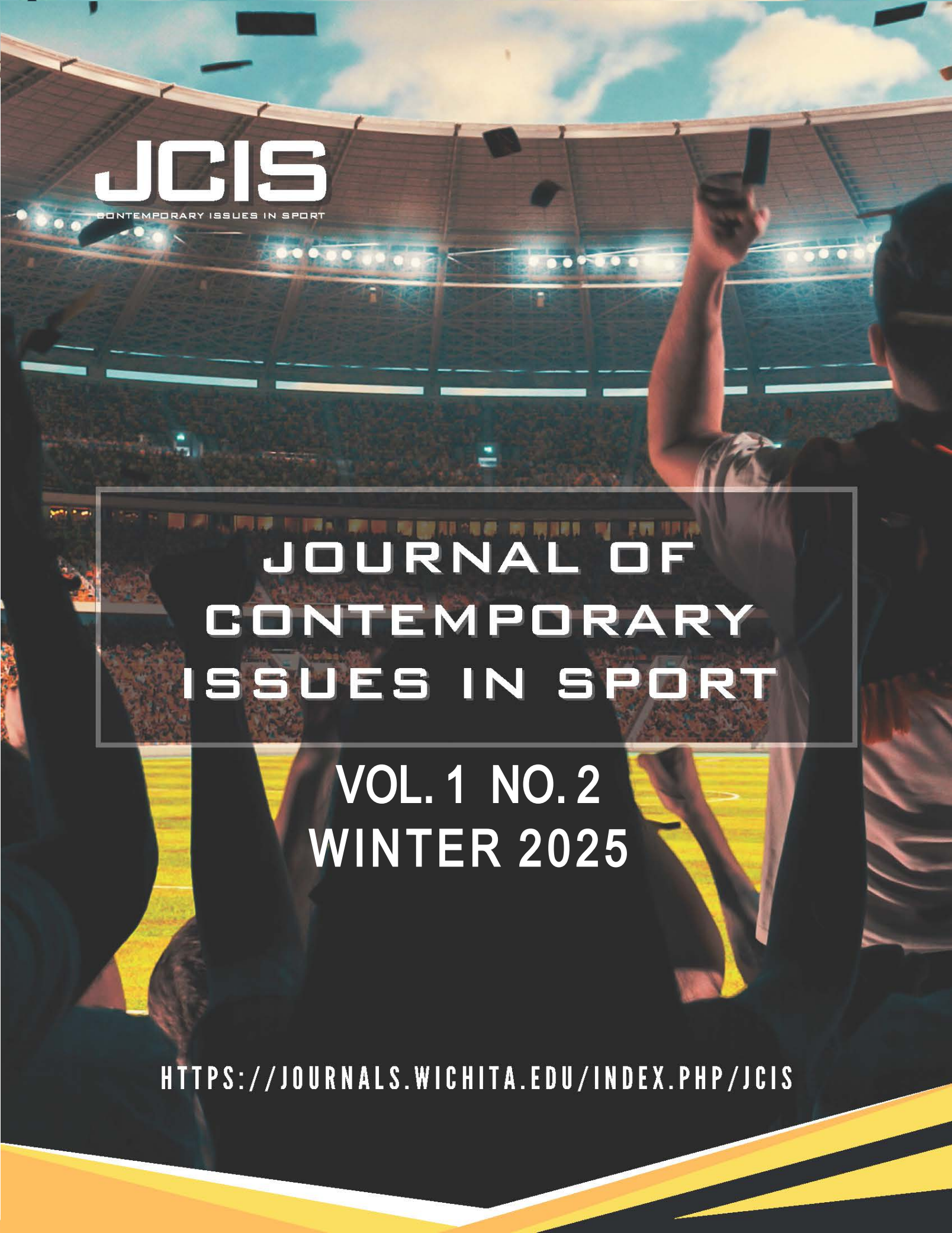

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Empirical Research Articles

Leveraging Artificial Intelligence for Automated Qualifier Determination in NCAA Division II Diving: A Technical Case Study

Jeff Noble
Department of Sport and Leadership Studies, Wichita State University

Abstract

The integration of artificial intelligence (AI) in sporting event administration has expanded in recent years, offering increased accuracy, efficiency, and standardization in decision-making processes. This case study investigates the use of ChatGPT, a large language model (LLM), to automate and validate the selection of championship qualifiers in the NCAA Division II Diving Championships, an administrative process known for its complexity and susceptibility to human error. Through structured prompt engineering, iterative testing, and verification using official qualification procedures, the study demonstrates the feasibility of employing AI to support operational reliability. The findings highlight opportunities and limitations for AI adoption in sport management settings and provide recommendations for future implementation.

Keywords: artificial intelligence; sport management; ChatGPT; NCAA diving; officiating technology; automation; decision support systems

Field Notes: Practice-Driven Issues in Sport by Dr. Jeff Noble

Dr. Jeff Noble, a faculty member in the Department of Sport and Leadership Studies at Wichita State University, specializes in sport management, leadership development, and applied sport research. Since 2008, he has served as an official and event management staff member for the NCAA Division II Swimming and Diving Championships, where he has significantly contributed to advancing the quality of events. Dr. Noble has been dedicated to developing creative approaches that bridge academic inquiry with real-world sport industry challenges. His commitment to evidence-based practice and support for emerging scholarship have made him a valuable contributor to the field and the mission of *the Journal of Contemporary Issues in Sport*.

Introduction

Artificial intelligence has become an increasingly prominent tool in sport event operations, with applications ranging from video-based officiating systems to predictive analytics and athlete performance monitoring (Baladaniya & Kumar, 2025; Dong, 2025; Hao et al., 2023). While much of the existing research focuses on competition-based technologies, such as VAR in soccer or automated judging in gymnastics, administrative processes in collegiate athletics have received comparatively little attention. This case study addresses this gap by examining the use of ChatGPT to automate qualifier determination for the NCAA Division II Swimming and Diving Championships.

This qualification process is uniquely complex within collegiate athletics. NCAA Division II requires divers to enter a pre-championship qualification meet, adhere to strict diving standard criteria, and advance based on a multi-step algorithm that weighs performance on both the 1-meter and 3-meter boards. Manual processing of results is challenging due to rule intricacies, dual-qualification handling, and potential tie scenarios. The incorporation of AI into this workflow presents a practical opportunity to enhance reliability and operational efficiency.

Artificial Intelligence in Sport Administration

AI applications in sport continue to expand across officiating, performance evaluation, athlete monitoring, and competition management. Computer vision systems, such as automated pose detection and machine learning–based scoring analysis, have demonstrated accuracy comparable to or exceeding human judgement in sports like diving, gymnastics, and figure skating (Lewis, 2024; Zhou et al., 2025). LLMs such as ChatGPT extend these capabilities by parsing rule structures, interpreting results, explaining decisions, and generating documentation (OpenAI, 2024).

In administrative sport contexts, AI offers benefits (Chen, 2024; Hammes et al., 2022; Lewis, 2024; Zhang et al., 2025; Zhou et al., 2025) that include:

- Standardized rule interpretation to reduce variability
- Automated data processing, enabling faster event turnaround times
- Decision auditing, allowing officials to track logic and identify discrepancies.
- Enhanced transparency, improving stakeholder trust.

The NCAA Division II diving qualification process provides a compelling practical example because it effectively combines structured rules with extensive tabular datasets, creating an ideal environment for automation using large language models (LLM).

NCAA Division II Diving Qualification Procedures

The NCAA Division II Pre-Championship Manual (NCAA, 2024) outlines a multi-phase process for determining championship qualifiers intended to ensure fairness and transparency:

1. Eligibility Requirements: Divers must achieve minimum qualifying scores and degrees of difficulty in bona fide collegiate competition.
2. Qualification Meet: Conducted at the championship site, where divers perform six optional dives on each entered board.
3. Initial Selection: The top nine men and top eleven women from each board automatically advance.
4. Dual-Qualification Adjustment: Additional divers are added alternately from 1-meter and 3-meter results until the caps of 18 men and 22 women are met.
5. Tie Resolution: All divers tied for the final qualifying position advance.
6. Alternates List: Developed using the same procedure.

Given the structured yet intricate nature of this process, it provides a strong test case for evaluating AI's ability to execute rule-based event operations.

Methodology

Data Preparation and Input Structure

ChatGPT was provided with:

1. NCAA Division II diving qualification rules (NCAA, 2024),
2. Complete 1-meter and 3-meter results from the prequalification meet, and
3. Instructions to identify qualifiers, resolve dual-qualification sequencing, and generate alternates.

Prompts emphasized clarity, rule hierarchy, and structured output formatting, factors shown to significantly impact LLM accuracy (Zamfirescu-Pereira et al., 2023).

Test Protocol

The evaluation consisted of three phases:

1. Validation using NCAA sample data from a memorandum distributed to Division II diving coaches (NCAA, 2025).
2. Application to 2024 men's prequalification data.
3. Application to 2024 women's prequalification data.

The AI-generated outputs were compared against manually verified results to assess performance.

Results

Phase 1: Rule Adherence Verification

ChatGPT successfully reproduced the official example of qualifier determination included in the NCAA memorandum, accurately identifying top finishers and resolving dual qualifications (2025 NCAA Division II Diving Prequalifying Meet Results, unpublished data). This confirmed its capacity to interpret rules and apply sequential decision logic.

Phase 2: Men's Prequalification Data

Initial outputs revealed minor discrepancies, including one omitted diver. These errors were attributed to:

- Misinterpretation of tied placements,
- Ambiguous alternation logic in early prompts, and
- Overly generalized rule phrasing provided to the AI.

After prompt refinement emphasizing tie-handling, ordered logic chains, and explicit alternation rules, ChatGPT successfully reproduced the official list of qualifiers and alternates.

Phase 3: Women's Prequalification Data

ChatGPT correctly identified all qualifiers on the first attempt with no discrepancies. The women's dataset contained fewer ties and more evenly distributed rankings, reducing the complexity of alternation processing.

Advantages and Limitations of AI Integration

Advantages

- Increased procedural accuracy: Once properly instructed, the AI executed rules without deviation.
- Reduced administrative load: AI performed calculations and rule resolutions within seconds.
- High transparency: ChatGPT generated step-by-step explanations supporting auditability.
- Scalability: Capable of expanding to multi-event or multi-year datasets.

Limitations

- Prompt sensitivity: Small ambiguities in instructions can generate logical errors.
- Lack of native numerical verification: AI must be carefully guided to avoid score misinterpretation.
- Human oversight required: Officials must verify outputs before application.

These findings align with broader research on LLM decision-support systems, which emphasize the need for structured prompts and human-in-the-loop models to ensure reliable outcomes (Bommasani et al., 2022; Shneiderman, 2022).

Discussion

The successful application of ChatGPT in this case demonstrates the feasibility of integrating LLM-based tools into NCAA event operations. Unlike video-analysis AI systems, which rely on machine learning models trained on dive footage, ChatGPT excels at rule interpretation, logic sequencing, and complex administrative decision support. When paired with computer vision scoring systems (Dong, 2025; Zhou et al., 2025), a comprehensive end-to-end AI-supported officiating ecosystem becomes possible.

Moreover, this case illustrates the value of AI as an intermediary between raw data and human decision-makers (Hao et al., 2023). By generating explanations, identifying inconsistencies, and applying rules systematically, ChatGPT enhances transparency and reduces the likelihood of human error, critical elements in maintaining competitive fairness.

Conclusion

ChatGPT demonstrated strong potential as an assistive decision-support tool in NCAA Division II diving qualifier determination. While not a replacement for human oversight, AI can improve accuracy, consistency, and efficiency in sport administration. As collegiate athletic organizations seek modernized workflows, integrating AI-driven tools like ChatGPT represents a pragmatic pathway toward enhanced operational reliability.

Future applications may include:

- Full integration with diving meet management software,
- Automated database-driven qualifier generation,
- Use in other judged sports such as gymnastics or figure skating, and
- Combining LLM-based rule logic with computer vision scoring systems.

References

Baladaniya, M., & Kumar, A. (2025). Artificial intelligence in sports science: A systematic review on performance optimization, injury prevention, and rehabilitation. *Journal of Clinical Medicine of Kazakhstan, 22*(3), 64-72. https://doi.org/10.23950/jcmk/16412

Bommasani, R., et al. (2022). *On the opportunities and risks of foundation models*. Stanford University. https://doi.org/10.48550/arXiv.2108.07258

Chen, J. (2024). The application and development of artificial intelligence and high technology in sports events. *Highlights in Business, Economics, and Management, 30*, 247-255. https://doi.org/10.54097/n7dhp396

Data sources: 2025 NCAA Division II Diving Prequalifying Meet Results (unpublished).

Dong, H. (2025). Overview of the application of artificial intelligence in sports events. *ICSTPA '24: Proceedings of the 2024 International Conference on Sports Technology and Performance Analysis*, 324-331. https://doi.org/10.1145/3723936.3723986

Hao, N., Ruan, S., Song, Y., Chen, J., & Tian, L. (2023). The establishment of a precise intelligent evaluation system for sports events: Diving. *Heliyon, 9*(11), e21361. https://doi.org/10.1016/j.heliyon.2023.e21361

Hammes, F., Hagg, A., Asteroth, A., & Link, D. (2022). Artificial intelligence in elite sports-A narrative review of success stories and challenges. *Frontiers in Sports and Active Living, 4*,861466. https://doi.org/10.3389/fspor.2022.861466

Lewis, M. (2024). *AI at Paris 2024 - how the Olympic Games set the gold standard for sports technology*. Brabners. https://www.brabners.com/insights/technology-media-telecoms/ai-at-paris-2024-how-the-olympic-games-set-the-gold-standard-for-sports-technology

National Collegiate Athletic Association. (2024). *2024 NCAA Division II Men's and Women's Swimming and Diving Pre-Championships Manual*. https://www.ncaa.org

National Collegiate Athletic Association. (2025, January 6). *Memorandum to Division II Diving Coaches*.

OpenAI. (2024). *ChatGPT (March 2024 version)*. https://openai.com/chatgpt

Shneiderman, B. (2022). *Human-centered AI*. Oxford University Press.

Zamfirescu-Pereira, J. D., Wong, R. Y., Hartman, B., & Yang, Q. (2023). Why Johnny can't prompt: How non-AI experts try (and fail) to design LLM prompts. *CHI '23: Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems*, 1-21. https://doi.org/10.1145/3544548.3581388

Zhang, Y., Qu, R., & Girard, O. (2025). Faster, more accurate? A feasibility study on replacing human judges with artificial intelligence in video review for the Paris Olympics Taekwondo competition. *Frontiers in Sports and Active Living, 7*,1632326, https://doi.org/10.3389/fspor.2025.1632326

Zhou, D., Keogh, J. W. L., Ma, Y., Tong, R. K. Y., Khan, A. R., & Jennings, N. R. (2025). Artificial intelligence in sport: A narrative review of applications, challenges, and future trends. *Journal of Sports Sciences*, 1-16. https://doi.org/10.1080/02640414.2025.2518694

Exploring Consumption Behavior of Digital Assets in Esports: The Influence of Esports Identification

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Abstract

Digital assets have garnered widespread attention for their potential to generate revenues. Grounded in innovation diffusion theory, this study investigated the adoption behavior of esports consumers as it pertains to the application of digital assets, especially non-fungible tokens (NFT) in-game items (i.e., virtual skins and items). The purpose of this study was to explore the relationships among innovation adoption, esports identification, and purchase intentions. With a sample of 309 esports gamers, confirmatory factor analysis and structural equation modeling were performed to test the measurement and hypothesized paths using R-Studio. The results revealed that the innovation adoption of digital assets had a significant impact on purchase intentions. In addition, esports identification was positively associated with purchase intentions, and the moderating effect of esports identification was identified. This novelty of digital assets such as NFTs and their increasing popularity in digital culture will continue to shift public perceptions of digital assets in esports industries. This study has originality and value in that it sheds light on the impact of the adoption behavior of esports consumers in relation to NFT-based in-game items.

Keywords: digital assets, non-fungible tokens, virtual game items, esports identification

Introduction

Digital assets, initiated by the Bitcoin protocol in 2009, are computer-coded transactions validated through consensus algorithms and encompass a wide range of forms, including video highlights and virtual items sold in games (Kaal, 2020). Digital assets have emerged as a significant trend in sports industries in recent years (e.g., non-fungible tokens and fan tokens; Nelson, 2021). To this end, the digital asset market

has evolved through rapid growth and ongoing shifts driven by new asset creation (Kaal, 2020). Professional sports leagues and brands have begun exploring digital asset platforms, creating unique digital memorabilia that allows fans to own distinctive, verifiable digital items (Colicev, 2023). For example, video highlights of iconic sports moments and digital representations of sports merchandise have gained traction among collectors and fans. Furthermore, esports consumers have exchanged digital assets (e.g., in-game items or skins) for cash or alternative digital currencies (Greer et al., 2019; Hing et al., 2022). In-game items (e.g., weapons) directly affect its gameplay performance, whereas skins are virtual items that "provide cosmetic alterations to a player's weapons, avatar, or equipment used within the game" (Gambling Commission, 2017, p. 17). Trading digital items (e.g., skins) in various financial transactions has already become prevalent within esports settings (McLeod, 2017).

Within the new ecosystem in the esports industry, a non-fungible token (NFT) has emerged as a popular digital asset for its consumers. NFT is a cryptocurrency or digital collectible that utilizes blockchain technology to ensure the ownership of digital assets and goods (Kanellopoulos et al., 2021). NFTs can represent a diverse digital ecosystem encompassing virtual environments, collectables, works of art, and digitalized characters regarding sport, entertainment media, and esports gaming (Król & Zdonek, 2022). Various sport industry companies (e.g., professional sport leagues) have incorporated NFTs into their business models by offering NFTs to consumers, including esports consumers.

NFTs in the esports industry are conceivable in that their influence will inevitably permeate games in already-established virtual economies. Esports games in which player trading and marketplaces exist, such as CS:GO, Dota 2, Fortnite, Rocket League, Team Fortress 2, and PUBG: Battlegrounds, have already exhibited the dynamic digital economic behaviors demonstrated by their player bases. Some esports organizations, such as Team Liquid (2024), have formed strategic partnerships with blockchain-based gaming developers to adapt to such developments. The demand to replace in-game items, such as skins, with NFTs is particularly prevalent within the community of CS:GO players, which possesses a robust digital economy centered around the trading of such skins.

After all, game items and skins based on the NFTs would provide key esports stakeholders real-world value through blockchain-controlled digital assets (Pizzo et al., 2022). Given this phenomenon, NFTs represent a good alternative for reducing the game publishers' control over a game; they also incentivize game developers to add better features. Furthermore, NFTs can offer monetary benefits to esports consumers who can legally take part in the trade of in-game items with a transparent transaction (Muthe et al., 2020). Given that esports has continued to consider advancing the esports environment by adopting various state-of-the-art technologies (e.g., NFTs for in-game items), it is warranted to explore how esports consumers perceive the application of NFTs to better understand the dynamics of digital asset utilization within the esports community.

Accordingly, the current research aims to fill the gaps in knowledge on esports consumer adoption behavior pertaining to digital assets such as NFT items and skins by adopting Diffusion of Innovation Theory (DOI; Rogers, 2003). In addition, this research examines the interaction effects of esports consumers' perceived identification, defined as the degree to which individuals associate themselves with esports, either as fans or consumers, with esports as a moderator in the relationship between innovation adoption and purchase intention. It is conceivable that highly identified esports consumers are more likely to view digital assets as valuable extensions of their esports experience, leading to greater willingness to adopt the innovative digital assets and stronger intentions to purchase them. Jang et al. (2021) supported the notion that esports identification would affect their consumptive intentions in the context of esports. Their study identified esports consumers who highly identified had a significant relationship with their behavioral intention. To further understand the role of the consumers' perceived identification with their favorite players in esports consumer adoption behavior of digital assets in gameplay, this study also

examined the moderating role of esports identification in the relationship between innovation adoption and intentions to purchase the products.

Innovation Adoption: Diffusion of Innovation Theory

Rogers (2003) defined innovation as an idea, practice, or object that an individual or another adoption unit perceives as new. He also proposed the Diffusion of Innovation Theory (DOI), which suggests that an innovation's attributes can influence its acceptance or rejection. In DOI, innovation adoption is characterized by five attributes—relative advantage, complexity, compatibility, observability, and trialability. How esports consumers perceive these attributes will likely determine their behavior toward adopting NFT items and skins. First, referring to the degree to which an innovation is perceived as better than the current idea, relative advantage is a simple yet powerful predictor of innovation adoption (Min et al., 2018). The perception of an innovation's relative advantage may vary depending on the nature of the industry. In the case of esports, consumers may perceive NFT items and skins as superior to the existing ones, leading to a higher likelihood of purchasing them.

Second, compatibility is the degree to which an innovation's perception is consistent with individuals' needs, values, beliefs, and past experiences (Acikgoz et al., 2023). If esports consumers perceive that the emerging application of NFTs is compatible with their needs, beliefs, or values, they are more likely to adopt it. Third, complexity refers to the perceived difficulty end-users may face in understanding and using innovation. Therefore, according to Rogers (2003), complexity negatively impacts the decision to adopt an innovation. As blockchain-based NFTs may be challenging to comprehend, end-users' need for understanding may hinder their adoption (Hartley et al*.,* 2022). Nonetheless, esports consumers may not need to fully comprehend the technical aspects of using it, as they may perceive the technology's complexity as an advantageous feature. This tendency is more so for high-technology products, such as blockchain-based NFTs.

Fourth, observability refers to the extent to which an innovation's outcomes are easily evident to potential users. As observability is closely related to the time of innovation diffusion, Hartley et al. (2022) excluded blockchain's observability from an innovation's attributes since it is too early to observe its benefits for others. Lastly, trialability refers to the extent to which an innovation can be tested before adoption. Previous research has identified that potential users are more likely to be attracted if they are allowed for several trial periods, and those with pre-experience will positively affect their perceptions of adopting the innovation (Chung, 2014). As NFT items and skins are relatively new and unique, esports consumers may want to experiment with their usage before committing to them.

Innovation Adoption Influencing Behavioral Intentions

IDT posits that the causal effects of innovation attributes influence innovation adoption behaviors, with mediation through global motives such as innovation attitudes. Uhrich (2020) contends that understanding consumers' attitudes adds depth to our comprehension of the dynamics of reasons and behavioral intentions, offering insight into how adoption factors align with subsequent attitudes. In light of this, IDT enables scholars to investigate the cognitive connections between adoption factors and behavioral intentions. Behavioral intentions are defined as "the degree to which a person has formulated conscious plans to perform or not perform some specified future behavior" (Warshaw & Davis, 1985, p. 214). In the context of this study, esports consumers' behavioral intention is centered on the purchase of NFT items and skins.

Research Hypotheses Development

The impact of innovation on purchase intentions. According to the DOI, five innovation adoption factors, including relative advantage, compatibility, complexity, observability, and trialability play pivotal

roles in influencing consumer behavior (Yuen et al., 2021). In addition, Uhrich (2020) investigated that innovation adoption can comprise multiple elements (e.g., perceived ease of use) affecting individuals' attitudes and behavioral intentions. Chou et al. (2023) investigated esports consumers' consumption patterns regarding in-game items and identified the impact of psychological factors on purchase intentions. Consequently, our hypothesis posits that esports consumers' perceived innovation adoption will positively influence their intentions to purchase NFT items and skins. Thus, we posit the following hypotheses:

H1: Innovation adoption will influence their purchase intentions.

Esports identification and purchase intentions. In general, team identification is referred to as sport fans' attachment with their favorite sport teams. Team identification has widely been examined in the context of sport management and frequently found that there is a positive relationship between identification and behavioral intentions (James & Trail, 2008). More recently, team identification has been defined as "an individual's self-concept, based on the emotional value attached to that membership, and the knowledge of, engagement with, and evaluation of the community itself " (Heere, 2016, p. 216). Individuals exhibiting higher levels of identification demonstrate a more pronounced sense of belongingness to the entity (Wann & Branscombe, 1993).

Following the recent definition of team identification, the current study applies the concept of team identification to the esports context, as esports identification is esports consumers who identify with an esports entity (e.g., their favorite esports teams or players). Esports identification has emerged as a crucial element in understanding esports consumer behavior (Hwang et al., 2024). In the dynamic realm of esports, NFTs can offer novel opportunities for the creation of personalized, exclusive in-game assets that enhance the overall immersive experience of esports experiences. For highly identified esports fans, the item could symbolize a deeper form of engagement, reflecting personal involvement in the esports community. Additionally, highly identified fans are likely to perceive the adoption of innovative technologies, such as NFTs, as a means to further express their identity and elevate their interaction with esports. In this sense, NFTs may not only enhance the esports consumer experience but also reinforce the consumer's psychological and social connection to esports, ultimately impacting their purchase intentions. Therefore, we posit the following hypotheses:

H2: Esports identification will influence their purchase intentions.

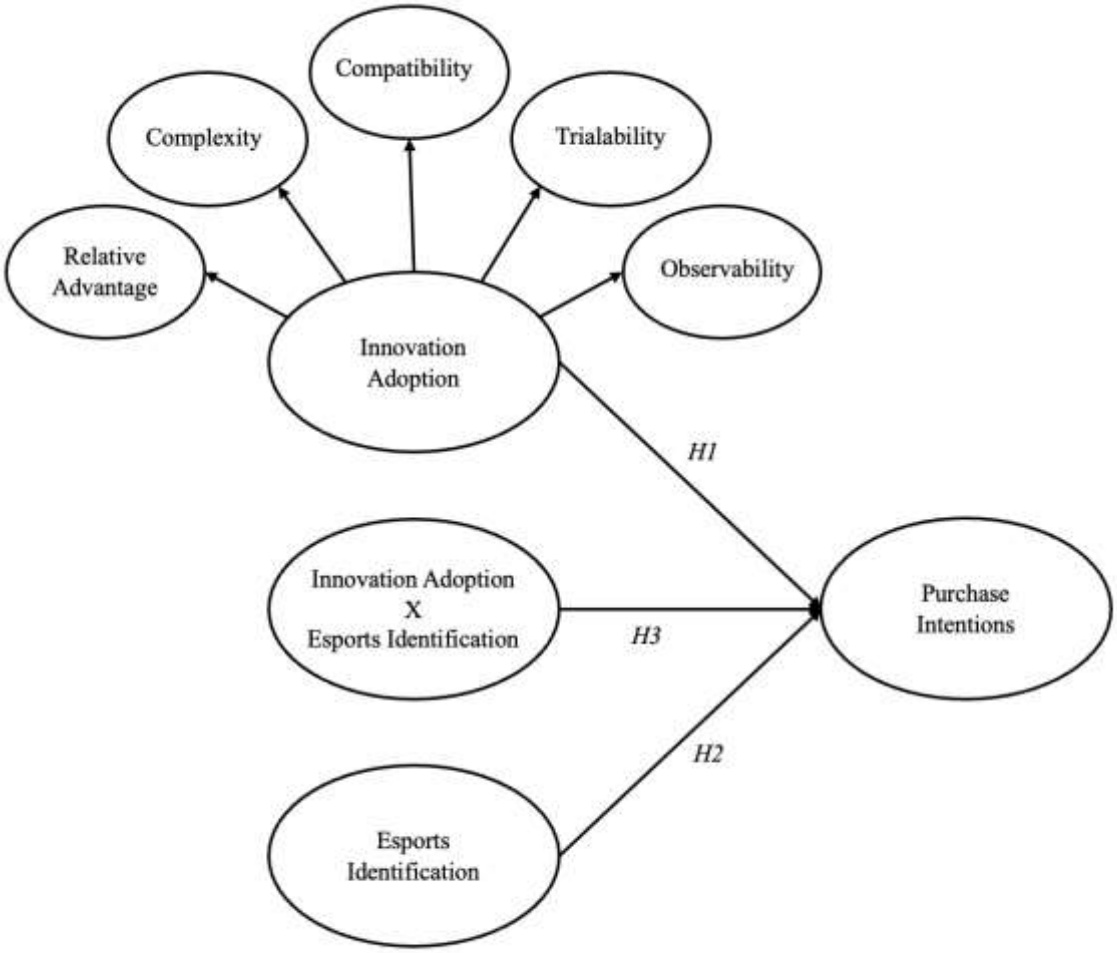
Moderating role of esports identification. Despite the importance of understanding esports identification in the context of esports, this concept has not been widely investigated. Recently, Kim et al. (2022) and Hwang et al. (2024) examined the impact of team identification on behavioral intentions. However, their studies focused on esports spectators' perceptions rather than esports consumers who play and trade game items in their favorite esports games. Thus, it is important to further explore the aspect of team identification in the esports setting. Whereas the results of Hwang et al.'s (2024) study found that sport esports fan's team identification influenced their team loyalty and attendance intentions, the interaction between innovation adoption and identification was not tested. The significance of examining the moderating role of esports identification lies in the understanding that it fosters a psychological connection influencing how esports consumers perceive, process, and respond to innovation adoption. This, in turn, influences the strength and direction of the relationship between innovation adoption and purchase intentions. Such insights are valuable for esports organizations seeking to better understand and segment their consumer profiles. In a similar vein, Zhang et al. (2012) explored how individual perceptions moderated the adoption of mobile commerce innovations. While the present study hypothesized esports identification as an antecedent of behavioral constructs (see Figure

1), it is also expected that the interaction effect with innovation adoption will influence behavioral intentions. For this reason, we posit the following hypotheses:

H3: The interaction effect between innovation adoption and esports identification will influence purchase intentions.

Figure 1

Model of esports consumers' adoption of NFT items and skins



Methodology

Sample and Data Collection

Institutional Review Board approval was obtained in 2022 to conduct the current study. An online survey was created in Qualtrics to gather data for this study. Participants were recruited using a convenience sampling method through Amazon Mechanical Turk (MTurk; Chandler & Shapiro, 2016). MTurk is a crowdsourcing web service that enables individuals to participate in research studies (e.g., surveys). To

ensure that the researchers collected the data from the study's target population, several filtering questions were employed. Participants were asked about their engagement with esports games, including weekly playing time and favorite game titles. These titles were cross-referenced with a list of esports tournaments or events (Esports Earning, 2022). Respondents who reported playing non-esports games were excluded from the study. The final sample consisted of 309 participants. Demographics showed that most participants were male (*n* = 195, 63.3%) and Caucasian (*n* = 246, 79.9%), with an average age of 35.14 years. In addition, about 62.7% of them hold a bachelor's degree, and 30.5% possess a master's and/or doctoral degree.

Instrument

The measures of relative advantage, complexity, compatibility, trialability, and observability were used with 19 items in this study. Relative advantage and complexity were each measured using four items adapted from Al-Jabri and Sohali (2012). A five-item measure of compatibility was adopted from Malik et al. (2021). To measure trialability, three items were adapted from Tan and Teo (2000). Observability was measured with Atkinson's (2007) three items. Purchase intentions were measured with Erkan and Evans' (2016) three items. A three-item measure of the identification scale was adopted and modified to the current context (Wu et al., 2012). All items were measured on a 7-point Likert-type scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

Single-item measures have gained preference over multi-item measurements in the sport management literature (e.g., Trail et al., 2023; Ko et al., 2023). Also, this approach eliminates the redundancy often associated with multi-item measures, where respondents may be required to answer similar questions repeatedly for a single construct. Bergkvist and Rossiter (2007) support the efficacy of single-item measures in maintaining data quality while streamlining the survey process. For this reason, this study first tested a measurement model using the original multi-measurement items, followed by the utilization of a single-item measure of innovation adoption.

Data Analysis

Using the lavaan (version 0.6–11; Rosseel, 2012), tidyverse (version 1.3.1; Wickham, 2021), and semTools (version 0.6–6; Jorgensen, 2022), the current study's measurement was tested with a confirmatory factor analysis (CFA) to verify the psychometric properties of measurement instruments. Subsequently, a structural equation modeling (SEM) approach was employed to examine the hypothesized relationships. The *lavaan* package is used for latent variable modeling and structural equation analysis, while *semTools* offers additional capabilities for the structural models. The *tidyverse* is employed for efficient data management.

Results

Prior to performing main data analyses, the multivariate non-normality was tested using the MVN package in R-Studio (Korkmaz et al., 2014). The results showed that the data were not normally distributed because of the significant levels of Mardia kurtosis (38.633, $p < .001$) and skewness (905.860, $p < .001$). To account for this non-normality, a robust estimation technique was carried out (i.e., maximum likelihood robust).

Multi-Item Measurement Validation

The measurement properties of the scale were examined through CFA. First, we examined factor loadings to see if the specified factor reflected the item well. Inspection of the factor loadings indicated

that four items did not meet the criteria (λ < .400; Brown, 2015; Floyd & Widaman, 1995). Thus, we removed the items. After removing the items, we examined the revised measurement. The internal consistency of each construct was ensured via Cronbach's alpha and Composite Reliability. All constructs' Cronbach's alpha coefficients and Composite Reliability exceeded the threshold of .70 (Bagozzi & Yi, 1988). In addition, average variance extracted (AVE) values for all constructs exceeded the suggested cutoff point of .50, except for compatibility (AVE = .48), observability (AVE = .49), and esports identification (AVE = .34). About the compatibility and observability constructs, the AVE values were close to the threshold, and both the compatibility and observability constructs showed acceptable reliability and internal consistency. However, the esports identification construct showed unacceptable construct validity. After reviewing the items, factors, and relevant literature, we decided to use a single-item measure of esports identification. Following Kunkel et al.'s (2022) approach using the single-item self-perception identification measure in the context of sport management, this study revised the original esports identification scale into a single-item measure (i.e., *I identify with a specific individual pro-player who plays [my favorite esports game]*).

With the revised measurement, the CFA demonstrated acceptable model fit: χ^2 (146) = 238.959, p <.001, CFI = .959, TLI = .952, RMSEA = .054 (90%, CI .041 to .066). The model fit and internal consistency of the measurement ensured internal validity of the latent constructs. To test the discriminant validity, the factor correlations between the constructs were tested. As shown in Table 2, the results indicated that all between-factor correlations were below the suggested benchmark of .85, indicating assurance of discriminant validity.

Validation of Single-Item Measurement Model

With the acceptable validity, reliability, and model fit of the original multi-item measurement, we refined the innovation adoption factors into a single-item measure. The validity assessment of innovation adoption showed that relative advantage (β = 0.73, SE = .03, p <.001), complexity (β = 0.54, SE = .05, p <.001), compatibility (β = 0.71, SE = .03, p <.001), trialability (β = 0.73, SE = .03, p <.001), and observability (β = 0.66, SE = .04, p <.001) had significant relationship with innovation adoption. With the single-item measurement, the CFA demonstrated better model fit: χ^2 (25) = 46.019, p <.001, CFI = .973, TLI = .961, RMSEA = .062 (90%, CI .032 to .090) (see Table 1). Thus, we used the single item measure of innovation adoption to test the study's hypotheses.

Table 1

Scale items of the measurement model

Construct	*M*	*SD*	*β*	*SE*	C.R.	AVE
Innovation Adoption*					N/A	N/A
Relative Advantage*						
NFT items or skins are a convenient way to manage finance.	5.32	1.31	.737	.037		
Complexity*						
NFT items or skins require a lot of mental effort.	5.30	1.31	.548	.052		

Compatibility*						
I believe that possessing NFT items or skins will fit my lifestyle.	5.32	1.28	.715	.039		
Trialability*						
I want to try NFT items or skins for at least one month.	5.35	1.40	.737	.037		
Observability*						
Other people seemed interested in NFT items or skins when they see me having it.	5.34	1.29	.662	.043		
Purchase Intentions					.769	.528
It is very likely that I will buy NFT items or skins.	5.30	1.36	.716	.040		
I will purchase NFT items or skins next time when I need it.	5.41	1.29	.701	.041		
I will definitely try NFT items or skins.	5.45	1.34	.762	.036		
Esports Identification						
I identify with a specific individual pro-player who plays (my favorite esports game)	5.50	1.31	N/A	N/A	N/A	N/A

Note: *M* = mean score; *SD* = standard deviation; *β* = beta weight; *SE* = standard error; C.R: = Composite Reliability; AVE: Average Variance Extracted; N/A = not applicable. **Innovation Adoption is a second order factor comprised of five first order factors indicated by *.

Research Hypothesis Testing

To test the proposed hypotheses, SEM was performed. The SEM model fit demonstrated acceptable model fit: χ^2 (25) = 28.024, p <.001, CFI = .991, TLI = .987, RMSEA = .024 (90%, CI .001 to .054). As illustrated in Table 2, all hypotheses were supported. Specifically, the path from innovation adoption to purchase intentions was positive and significant (β = 0.84, SE = .11, p <.001), supporting Hypothesis 1. In addition, esports identification significantly affected behavioral intentions (β = 0.15, SE = .04, p <.001), thereby Hypothesis 2 was supported.

To test Hypothesis 3, the interaction factor was created and estimated in the SEM. The results demonstrated that the interaction between innovation adoption and esports identification had a significant effect on purchase intentions (β = -0.15, SE = .06, p <.05, CI [-.278; -.023]), thus supporting Hypothesis

Table 2

Results of Hypotheses in SEM

Hypothesis	Paths	*β*	CI	Results
H1	Adoption → PI	0.721***	[0.555; 0.887]	Supported
H2	Esports ID → PI	0.092***	[0.003; 0.181]	Supported
H3	Adoption*ID → PI	-0.128**	[-0.234; -0.022]	Supported

Note: Esports ID: Esports Identification; PI: Purchase Intentions.

95% bootstrap confidence intervals with 5,000 subsamples; CI = confidence intervals [Lower bound – Upper bound]. *p <.05. **p <.01. ***p <.001.

Discussion

In this study, building upon the extended DOI, we aimed to explore esports consumers' adoption behavior of esports consumers pertaining to one of digital assets (i.e., NFT in-game products). Additionally, the current study sought to examine whether the innovation adoption indirectly affects behavior intentions through attitudes. Unlike past studies addressing esports consumers' consumptive behavior, this is the first study that empirically investigated the relationships between esports consumers' innovation adoption, attitudes, and purchase intentions in relation to in-game items and skins. Within that framework, the study identified that the most important adoption factor among esports consumers was relative advantage (e.g., efficient financial resource management), followed by observability, complexity, and compatibility.

The results suggest that esports consumers are likely to accept digital assets due to various adoption factors, including the ability to manage their personal finances, the complexity of using the items, the compatibility of the NFT products with their lifestyles, and the opportunity to try out the products. In response, enhancing esports consumers' perceptions affecting those adoption factors would likely increase their likelihood of adopting the NFT items and skins. Altogether, those results provide a foundation for understanding esports consumers' adoption behavior and thus extend the line of research on consumptive behavior regarding esports areas based on the IDT.

In terms of Hypothesis 1, we examined whether innovation adoption was positively associated with purchase intentions. Results indicate that esports consumers' adoption of in-game NFT products is likely influenced by adoption factors within the innovative decision-making process, including relative advantage, complexity, compatibility, and trialability, and that such factors are likely to drive purchase intentions. Those results are consistent with Uhrich's (2020) findings, which show that motivational factors for adopting innovative technology directly influence individuals' behavioral intentions. When extended to adoption behavior regarding NFT items and skins in esports settings, those findings suggest that esports consumers are likely to form favorable perceptions toward NFTs, thus influencing purchase intentions.

Regarding Hypothesis 2, esports identification positively influenced esports consumers' purchase intentions of NFT items and skins. Results indicate that esports consumers' purchase behavior is positively influenced by their identification with esports. The results align with prior studies showing that esports identification exerts significant positive effects on behavioral intentions (Hwang et al., 2024). Along those lines, our results extend the longstanding relationship between individuals' identification with

esports and behavioral intentions in the sport management literature by confirming that higher identified esports consumers will increase their intentions to purchase in-game NFT products.

With respect to Hypothesis 3, the findings demonstrate a significant moderating effect. While the results of the moderating effect align with our hypothesis, due to the negative coefficients, this result suggests an inverse relationship between the level of esports identification and the strength of the association between innovation adoption and purchase intentions, which we did not expect. However, the findings indicate that esports consumers with a low level of identification exhibit a greater tendency to adopt innovative in-game items, which subsequently affects their purchase intentions. This phenomenon may be attributed to two factors. Firstly, esports consumers with low identification often seek ways to be connected to the community (Abbasi et al., 2023). Thus, it is possible that these individuals are more prone to purchase digital items compared to highly identified esports consumers. Secondly, these individuals may also prioritize the functional aspects of innovations over psychological connections, being more likely to assess the utility and aesthetic appeal of new innovative in-game items and skins compared to their highly identified esports consumers counterparts. A combination of the two reasons could explain the findings that esports with a low identification showed stronger relationship between innovation adoption and purchase intentions. In addition, a low-identified esports consumer is likely an individual vulnerable to the allure of innovation adoption, thereby potentially enhancing their consumption behavior.

Managerial Implications

The uniqueness or innovativeness of NFTs contribute to their digital scarcity within the value chain (Kiliçaslan & Ekizler, 2022), which triggers a sense of urgency among esports consumers to adopt NFT products and, in turn, motivates their adoption behavior of the products. To maximize esports consumers' likelihood of adopting the new innovative technology, practitioners may need to consider enhancing the characteristics of the innovations behind NFT items and skins (i.e., relative advantage, complexity, compatibility, and trialability of NFT items and skins). When introducing NFT items and skins, it is also important to emphasize that in-game items are traded via secured and safe digital accounts. As aforementioned, NFTs in esports games can be used to attract previously unreachable audiences by allowing the secure trade of in-game items and skins.

Colicev (2023) highlighted the advantages of promoting NFTs as collectibles that afford exclusive access to other virtual rewards, such as entry to private channels, merchandise, and, in more advanced scenarios, full intellectual property rights. Stressing those benefits can be expected to evoke a sense of perceived uniqueness and ownership among esports consumers through the possession of NFT items and skins. Consequently, strategically limiting NFT offerings, providing pre-release access opportunities, and conducting exclusive collection sales restricted to esports consumers with various levels of identifications can be powerful marketing forces for NFT items and skins on the esports market. Likewise, genres that focus on collectible in-game items, notably collectible card games (CCGs) such as *Hearthstone* and sports games such as *FIFA* and *NBA 2K*, have the greatest potential for seamlessly integrating NFTs in their business models.

Beyond that, offering loot boxes that contain NFT items and skins and are subject to proper regulations provides a means to introduce esports consumers to the concept of in-game NFT products and thereby increases the likelihood of adopting NFT items and skins (i.e., trialability). As loot boxes incorporate entertainment elements appealing to various segments of the esports consumers, the strategic implementation of the loot boxes can effectively attract a diverse range of esports consumers across different engagement levels. Traditional loot boxes are typically acquired by esports consumers through payments using in-game virtual currencies or with real-world money, which comes with an increased risk of gambling, as children and young people are susceptible to the addictive nature of gambling. Leveraging

blockchain technology, NFTs have the capacity to mitigate that risk by ensuring the clear identification of ownership within digital assets and goods. Consequently, loot boxes with NFTs can function as a transparent, enjoyable feature within games that is free from the adverse consequences associated with traditional loot boxes in esports games.

References

Abbasi, A. Z., Asif, M., Shamim, A., Ting, D. H., & Rather, R. A. (2023). Engagement and consumption behavior of eSports gamers. *Spanish Journal of Marketing-ESIC, 27*(2), 261-282. https://doi.org/10.1108/SJME-07-2022-0161

Acikgoz, F., Elwalda, A., & De Oliveira, M. J. (2023). Curiosity on cutting-edge technology via theory of planned behavior and diffusion of innovation theory. *International Journal of Information Management Data Insights*, *3*(1), 100152. https://doi.org/10.1016/j.jjimei.2022.100152

Al-Jabri, I. M., & Sohail, M. S. (2012). Mobile banking adoption: Application of diffusion of innovation theory. *Journal of Electronic Commerce Research, 13*(4), 379–391. https://ssrn.com/abstract=2523623

Atkinson, N. L. (2007). Developing a questionnaire to measure perceived attributes of eHealth innovations. *American Journal of Health Behavior, 31*(6), 612–621. https://doi.org/10.5555/ajhb.2007.31.6.612

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the Academy of Marketing Science*, *16*, 74-94. https://doi.org/10.1007/BF02723327

Bergkvist, L., & Rossiter, J. R. (2007). The predictive validity of multiple-item versus single-item measures of the same constructs. *Journal of Marketing Research*, *44*(2), 175-184. https://doi.org/10.1509/jmkr.44.2.175

Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). Guilford Press

Chandler, J., & Shapiro, D. (2016). Conducting clinical research using crowdsourced convenience samples. *Annual Review of Clinical Psychology*, *12*(1), 53-81. https://doi.org/10.1146/annurev-clinpsy-021815-093623

Chou, S. Y., Jang, W., Ma, S. C., Chang, C. H., & Byon, K. K. (2023). Is mobile gaming a new pillar of esports? Exploring players' in-game purchases in PC and mobile platforms by using flow and clutch. *International Journal of Sports Marketing and Sponsorship, 24*(2), 311–332. https://awspntest.apa.org/doi/10.1108/IJSMS-07-2022-0134

Colicev, A. (2023). How can non-fungible tokens bring value to brands? *International Journal of Research in Marketing, 40*(1), 30–37. https://doi.org/10.1016/j.ijresmar.2022.07.003

Erkan, I., & Evans, C. (2016). The influence of eWOM in social media on consumers' purchase intentions: An extended approach to information adoption. *Computers in Human Behavior, 61*, 47-55. https://doi.org/10.1016/j.chb.2016.03.003

Esports Earnings (2022). *Esports earnings*. https://www.esportsearnings.com/

Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment, 7*(3), 286–299. https://psycnet.apa.org/doi/10.1037/1040-3590.7.3.286

Gambling Commission. (2017). *Virtual currencies, eSports and social casino gaming – position paper*. Gambling Commission. https://www.gamblingcommission.gov.uk/about-us/page/virtual-currencies-esports-and-social-gaming-discussion-paper

Greer, N., Rockloff, M., Browne, M., Hing, N., & King, D. L. (2019). Esports betting and skin gambling: A brief history. *Journal of Gambling Issues, 43,* 128-146. http://dx.doi.org/10.4309/jgi.2019.43.8

Hartley, J. L., Sawaya, W., & Dobrzykowski, D. (2022). Exploring blockchain adoption intentions in the supply chain: Perspectives from innovation diffusion and institutional theory. *International Journal of Physical Distribution and Logistics Management, 52*(2), 190-211. https://doi.org/10.1108/IJPDLM-05-2020-0163

Heere, B. (2016). Team identity theory. In G. Cunningham, J. Fink, & A. Doherty (Eds.), *Routledge Handbook of Theory in Sport Management* (pp. 213–222). Taylor & Francis.

Hing, N., Lole, L., Russell, A. M. T., Rockloff, M., King, D. L., Browne, M., Newall, P., & Greer, N. (2022). Adolescent betting on esports using cash and skins: Links with gaming, monetary gambling, and problematic gambling. *PLoS ONE, 17*(5), 1-16. https://doi.org/10.1371/journal.pone.0266571

Hwang, Y., Fisackerly, W., & Heere, B. (2024). Team identification in esports: The benefits of localizing an esports team. *Sport Marketing Quarterly, 33*(2), 135-149. https://doi.org/10.32731/SMQ.332.062024.03

James, J. D., & Trail, G. T. (2008). The relationship between team identification and sport consumption intentions. *International Journal of Sport Management, 9*(4), 427-440.

Jorgensen, T. D. (2022). *Package "semTools."* Useful Tools for Structural Equation Modeling. https://github.com/simsem/semTools/wiki

Kaal, W. A. (2020). Digital Asset Market Evolution. *The Journal of Corporation Law*. *46*(4), 909–963. https://ssrn.com/abstract=3606663

Kanellopoulos, I. F., Gutt, D., & Li, T. (2021). Do non-fungible tokens (NFTs) affect prices of physical products? Evidence from trading card collectibles. *SSRN Electronic Journal*.

Kiliçaslan, F., & Ekizler, H. (2022). Factors affecting purchase intention in blockchain and NFT (non-fungible token) technologies. *Journal of Research in Business, 7*(2), 604–623. https://doi.org/10.54452/jrb.1177600

Kim, K., Kim, M., Han, J., Kim, D., & Lee, I. (2022). Does "we" matter for esports fans? Analyzing the mediating effects of the sense of fan community on team identification and fandom behaviors. *Physical Culture and Sport. Studies and Research, 97*(1), 65–76. https://doi.org/10.2478/pcssr-2022-0024

Ko, Y. J., Kwon, H. H., Kim, T., Park, C., & Song, K. (2023). Assessment of event quality in major spectator sports: Single-item measures. *Journal of Global Sport Management*, *8*(4), 1008-1024. https://doi.org/10.1080/24704067.2021.2001353

Korkmaz, S., Goksuluk, D., & Zararsiz, G. (2014). MVN: An R package for assessing multivariate normality. *The R Journal, 6*(2), 151–162. https://doi.org/10.32614/RJ-2014-031

Król, K., & Zdonek, D. (2022). Digital assets in the eyes of generation Z: Perceptions, outlooks, concerns. *Journal of Risk and Financial Management*, *16*(22), 1-14. https://doi.org/10.3390/jrfm16010022

Kunkel, T., Karg, A., & McDonald, H. (2022). The utility of a single-item self-perception fandom measure for sport consumer segmentation and predicting behavior. *Sport Marketing Quarterly*, *31*(2), 141-156. https://doi.org/10.32731/SMQ.312.0622.05

Malik, H. A. M., Muhammad, A., & Sajid, U. (2021). Analyzing usability of mobile banking applications in Pakistan. *Sukkur IBA Journal of Computing and Mathematical Sciences*, *5*(2), 25-35.

McLeod, C. (2017). More than skin deep: Why it's time to go "all-in" on skin gambling regulation. *SSRN Electronic Journal*.

Min, S., So, K. K. F., & Jeong, M. (2018). Consumer adoption of the Uber mobile application: Insights from diffusion of innovation theory and technology acceptance model. *Journal of Travel & Tourism Marketing, 36*(7), 770–783. https://doi.org/10.1080/10548408.2018.1507866

Muthe, K. B., Sharma, K., & Sri, K. E. N. (2020, November). A blockchain based decentralized computing and NFT infrastructure for game networks. *2020 Second International Conference on Blockchain Computing and Applications (BCCA)*, 73–77. https://doi.org/10.1109/BCCA50787.2020.9274085

Nelson, D. (2021). *Dapper Labs' NBA Top Shot has crossed the million-user mark*. CoinDesk. https://www.coindesk.com/dapper-labs-nba-top-shot-has-crossed-the-million-user-mark

Pizzo, A.D., Su, Y., Scholz, T., Baker, B.J., Hamari, J. & Ndanga, L. (2022). Esports scholarship review: Synthesis, contributions, and future research. *Journal of Sport Management*, *36*(3), 228-239. https://doi.org/10.1123/jsm.2021-0228

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Simon and Schuster.

Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software, 48*(2). https://doi.org/10.18637/jss.v048.i02

Tan, M., & Teo, T. S. (2000). Factors influencing the adoption of Internet banking. *Journal of the Association for Information Systems*, *1*(1), 1-45. https://aisel.aisnet.org/jais/vol1/iss1/5

Team Liquid. (2024). *Illuvium – Partnership Announcement: Team Liquid*. https://illuvium.io/news/illuvium-x-team-liquid

Trail, G., Lee, D., Triantafyllidis, S., Braunstein-Minkove, J. R., Kim, A., Sweeney, K., Choi, W., & Alfaro-Barrantes, P. (2023). Are single-item needs' and values' measures a good alternative to multi-item measures for sport marketers? *International Journal of Sports Marketing and Sponsorship*, *24*(1), 168-185. https://psycnet.apa.org/doi/10.1108/IJSMS-11-2021-0225

Uhrich, S. (2020). Sport spectator adoption of technological innovations: A behavioral reasoning analysis of fan experience apps. *Sport Management Review, 25*(2), 275–299. https://doi.org/10.1080/14413523.2021.1935577

Wann, D., & Branscombe, N. (1993). Sports fans: Measuring degree of identification with their team. *International Journal of Sports Psychology, 24*, 1–17.

Warshaw, P. R., & Davis, F. D. (1985). Disentangling behavioral intention and behavioral expectation. *Journal of Experimental Social Psychology, 21*(3), 213–228.

Wickham, H. (2021). *Package "tidyverse." Easily install and load the "tidyverse."* https://tidyverse.tidyverse.org

Wu, S. H., Tsai, C. Y. D., & Hung, C. C. (2012). Toward team or player? How trust, vicarious achievement motive, and identification affect fan loyalty. *Journal of Sport Management, 26*(2), 177–191. https://doi.org/10.1123/jsm.26.2.177

Yuen, L., Cai, L., Qi, G., & Wang, X. (2021). Factors influencing autonomous vehicle adoption: An application of the technology acceptance model and innovation diffusion theory. *Technology Analysis & Strategic Management, 33*(5), 505–519. https://doi.org/10.1080/09537325.2020.1826423

Zhang, L., Zhu, J., & Liu, Q. (2012). A meta-analysis of mobile commerce adoption and the moderating effect of culture. *Computers in Human Behavior*, *28*(5), 1902-1911. https://doi.org/10.1016/j.chb.2012.05.008

Social Anchor of the Pelican State: Intangible Benefits and Economic Impact of the Superdome

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Abstract

The Louisiana Superdome has had tremendous impact on the Gulf Coast region since its opening in 1975. With the region, the Superdome has had to adjust to potential economic, social, and infrastructural changes alongside natural disasters by opening as a shelter of last resort during hurricanes. The total direct economic impact from stadium operations was estimated to $934.28 million during the first ten years of operations of the stadium from 1975 to 1984. It important to analyze how much this facility has economically impacted the region in the first ten years of operations as well as social impacts. As the NFL's New Orleans Saints prepared to play in their first game in the Superdome post-Katrina in 2005, Chris Rose, a former columnist in the *Times-Picayune,* stated, "The Superdome, for the past year, an icon of our national disgrace, is now a cause for celebration. The Superdome is the most visible building on our city's skyline. Its durability is our durability" (Rose, 2006, para. 2).

Keywords: Superdome, social anchor, intangible benefits, economic impact

Introduction

"My God Mr. Dixon! That would be the greatest building in the history of mankind and we'll build that sucker!", Governor of Louisiana John McKeithan said to Dave Dixon in a 1964 meeting in Baton Rouge (Higgins, 2009, p.4). The "greatest building in the history of mankind" was determined to be the Louisiana Superdome, now Caesar's Superdome, an integral piece of the economy and psyche of Louisiana making

New Orleans a great host for sport mega events (Higgins, 2009; Chighizola, 2012). Baade (1996) states that the Superdome is arguably the most elaborate and expensive structure in real terms of any stadia built in the United States. However, it's value within the city of New Orleans and the state of Louisiana extends beyond its status as the mecca of mega sporting events in the Gulf South (Higgins, 2009). When the idea of the Superdome originated, the NFL was exploring the possibility of awarding another expansion franchise (Haas, 2014). The mayor of New Orleans at the time, Victor Schiro, and Dave Dixon, the Chairman of the New Orleans Sports Commission, understood the potential economic, social, and infrastructural impact of constructing a modern, all-weather sports facility and thereby wooing a professional football franchise to their city (Haas, 2014). Additionally, the city was trying to emerge from post-Jim Crow era of racial strife and segregation (Germany, 2007). Schiro believed a move to add an NFL franchise could unite the city and transcend political, social, and racial division (Haas, 2014).

While the Superdome is now considered by many a symbol of pride and resiliency for the city of New Orleans, there were many obstacles to overcome to get to the finish line (Higgins, 2009). In the 1960's, the city and state wanted assurances from the NFL, that if they did build the Superdome, the NFL would grant New Orleans an expansion franchise (Haas, 2014). A boycott of the AFL All-Star game in 1965 due to mistreatment of African American players in the French Quarter highlighted some of the racial injustices that continued to scar the image of the city (Haas, 2014). Concerns regarding the city's record of race relations worried many in their hopes of landing an NFL franchise. However, Schiro and McKeithan made sure they had a proverbial ace up their sleave, two very influential Congressmen from the state of Louisiana, Senator Russell Long and Representative T. Hale Boggs. As the NFL moved closer to seeking a merger with the AFL, it also needed help from Congress to grant them antitrust immunity for the merger. Right on cue, the two Louisiana congressmen played an important role in ensuring the antitrust legislation passed. Unsurprisingly, less than two weeks after the antitrust legislation passed, New Orleans was granted the 16th NFL franchise on November 1, 1966, which also happens to be All Saint's Day in the Catholic liturgical calendar (Pramschufer, 2016).

Prior to the construction of the Superdome, New Orleans was a city that was trying to emerge as a dynamic hub for commerce and tourism in the post-Jim Crow south and signs were emerging that the city was ready to take its place next to other rapidly growing cities in the new Dixie (Germany, 2007). A large domed multipurpose stadium along with a new NFL franchise was thought to enhance the city's image as "big league" (Germany, 2007). The citizens of Louisiana enthusiastically agreed with the idea. In 1966, Louisiana voters passed legislation to allow New Orleans to commence construction on the Superdome by the largest margin in the history of the state ("Historical Timeline," n.d.). Despite the enthusiasm that accompanies a new stadium and a new NFL franchise, obstacles remained. Among them were the unrealistic cost estimates, timeframe to complete the project, and location (Haas, 2014). Shortly after the voter approval, Schiro was provided an estimated cost of $35 million to build the stadium, yet a memo he received in 1968 suggested that the cost would be more than twice that amount (Haas, 2014). Also, Dixon proclaimed that the dome would be completed in 1969, just three years from the date the voter initiative passed. However, as word spread that the stadium could cost over $100 million and construction still had not begun on the stadium in 1968, accusations of fraud and deception were lobbed at Schiro and Dixon (Haas, 2014). The push to build the stadium downtown was met with significant resistance from those who wanted to move it to the lakefront in New Orleans' suburbs. A stadium with more space would provide greater parking, easier highway access, and at a lower cost. However, the allure of having a stadium downtown near the French Quarter, hotels, and restaurants was an opportunity to create a premier tourism experience unlike anything else in the United States (Haas, 2014). Despite the obstacles and the years of posturing, the Superdome broke ground in downtown New Orleans on August 12th, 1971 ("Historical timeline," n.d.). As the Superdome quickly approaches its 50th anniversary,

McKeithan, Schiro, and Dixon could not have possibly envisioned the multifaceted roles and impact the Superdome would play for the city of New Orleans in the decades to come.

Literature Review

A major league sport facility, accompanied by a major professional franchise, can provide a plethora of economic benefits to a city. Prior research regarding economic impact of sporting events and venues suggests additive economic drivers such as job creation, tax revenue generation, infrastructure development, and new business investments (Crompton, 2006; Njoroge et al., 2017; Perić, 2018; Tomino et al., 2020). Whether those benefits supersede the cost of building such a facility to provide a sufficient economic return on investment continues to be challenged (Abbiasov & Sedov, 2023; Bradbury et al., 2023). Indirect effects such as leakages from the local economy, increased cost of living, inflationary pressures, resource consumption should also be considered before utilizing public funds to build a sport venue or host an event (Emery, 2002; Njoroge et al., 2017; Tzoumaka et al., 2022) However, limiting such notions of benefits to economic outputs provides a limited perspective of the overall impact . Spillover benefits, such as increased community visibility, improving a community's image, enhancing localized development, and psychic income have also been considered as alternatives to direct economic impact (Al-Emadi et al., 2022; Crompton, 2004).

Another consideration outside of economic output is a sport facility serving as a social anchor to the community (Seifried & Clopton, 2013). Social anchors incorporate social capital development by providing a point of connection for community members while also fostering a sense of unique group identity (Clopton & Finch, 2011). Sport venues provide both a social and physical institution for which the communities build a social identity (Newman & Giardina, 2008). For context, look no further than a fall Saturday on a college campus. Bradford & Sherry (2018) describe the environment around a university football stadium to be a community-building exercise that encapsulates American culture. Utilizing Clopton and Finch's (2011) social anchoring model, a true social anchor must bond and bridge social capital while also building collective identity for the community. Bonding social capital is built on trust and shared identity and often is tied to providing people a safety net in times of need. Whereas, bridging social capital refers to connecting people across various social and cultural communities to foster a place of belonging (Putnam, 2000).

This study aims to examine the unique financial, cultural, and social phenomenon of the Caesars Superdome through the lens of economic impact and social anchoring. While prior research has attempted to capture the socioeconomic outcomes of building and refurbishing the venue, this study was designed to synthesize those previous studies to provide broader context. Ultimately, this study seeks to determine the measurable economic and intangible benefits of the Caesars Superdome on the city of New Orleans and the Gulf South region.

Methodology

A qualitative synthesis of economic studies, media articles, and academic journal articles was used to complete this study. A comprehensive search was conducted using reputable scholarly databases and search engines, including Google, Google Scholar, Newspaper Source Plus, and SPORTDiscus. Employing a systematic search strategy to identify relevant literature, the authors used the following keywords: "New Orleans," "economic impact," "Superdome." Usage of Boolean operators "OR" and "AND" were utilized in refining the search. The searches were designed to capture a diverse selection of articles pertinent to the economic and intangible benefits of the Superdome in the Gulf South region. Inclusion criteria to determine article eligibility included publication dates from 1960 to present, reputable

peer reviewed studies or news outlets, and information related to the economic or societal impact of the Superdome.

The search strategy yielded initial results of 113 articles. Following an elimination of duplicates and meticulous screening based upon subject relevance inclusion criteria, 13 articles were identified as suitable for this study. Those articles can be found in Table 1, which provides a summary of their contents.

Table 1

Summary of selected articles pertinent to this study

Reference	Title	Article Type	Conclusions
Baade & Matheson, 2012	Professional Sports, Hurricane Katrina, and the Economic Redevelopment of New Orleans	Economic impact study	Capital expenditures refurbishing and upgrading the Superdome in the face of massive need for capital expenditures elsewhere were ill-advised
Barton, 2025	After Hurricane Katrina, the Superdome was a 'symbol of misery and suffering.' 5 years later, it was the home of the champs	News article	Despite the tragedies that occurred in and around the Superdome during Katrina, it served as a symbol of rebirth for the city
Burns, 2014	When the Saints Went Marching In: Social Identity in the World Champion New Orleans Saints Football Team and Its Impact on Their Host City	Post hoc content analysis	Associated positive self-image of Saints fans and the success of the team
Chighizola, 2012	Where the Good Times Roll: New Orleans as a Destination for Sports Events Tourism	Qualitative case study	City officials cited infrastructure, city authenticity, economic impact, and entertainment as key components to attract events to New Orleans

Duncan, 2018	The NFL got it right: New Orleans is the best Super Bowl city in the world.	News article	Highlights the various attributes that make New Orleans a perfect host city for the Super Bowl
Higgins, 2009	A House Divided: The Evolution of the Louisiana Superdome from a Divisive Concept into a Symbol of New Orleans and the Surrounding Areas	Narrative case study	While financial benefits of the Superdome may be in question, the value to the city as a center point to the community makes it indispensable
Gerth, 1978	Superdome a Bottomless Pit for Taxpayer Funds	News article	Superdome's initial public investment and operations mistakes
Louis, 2009	Reclaiming a Citizenship Site: Performing New Orleans in the Superdome	Narrative case study	The reclamation of the Superdome post-Katrina as a citizenship symbol that defines the city
Matheson & Baade, 2006a	Can New Orleans Play Its Way Past Katrina?	Qualitative review	
Noll & Zimbalist, 1997	Sports, Jobs & Taxes: Are New Stadiums Worth the Cost?	Edited book	Public financing of sports facilities is a poor use of public funds
Matheson et al., 2018	Professional Sports, Hurricane Katrina, and the Economic Redevelopment of New Orleans: Revisited	Economic impact study	Symbolic reconstruction investments in sport facilities were misguided in response to Katrina
Ragas et al., 1987	Louisiana Superdome: Public Costs & Benefits	Quantitative economic impact study	Superdome produces significant direct effect economic impact
Rose, 2006	Saints in Superdome signals New Orleans' return.	News article	Outlines efforts that resulted in the return of the Superdome and its impact on the city

Results

In 1985, researchers in tourism, marketing, real estate, and public finance from the University of New Orleans studied the costs and benefits with the Louisiana Superdome for the first ten years of operations (Ragas et al., 1987). Ragas et al. (1987) stated that the most important tenant of the Superdome is the National Football League's (NFL's) New Orleans Saints. The Saints was organized as an expansion team for the NFL following the public commitment by the state government to build a new stadium to house the team (Ragas et al., 1987). Without the construction of the Superdome, New Orleans would not have acquired the Saints from the NFL (Ragas et al., 1987). The Superdome charges rent to the New Orleans Saints a fee of $25,000 a home game, or 5 percent of gross ticket receipts, with a yearly cap of $800,000 (Noll & Zimbalist, 1997). The team receives 100 percent of the signage, suite, parking revenues, and 42 percent of gross concessions receipts (Noll & Zimbalist, 1997). The economic impact of the Saints was considered part of the Superdome impact on the region of south Louisiana (Ragas et al., 1987). From the time period of 1975 to 1984, the overall economic impact of the Superdome, included the calculation of out-of-town patrons to Saints games, local purchases, wages of the two vendors responsible for stadium operations and food service, and the resulting impact of Saints on the local economics of the greater New Orleans metropolitan area (Ragas et al., 1987).

The annual economic impact was assumed to vary with the number of events in 1983. The mathematical model for estimating dollar expenditures per event per year for that year was (Ragas et al., 1987):

$$\begin{aligned} &Estimated\ Dollar\ Volume\ in\ Year\ X \\ &\quad = \frac{Event\ Attendance\ for\ X\ Year}{Event\ Attendance\ Category\ 1983} \times 1983\ Dollar\ Volume\ for\ Event\ Type \\ &\quad \times \frac{X\ Year\ CPI}{1983\ CPI} \end{aligned}$$

The total direct economic impact from stadium operations was estimated to $934.28 million during the first ten years of operations of the stadium from 1975 to 1984 (Ragas et al., 1987). Operations, real estate, and taxes were the main generators of economic impact (Ragas et al., 1987). This does not involve any indirect multiplier effects for the state or local income. The study did not include any local events like proms, boat shows, or discos. For events that included locals and out of town patrons, economic impact calculations only included out of town attendance figures. Real estate impacts totaled $149 million, which was comprised of cost savings resulting from the substitution of public for private parking facilities on site, and appreciation of the land value where the Superdome sits in downtown New Orleans. Tax revenues accounted for $115.95 million of revenue generation coming from municipal tax revenues at $50.08 million, and state tax revenues at $65.87 million (Ragas et al., 1987). This was compounded by the Superdome losing $13 million dollars for the 1977 fiscal year (Higgins, 2009; Gerth, 1978). Despite this economic loss, the Superdome hosted two Super Bowls in 1978 and 1981, which contributed $130.83 millions of that total $934.28 millions of economic impact (Ragas et al., 1987). Other sporting events, that was not the Saints, included the Sugar Bowl, Tulane University football, concerts, and boxing matches. This stadium also hosted the Final Four in 1982 in this first ten-year period. The $100 million annual operating impact is indeed ample in terms of economic maturity for a region constituting of 1.2 million people with less than $10 billion in annual household incomes (Ragas et al., 1987). The Saints, two Super Bowls, Tulane University football, a Muhammad Ali fight, and a Final Four accounted for the bulk of this economic impact during the first ten years of operation.

Discussion on Policy Implications

Sport economists can argue for the fiscal benefits of investing in stadia for cities. Sociologists, like D. Stanley Eitzen (2016), argue that sport is for good of all the community. Pope Francis wrote that, "may

sport always promote the culture of encounter" (Eitzen, 2016, p. 23). For more than 50 years, the Superdome has allowed multitudes of people to enjoy moments in people's collective lives including Tulane University graduations, the Rolling Stones and Taylor Swift concerts, the Saints and 2009 Super Bowl run, National Championships in college football, Lutheran prayer gatherings and many other events. These events have added to the social capital of the area and are ingrained in collective memory. Collective memory represents the vast influential events in history that a populace will remember and is defined as the "the collection of memories shared by a common culture" (Company, 2004 & Smith, 2016). The collective memory of the people of the Gulf South Region includes this wonderful multipurpose facility at 1500 Sugar Bowl Dive with an added bonus of being "a small part of history" for the event staff of the stadium like Ms. Edwina Handsome, control room operator of over 36 years for Legends Global, formerly SMG World.

As a collective identity, the Superdome can be seen as a symbol of celebration, fandom, refuge and rebirth. The social connections made within its walls and because of its presence (bridging social capital), the physical and social resiliency in the face of tragedy (bonding social capital), and the identity cultivated within the community (building collective identity), exemplifies Clopton and Finch's (2011) three pillars necessary for a true social anchor for the city of New Orleans. However, none of this would be possible without the financial investments necessary to construct, renovate, and maintain the facility over the past 50 years. Additionally, the financial commitments dedicated to the Superdome are partially predicated on the economic impact it derives by hosting some of the largest sporting events in the world. While its economic return on investment may not be fully appreciated, the value derived from its status as one of the community's strongest social anchors cannot be overstated.

Discussion

The Superdome is a physical institution within the city of New Orleans that offers an open platform for a heterogeneous collection of residents to interact in an informal setting. The social engagement among tens of thousands of fans attending Saints' games or attending a Taylor Swift concert simply cannot be replicated anywhere else in the city. As a decades-long fixture of the city of New Orleans and the Gulf South region, our findings confirm its status as a social anchor by displaying bridged and bonded social capital, along with the Superdome's ability to build collective identity. Through bridging social capital, the Superdome functions as a "communal endeavor" of sports fandom by building social networks that transcend socioeconomic, social, racial, or political division. Whether the city is united by the success of the Saints or as a welcoming host to a multitude of mega events (e.g., Super Bowl, Final Four, NBA All Star Games, Papal Visits), the Superdome serves as the hub for building relationships and networks within the community and for external audiences. While social anchoring primarily focuses on the local community, the allure for visitors to be immersed in the unique culture within the community is why New Orleans is considered one of the best hosts for mega-events in the United States (Duncan, 2018). Unfortunately, its role changed drastically in the summer of 2005.

Hurricane Katrina was a storm of unprecedented ferocity causing the largest damage in real dollar terms of any hurricane in U.S. History, with property losses ranging from $70 to $125 billion (Baade et al., 2007; Wildasin, 2006). With a final death toll of over 1400 people, Katrina is among one of the worst national disasters ever suffered in the United States (Baade et al., 2007). With total losses over $100 billion, Katrina was far worse than past hurricanes, or the effects of Rodney King riots in Los Angeles. The Superdome provided a shelter of last resort for Katrina and other hurricanes for the general public in the past. Despite the substantial physical, economic, and emotional damage to the city and region, the Superdome's recovery served as a symbol of resilience in the face of tragedy (Louis, 2009). Bonding

social capital requires a shared identity and a collective trust within a tight-knit community to help others "get by" in times of struggle (Putnam, 2000). Post-Katrina, the speed in which the Superdome was repaired and the Saints returned to New Orleans gave people hope. In response to the Saints first home game since Katrina, former New Orleans' mayor, Mitch Landrieu commented on its impact.

> When the Saints came back into that building, and we all saw each other for the first time in a long time, and we had the glorious Saints Day, that's the moment when we knew we were going to survive, he says. It was a big moment for us, and people in New Orleans remember that very moment, and the Saints gave us that (as cited in Barton, 2025, para. 29).

Following Hurricane Katrina, the Superdome had a massive renovation, with the help from FEMA, and was ready for football again in September 2006 (Chighizola, 2012). The city of New Orleans was able to rebound after the devastation of Hurricane Katrina with the New Orleans Saints returning to play in a memorable game versus the Atlanta Falcons in September 2006 and then hosting the NBA All Star game in 2008 (Chighizola, 2012). The resilience shown by the community in the recovery after Katrina, highlights the strength of bonding social capital by serving as an emotional safety net during the crisis. "The Superdome is a cause for celebration. The Superdome is the most visible building on our city's skyline. Its durability is our durability" (Rose, 2006).

The Superdome also allows the New Orleans' community to rally around its teams and events as a collective identity subgroup of the population. The record-setting approval of the citizens of Louisiana for the construction of the Superdome in 1966 is a perfect encapsulation of the passion and excitement that the community demonstrated as sports fans ("Historical timeline", n.d.). More specifically, their collective identity as fans of the NFL franchise that eventually became the New Orleans Saints. The Saints even don the logo and colors representative of the city, as the fleur-de-lis represents the French culture found within the community and the colors represent Mardi Gras (gold) and oil (black) (Del Rio, 2012). As further evidence of collective identity, Burns (2014) confirms the positive associations fans had with the Saints during their Super Bowl victory in 2009:

> The intangible benefits commonly referenced are the unity among fans in the "Who Dat Nation" and the ecstatic joy experienced by the citizens of New Orleans and the Gulf Coast region, examples of accentuating similarities within the in-group, as well as the corresponding good feelings about the city and the region and the positive impression it may create in the rest of the viewing public around the country, and the world, as a result of the positive media coverage of the 2009 season, both examples of positive self-perception of the in-group (p. 159).

Limitations

The study by Ragas et al. (1987) did not account for local patrons for the main clients- the New Orleans Saints and Tulane Green Wave football teams. The economic impact study relied heavily on out-of-town patrons and did not count the locals who come every week for college and or professional football events. A third of the economic impact of this building was not accounted for with non-sporting and local events according to Ragas et al. (1987). According to Doug Thornton, President of North American Venues of Legends Global / Caesar's Superdome, the biggest challenge in this sport tourism industry affecting New Orleans is the fiscal resources, for New Orleans is not a wealthy city like New York, Dallas, Atlanta, or Chicago (Chighizola, 2012). New Orleans must continue to stay competitive with cities with much newer stadia. Despite being a small city, New Orleans ranked fifth in the number of conventions hosted in the United States, prior to Hurricane Katrina (Matheson & Baade, 2006a; Tennessean News Services, 2005).

Conclusion

The review above reveals that the Caesar's Superdome has had certain challenges in the first ten years of operation and in years following, since opening its doors in 1975. It is very relevant to mention hurricanes and Super Bowls for both had dramatic economic stimuli or negative impact on financial status of this world class venue (Chighizola, 2012; Higgins, 2009; Ragas et al., 1987). Like all econometric studies, degrees of uncertainty of true economic impact of major events on host cities remain (Matheson & Baade, 2006b). What is certain, is this world class multipurpose facility has had a positive economic and social impact to the state of Louisiana and the city of New Orleans (Higgins, 2009).

To conclude, there are notable benefits of studying the economic impact of the Superdome, for this multipurpose facility generated a total estimated direct economic impact of $934.28 million during the first ten years of operations (Ragas et al., 1987). That value is equal to more than $2.9 billion in 2025 dollars. According to Higgins (2009), the Superdome had become the venue that saved New Orleans from falling into fiscal despondency, similar to Detroit, for this building has become a symbol of the resurgence of New Orleans post Katrina and post Covid. Econometric studies on fiscal impact of sport mega events (SMEs) are highly debated by scholars, and the debate remains on the true collective economic impact (Matheson & Baade, 2004; Matheson, 2009). Economists argue that hosting big events like the Super Bowl, Final Four, WrestleMania, and NBA All Star Game can be either proverbial air balls or slam dunks (Matheson & Baade, 2004). Moreover, sport tourism studies have only recently begun to emphasize sports event tourism (Chighizola, 2012). Mr. Doug Thornton would argue that these events have been economic slam dunks for one to thirteen economic returns are indeed robust and worth the time and energy (Ragas et al., 1987):

> The only world-class events that we haven't hosted are the World Cup and the Olympics. Super Bowl, probably the biggest single event in the world; Final Four, biggest collegiate event in the country; BCS Championship, largest single college event in the country; Republican National Convention, 1988; Papal Visit, 1986; largest event ever for an indoor concert in 1981 where we had a 91,000 people here with the Rolling Stones, so we've done quite a few things here (Chighizola, 2012, p.64).

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References

Abbiasov, T., & Sedov, D. (2023). Do local businesses benefit from sports facilities? The case of major league sports stadiums and arenas. *Regional Science and Urban Economics, 98*, 103853. https://doi.org/10.1016/j.regsciurbeco.2022.103853

Al-Emadi, A., Sellami, A. L., & Fadlalla, A. M. (2022). The perceived impacts of staging the 2022 FIFA world cup in Qatar. *Journal of Sport & Tourism, 26*(1), 1-20. https://doi.org/10.1080/14775085.2021.2017327

Baade, R. A. (1996). Professional sports as catalysts for metropolitan economic development. *Journal of Urban Affairs, 18*(1), 1-17. https://doi.org/10.1111/j.1467-9906.1996.tb00361.x

Baade, R. A., Baumann, R., & Matheson, V. A. (2007). Estimating the impact of natural and social disasters, with an application to Hurricane Katrina. *Urban Studies, 44*(11), 2061-2076. https://doi.org/10.1080/00420980701518917

Baade, R. A., & Matheson, V. A. (2012). An evaluation of the economic impact of National Football League mega-events. In K. G. Quinn (Ed.), *The economics of the National Football League* (pp. 243-258), Springer.

Barton, J. (2025). *After Hurricane Katrina, the Superdome was a 'symbol of misery and suffering.' 5 years later, it was the home of the champs*. CNN. https://amp.cnn.com/cnn/2025/08/24/sport/football-nfl-superdome-hurricane-katrina-intl?utm_source=chatgpt.com

Bradbury, J. C., Coates, D., & Humphreys, B. R. (2023). The impact of professional sports franchises and venues on local economies: A comprehensive survey. *Journal of Economic Surveys, 37*(4), 1389-1431. https://ssrn.com/abstract=4022547

Bradford, T. W., & Sherry, J. F. (2018). Dwelling dynamics in consumption encampments: Tailgating as emplaced brand community. *Marketing Theory, 18*(2), 203-217. https://doi.org/10.1177/1470593117732460

Burns, E. B. (2014). When the Saints went marching in: Social identity in the world champion New Orleans Saints football team and its impact on their host city, *Journal of Sport and Social Issues, 38*(2), 148-163. https://doi.org/10.1177/0193723513499920

Chighizola, K. E. (2012). *Where the good times roll: New Orleans as a destination for sports event tourism* (Publication No. 3660) [Master's thesis, Louisiana State University]. ProQuest Dissertations and Theses Global.

Clopton, A. W., & Finch, B. L. (2011). Re-conceptualizing social anchors in community development: Utilizing social anchor theory to create social capital's third dimension. *Community Development, 42*(1), 70-83. https://doi.org/10.1080/15575330.2010.505293

Company, H. M. (2004). *The American Heritage College Dictionary*. Houghton Mifflin Harcourt.

Crompton, J. (2004). Beyond economic impact: An alternative rationale for the public subsidy of major league sports facilities. *Journal of Sport Management, 18*, 40-58. https://doi.org/10.1123/jsm.18.1.40

Crompton, J. (2006). Economic impact studies: instruments for political shenanigans? *Journal of Travel Research, 45*(1), 67-82. https://doi.org/10.1177/0047287506288870

Del Rio, A. (2012, October 13). *The essence of black and gold or how the New Orleans Saints got their colors*. Who Dat Dish. https://whodatdish.com/2012/10/13/the-essence-of-black-and-gold-or-how-the-new-orleans-saints-got-their-colors/

Duncan, J. (2018, May 23). *The NFL got it right: New Orleans is the best Super Bowl city in the world.* The New Orleans Times-Picayune. https://www.nola.com/sports/saints/the-nfl-got-it-right-new-orleans-is-the-best-super-bowl-city-in-the/article_c30cb48e-830a-5b1f-bf2d-6d3efe35b633.html

Eitzen, D. S. (2016). *Fair and foul: beyond the myths and paradoxes of sport*. Rowman and Littlefield.

Emery, P. R. (2002). Bidding to host a major sports event: The local organising committee perspective. *International Journal of Public Sector Management, 15*(4), 316-335. https://doi.org/10.1108/09513550210430255

Germany, K. B. (2007). *New Orleans after the promises: Poverty, citizenship, and the search for the Great Society*. University of Georgia Press.

Gerth, J. (1978, January 13). *Superdome a bottomless pit for taxpayer funds*. New York Times. https://timesmachine.nytimes.com/timesmachine/1978/01/13/110763400.html?pageNumber=18

Haas, E. F. (2014). *Mayor Victor H. Schiro: New Orleans in transition*. University Press of Mississippi.

Higgins, M. B. (2009). *A house divided: The evolution of the Louisiana Superdome from a divisive concept into a symbol of New Orleans and the surrounding areas* (Publication No. 947) [Master's thesis, University of New Orleans]. ProQuest Dissertations and Theses Global.

Historical timeline. (n.d.). *Caesar's Superdome*. https://www.caesarssuperdome.com/about-us/event-highlights

Louis, R. (2009). Reclaiming a citizenship site: Performing New Orleans in the Superdome, *Text and Performance Quarterly, 29*(3), 279-295. https://doi.org/10.1080/10462930903017232

Matheson, V. A. (2009). Economics of the Super Bowl. *Economics Department Working Papers. Paper 29*. https://crossworks.holycross.edu/econ_working_papers/29

Matheson, V. A., & Baade, R. A. (2004). *An economic slam dunk or march madness? Assessing the economic impact of the NCAA basketball tournament. The Economics of College Sports* (J. Fizel & R. Fort, Eds.). Praeger Publishers.

Matheson, V. A., & Baade, R. A. (2006a). Can New Orleans play its way past Katrina? The role of professional sports in the development of New Orleans. *International Journal of Sport Management and Marketing, 6*(1), 1-25. https://crossworks.holycross.edu/econ_working_papers/75

Matheson, V. A., & Baade, R. A. (2006b). Padding required: Assessing the economic impact of the Super Bowl. *European Sport Management Quarterly, 6*(4), 353-374.

Matheson, V. A., Baade, R. A., & Henderschott, C. (2018). Professional sports, Hurricane Katrina, and the economic redevelopment of New Orleans: Revisited. *Working Papers 1817, College of the Holy Cross, Department of Economics*.

Newman, J. I., & Giardina, M. D. (2008). NASCAR and the" Southernization" of America: Spectatorship, Subjectivity, and the Confederation of Identity. Cultural Studies? *Critical Methodologies, 8*(4), 479-506. https://doi.org/10.1177/1532708608321578

Njoroge, J., Atieno, L., & Vieira Do Nascimento, D. (2017). Sports tourism and perceived socio-economic impact in Kenya: The case of Machakos County. *Tourism and Hospitality Management, 23*(2), 195-217. https://doi.org/10.20867/thm.23.2.9

Noll, R. G., & Zimbalist, A. (1997). *Sports, jobs and taxes. The economic impact of sports teams and stadiums*. Brookings Institution Press.

Perić, M. (2018). Estimating the perceived socio-economic impacts of hosting large-scale sport tourism events. *Social Sciences, 7*(10), 176. https://doi.org/10.3390/socsci7100176

Pramschufer, M. (2016, September 16). *The man behind the Saints and the Superdome.* New Orleans Magazine. https://www.myneworleans.com/the-man-behind-the-saints-and-the-superdome/

Putnam, R. D. (2000). *Bowling alone: America's declining social capital*. In Culture and politics (pp. 223-234). Palgrave Macmillan. https://doi.org/10.1007/978-1-349-62965-7_12

Ragas, W. R., Miestchovich, I. J., Nebel, E. C., Ryan, T. P., & Lacho, K. J. (1987). Louisiana Superdome: Public costs and benefits 1975-1984. *Economic Development Quarterly, 1*(3), 226-239. https://doi.org/10.1177/089124248700100305

Rose, C. (2006, September 25). *Saints in Superdome signals New Orleans' return*. NPR. https://www.npr.org/2006/09/25/6137687/saints-in-superdome-signals-new-orleans-return

Seifried, C., & Clopton, A. W. (2013). An alternative view of public subsidy and sport facilities through social anchor theory. *City, Culture and Society, 4*(1), 49-55. https://doi.org/10.1016/j.ccs.2013.01.001

Smith, N. P. (2016). *An analysis of the influence of the Boston Marathon bombing on sport venue management*. [Master's thesis, Southeastern Louisiana University]. ProQuest Dissertations and Theses Global.

Tennessean News Services. (2005). *Rebuilding New Orleans incredibly big, far from easy: Massive job will take billions of dollars and tons of national resolve*. Nashville Tennessean.

Tomino, A., Perić, M., & Wise, N. (2020). Assessing and considering the wider impacts of sport-tourism events: A research agenda review of sustainability and strategic planning elements. *Sustainability, 12*(11), 4473. https://doi.org/10.3390/su12114473

Tzoumaka, E., Leivadi, S., & Kaplanidou, K. (2022). Recurring rural destination sport events: A study on participants' direct spending. *International Journal of Financial Studies, 10*(3), 78. https://doi.org/10.3390/ijfs10030078

Wildasin, D. (2006). Disasters: issues for state and federal government finances. *Working Paper No. 2006-07. Institute for Federalism and Intergovernmental Relations. University of Kentucky*.

Examining the Influence of Coaching Competencies on Coach Leadership Styles: A Hierarchical Multiple Regression Approach

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Abstract

Numerous studies have demonstrated that coach leadership styles are vital for athletes' training success and game outcomes. Coaching leadership influences sports results, and previous research emphasizes the most effective coaching behaviors. Despite the acknowledged importance of coaching skills in effective sports leadership, little research has explored how coaching competencies relate to specific leadership styles. To address this gap, this study identifies key coaching competency factors linked to democratic and autocratic leadership. The research examines Ghanaian university (collegiate) athletes' perceptions of coaching skills and their coaches' behavioral traits. Data were collected from 308 athletes involved in college sports in Ghana. Findings showed that athletes regard motivation and game strategy as critical coaching competencies shaping their perceptions of their coaches' democratic and autocratic leadership. While technique competency was essential for democratic leadership, it was not for autocratic leadership. Character-building skills were not a significant factor for either style. Coaching education programs, such as those in college athletic departments, can use these insights to guide professional leadership development, enhance core competencies, and foster effective coaching leadership.

Keywords: coaching leadership, coaching competency, democratic leadership, autocratic leadership

Introduction

Coach leadership styles can influence the success of sports, and previous research has shown the most effective coaching behaviors (Jowett, 2017). Sports in the universities in Ghana are governed by the Ghana Universities Sports Association (GUSA). The relationship between university coaches and athletes in Ghana has continued to evolve. Coaches are more supportive of athletes' dual roles as students and sportspersons, helping them balance academic work with sports participation (University of Education, Winneba, 2025, January 23; University of Ghana, 2024). However, studies exploring Ghanaian university athletes' perceptions of coaching competency and their coaches' behavioral traits are scarce.

Many studies have found that coach leadership styles play a crucial role in athletes' training effectiveness and game outcomes (Becker & Wrisberg, 2008), psychological development and satisfaction (Weiss & Friedrichs, 1986), and team cohesion (Jowett & Chaundy, 2004). In sports settings, Chelladurai and Saleh (1980) developed the Multidimensional Model of Leadership, which includes five dimensions: democratic behavior, autocratic behavior, training and instruction, social support, and positive feedback. Among these five dimensions, democratic leadership and autocratic leadership are opposing traits. Therefore, this study compares democratic and autocratic leadership to prevent conflicts between athletes and coaches, since a coach's primary role is to adapt to the needs and desires of athletes (Kim et al., 2021).

Democratic leadership differs from autocratic leadership because it involves coaches sharing their authority with athletes and allowing them to take responsibility for team performance and skill development in specific areas. With democratic leadership, athletes have more influence in decision-making, such as how they train and complete tasks (Cruz & Kim, 2017). While a higher level of democratic leadership is linked to more positive and fewer negative psychological reactions in athletes, it can also cause conflicts, such as disrespect and disobedience (Foels et al., 2000).

While democratic leadership allows athletes to express their opinions and influence decisions, autocratic leadership expects athletes to accept the coach's decisions and opinions. Autocratic leadership usually features a hierarchical, top-down decision-making process, where coaches hold authority and control over all aspects of athletes, and athletes' feedback or comments are generally not accepted (Hoyle, 2012). It emphasizes a coach's authority and maintains distance from athletes (Chelladurai & Saleh, 1980). With autocratic leadership, the coach's decision-making dominates, and his or her personal power limits athletes' freedom of choice. This style may facilitate quick problem-solving and improve practice effectiveness, which are important in competitive sports (Jin et al., 2022; Yang & Jowett, 2010).

Castillo and Espinosa (2014) found that the autocratic leadership approach led to more effective improvement in dance skill performance because it enhanced students' concentration during learning. However, the autocratic coaching style can negatively impact athletes' intrinsic motivation because autocratic coaches often hinder athletes' psychological motivation (Hollembeak & Amorose, 2005; Mallett, 2005). Additionally, Price and Weiss (2000) observed that athletes reported higher levels of burnout and anxiety, and lower levels of enjoyment when subjected to higher levels of autocratic coaching leadership compared to lower levels.

In the sports context, examining coach leadership styles is especially important because sports are more complex and unique compared to other settings (Farh & Cheng, 2000). For example, if athletes prefer a high level of autonomy but their coach exerts assertive control over them, they may feel tension with their coach. This disparity can lead to poor performance and distrust between the coach and athletes (Jin et al., 2022). In this context, it is essential to avoid conflict between the coach's leadership style (e.g., democratic or autocratic) and the athletes' ability to achieve mutual functional goals (Yang & Jowett,

2010). Moreover, coach leadership fosters positive coach-athlete relationships through engagement, flexibility, and communication. Despite the acknowledged importance of coaching competence in effective sports leadership (Carroll et al., 2008), little research has explored how coaching skills relate to specific leadership styles. To address this gap, this study identifies key coaching competency factors associated with democratic and autocratic leadership among coaches.

To understand a coach's abilities, Myers et al. (2006) proposed a conceptual framework of coaching competency to explain athletes' perceptions of their coach's capabilities. Myers et al. (2006) defined coaching competency as the coach's evaluations that influence athletes' learning and performance, conceptualized as a combination of game strategy, motivation, technique, and character-building skills. Game strategy competency refers to assessing the coach's strategic ability during competition. Motivation competency relates to evaluating the coach's ability to impact athletes' psychological mood and skills. Technique competency involves athletes' assessment of the coach's instructions during practice, while character-building competency measures the coach's ability to foster a positive attitude and personal growth in athletes. Therefore, coaching competency reflects perceptions of a coach's capability to influence athletes' psychological behaviors, such as perceptions, beliefs, and attitudes (Myers et al., 2006).

Coaching competency can be seen as a form of proxy efficacy, as athletes depend on their coaches to reach their goals. Proxy agency explains how individuals seek safety, desired outcomes, and well-being through external proxy agents (Kao et al., 2021). According to social cognitive theory (Bandura, 1999), personal efficacy beliefs relate to personal agency, collective agency, and proxy agency. Specifically, proxy agency is closely linked to coaching competency (Kao & Tsai, 2016) because athletes turn to proxy agents when they have not achieved their goals. Athletes may believe that other agents, like coaches, can do this better. The coach also aims to proxy control over athletes' improvement and success by using their knowledge and experience (Lara-Bercial et al., 2022). Since the connection between a coach's behavior and athletes' attitudes depends on athletes' perceptions of the coach's actions (Horn, 2002), athletes' views of a coach's behavior are crucial for coaching effectiveness. Therefore, it is important to examine which coaching competency factors influence different coach leadership styles, such as democratic and autocratic leadership.

Much of the coach leadership research has focused on identifying which specific coach leadership styles influence successful performance or positive psychological outcomes for athletes (Horn, 2002). However, it should not be limited to determining which coaching competency is more important than others because coach leadership effectiveness depends on the circumstances and situations, such as athletes' ability levels, team conditions, or levels of sports. For example, a high school coach may need to be democratic, providing clear and specific guidance and instructions for student-athletes. Conversely, coaches at the professional level are more likely to exert control over athletes by using their authority and power. Terry and Howe (1984) found that coaching effectiveness closely relates to task dependence, explaining that athletes in team sports tend to favor autocratic leadership over democratic leadership. Price and Weiss (2000), on the other hand, revealed that athletes reported higher levels of burnout and anxiety with lower perceived competence under higher levels of autocratic coaching. Therefore, this study investigates how coaching competency links leadership styles in sports, with a focus on democratic and autocratic leadership. The following hypotheses are proposed for this study:

H1-a. Given that athletes' psychological aspects (e.g., intrinsic motivation) are crucial, there is a positive relationship between motivation competency and democratic leadership.

H1-b. Given that athletes' psychological aspects (e.g., intrinsic motivation) are crucial, there is a positive relationship between motivation competency and autocratic leadership.

H2-a. Given that game strategies are crucial, there is a positive relationship between game strategy competency and democratic leadership.

H2-b. Given that game strategies are crucial, there is a positive relationship between game strategy competency and autocratic leadership.

H3-a. Given that participants in this study are collegiate athletes, and they may freely express their opinions and decisions during practice and competition, there is a positive relationship between technique competency and democratic leadership.

H3-b. Given that participants in this study are collegiate athletes, and they may freely express their opinions and decisions during practice and competition, there is no relationship between technique competency and autocratic leadership.

H4-a. Given that character-building competency is related to a coach's ability to foster a positive attitude and personal growth in athletes, there is a positive relationship between character-building competency and democratic leadership.

H4-b. Given that character-building competency is related to a coach's ability to foster a positive attitude and personal growth in athletes, there is a positive relationship between character-building competency and autocratic leadership.

Methodology

The researchers sent letters to the Heads of Sports Directorates of the Universities for permission to conduct the study in their institutions. In addition to requesting permission to conduct the study in their institutions, the researchers requested the Heads of Sports Directorates of the Universities to notify their student athletes, through their respective coaches, about the research and that permission has been granted for the study to be conducted in their institutions. Only athletes who had participated in at least one GUSA competition were included in the study. Athletes who did not compete in a GUSA competition were excluded. The consent form for the participants indicated that the study was voluntary and that they could withdraw at any time by discontinuing completion of the questionnaire.

The study utilized a purposive sampling technique to select 308 athletes from seven universities in Ghana. The estimated population size of university athletes in the country's 16 GUSA-affiliated universities eligible to participate in the GUSA Games was 4,400. However, the estimated number of athletes eligible in the seven universities purposively selected for the present study was 1,900. The researchers sent out 350 copies (50 copies to each institution) of the questionnaire to the seven universities. Out of the 350 copies, 314 of the questionnaires were completed and returned to the researchers. Data were collected from Summer through Fall 2024. However, data for six of the completed questionnaires were deleted during data analysis due to missing data. For more detailed information, please see Table 1 and Table 2.

Table 1

Frequencies and Percentages of Participants from the Universities (N = 308)

University	***N* (%)**
University of Education, Winneba	49 (15.91%)

University of Cape Coast	45 (14.61%)
University of Ghana	47 (15.26%)
University of Health and Allied Sciences	44 (14.29%)
University of Energy and Natural Resources	34 (11.04%)
Kwame Nkrumah University of Science & Technology	46 (14.94%)
University for Development Studies	43 (13.95%)
Total	**308 (100%)**

Table 2

Frequencies and Percentages of Types of Sports (N = 308)

Sports	***N* (%)**
Football	66 (21.40%)
Volleyball	38 (12.30%)
Hockey	16 (5.20%)
Basketball	15 (4.90%)
Tennis	11 (3.60%)
Table Tennis	10 (3.20%)
Cross Country	39 (12.70%)
Athletics (Track and Field)	102 (33.10%)
Pickleball	6 (1.90%)
Weightlifting	1 (0.30%)
Other	4 (1.30%)
Total	**308 (100%)**

Each participant completed a questionnaire divided into four sections. The coaching leadership style was examined using the scale developed by Chelladurai and Saleh (1980), which includes six items: three measuring democratic leadership (e.g., “Let his/her athletes share in decision-making”) and three items measuring autocratic leadership (e.g., “Works relatively independent of the athletes”). To assess coaching competency, participants rated twelve items across four variables (i.e., motivation, game strategy, technique, and character-building competency) based on Myers et al. (2006). Example items include: “My coach helps athletes maintain confidence in themselves” (motivation competency), “My coach understands competitive strategies” (game strategy competency), “My coach demonstrates the skills of his/her sport” (technique competency), and “My coach instills an attitude of good moral character” (character-building competency). All items were rated on a 7-point Likert scale (1=strongly disagree to 7=strongly agree). Finally, participants provided demographic information, including their sport, level of competition, gender, and place of residence.

After receiving Institutional Review Board approval at Southeast Missouri State University, data were collected from 308 athletes participating in collegiate sports in Ghana in 2024, including 185 males (60%) and 123 females (40%). Hierarchical regressions using the Statistical Package for the Social Sciences were conducted to examine the effect of coaching competency on democratic and autocratic leadership. The study employed a four-stage hierarchical approach, adding predictors in this order: motivation competency, game strategy competency, technique competency, and character-building competency.

Results

Before evaluating reliability and validity, data screening and assumption tests were conducted. First, normality was tested using absolute skewness and kurtosis scores. The absolute skewness values ranged from .30 (Autocratic) to 1.33 (Motivation), and the absolute kurtosis values ranged from .08 (Democratic) to 1.16 (Motivation). Therefore, the normality requirements based on criterion by Kline (2011) were satisfied. Second, multicollinearity was assessed. There was no evidence of problematic multicollinearity, as the variance inflation factor ranged from 2.09 (Motivation) to 2.56 (Game strategy), and tolerance ranged from .39 (Game strategy) to .48 (Motivation). The reliability results showed that all scales ranging from .75 – .86 were greater than the minimum criteria of Cronbach's alpha level of .70 (Hair et al., 2010).

A four-step hierarchical regression was conducted to test whether coaching competencies predict democratic leadership. First, the analysis entered motivation competency as a predictor. The model significantly predicted democratic leadership (R^2 = .32, Adj. R^2 = .32, F (1,306) = 146.83, p <.001). Motivation competency emerged as a highly significant predictor (β = .57, p <.001). Next, game strategy competency was added to the model. The model continued to predict significant democratic leadership (R^2 = .41, Adj. R^2 = .41, F (1,305) = 43.44, p <.001). Game strategy competency remained a robust predictor (β = .39, p <.001). In the third step, the technique competency was added to the model. The model continued to predict significantly democratic leadership (R^2 = .42, Adj. R^2 = .41, F (1,304) = 4.05, p <.05). Technique competency remained a modest predictor (β = .13, p <.05). In the last step, character-building competency was added. However, this step did not account for additional variance in democratic leadership (R^2 = .42, Adj. R^2 = .41, F (1,303) = .11, p = .74). Character-building competency was not a robust predictor (β = .02, p = .74). Table 3 shows the results.

Table 3

Results of Hierarchical Regression Predicting Democratic Leadership

Predictor	β	R^2	Adj. R^2	ΔR^2	F for ΔR^2	p
Step 1						
Motivation Competency	.57***	.32	.32	–	146.83	<.001
Step 2						
Motivation Competency	–					

Game Strategy Competency	.39***	.41	.41	.09***	43.44	<.001
Step 3						
Technique Competency	.13*	.42	.41	.01*	4.05	.045
Step 4						
Character-Building Competency	.02	.42	.41	.00	.11	.74

Note. p <.05*; p <.01**; p <.001***.
β = standardized regression coefficient. ΔR^2 = R^2 change from the previous step.

A hierarchical regression was also assessed to examine significant predictors of autocratic leadership. First, game strategy competency significantly predicted autocratic leadership (R^2 = .07, Adj. R^2 = .07, F (1,305) = 4.69, p <.05). Game strategy competency remained a modest predictor (β = .57, p <.001). Next, motivation competency was added to the model, and the model continued to significantly predict autocratic leadership (R^2 = .06, Adj. R^2 = .06, F (1,306) = 19.33, p <.001). Motivation competency emerged as a highly significant predictor (β = .24, p <.001). However, technique Competency (R^2 = .08, Adj. R^2 = .07, F (1,304) = .90, p = .34) and character-building competency (R^2 = .08, Adj. R^2 = .07, F (1,303) = .51, p = .48) failed to predict autocratic leadership. Table 4 shows the results.

Table 4

Results of Hierarchical Regression Predicting Autocratic Leadership

Predictor	β	R^2	Adj. R^2	ΔR^2	F for ΔR^2	p
Step 1						
Game Strategy Competency	.57***	.07	.07	–	4.69	.031
Step 2						
Motivation Competency	.24***	.06	.06	-.01	19.33	<.001
Step 3						
Technique Competency	–	.08	.07	.02	.90	.34
Step 4						
Character-Building Competency	–	.08	.07	.00	.51	.48

Note. p < .05*; p < .01**; p < .001***.
β = standardized regression coefficient. ΔR^2 = R^2 change from the previous step.

Discussion

This study explored how coaching competencies—such as game strategy, motivation, technique, and character-building skills—relate to democratic and autocratic leadership styles among Ghanaian collegiate athletes. It is hypothesized that these four coaching dimensions are positively linked to both leadership styles. Using hierarchical regression analyses, the hypotheses were supported. Results indicated that motivation and game strategy are essential factors for both leadership styles. These findings support the hypotheses.

The study adds to the literature on coaching competency and leadership, highlighting that motivation and game strategy are key elements for both democratic and autocratic leadership among Ghanaian collegiate athletes. Based on the findings, coaches' motivation and game strategy skills seem to be important signals for athletes when assessing their coaches, regardless of leadership style. The results also suggest that athletes regard motivation and game strategy as important factors influencing their perception of their coaches' leadership. Additionally, the findings extend the work of Myers et al. (2011), confirming a positive relationship between coaches' motivation competency and athlete satisfaction. Kao et al. (2017) examined four coaching competencies—motivation, game strategy, technique, and character-building—and found that athletes' trust significantly influenced motivation and game strategy in their coaches.

While technique competency was crucial for democratic leadership, it was not for autocratic leadership. Technique competency assessed the coach's ability to develop or demonstrate skills, such as 'My coach demonstrates the skills of his/her sport,' 'My coach coaches individual athletes on technique,' and 'My coach develops athletes' abilities.' This study shows that coaches' ability to develop or demonstrate individual athletes' skills is more closely related to democratic leadership, as democratic leaders are more likely to listen to athletes' opinions and provide clear, specific guidance and instructions. Conversely, technique competency was not associated with autocratic leadership, which generally does not explain its actions and refuses to compromise on issues. Thus, these findings support the hypotheses.

Interestingly, this study found that character-building competency is not a significant factor for either leadership style. The results suggest that while coaches may emphasize traits like fair play, good morals, sportsmanship, and respect for others, athletes do not view character-building as a key factor in how they exercise leadership. This finding contrasts with previous studies showing that athletes' moral behaviors are a primary element of effective coaching (Becker & Wrisberg, 2008). The difference could be because Ghanaian athletes might see character-building competency as a basic quality of their coaches rather than a distinctive trait of specific leadership styles. Another possibility is that athletes may prioritize involvement in communication and decision-making during practice and competition over ethical or moral instruction. Further research is needed to explore the relationship between character-building competency and leadership style, along with contextual factors such as sport type, level of competition, or age and gender groups.

This study offers practical insights. First, it sheds light on coaching education by analyzing how four coaching competencies influence leadership. When coaches show strong motivation or game strategy skills, they are more likely to effectively use democratic and autocratic leadership styles. Coaches should work on their ability to adapt motivational leadership and strategic decision-making to meet athletes' leadership needs. While technique competency was directly linked to democratic leadership, it did not influence autocratic leadership. Using various communication and decision-making methods can improve coaching competency, a crucial part of leadership. Interestingly, collegiate athletes did not view character-building as a vital component of their coach's leadership. Therefore, coaching education programs, such as those in college athletic departments, can use these findings to shape professional

leadership development efforts, which will enhance key competencies and foster effective coaching leadership. This study provides practical implications based on the results of this study. Coaching rules and leadership development programs for Ghanaian university sport should focus on the principles of democratic leadership as it relates to coaching competencies that result in athlete engagement and high athletic performance. In addition, motivation and game strategy competencies should be integral parts of university athletic programs as they predict effective leadership traits in coaches.

References

Bandura, A. (1999). Social cognitive theory of personality. In L. A. Pervin & O. P. John (Eds.), *The Coherence of Personality: Social-cognitive Bases of Consistency, Variability, and Organization* (pp. 185-241). Guilford Press.

Becker, A. J., & Wrisberg, C. A. (2008). Effective coaching in action: Observations of legendary collegiate basketball coach Pat Summitt. *The Sport Psychologist, 22*(2), 197-211. https://doi.org/10.1123/tsp.22.2.197

Bosselut, G., Heuzé, J. P., Eys, M. A., Fontayne, P., & Sarrazin, P. (2012). Athletes' perceptions of role ambiguity and coaching competency in sport teams: A multilevel analysis. *Journal of Sport and Exercise Psychology, 34*(3), 345-364. https://doi.org/10.1123/jsep.34.3.345

Castillo, D. B., & Espinosa, A. A. (2014). Autocratic and participative coaching styles and their effects on students' dance performance. *International Journal of Learning, Teaching and Educational Research, 3*, 32–44. https://www.ijlter.org/index.php/ijlter/article/view/21/0

Chelladurai, P., & Saleh, S. D. (1980). Dimensions of leader behavior in sports: Development of a leadership scale. *Journal of Sport Psychology, 2*(1), 34–45. https://doi.org/10.1123/jsp.2.1.34

Chukwusa, J. (2018). Autocratic leadership style: Obstacle to success in academic libraries. *Library Philosophy and Practice.*

Coussens, A. H., Rees, T., & Freeman, P. (2015). Applying generalizability theory to examine the antecedents of perceived coach support. *Journal of Sport and Exercise Psychology, 37*(1), 51–62. https://psycnet.apa.org/doi/10.1123/jsep.2014-0087

Cruz, A. B., & Kim, H. (2017). Leadership preferences of adolescent players in sport: Influence of coach gender. *Journal of Sports Science and Medicine, 16*(2), 172–179.

Farh, J. L., & Cheng, B. S. (2000). A cultural analysis of paternalistic leadership in Chinese organizations. In J. T. Li, A. S. Tsui, & E. Weldon (Eds.), *Management and Organizations in the Chinese Context* (pp. 84–127). Palgrave Macmillan.

Feltz, D. L., Chase, M. A., Moritz, S. E., & Sullivan, P. J. (1999). A conceptual model of coaching efficacy: Preliminary investigation and instrument development. *Journal of Educational Psychology, 91*(4), 765–776. https://psycnet.apa.org/doi/10.1037/0022-0663.91.4.765

Foels, R., Driskell, J. E., Mullen, B., & Salas, E. (2000). The effects of democratic leadership on group member satisfaction: An integration. *Small Group Research, 31*(6), 676–701. https://doi.org/10.1177/104649640003100603

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis* (7th ed.). Prentice-Hall.

Horn, T. S. (2002). Coaching effectiveness in the sport domain. In T. S. Horn (Ed.), *Advances in Sport Psychology* (3rd ed., pp. 239–267). Human Kinetics.

Hoyle, J. R. (2012). Leadership styles. In *Encyclopedia of Educational Leadership and Administration.* SAGE Publications.

Jin, H., Kim, S., Love, A., Jin, Y., & Zhao, J. (2022). Effects of leadership style on coach-athlete relationship, athletes' motivations, and athlete satisfaction. *Frontiers in Psychology, 13*, 1012953. https://doi.org/10.3389/fpsyg.2022.1012953

Jowett, S. (2017). Coaching effectiveness: The coach–athlete relationship at its heart. *Current Opinion in Psychology, 16*, 154–158. https://doi.org/10.1016/j.copsyc.2017.05.006

Jowett, S., & Chaundy, V. (2004). An investigation into the impact of coach leadership and coach-athlete relationship on group cohesion. *Group Dynamics: Theory, Research, and Practice, 8*(4), 302–311. https://doi.org/10.1037/1089-2699.8.4.302

Kao, S. F., & Tsai, C. Y. (2016). Transformational leadership and athlete satisfaction: The mediating role of coaching competency. *Journal of Applied Sport Psychology, 28*(4), 469–482. https://doi.org/10.1080/10413200.2016.1187685

Kao, S. F., Hsieh, M. H., & Lee, P. L. (2017). Coaching competency and trust in coach in sport teams. *International Journal of Sports Science & Coaching, 12*(3), 319–327. https://doi.org/10.1177/1747954117710508

Kao, S. F., Tsai, C. Y., & Schinke, R. (2021). Investigation of the interaction between coach transformational leadership and coaching competency change over time. *International Journal of Sports Science & Coaching, 16*(1), 44–53. https://doi.org/10.1177/1747954120953946

Kim, S., Park, S., Love, A., & Pang, T. C. (2021). Coaching style, sport enjoyment, and intent to continue participation among artistic swimmers. *International Journal of Sports Science & Coaching, 16*(3), 477–489. https://doi.org/10.1177/1747954120984054

Kline, R. B. (2011). Convergence of structural equation modeling and multilevel modeling. In M. Williams & W. P. Vogt (Eds.), *The SAGE Handbook of Innovation in Social Research Methods* (pp. 562-589). SAGE Publications.

Lara-Bercial, S., Bales, J., North, J., Petrovic, L., & Calvo, G. (2022). International Council for Coaching Excellence position statement: Professionalisation of sport coaching as a global process of continuous improvement. *International Sport Coaching Journal, 9*(2), 157–160. https://doi.org/10.1123/iscj.2021-0097

Malete, L., Chow, G. M., & Feltz, D. L. (2013). Influence of coaching efficacy and coaching competency on athlete-level moral variables in Botswana youth soccer. *Journal of Applied Social Psychology, 43*(10), 2107–2119. https://doi.org/10.1111/jasp.12164

Mallett, C. J. (2005). Self-determination theory: A case study of evidence-based coaching. *The Sport Psychologist, 19*(4), 417–429. https://doi.org/10.1123/tsp.19.4.417

Myers, N. D., Beauchamp, M. R., & Chase, M. A. (2011). Coaching competency and satisfaction with the coach: A multilevel structural equation model. *Journal of Sports Sciences, 29*(4), 411–422. https://psycnet.apa.org/doi/10.1080/02640414.2010.538710

Myers, N. D., Feltz, D. L., Maier, K. S., Wolfe, E. W., & Reckase, M. D. (2006). Athletes' evaluations of their head coach's coaching competency. *Research Quarterly for Exercise and Sport, 77*(1), 111–121. https://doi.org/10.1080/02701367.2006.10599337

Price, M. S., & Weiss, M. R. (2000). Relationships among coach burnout, coach behaviors, and athletes' psychological responses. *The Sport Psychologist, 14*(4), 391–409. https://doi.org/10.1123/tsp.14.4.391

Smoll, F. L., & Smith, R. E. (1989). Leader behaviors in sport: A theoretical model and research paradigm. *Journal of Applied Social Psychology, 19*(18), 1522–1551. https://psycnet.apa.org/doi/10.1111/j.1559-1816.1989.tb01462.x

University of Education, Winneba. (2025, January 23). *UEW GUSA Games team presents prizes to management.* University of Education, Winneba. https://uew.edu.gh/news/uew-gusa-games-team-presents-prizes-management

University of Ghana. (2024). *University of Ghana sports policy, guidelines for organising and managing inter-halls, and policy on the admission of athlete students (UG-PAAS).* University of Ghana. https://www.ug.edu.gh/pad/sites/pad/files/2024-11/UG%20Sports%20Policy%2C%20Guidelines%20for%20Organising%20and%20Managing%20Inter-Halls%2C%20UG-PAAS.pdf

Weiss, M. R., & Friedrichs, W. D. (1986). The influence of leader behaviors, coach attributes, and institutional variables on performance and satisfaction of collegiate basketball teams. *Journal of Sport and Exercise Psychology, 8*(4), 332–346. https://doi.org/10.1123/jsp.8.4.332

Yang, S. X., & Jowett, S. (2010). An examination of the psychometric properties of the Chinese coach-athlete relationship questionnaire (CART-Q). *International Journal of Coaching Science, 4*, 73–89.

Segmenting Major League Baseball Teams by Attendance: A Multilevel Analysis of Determinants Across Clusters

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Abstract

The study examines determinants of game-day attendance in Major League Baseball (MLB) by classifying teams based on their seasonal average attendance and analyzing how established predictors operate within each attendance segment. Using data from all 30 MLB teams across the 2006–2017 regular seasons (*N*=29,056), the analysis proceeded in two stages. First, using cluster analysis, the study identified four attendance-based groups that reflected distinct market and performance profiles. Second, three-level hierarchical linear modeling (HLM) evaluated the effects of economic, demographic, game-attractiveness, and residual-preference factors on single-game attendance within each group. Results revealed meaningful differences across clusters. High-attendance teams were less sensitive to opponent characteristics and more influenced by structural factors such as stadium capacity and home team performance. Lower-attendance teams showed stronger responses to visiting team quality, star players, game uncertainty, and local market conditions. Group-specific patterns also emerged for rivalry games, weekend scheduling, and seasonal progression. Findings demonstrate the value of segmenting MLB teams according to historical attendance patterns and highlight the utility of multilevel modeling for analyzing sport consumption. Results provide practical implications for MLB organizations seeking to tailor marketing strategies, improve scheduling decisions, and enhance fan engagement across diverse market environments.

Keywords: Major League Baseball, sport attendance, cluster analysis, hierarchical linear modeling, market demand

Introduction

Since the 2017 regular season of Major League Baseball (MLB), fans have witnessed markedly different game-day environments. For instance, the familiar ritual of a pitcher throwing four intentional balls to issue a walk was replaced with a manager's signal and an automatic walk to first base. This rule change was part of a broader pace-of-play initiative that also included limiting mound visits, shortening between-inning breaks, and imposing a 30-second decision limit on replay reviews (Posnanski, 2017; McCallister, 2018). Additional adjustments continued in the following years. By the 2024 season, MLB reduced the pitch clock from 20 to 18 seconds with runners on base and expanded the runner's lane to first base (Castrovince, 2023). Ahead of the 2025 season, the league strengthened penalties for infield shift violations and expanded replay capabilities to include abandonment of second or third base (Randhawa, 2025).

MLB Commissioner Rob Manfred explained that these rule adjustments were intended to counter the trend of increasingly longer games, a pattern many analysts have associated with declining attendance. Recent data support this concern. In 2023, the average duration of a nine-inning game fell to just under 2 hours and 40 minutes, which represented the fastest pace recorded in nearly forty years. In the same season, total regular-season attendance rose to 70,747,365, the first time since 2017 that league-wide attendance exceeded 70 million (Adler, 2023). These outcomes contrast with the 2022 season, when league-wide attendance totaled approximately 64.6 million, a figure that remained below the 68.5 million recorded in the last full pre-pandemic season in 2019 (Associated Press, 2022, October 6).

Game duration has demonstrated a meaningful association with spectator demand. Data from the 2004 to 2018 MLB seasons showed a negative correlation ($r = -.57$, $p < .05$) between average game time and next-season attendance, indicating that each additional minute of game time was associated with a decline of approximately 94 spectators per game. Although league-wide patterns provide useful context, they can obscure important differences across individual teams, which operate under varying market, performance, and promotional conditions.

To address this variation, the present study adopts a two-part approach. First, it uses cluster analysis to group MLB teams based on their seasonal average attendance. Second, it applies multilevel modelling to examine how established attendance determinants, including team performance, market characteristics, and opponent attractiveness, influence attendance within each group (DeSchriver & Jensen, 2002; Rivers & DeSchriver, 2002).

Determinants of Sport Attendance

Attendance has long been recognized as a foundational element of sport consumption, and despite the growing financial importance of sponsorship and media, spectator demand remains essential to the sustainability of sport organizations. Early studies examined a wide range of factors influencing attendance (e.g., Baade & Tiehen, 1990). Two widely cited frameworks classify these determinants. Schofield (1983) proposed four categories: economic factors, demographic factors, attractiveness factors, and residual preference factors. Borland and Macdonald (2003) later introduced a similar framework that emphasized viewing quality in addition to consumer preference, economic conditions, contest characteristics, and venue capacity.

Attractiveness refers to game and team characteristics that motivate fans to attend. Indicators such as team performance, star players, playoff contention, and historical success consistently show positive relationships with attendance (Rivers & DeSchriver, 2002; Welki & Zlatoper, 1994). Visiting team quality also plays a significant role, with higher attendance when nationally popular or rival teams appear (Lemke

et al., 2010). Promotions and special events provide an additional boost to demand and are controllable tools for sport marketers.

Residual preference factors encompass external elements, including weather and game-day scheduling (weekday vs. weekend), start time, and stadium comfort (Hansen & Gauthier, 1989). Several studies have shown that extreme temperatures, rain, and weekday scheduling reduce attendance (Welki & Zlatoper, 1994; Lemke et al., 2010). Stadium age and capacity influence spectator experience as well, with newer or less crowded venues typically attracting more attendees (McEvoy et al., 2005).

Economic and demographic variables influence the size of the potential market for live sport consumption. Income levels and metropolitan population are consistently identified as significant predictors of attendance (McEvoy et al., 2005; Coates & Humphreys, 2007). Although ticket price is expected to have a direct negative effect on demand, measuring this effect is challenging due to fan loyalty, dynamic pricing systems, and secondary market transactions (Ahn & Lee, 2007; Fort, 2004).

Drawing from these established determinants, the present study classifies all 30 MLB teams into groups according to their seasonal average attendance through cluster analysis. It then examines the extent to which economic, demographic, attractiveness, and residual preference factors influence single game attendance for each group using multilevel modelling. This allows for an understanding of how determinants differ across distinct segments of the league.

Research Questions

Based upon the previous literature, the following research questions guide this study:

RQ 1-1: Into how many groups should the 30 MLB teams be classified based on their seasonal average attendance?

RQ 1-2: Which MLB teams belong to each group?

RQ 2-1: What economic, demographic, attractiveness, and residual preference factors significantly influence single game attendance in each group from the 2006 to 2017 MLB regular seasons?

RQ 2-2: How do these significant determinants differ across the groups?

Methodology

Data

The data set included all regular season games played by the 30 MLB teams from 2006 through 2017. Seasonal average attendance for all teams (N_1=360; “MLB Attendance Report”, 2017) was collected from ESPN to classify clubs into attendance-based groups (RQ1). Single game attendance (N_2=29,056; “Arizona Diamondbacks”, 2017) served as the dependent variable for examining determinants of demand within each group identified through cluster analysis (RQ2). Independent variables reflected four major categories identified in prior literature: *attractiveness*, *residual preference*, *economic*, and *demographic factors*. These variables included team performance indicators, payroll, rivalry status, game uncertainty, stadium characteristics, ticket prices, income levels, and metropolitan population. Game-level and season-level variables were coded accordingly, and continuous predictors were centered at either the group mean or the grand mean to facilitate interpretation.

Team quality and game uncertainty were calculated following the methods of Tainsky and McEvoy (2012). Stadium age, capacity, ticket prices, household income, and metropolitan population were

rescaled to improve model estimation. A complete description of all variables and coding procedures is provided in Table 1 and in the Appendix B.

After the data were collected, several variables required rescaling to facilitate interpretation and model convergence. The final rankings of the home and visiting teams were reverse coded so that higher values indicated better performance. Large-unit variables such as payroll, stadium capacity, household income, and metropolitan population were divided by one thousand. All continuous predictors, except for binary indicators such as rivalry and weekend games, were centered to improve interpretability and model estimation. Game-level variables were centered at their group means, and season-level variables were centered at the grand mean.

Data Analysis

Cluster analysis. A hierarchical cluster analysis was conducted to classify the 30 MLB teams based on their seasonal average attendance across twelve seasons. Similarity among teams was assessed using Euclidean distance, following standard procedures in cluster analysis (Afifi et al., 2003). A dendrogram was used to identify a reasonable number of attendance groups, and analysis of variance was performed to confirm that the resulting groups differed significantly in their average attendance.

Hierarchical linear modeling (HLM). Attendance data in professional sports or recurring sporting events have hierarchical characteristics. In the case of MLB data analyzed in this study, the variance in attendance is influenced by differences across individual games, seasons, and teams. Because hierarchical linear modeling (HLM), also known as multilevel modeling (MLM), is more effective than general linear modeling (GLM) for analyzing multilevel data (Lim & Pedersen, 2022), this study used HLM to examine the relationship between actual attendance and the attendance determinants for each group identified by the cluster analysis. The null model for each group was estimated first to determine the need for HLM by assessing variance components at each level. The full three level HLM for each group was then constructed with twelve game-level variables and thirteen season-level variables. The full model was expressed as:

$$Att_{gijk} = \gamma_{g000} + \gamma_{gn00}X_{gijk} + \gamma_{g0m0}Y_{g\cdot jk} + R_{gijk} + U_{g0jk} + V_{gook}$$

(Where *n*=1, …, 12 and *m*=1, …, 13)

Where, *g*: groups that decided by cluster analysis

X_{gijk}: the twelve game-level independent variables

$Y_{g\cdot jk}$: the thirteen season-level independent variables

σ^2: variance within season (R_{gijk})
τ_0^2: variance between seasons (U_{g0jk})
φ_0^2: variance between teams (V_{gook})

These HLM models were evaluated to ensure that key assumptions were satisfied, including the normality of residuals and the normality of season-level residuals for random coefficients. All statistical analyses in this study were conducted using SAS 9.4.

Results

Cluster Analysis

The mean seasonal average attendance for the 30 MLB teams from the 2006 to 2017 regular seasons was 30,831 (N_1 = 360, *SD* = 8,136). The hierarchical cluster analysis indicated that dividing the teams into four groups provided a reasonable and interpretable structure. The resulting group assignments are presented in Table 2. Although the Philadelphia Phillies recorded a higher twelve-year average attendance than the New York Mets, they were classified into Group 2 due to substantial variation across seasons, including attendance levels below 25,000 in the most recent three years of the dataset. The Toronto Blue Jays exhibited a similar pattern of fluctuation and were therefore grouped in the same category. The results of cluster analysis are provided in Table 2 and in the Appendix B.

A one-way analysis of variance demonstrated that the four groups differed significantly in seasonal average attendance (F = 242.3, p <.001), confirming the appropriateness of the cluster solution. One-way ANOVA tests conducted on the season-level variables, such as team payroll, household income, and metropolitan population, indicated violations of the homogeneity of variance assumption suggesting the variance within each group for these independent variables differed across groups. Although the mean values for some season-level variables appeared to differ across groups, these differences could not be confirmed through statistical testing.

Hierarchical Linear Modeling

Based on the results of the cluster analysis, hierarchical linear modeling was conducted separately for each group to examine the extent to which attendance determinants predicted single game attendance. Descriptive statistics for all variables across the full sample and within each group are presented in Table 3. Because ESPN does not report attendance for the first game of doubleheaders, ninety-nine games were missing from the dataset. In addition, the game between the Baltimore Orioles and the Chicago White Sox on April 29, 2015, which was held without spectators, was excluded. The number of missing games for Groups 1 through 4 was 20, 21, 40, and 19 respectively. The results of descriptive statistics are provided in Table 3 and in the Appendix B.

A three-level null model was estimated for each group following centering and rescaling procedures. Intraclass correlations were calculated to determine the proportion of variance attributable to differences between teams and seasons. As shown in Table 4, variation in Group 1 attendance was distributed across teams (25.2%), seasons (38.5%), and games within seasons (36.2%). In contrast, the proportion of variance between teams in Groups 2, 3, and 4 was relatively small, ranging from 1.2 to 2.8 percent. These groups showed substantially greater variation at the game-level within seasons (Group 2: 65.2%, Group 3: 75.1%, Group 4: 79.8%). Excluding Group 4, which comprised only four teams, these results indicate that single game attendance did not differ meaningfully across teams in Groups 2 and 3. The results of variance and intraclass correlations by level are provided in Table 4 and in the Appendix B.

Given the limited variance at the team level for Groups 2, 3, and 4, Group 1 was estimated with a full three-level model, while the other groups were estimated with simplified three-level models that did not include random team effects. Results of the full models for all groups are displayed in Table 5.

For Group 1, seven game-level variables (i.e., *HTQ*, *VTQ*, *VT_Payroll*, *Rival*, *Weekend*, *Progress*, and $Progress^2$ [p <.001]) and five season-level variables (i.e., *HT_Payroll*, *Capacity*, *Season* [p <.001], *ProTeams*, and $Season^2$ [p <.05]) were significant predictors of single game attendance. Overall, effect sizes were modest relative to the other groups. The influence of the visiting team was limited, as variables such as final rank, team age, star players, and championships were not significant. Although Group 1

attendance generally declined over time ($\gamma_{1\cdot0\cdot12\cdot0}$ = -1099, *p* <.001), the magnitude of decline was smaller compared with Group 3.

Group 2 was the group most strongly influenced by the performance and popularity of the home team Home team quality ($\gamma_{2\cdot1\cdot0\cdot0}$ = 45563, *p* <.001), payroll ($\gamma_{2\cdot0\cdot1\cdot0}$ = 1.87, *p* <.001), and number of star players ($\gamma_{2\cdot0\cdot3\cdot0}$ = 615.83, *p* <.05) were all significant predictors, and several characteristics of the visiting team also influenced attendance, including payroll, championships (*p <.001*), star players, and team age (*p <.05)*. Group 2 was the most sensitive to stadium age ($\gamma_{2\cdot0\cdot6\cdot0}$ = -304.67, *p* <.05) and the presence of other professional teams in the metropolitan area ($\gamma_{2\cdot0\cdot10\cdot0}$ = -1980, *p* <.05). Unlike the overall league trend of declining attendance, Group 2 attendance increased steadily over the twelve-year period ($\gamma_{2\cdot0\cdot12\cdot0}$ = 1128, *p* <.05).

For Group 3, where the average home team winning percentage was relatively low, attendance was heavily influenced by characteristics of the visiting team. Visiting team quality, payroll, previous season final rank, team age, and championships all had positive effects on attendance (*VTQ* [$\gamma_{3\cdot2\cdot0\cdot0}$ = 3664, *p* <.05]; *VT_Payroll* [$\gamma_{3\cdot4\cdot0\cdot0}$= 0.74, *p* <.001]; *VT_FinalRank* [$\gamma_{3\cdot5\cdot0\cdot0}$ = 198.96, *p* <.001]; *VT_Age* [$\gamma_{3\cdot7\cdot0\cdot0}$ = 11.20, *p* <.001]; *VT_Champs* [$\gamma_{3\cdot8\cdot0\cdot0}$ = 129.54, *p* <.001]). The positive effect of the game uncertainty measure ($\gamma_{3\cdot3\cdot0\cdot0}$ = 2670, *p* <.05) further suggests that fans in this group showed heightened interest in matchups involving stronger or more competitive opponents. In contrast to Groups 2 and 4, the presence of star players on the home team did not significantly affect attendance (*p* >.05). Group 3 also experienced the steepest decline in attendance as the season progressed ($\gamma_{3\cdot0\cdot12\cdot0}$ = -1281, *p* <.001).

Although Group 4 had a higher average winning percentage (49.3%) over the 12 seasons compared to Group 3 (47.8%), its average attendance was approximately 6,500 lower. The effects of home team quality ($\gamma_{4\cdot1\cdot0\cdot0}$ = 34604, *p* <.001) and payroll ($\gamma_{4\cdot0\cdot1\cdot0}$ = 1.57, *p* <.001) were smaller in magnitude than in Group 3. Instead, Group 4 showed the strongest response to the presence of star players on the home team ($\gamma_{4\cdot0\cdot3\cdot0}$ = 756.12, *p* <.001). Attendance was also influenced by the strength of the visiting team, including payroll ($\gamma_{4\cdot4\cdot0\cdot0}$ = .78, *p* <.001), star players ($\gamma_{4\cdot6\cdot0\cdot0}$= 221.03, *p* <.05), and championships ($\gamma_{4\cdot7\cdot0\cdot0}$ = 194.04, *p* <.001), as well as by metropolitan income ($\gamma_{4\cdot9\cdot0\cdot0}$ = 301.44, *p* <.001) and population ($\gamma_{4\cdot10\cdot0\cdot0}$ = 16.09, *p* <.05).

R-squared values for the full models indicated that attendance in Group 1 was explained most effectively by the predictors included in the model, with an explained variance of 60.2%. Group 4 showed the lowest explained variance at 41.6%, suggesting that additional variables may be needed to fully account for variation in attendance for this group. The results of full models for each group are provided in Table 5 and in the Appendix B. The next section discusses the implications of these findings for team level and league level marketing strategies.

Discussion

Group-Based Attendance Patterns

The primary aim of this study was to classify MLB teams according to their seasonal average attendance and to examine how established attendance determinants function across these attendance segments. The hierarchical cluster analysis identified four distinct groups that reflected meaningful variation in attendance patterns. Teams with long-standing national reputations, such as the New York Yankees, Los Angeles Dodgers, and St. Louis Cardinals, appeared in the group with the highest average attendance. In contrast, organizations that have consistently faced attendance challenges, including the Tampa Bay Rays, Oakland Athletics, and Miami Marlins, were placed in the group with the lowest average

attendance. Analysis of variance confirmed that the four groups were statistically different from one another, supporting the validity of this segmentation approach.

Using this framework, the study applied well-established attendance determinants across economic, demographic, game attractiveness, and residual preference categories (Baade & Tiehen, 1990; Lemke et al., 2010). Given the multilevel structure of MLB attendance data, hierarchical linear modeling provided an appropriate analytical strategy for estimating the influence of these determinants at both the game and season-levels. The null model results confirmed that attendance variation occurred across games, seasons, and teams, validating the use of a multilevel approach. The full models identified significant predictors within each group and revealed that the determinants operated differently depending on each team's attendance profile. These findings provide a structured basis for understanding group-specific attendance dynamics and offer practical direction for differentiated attendance strategies.

Market Demand and Consumer Behavior in Professional Sports

In the past decade, there has been a decline in consumer interest in professional sports, while competition in the sport marketplace has increased. Retaining consumers has become the biggest challenge for the sports industry. To overcome competition, it is essential for marketers to understand market demand, which is related to consumer expectations of the core product's attributes. Market demand is a set of pull factors that an organization can offer to new and returning consumers. Analyzing market demand provides insight into consumer expectations and enables the formulation of an effective marketing mix. This leads to strategic decisions that enhance the success of the business, ultimately satisfying consumer needs and increasing market demands.

Previous studies (e.g., DeSchriver & Jensen, 2002; Rivers & DeSchriver, 2002) have examined market demand primarily in professional and intercollegiate sports. These studies found that game attractiveness, economic consideration, and schedule convenience were essential factors for consumers' decision-making. Game attractiveness was explained by several factors, including individual skills, star players, team records, and stadium quality. Economic consideration included factors such as ticket prices, marketing promotions, substitute forms of entertainment, and competition from other sporting events. Schedule convenience was explained by game time, day of the week, and weather. These factors explained a meaningful portion of the variance in professional sport consumption. The identified market demand variables can be applied to different professional sports.

MLB Attendance Trends

It is worth noting that even before the COVID-19 pandemic in 2020, there had been a gradual decline in MLB attendance over the past several years. Factors such as the rising cost of attending games, the availability of other entertainment options, and changes in viewing habits have all contributed to this trend. Moreover, MLB teams played in empty stadiums or with limited attendance due to health and safety protocols caused by the COVID-19 pandemic in 2020. However, in the 2021 season, some teams were able to have fans back in their venues, though the capacity varied by location and was subject to change depending on local health guidelines.

According to a report published in Forbes (Brown, 2022), MLB attendance for the 2022 season was down nearly 6% from the 2019 season, which was the last full season before the COVID-19 pandemic. Indeed, Forbes indicates that the average attendance per game for the 2022 season was 26,775, compared to 28,044 in 2019. The decline in attendance was not unexpected, given the ongoing impact of the pandemic on live events and public gatherings at the time. There were a variety of factors contributed to the decline in attendance, including but not limited to the rising cost of attending games, changes in viewing habits, and the performance of individual teams. Thus, the analysis of declining MLB attendance is a critical

ongoing concern for MLB and the sport industry as understanding the factors that contribute to attendance trends can help teams and leagues make informed decisions about marketing, pricing, and other strategic initiatives.

The study by Zhang et al. (2003) discovered that the market demand factors have the ability to forecast the consumption of live and televised professional sporting events. These results are consistent with previous research conducted by numerous scholars (e.g., Baade & Tiehen, 1990; Becker & Suls, 1983; Hansen & Gauthier, 1989; Whitney, 1988), and highlight the significance of market demand factors, such as game attractiveness, economic considerations, and marketing promotion, in the creation of the marketing mix, including product, price, place, and promotion. By using a 4x3 interactive grid that relates the four marketing mix elements and the three market demand factors, specific marketing strategies can be designed in practice. Different contingency factors that are specific to various sports and competition levels can also be taken into account in different situations. Next, some general marketing implications are briefly discussed.

Implications, Limitations, and Future Research

The group-specific findings in this study offer clear implications for MLB teams seeking to enhance attendance. Recognizing the unique attendance drivers within each group enables organizations to develop more precise strategies related to pricing, scheduling, promotional activities, and brand positioning. For example, teams in lower-attendance clusters may benefit from prioritizing opponent-based attractiveness, while high-attendance teams may focus on strengthening brand equity and enriching in-game experiences. From a theoretical standpoint, the study contributes to the sport management literature by illustrating the value of clustering approaches in segmenting sport markets and by demonstrating the advantages of multilevel modeling for examining attendance determinants.

A key limitation concerns the temporal scope of the dataset, as the analyses rely on pre-pandemic attendance data. COVID-19 pandemic and its aftermath may have altered attendance segments and the salience of key determinants through shifts in live event consumption, media habits, and pricing dynamics. Future research should replicate the analysis with post-pandemic data and compare pre- and post-COVID pandemic to evaluate whether clusters and group-specific effects remain consistent. Additional extensions may incorporate evolving media consumption habits, dynamic and secondary ticket pricing mechanisms, and fan-level psychological motivations. These extensions would provide a more comprehensive understanding of attendance decision-making in today's MLB environment.

Appendix A

Computation of Team Quality and Game Uncertainty

A1. Team Quality Calculation

Team quality for each game was calculated following Tainsky and McEvoy (2012).

The value reflects a weighted combination of the previous season winning percentage and the current season winning percentage prior to game *i*.

$$TQ_{ijk} = \left[Win\%_{\cdot(j-1)k} \times \left(162 - Progress_{(i-1)jk}\right) + \left(Win\%_{ijk} \times Progress_{(i-1)jk}\right)\right]/162$$

Where,

i: i^{th} home game of team *k* in season *j* (*i* ≅ 1, …, 81)

j: season *j* (*j* = 1, …, 12)

k: team *k* (*k* = 1, …, 30)

$Win\%_{\cdot(j-1)k}$: team *k*'s winning percentage in the previous season of season *j*

$Win\%_{ijk}$: team *k*'s winning percentage prior to game *i* in season *j*

$Progress_{ijk}$: team *k's* number of games that have been played in season *j*, including game *i*

A2. Game Uncertainty Calculation

Game uncertainty was computed using the home and visiting team qualities, following the uncertainty measure based on Bill James' approach.

$$Uncertainty_{ijk} = |0.5 - C_{ijk}|$$

$$C_{ijk} = (HTQ_{ijk} - HTQ_{ijk}VTQ_{ijk})/[(HTQ_{ijk} + VTQ_{ijk}) - 2HTQ_{ijk}VTQ_{ijk}]$$

Where,

HTQ_{ijk}: home team quality for game i of team k in season j

VTQ_{ijk}: visiting team quality for the same game

Appendix B

Table 1

Variable Descriptions of MLB Attendance Determinants

Symbol	Description
Dependent Variable	
Att_{ijk}	Team *k*'s attendance of game *i* in the season *j*
(Game-level) Independent Variables	
HTQ_{ijk}	Home team's winning percentage prior to game *i*
VTQ_{ijk}	Visiting team's winning percentage prior to game *i*
$Uncertainty_{ijk}$	Bill James's baseball game uncertainty
$VT\_Payroll_{ijk}$	Total payroll of visiting team
$VT\_FinalRank_{ijk}$	Visiting team's final rank in the season *j*
$VT\_StarPlayers_{ijk}$	Visiting team's number of star players
VT_Age_{ijk}	Visiting team's age
VT_Champs_{ijk}	Visiting team's number of previous Championships
$Rival_{ijk}$	Dummy of local or divisional rivalry games
$Weekend_{ijk}$	Dummy of weekend games (from Friday to Sunday)
$Progress_{ijk}$	Number of games that have been played, including game *i*

$Progress_{ijk}^2$	Quadratic term of *Progress*
(Season-level) Independent Variables	
$HT\_Payroll_{\cdot jk}$	Total payroll of home team *k* in the season *j*
$HT\_FinalRank_{\cdot jk}$	Home team *k*'s final rank in the season *j*
$HT\_StarPlayers_{\cdot jk}$	Home team *k*'s number of star players
$HT\_Age_{\cdot jk}$	Home team *k*'s age
$HT\_Champs_{\cdot jk}$	Home team *k*'s number of previous championships
$STD\_Age_{\cdot jk}$	Arena age of home team *k*
$Capacity_{\cdot jk}$	Arena capacity of home team *k*
$Ticket_{\cdot jk}$	Fan Cost Index of home team *k*
$Income_{\cdot jk}$	Median household income for home city
$ProTeams_{\cdot jk}$	Number of other professional teams in same area
$Population_{\cdot jk}$	Population of home city
$Season_{\cdot jk}$	Season progress of home team k from 2006 season
$Season_{\cdot jk}^2$	Quadratic term of *Season*

Note. *i*: home game *i* (*i*≅1, …, 81); *j*=season *j* (*j*=1, …, 12); *k*: team *k* in MLB (*k*=1, …, 30)

Table 2

Results of Cluster Analysis

Group 1 (n_1=8)		**Group 2** (n_2=7)		**Group 3** (n_3=11)		**Group 4** (n_4=4)	
NY Yankees	(44,956)	Philadelphia	(36,010)	Toronto	(29,890)	Cleveland	(21,960)
LA Dodgers	(44,948)	Detroit	(34,071)	Houston	(29,614)	Oakland	(20,749)
St. Louis	(41,930)	Milwaukee	(33,677)	San Diego	(28,448)	Miami	(19,709)
San Francisco	(39,775)	Colorado	(32,736)	Washington	(28,302)	Tampa Bay	(18,650)
LA Angels	(39,086)	Texas	(32,399)	Arizona	(28,226)		
Chicago Cubs	(37,627)	Minnesota	(30,275)	Seattle	(26,600)		
Boston	(36,728)	Atlanta	(29,890)	Cincinnati	(26,550)		
NY Mets	(35,205)			Baltimore	(26,525)		
				White Sox	(26,129)		
				Pittsburgh	(26,016)		
				Kansas City	(24,695)		
Mean	40,032	Mean	32,723	Mean	26,777	Mean	20,267
SD	3,644	*SD*	2,146	*SD*	1,784	*SD*	1,417

Note. The average of seasonal average attendance during over 12 seasons in parentheses

Table 3

Descriptive Statistics of Overall and each Group

Variables	**Overall** (*N*=29155)		**Group 1** (*N*=7774)		**Group 2** (*N*=6806)		**Group 3** (*N*=10688)		**Group 4** (*N*=3886)	
	Mean	(*SD*)	Mean	(*SD*)	Mean	(*SD*)	Mean	(*SD*)	Mean	(*SD*)
Dependent Variable										
Att	30848	(10376)	40038	(6382)	32736	(8484)	26792	(8788)	20279	(7467)
(Game-level) Independent Variables										
HTQ	0.500	(0.061)	0.531	(0.054)	0.502	(0.057)	0.478	(0.061)	0.493	(0.055)
VTQ	0.500	(0.061)	0.498	(0.060)	0.497	(0.061)	0.503	(0.061)	0.503	(0.062)
Uncertainty	0.072	(0.051)	0.072	(0.050)	0.069	(0.050)	0.075	(0.053)	0.070	(0.049)
VT_Payroll	3619108	(1493494)	3487997	(1460296)	3555978	(1455710)	3677144	(1517856)	3832326	(1525020)
VT_FinalRank	3.00	(1.44)	3.06	(1.44)	3.03	(1.44)	2.96	(1.46)	2.94	(1.41)
VT_StarPlayers	2.00	(1.37)	1.97	(1.34)	1.93	(1.34)	2.03	(1.38)	2.10	(1.43)
VT_Age	80.56	(43.5)	77.86	(45.2)	80.06	(43.56)	83.03	(43.31)	80.01	(39.97)
VT_Champs	3.55	(5.1)	3.27	(4.76)	3.31	(4.49)	3.81	(5.36)	3.82	(5.92)
Rival	0.12	(0.33)	0.17	(0.37)	0.14	(0.35)	0.08	(0.28)	0.12	(0.32)
Weekend	0.48	(0.50)	0.48	(0.50)	0.48	(0.50)	0.48	(0.50)	0.48	(0.50)
(Season-level) Independent Variables										
HT_Payroll	3619142	(1493643)	4928661	(1401240)	3606724	(1251562)	3161349	(1145882)	2280406	(810076)
HT_FinalRank	3.00	(1.44)	2.42	(1.37)	2.84	(1.4)	3.49	(1.37)	3.10	(1.36)

HT_StarPlayers	2.00	(1.37)	2.38	(1.5)	2.23	(1.29)	1.77	(1.26)	1.50	(1.22)
HT_Age	80.56	(43.5)	104.00	(32.71)	85.20	(43.51)	66.51	(40.31)	63.25	(47.42)
HT_Champs	3.55	(5.10)	7.70	(7.78)	1.68	(1.58)	1.83	(1.85)	3.25	(3.42)
STD_Age	22.68	(24.32)	41.34	(37.43)	12.45	(6.20)	15.08	(10.99)	24.13	(14.00)
Capacity	43670	(5288)	45515	(6057)	45490	(3853)	43503	(3918)	37252	(3779)
Ticket	27.14	(9.54)	35.81	(11.71)	24.52	(6.59)	24.28	(6.32)	22.21	(3.58)
Income	47859	(13160)	53832	(13585)	42657	(9639)	50095	(12135)	38873	(12214)
ProTeams	2.70	(1.39)	4.00	(1.73)	2.57	(0.73)	2.00	(0.95)	2.25	(0.43)
Population	1523285	(2042557)	3190825	(3225563)	714617	(354119)	1214125	(883478)	454054	(90001)

Table 4

The results of Variance and Intraclass Correlations by Level

Parameter	**Group 1**		**Group 2**		**Group 3**		**Group 4**	
	Estimate	(ICC)	Estimate	(ICC)	Estimate	(ICC)	Estimate	(ICC)
Within Season (σ^2)	14,773,113	(0.362)	46,939,214	(0.652)	57,969,572	(0.751)	45,738,924	(0.821)
Between Seasons (τ_0^2)	15,748,719	(0.386)	23,066,066	(0.320)	17,904,909	(0.232)	9,314,891	(0.167)
Between Teams (φ_0^2)	10,280,387	(0.252)	1,980,803	(0.028)	1,335,942	(0.017)	679,817	(0.012)
Total	40,802,219		71,986,083		77,210,423		55,733,632	

Table 5

Results of Full Models for each Group

	Group 1 (ML)		**Group 2 (ML)**		**Group 3 (ML)**		**Group 4 (ML)**	
	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error	Estimate	Std. Error
Fixed Effect								
Intercept	** 41301	878	** 25332	1613	** 22906	894	** 18158	895
(Game-level) Independent Variables								
HTQ	** 15821	1768	** 45563	2835	** 34604	2410	** 28228	3000
VTQ	** 4502	1084	2797	1809	* 3664	1451	2964	2304
Uncertainty	1455	988	-1248	1533	* 2670	1311	3532	2020
VT_Payroll	** 0.29	0.04	** 0.60	0.06	** 0.74	0.05	** 0.78	0.09
VT_FinalRank	28.31	38.38	106.45	69.43	** 198.96	54.64	-20.09	88.60
VT_StarPlayers	-38.31	36.37	* 189.43	65.93	75.48	52.29	* 221.03	80.84
VT_Age	0.92	1.04	* 4.04	1.89	** 11.20	1.58	* 7.63	2.63
VT_Champs	0.50	11.04	** 126.31	19.32	** 129.54	14.18	** 194.04	20.98
Rival	** 1203	116	** 991	205	** 2525	233	** 1571	292
Weekend	** 2427	79	** 6210	139	** 7595	116	** 5846	183
Progress	** 51.93	3.44	** 92.82	6.05	** 98.84	5.01	** 43.66	7.90
Progress^2	** -0.28	0.02	** -0.49	0.04	** -0.55	0.03	** -0.20	0.05
(Season-level) Independent Variables								
HT_Payroll	** 1.24	0.25	** 1.87	0.35	** 1.57	0.32	** 1.52	0.20
HT_FinalRank	67.80	168.86	222.70	244.19	245.91	218.43	141.44	122.7
HT_StarPlayers	9.96	153.58	* 615.83	256.24	319.01	250.82	** 756.12	110.81

HT_Age	-14.07	21.73	** -70.49	18.92	* -32.38	16.47	** 106.22	17.54
HT_Champs	67.15	81.81	762.01	543.18	-294.92	378.56	-372.20	227.87
STD_Age	17.10	15.40	** -304.67	67.29	** -160.97	24.84	** -195.86	36.34
Capacity	** 740.29	71.16	* 441.97	136.32	-121.12	77.34	68.45	66.46
Ticket	16.57	38.45	85.85	123.49	-2.33	60.93	* 152.21	75.25
Income	2.59	31.15	76.84	62.17	* -98.63	34.79	** 301.44	41.04
ProTeams	* -1533	594	* -1980	712	* -680	323	** 8084	1409
Population	-0.15	0.25	* 6.00	1.91	0.56	0.36	* 16.09	6.01
Season	** -1099	265	* 1128	472	** -1281	304	193	283
Season^2	* 50.15	19.74	** -117.75	32.01	** 95.83	23.66	** -79.29	21.98
Random Effect								
Residual (σ^2)	11,966,598	193,388	32,586,742	562,974	35,795,248	493625	32091766	731122
τ_0^2	3,381,069	557,345	6,301,612	1,034,718	6,960,686	911783	450757	239440
φ_0^2	872,514	846,856						
-2 Log Likelihood	148692.1		136867.6		215813.6		77832.2	
***R*-Square**								
R^2	0.602		0.459		0.446		0.416	

Note. * p<.05, ** p<.001, and ML means using maximum likelihood estimation.

References

Adler, D. (2023, October 2). *Attendance up, game time down in record-setting '23 season*. MLB.com. https://www.mlb.com/news/mlb-attendance-mlb-tv-post-big-numbers-in-2023

Afifi, A., Clark, V. A., & May, S. (2003). *Computer-aided Multivariate Analysis* (4th ed.). CRC Press.

Ahn, S. C., & Lee, Y. H. (2007). Lifecycle demand for Major League Baseball. *International Journal of Sport Finance, 2*(2), 79-93. https://doi.org/10.1177/155862350700200203

Arizona Diamondbacks Schedule. (2017). *ESPN*. http://www.espn.com/mlb/team/schedule/_/name/ari/season/2017

Associated Press. (2022, October 6). *MLB crowds up from 2021, but still below pre-pandemic levels*. *ESPN*. https://www.espn.com/mlb/story/_/id/34741056/mlb-crowds-2021-pre-pandemic-levels

Baade, R. A., & Tiehen, L. J. (1990). An analysis of Major League Baseball attendance, 1969–1987. *Journal of Sport and Social Issues*, *14*(1), 14–32. https://doi.org/10.1177/019372359001400102

Becker, M. A., & Suls, J. (1983). Take me out to the ballgame: The effects of objective, social, and temporal performance information on attendance at major league baseball games. *Journal of Sport and Exercise Psychology*, *5*(3), 302-313. https://doi.org/10.1123/jsp.5.3.302

Borland, J., & Macdonald, R. (2003). Demand for sport. *Oxford Review of Economic Policy*, *19*(4), 478–502. https://doi.org/10.1093/oxrep/19.4.478

Brown, M. (2022, October 6). *MLB attendance for 2022 down nearly 6% from 2019, last year before the pandemic*. Forbes. https://www.forbes.com/sites/maurybrown/2022/10/06/mlb-attendance-for-2022-down-nearly-5-from-2019-last-year-before-the-pandemic/

Castrovince, A. (2023, December 21). *Widening of runner's lane to 1B among rule changes for '24*. MLB.com. https://www.mlb.com/news/mlb-2024-rule-changes-runners-lane-to-first-base

Coates, D., & Humphreys, B. R. (2007). Ticket prices, concessions and attendance at professional sporting events. *International Journal of Sport Finance*, *2*(3), 161-170. https://doi.org/10.1177/155862350700200305

DeSchriver, T. D., & Jensen, P. E. (2002). Determinants of spectator attendance at NCAA Division II football contests. *Journal of Sport Management*, *16*(4), 311–330.

Fort, R. (2004). Inelastic sports pricing. *Managerial and Decision Economics*, *25*(2), 87-94. https://www.jstor.org/stable/25151279

Hansen, H., & Gauthier, R. (1989). Factors affecting attendance at professional sporting events. *Journal of Sport Management*, *3*(1), 15-32.

Lemke, R. J., Leonard, M., & Tlhokwane, K. (2010). Estimating attendance at Major League Baseball games for the 2007 season. *Journal of Sports Economics*, *11*(3), 316-348. https://doi.org/10.1177/1527002509337212

Lim, N., & Pedersen, P. M. (2022). Examining determinants of sport event attendance: A multilevel analysis of a Major League Baseball season. *Journal of Global Sport Management*. *7*(1), 181-198. https://doi.org/10.1080/24704067.2018.1537675

McCallister, D. (2018, February 20). MLB sets new rules to speed up the game. *National Public Radio*. https://www.npr.org/sections/thetwo-way/2018/02/20/587181780/rules-for-2018-aim-to-speed-up-how-long-it-takes-to-play-a-mlb-game

McEvoy, C. D., Nagel, M. S., DeSchriver, T. D., & Brown, M. T. (2005). Facility age and attendance in Major League Baseball. *Sport Management Review*, *8*(1), 19-41. https://doi.org/10.1016/S1441-3523(05)70031-0

MLB Attendance Report. (2017). *ESPN*. http://www.espn.com/mlb/attendance/_/year/2017

Posnanski, J. (2017, February 22). Anticipated rule could continue decline of IBB. *MLB.com*. https://www.mlb.com/news/2018-19-mlb-offseason-analysis-for-each-move/c-302712514

Randhawa, M. (2025, January 23). MLB implementing 2 minor rules changes starting this season. *MLB.com*. https://www.mlb.com/news/mlb-shift-baserunning-rules-changes-2025

Rivers, D. H., & DeSchriver, T. D. (2002). Star players, payroll distribution, and Major League Baseball attendance. *Sport Marketing Quarterly*, *11*(3), 164–173. https://doi.org/10.1177/106169340201100304

Schofield, J. A. (1983). Performance and attendance at professional team sports. *Journal of Sport Behavior*, *6*(4), 196–206.

Tainsky, S., & McEvoy, C. D. (2012). Television broadcast demand in markets without local teams. *Journal of Sports Economics*, *13*(3), 250-265. https://doi.org/10.1177/1527002511406129

Welki, A. M., & Zlatoper, T. J. (1994). US professional football: The demand for game-day attendance in 1991. *Managerial and Decision Economics*, *15*(5), 489-495. https://doi.org/10.1002/mde.4090150510

Whitney, J. D. (1988). Winning games versus winning championships: The economics of fan interest and team performance. *Economic Inquiry*, *26*(4), 703-724. https://doi.org/10.1111/j.1465-7295.1988.tb01524.x

Zhang, J. J., Lam, E. T., & Connaughton, D. P. (2003). General market demand variables associated with professional sport consumption. *International Journal of Sports Marketing and Sponsorship*, *5*(1), 24-46. https://doi.org/10.1108/IJSMS-05-01-2003-B003