockchain's transparency, security, and decentralization increase users' motivation to adopt this technology. The interpretation suggests that blockchain reduces security risks and provides real-time transaction transparency, thereby enhancing user trust and lowering adoption barriers, aligning with the Innovation Diffusion Theory Moore and Benbasat [11]. This result is consistent with Alzubaidi and Kumar [19] and Principe, Ribeiro [20] and Zhan, Yuan [51], who demonstrated that blockchain's security and transparency facilitate adoption. A key factor is Iranian users' concerns about ticket forgery and black-market exploitation, which blockchain addresses through its immutable features. This finding is significant for sports policy, as organizations can promote blockchain adoption by highlighting these capabilities, moving closer to economic sustainability goals.

Complexity (C) has a negative and significant effect on Perceived Ease of Use (PEOU). This finding indicates that the perceived complexity of blockchain systems reduces users' perception of ease of use, potentially hindering technology adoption in sports ticketing. The interpretation suggests that in Iran, where technical knowledge among users, particularly fans and local managers, may be limited, perceived complexity disrupts the user experience and reduces trust in the system, especially given fears related to digital complexities like data security or technical difficulties [18]. This result aligns with Vazquez Melendez, Bergey [49], who identified complexity as a key barrier to positive user experiences with innovative technologies, and Bartin, Ozbay [52], who showed that perceived complexity challenges adoption among users with limited

awareness. The primary driver of this negative effect is the lack of education and public awareness about blockchain in Iran, making the technology appear difficult and unfamiliar to non-expert users, consistent with the Innovation Diffusion Theory [11], which views complexity as a barrier to innovation adoption. This finding has significant implications for designing blockchain-based ticketing systems, as organizations should prioritize user-friendly interfaces and provide educational support to build trust and facilitate adoption.

Extrinsic Motivation (EM) has a positive and significant effect on Adoption Intention Digital Ticket (AI(DT)). This result indicates that incentives such as financial rewards, institutional support, and competitive pressures significantly increase users' willingness to adopt blockchain-based digital ticketing. The interpretation suggests that in the Iranian football context, where distrust in digital systems and resistance to change due to unfamiliarity with new technologies exist, extrinsic motivations act as a driving force, reducing initial barriers and encouraging blockchain use. This aligns with the Unified Theory of Acceptance and Use of Technology (UTAUT), which identifies extrinsic motivations as a key factor in adoption [28]. This result is consistent with Oliveira, Barbeitos [53], who highlighted the critical role of extrinsic incentives in early technology adoption, and is reinforced by Sriram, Saraf [54], who confirmed competitive advantages as adoption drivers across industries. A key factor is the need to build trust among fans and managers in Iran, facilitated by incentives like financial discounts or institutional support that enhance user experience. This finding has significant practical implications, as sports organizations can promote blockchain adoption through policies offering financial rewards or partnerships with governmental bodies, achieving economic sustainability and fan satisfaction goals.

Perceived Usefulness (PU) has a positive and significant effect on Adoption Intention Digital Ticket (AI(DT)). This result indicates that users' perception of blockchain's benefits, such as reduced fraud, increased transparency, and improved efficiency, directly strengthens their willingness to adopt this technology in sports ticketing. The interpretation suggests that in Iran, perceived usefulness acts beyond a mere motivational factor, addressing tangible user needs like transaction security and cost reduction, thereby increasing trust and facilitating adoption. This aligns with the Technology Acceptance Model (TAM), which identifies perceived usefulness as a primary predictor of usage intention [10]. This result is consistent with Selvaratnam [55], who showed that perceived performance benefits of innovative sports technologies enhance adoption, and is complemented by Ali, Norman [56], who emphasized that perceived reliability and efficiency boost user trust. The primary driver is the challenges in Iran's traditional ticketing systems, such as fraud and inefficiency, which blockchain addresses with tangible solutions. This finding has significant implications for sports organizations, as targeted communication about blockchain's benefits can enhance perceived usefulness and accelerate adoption.

Perceived Ease of Use (PEOU) has no significant effect on Adoption Intention Digital Ticket (AI(DT)). This result suggests that in the Iranian context, the simplicity of using blockchain systems is not a determining factor in adoption, with users prioritizing other aspects like efficiency.

The interpretation indicates that Iranian users' relative familiarity with digital technologies, such as payment or online ticketing apps, reduces the importance of ease of use, shifting focus to tangible outcomes like transparency and security. This contradicts TAM, which considers ease of use a key adoption factor [10], but aligns with Selvaratnam [55] for complex technologies, where prior experience prioritizes usefulness over simplicity. The primary factor is the Iranian user culture, which values efficiency and practical outcomes over ease of use, aligning with reduced fear of digital complexities, unlike Popp, Simmons [18]. This finding has implications for blockchain system design, as organizations should focus on communicating performance benefits rather than solely simplifying systems to increase adoption.

Relative Advantage (RA) has a positive and significant effect on Perceived Usefulness (PU). This result indicates that the perceived superiority of blockchain over traditional systems, such as transparency, security, and cost reduction, significantly enhances users' perception of its usefulness. The interpretation suggests that in the Iranian football context, blockchain's relative advantage addresses economic (cost reduction) and social (increased trust) needs, creating motivation for adoption. This aligns with the Innovation Diffusion Theory, which considers relative advantage a primary driver of innovation adoption [11]. This result is consistent with Shang, Liu [57], who confirmed blockchain's superiority in security and transparency, and is complemented by Feulner, Sedlmeir [17], who showed that self-sovereign identity systems reduce fraud and enhance relative advantage. The key factor is the challenges of traditional systems in Iran, such as intermediation and inefficiency, which blockchain addresses with tangible solutions. This finding has significant practical implications, as organizations can increase perceived usefulness and accelerate adoption by communicating these advantages, contributing to economic sustainability goals.

Limitations and Suggestions for Future Research

This study, while offering valuable insights into the adoption of blockchain technology in sports ticketing, is subject to several limitations that provide avenues for future research. The primary focus on the Iranian football industry restricts the generalizability of the findings to other sports, sectors (e.g. cultural events), or regions with different levels of digital infrastructure and governance. Future studies should extend this framework to diverse contexts to allow for cross-industry and cross-cultural comparisons. Additionally, the use of purposive and convenience sampling may have introduced selection bias, limiting representativeness. Employing random or stratified sampling in future research could enhance result validity. Another limitation concerns the restricted sample population, which excluded key stakeholders such as fans, ticketing platform developers, and regulatory authorities. Expanding the participant base in future investigations would yield a more holistic understanding of technology acceptance dynamics. Moreover, participants' varying levels of familiarity with blockchain may have influenced their responses; qualitative follow-up studies (e.g., interviews, focus groups) could help clarify perceptions and psychological barriers. The study also did not empirically address practical implementation challenges, including legal, regulatory, and infrastructural obstacles that are critical in developing

countries like Iran. Future research should adopt mixed-methods approaches to analyze these barriers and propose actionable solutions. The unexpected insignificance of perceived ease of use on adoption intention warrants deeper inquiry—possibly through redesigned measurement instruments or cultural/contextual exploration of user experience. Furthermore, the cross-sectional nature of this study limits the ability to track shifts in attitudes over time. Longitudinal designs are recommended to monitor behavioral evolution as users become more familiar with blockchain technologies. Technological platforms like Ethereum and Hyperledger Fabric—known for smart contracts and secure permissioned environments—should be tested through pilot implementations in smaller-scale sporting events to evaluate their practical viability. Legal frameworks around digital commerce and data governance in Iran also require revision to support blockchain integration. Collaboration among legal, technological, and sports institutions will be essential to ensure smooth deployment. Finally, educational and awareness initiatives targeting the benefits, functionality, and security of blockchain-based ticketing are crucial to reducing cultural resistance and promoting widespread adoption.

Conclusion

The findings of this study indicate that the application of blockchain technology in the sports ticketing process can significantly enhance the economic sustainability of this sector. On one hand, blockchain capabilities directly contribute to improving economic sustainability, and on the other hand, by increasing users' intention to adopt digital ticketing, it indirectly supports economic sustainability. It was also found that several factors influence the intention to adopt digital ticketing, including extrinsic motivation, perceived usefulness, and blockchain capabilities, all of which demonstrated significant positive effects. Meanwhile, perceived ease of use, despite theoretical expectations, did not significantly influence adoption intention, which may indicate users' growing familiarity with technology or specific perceived complexities in the system. Furthermore, system complexity was found to negatively affect perceived ease of use, while the perceived relative advantage of the technology contributed to enhancing users' perception of its usefulness. These results suggest that the successful adoption of digital ticketing on a blockchain platform requires user-friendly design, reduced technical complexity, and a clear understanding of the technology's benefits by users. Overall, this study emphasizes that the targeted use of blockchain technology, combined with attention to users' behavioral and motivational factors, can play a significant role in the digital transformation of the sports industry and the move toward economic sustainability in sports events.

Ethical Considerations:

Compliance with ethical guidelines

Ethical considerations in this study included informed consent, confidentiality, and the right to withdraw at any time.

Funding

Authors state no funding involved.

Conflict of Interest

The authors declare that there are no conflicts of interest regarding the publication of this manuscript.

Acknowledgment

The authors would like to express their sincere gratitude to all individuals and organizations who contributed to this research, especially the participants who generously shared their time and insights. Their cooperation and support were invaluable to the successful completion of this study.

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نشریه فناوری ورزشی پیشرفته
DOI: 10.22098/jast.2025.17265.1414
تاریخ دریافت: ۱۴۰۴/۰۲/۰۴ تاریخ پذیرش: ۱۴۰۴/۰۸/۱۲
Journal of Advanced Sport Technology
«مقاله پژوهشی»

پایداری اقتصادی در بلیط‌فروشی ورزشی: نقش عوامل تکنولوژیکی پذیرش فناوری و قابلیت‌های بلاکچین

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چکیده

هدف: این پژوهش با هدف بررسی نقش هم‌زمان عوامل پذیرش فناوری و قابلیت‌های بلاکچین (BC) در دستیابی به پایداری اقتصادی (ES) در زمینه بلیت‌فروشی دیجیتال در لیگ برتر فوتبال ایران انجام شد.

روش شناسی: جامعه آماری پژوهش شامل مدیران و کارشناسان مرتبط با لیگ برتر فوتبال ایران بود که از طریق نمونه‌گیری هدفمند و در دسترس انتخاب شدند (N=184). داده‌ها با استفاده از پرسشنامه‌های استاندارد عوامل پذیرش فناوری، قابلیت‌های بلاکچین و پایداری اقتصادی جمع‌آوری شد. روایی پرسشنامه‌ها توسط ۸ استاد مدیریت ورزشی تأیید شد و پایایی آن با آلفای کرونباخ و پایایی ترکیبی ارزیابی گردید. آمار توصیفی با نرم‌افزار SPSS نسخه ۲۷ و مدل‌سازی معادلات ساختاری با نرم‌افزار Smart PLS نسخه ۳,۲ انجام شد.

نتایج: نتایج نشان داد که نیت پذیرش بلیت دیجیتال تأثیر مثبت و معنی‌داری بر پایداری اقتصادی داشت (β=0.209، t=2.726). قابلیت‌های بلاکچین تأثیر مثبت و معنی‌داری بر نیت پذیرش بلیت دیجیتال (β=0.186، t=2.771) و پایداری اقتصادی (β=0.574، t=8.369) داشت. پیچیدگی تأثیر معنی‌داری بر سهولت ادراک‌شده داشت (β=0.616، t=12.265). انگیزه بیرونی و سودمندی ادراک‌شده تأثیر مثبت و معنی‌داری بر نیت پذیرش بلیت دیجیتال داشتند (β=0.351، t=5.748؛ β=0.369 ، t=5.352). با این حال، سهولت ادراک‌شده تأثیر معنی‌داری بر نیت پذیرش نداشت (β=0.05، t=0.649، p=0.517). همچنین مزیت نسبی تأثیر معنی‌داری بر سودمندی ادراک‌شده داشت (β=0.565، t=10.573).

نتیجه‌گیری: یافته‌ها نشان می‌دهد که پیاده‌سازی موفق فناوری‌های نوین مانند بلاکچین در صنعت ورزش نیازمند توجه به جنبه‌های فنی و ادراک کاربران است. قابلیت‌های بلاکچین و عوامل پذیرش فناوری محرک‌های کلیدی پایداری اقتصادی در بلیت‌فروشی دیجیتال هستند. استراتژی‌های آینده باید بر تقویت انگیزه کاربران و ساده‌سازی استفاده از فناوری تمرکز کنند تا پذیرش فناوری و پایداری به حداکثر برسد.

واژه‌های کلیدی: اقتصاد ورزش، رویدادهای ورزشی، پایداری، فناوری، صنعت ورزش.