

Assessment of the Impact of Digital Innovation and Fintech Integration on Sports Infrastructure Development in Federal Universities of Education, North-West Geo-Polical Zone, Nigeria

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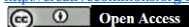
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ABSTRACT

The integration of digital innovation and Financial Technology (FinTech) has revolutionized various sectors, yet its empirical application to sports administration within educational institutions remains underexplored. This study assessed the impact of digital innovation and FinTech integration on sports infrastructure development in Federal Universities of Education (FUEs) in North-West Nigeria. A descriptive survey research design was adopted. The population comprised of 589 Human Kinetics and Health Education (HKED) undergraduates and academic staff in FUE, Zaria and FUE, Kano for the 2025/2026 academic session. A sample size of 233 was selected using the proportionate, stratified and random sampling technique, guided by the Research Advisors (2006) sample size table. The instrument for data collection was a self-structured questionnaire titled “Digital Innovation, FinTech and Sports Infrastructure Questionnaire (DIFSIQ),” which was validated by three experts and yielded a reliability coefficient of 0.84 via Cronbach’s Alpha. Data were analyzed using Mean and Standard Deviation to answer the research questions, while Simple Linear Regression was used to test the null hypotheses at an alpha level of 0.05. The findings revealed that digital crowd funding significantly impacts sports facility upgrades ($F = 162.45$; $p < 0.05$). Furthermore, digital payment systems significantly affects the prompt procurement of sports equipment ($F = 241.67$; $p < 0.05$), and transparent financial technologies significantly influences sports infrastructure fund management ($F = 207.34$; $p < 0.05$). The study concludes that adopting FinTech solutions offers a viable alternative to bridging the sports funding gap in Nigerian tertiary institutions. Based on the findings, it is recommended that university administrators and the government collaborate with FinTech firms to establish dedicated digital platforms for sports endowment, procurement, and transparent fund management.

Introduction

Sports infrastructure is the bedrock of athletic development, Human Kinetics, and overall student well-being in tertiary institutions. In Nigerian Federal Universities of Education (FUEs), sports facilities such as football pitches, athletics tracks, gymnasiums, and basketball courts serve not only as recreational arenas but as fundamental laboratories for Human Kinetics Education (HKED) students. However, the development and maintenance of these facilities have been persistently hampered by inadequate funding, bureaucratic bottlenecks, and opaque financial management (Onifade & Ayodele, 2021). The over-reliance on government subventions and the Tertiary Education Trust Fund (TETFund), which is often insufficient and delayed, has left many sports facilities in FUEs in a state of dilapidation.

In recent years, the global financial landscape has been disrupted by Digital Innovation and Financial Technology (FinTech). FinTech refers to the integration of technology into offerings by financial services companies to improve their use and delivery to consumers (Mogaji & Nguyen, 2022). In Nigeria, the FinTech ecosystem has witnessed exponential growth, driven by initiatives such as the Central Bank of Nigeria's Payments System Vision 2025. Today, innovations like digital crowd funding,

seamless mobile payment gateways, and transparent block chain-based financial ledgers are reshaping how funds are raised, utilized, and monitored across various sectors.

Despite the proven efficacy of FinTech in sectors like commerce and general education funding, its specific integration into sports administration within Nigerian universities is still in its infancy. Digital crowd funding platforms present an untapped avenue for mobilizing resources from alumni, private corporations, and sports enthusiasts to upgrade university sports facilities. Furthermore, digital payment systems (e-procurement) can streamline the purchasing of sporting equipment, eliminating the middle-man delays and paper-based inefficiencies that currently plague the system. Additionally, transparent financial technologies, utilizing immutable digital ledgers, can restore donor trust by ensuring that funds earmarked for sports infrastructure are strictly managed and protected against misappropriation (Adebayo & Ibrahim, 2024).

The core mandate of Human Education departments in Federal Universities of Education is to produce competent physical educators and sports administrators. This mandate is currently threatened by the alarming decay of sports infrastructure. Observably, in FUE Zaria and FUE Kano, athletic tracks are worn out, indoor sports halls lack modern equipment, and general maintenance is poor. The traditional funding architecture primarily reliant on government budgetary allocations and internal revenue generation has proven grossly inadequate to meet the capital-intensive demands of modern sports infrastructure.

Furthermore, the manual processes involved in procuring sports equipment are fraught with bureaucratic delays and vulnerabilities to financial leakages. Potential donors and alumni who might wish to contribute to sports development are often discouraged by the lack of transparent, accountable, and easy-to-use channels for remitting and tracking their funds. While FinTech has provided robust solutions for capital mobilization, transparent fund management, and seamless payments in the corporate world, there is a glaring gap in its application within university sports administration in Nigeria. The problem this study seeks to address, therefore, is: to what extent can digital innovation and FinTech integration resolve the sports infrastructure development challenges in Federal Universities of Education in North-West Geo-political zone Nigeria?

Objectives of the Study

The main objective of this study is to assess the impact of digital innovation and FinTech integration on sports infrastructure development in Federal Universities of Education, North-West Geo-political zone, Nigeria. Specifically, the study seeks to:

1. Determine the impact of digital crowd funding platforms on sports facility upgrades in Federal Universities of Education, North-West Nigeria.
2. Assess the role of digital payment systems in the procurement of sports equipment in Federal Universities of Education, North-West Nigeria.
3. Evaluate the influence of transparent financial technologies (e.g., block chain-based ledgers) on sports infrastructure fund management in Federal Universities of Education, North-West Nigeria.

Research Questions

To guide the study, the following research questions were raised:

1. To what extent does digital crowd funding platforms impact on sports facility upgrades in Federal Universities of Education, North-West Nigeria?
2. How does a digital payment systems impact on the procurement of sports equipment in Federal Universities of Education, North-West Nigeria?
3. What is the impact of transparent financial technologies on sports infrastructure fund management in Federal Universities of Education, North-West Nigeria?

Null Hypotheses

The following null hypotheses (H0) were formulated and tested at an alpha level of 0.05:

H01: Digital crowd funding platforms have no significant impact on sports facility upgrades in Federal Universities of Education, North-West Nigeria.

H02: Digital payment systems have no significant impact on the procurement of sports equipment in Federal Universities of Education, North-West Nigeria.

H03: Transparent financial technologies have no significant impact on sports infrastructure fund management in Federal Universities of Education, North-West Nigeria.

Theoretical and Conceptual Review

This study is anchored on the Resource Dependence Theory (RDT) and the Technology Acceptance Model (TAM). RDT posits that organizations (such as universities) must engage in transactions with external actors and organizations to acquire resources necessary for their survival. In the context of this study, FUEs can utilize digital innovation to diversify their resource base away from solely government funding, tapping into global and local FinTech networks. Concurrently, TAM explains the adoption of these digital tools by university administrators and students, emphasizing perceived ease of use and perceived usefulness.

Empirical evidence globally suggests that sports organizations adopting digital tools report improved operational efficiency, stronger revenue generation, and better infrastructure maintenance (Ratten, 2020). However, contextual literature regarding North-West Nigeria a region with unique socio-economic and infrastructural dynamics is scarce. Therefore, assessing the specific integration of digital finance models in FUE Zaria and FUE Kano becomes imperative to provide data-driven solutions to the infrastructural deficits in these institutions.

Methodology

The study adopted a descriptive survey research design. This design was considered appropriate because it allows for the collection of data from a representative sample of a population to describe current conditions, attitudes, and impacts on FinTech and sports infrastructure without manipulating the variables in an experiment.

The population for this study consisted of 589 individuals, comprising Physical and Health Education (HKED) undergraduates and academic staff in two Federal Universities of Education in North-West Nigeria (FUE, Zaria and FUE, Kano) as of the 2025/2026 academic session.

A sample size of 233 respondents was drawn from the population. This figure was determined using the Research Advisors (2006) sample size selection table, which stipulates that for a population of approximately 600, a sample of 234 is required for a 95% confidence level and a 5% margin of error (adjusted to 233 based on the exact population of 589). The proportionate and stratified random sampling techniques were utilized. The population was stratified based on the institutions (Zaria and Kano) and status (Staff and Students) to ensure equitable representation.

The instrument used for data collection was a researcher's self-developed structured questionnaire titled "Digital Innovation, FinTech and Sports Infrastructure Questionnaire (DIFSIQ)." The questionnaire was divided into two sections. Section A elicited demographic information from the respondents. Section B contained 12 items corresponding to the three research questions, structured on a modified 4-point Likert's scale of Strongly Agree (SA) = 4, Agree (A) = 3, Disagree (D) = 2, and Strongly Disagree (SD) = 1.

The face and content validity of the instrument were established by three experts: two from the Department of Human Kinetics Education. Their corrections were incorporated into the final draft. To ascertain the reliability coefficient of the instrument, a pilot study was conducted on 30 respondents in a State University of Education North-West University Kano, Kano state. The data generated were subjected to the Cronbach's Alpha reliability test, which yielded a reliability coefficient of 0.84, indicating that the instrument was highly reliable for the study, hence it is more closer to 1.

Data collected were analyzed using both descriptive and inferential statistics were analyzed using frequencies and percentage Demographic data and research questions were analyzed using Mean and Standard Deviation. The criterion mean for decision-making was 2.50. Any item with a mean score of 2.50 and above was accepted as "Agreed," while any mean score below 2.50 was rejected as "Disagreed." The null hypotheses were tested using Simple Linear Regression Analysis at a 0.05 level of significance, utilizing the Statistical Package for the Social Sciences (SPSS) software 31.0.2.0 version.

Results

Out of the 233 copies of the questionnaire administered under strict control, all 233 (100%) were properly completed, retrieved, and found usable for the analysis.

Descriptive Analysis of Research Questions

Research Question 1: To what extent do digital crowd funding platforms impact sports facility upgrades in Federal Universities of Education?

Table 1. Mean and Standard Deviation on the Impact of Digital Crowd funding Platforms on Sports Facility Upgrades

S/N	Item Statement	Mean	SD	Decision
1	Digital crowd funding campaigns have the potential to raise substantial funds for upgrading dilapidated sports pitches.	3.12	0.81	Agreed
2	Alumni digital donation portals provide a steady stream of revenue for sports facility maintenance.	2.95	0.88	Agreed
3	Lack of awareness about FinTech crowd funding limits its current impact on sports infrastructure.	3.42	0.65	Agreed
4	FinTech platforms make it easier for external stakeholders and private corporations to sponsor university sports facilities.	3.18	0.74	Agreed
Aggregate Mean / Standard Deviation		3.17	0.77	Agreed

Table 1 shows that all items yielded mean scores above the 2.50 criterion mean. The grand mean of 3.17 indicates that respondents agree that digital crowd funding platforms have a substantial potential impact on funding sports facility upgrades, though awareness remains a limiting factor.

Research Question 2: How does a digital payment system impact on the procurement of sports equipment in Federal Universities of Education?

Table 2. Mean and Standard Deviation of the Role of Digital Payment Systems on Equipment Procurement

S/N	Item Statement	Mean	SD	Decision
5	E-procurement platforms reduce bureaucratic delays in acquiring sporting equipment.	3.25	0.70	Agreed
6	Digital wallets and mobile transfers ensure seamless and traceable payments to sports equipment vendors.	3.10	0.78	Agreed
7	The use of digital payment channels reduces the risk of physical cash mishandling during procurement.	3.31	0.62	Agreed
8	Transaction failures and poor network infrastructure occasionally hinder the timely procurement of sporting goods.	2.85	0.94	Agreed
Aggregate Mean / Standard Deviation		3.13	0.76	Agreed

Table 2 reveals a grand mean of 3.13, indicating strong agreement among respondents that digital payment systems positively affect the procurement process by reducing delays and mishandling, despite occasional network infrastructural challenges.

Research Question 3: What is the impact of transparent financial technologies on sports infrastructure fund management?

Table 3. Mean and Standard Deviation on Transparent Financial Technologies and Fund Management

S/N	Item Statement	Mean	SD	Decision
9	Transparent digital tracking systems build trust among donors, alumni, and university administration.	3.45	0.58	Agreed
10	Immutable digital ledgers (like block chain) can significantly curb fraud and leakages in the management of sports subventions.	3.05	0.85	Agreed
11	Digital financial reporting ensures that funds allocated for sports are used strictly for their intended purpose.	3.22	0.71	Agreed
12	The transition to transparent digital ledgers requires targeted digital literacy training for sports administrators.	3.38	0.64	Agreed
Grand Mean / Standard Deviation		3.28	0.70	Agreed

Table 3 indicates a grand mean of 3.28. Respondents strongly agree that transparent financial technologies significantly improve fund management by building trust and curbing fraud, provided that administrators receive appropriate digital training.

Inferential Analysis (Testing of Hypotheses)

Hypothesis 1: Digital crowd funding platforms have no significant impact on sports facility upgrades in Federal Universities of Education, North-West Geo-political zone, Nigeria.

Table 4. Simple Linear Regression Analysis of Digital Crowd funding on Sports Facility Upgrades

Model	R	R-Square	Adjusted R-Square	Std. Error of the Estimate	F	Sig.(p-value)	Decision
1	0.642	0.412	0.409	0.5142	162.45	0.000	Reject H01

Table 4 shows a correlation coefficient (R) of 0.642, indicating a strong positive relationship. The R-Square value of 0.412 implies that 41.2% of the variance in sports facility upgrades can be explained by the integration of digital crowd funding platforms. The F-statistic is 162.45 with a p-value of 0.000 ($p < 0.05$). Therefore, the null hypothesis is hereby rejected. Meaning that digital crowd funding platforms have a significant impact on sports facility upgrades.

Hypothesis 2: Digital payment systems have no significant impact on the procurement of sports equipment in Federal Universities of Education, North-West Geo-political zone, Nigeria.

Table 5. Simple Linear Regression Analysis of Digital Payment Systems on Equipment Procurement

Model	R	R-Square	Adjusted R-Square	Std. Error of the Estimate	F	Sig.(p-value)	Decision
1	0.715	0.511	0.509	0.4821	241.67	0.000	Reject H02

Table 5 reveals an R-value of 0.715, showing a very strong positive relationship. The R-Square value of 0.511 indicates that 51.1% of the variation in the efficiency of sports equipment procurement is accounted for by digital payment systems. The F-value is 241.67 with a p-value of 0.000 ($p < 0.05$). Thus, the null hypothesis is hereby rejected, concluding that digital payment systems have a significant impact on sports equipment procurement.

Hypothesis 3: Transparent financial technologies have no significant impact on sports infrastructure fund management in Federal Universities of Education, North-West Geo-political zone, Nigeria.

Table 6. Simple Linear Regression Analysis of Transparent Financial Technologies on Fund Management

Model R	R-Square	Adjusted R-Square	Std. Error of the Estimate	F	Sig.(p-value)	Decision
1	0.688	0.473	0.4955	207.34	0.000	Reject H03

Table 6 displays an R-value of 0.688 and an R-Square of 0.473, demonstrating that transparent financial technologies account for 47.3% of the variance in fund management effectiveness. The F-value of 207.34 with a p-value of 0.000 ($p < 0.05$) leads to the rejection of the null hypothesis. This confirms that transparent financial technologies have a significant influence on sports infrastructure fund management.

Summary of Major Findings were established:

1. Digital crowd funding platform had significant impact on sport facilities upgrades in Federal University of Education in the North-West Geo-political zone, Nigeria ($p < 0.05$).
2. Digital payment system had significant impact on the procurement of sport equipment in Federal University of Education in the North-West Geo-political zone, Nigeria ($p < 0.05$).
3. Transparent financial technologies (FINTECH) had significant impact on sport infrastructure fund management in Federal University of Education in the North-West Geo-political zone, Nigeria ($p < 0.05$).

The following major findings

Discussion

The findings of this study provide critical empirical insights into the intersection of technology, finance, and sports administration in Nigerian tertiary institutions.

The study established that digital crowd funding platforms have a significant impact on sports facility upgrades. This finding aligns with the propositions of Abdulkadir et al. (2022) and the broader consensus that FinTech democratizes access to funding. In the face of dwindling government subventions, FUEs that deploy dedicated alumni portals and global crowd funding campaigns can effectively bypass traditional financial bottlenecks. The descriptive data, however, highlighted a critical barrier: lack of awareness. This echoes the assertions of Olatunji and Mishra (2024), who noted that while the technology exists within the Nigerian digital economy, user adoption at institutional levels requires aggressive awareness and policy backing.

The second major finding revealed that digital payment systems significantly expedite and secure the procurement of sports equipment. The bureaucratic nature of physical cash requisitions in public universities often leads to inflation of prices and delayed delivery of critical PHE equipment. The integration of e-procurement and mobile FinTech solutions bridges this gap. This finding is consistent with the findings of Ekong and Udo (2020), who observed that e-administration in sports, reduces administrative redundancies and ensures vendor accountability. By utilizing digital wallets and direct vendor transfers, FUEs can achieve a higher degree of operational efficiency, directly benefiting the academic and athletic progress of students.

Finally, the study revealed that transparent financial technologies (such as digital tracking systems and block chain-inspired ledgers) significantly impact sports fund management. The core issue in public institutional funding in Nigeria is often not just the lack of funds, but the mismanagement of available resources (Adebayo & Ibrahim, 2024). The results indicated that implementing transparent ledgers builds an unprecedented level of trust among stakeholders. When donors and government agencies can track their financial contributions in real-time, their willingness to invest in sports infrastructure exponentially increases. However, the data also pointed out the necessity for digital up-skilling, corroborating the World Bank (2020) perspective that technology implementation must be matched with human capital development.

Conclusion

The integration of digital innovation and FinTech is not merely a corporate phenomenon but a vital necessity for modernizing sports administration in the educational sector. This empirical assessment of Federal Universities of Education in North-West Nigeria establishes that traditional funding and

management paradigms are no longer sufficient to maintain or develop 21st-century sports infrastructure. Digital crowd funding presents a robust alternative for capital generation; digital payment systems eliminate procurement bottlenecks; and transparent financial technologies guarantee the accountability required to sustain investor and alumni confidence. Ultimately, embracing these digital financial frameworks will revitalize sports facilities, enhance the pedagogical delivery of Physical and Health Education, and position Nigerian tertiary institutions to produce elite athletes and competent sports professionals.

Recommendations

Based on the findings and conclusion of this study, the following recommendations are made:

1. Establishment of Institutional Crowd funding Portals: Management of FUEs should collaborate with indigenous FinTech startups (such as Pay stack, Flutter wave, or specialized Ed-Tech firms) to develop dedicated, secure crowd funding platforms tailored for sports endowment and alumni contributions.

2. Transition to Full E-Procurement for Sports: University procurement units should mandate the use of digital payment systems and e-invoicing for all sports equipment purchases to eliminate cash handling, ensure traceability, and speed up the supply chain.

Adoption of Transparent Digital Ledgers: The financial directorates of FUEs should integrate transparent digital tracking tools for all sports-related funds. Publishing digital quarterly financial reports on sports expenditure will build trust and encourage private-sector sponsorships.

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