

Design of a Google Sheets-Based Financial Management System Integrated with a Telegram Bot for Small-to-Medium Sports Facilities

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ABSTRACT: This study aimed to (1) develop a cloud-based financial management system integrating Google Sheets and a Telegram Bot for small-to-medium-scale sports facilities, and (2) provide a practical, interactive, and accessible financial recording tool to improve the operational efficiency of sports facility managers. This research and development (R&D) study used the ADDIE model (Analyze, Design, Development, Implement, Evaluate), limited to the development stage-namely expert validation and a small-group trial involving managers of small-to-medium sports facilities. Subjects were selected purposively, consisting of five expert validators (two IT/system experts and three financial management experts) and five facility managers/administrative staff for the trial. Data were collected through observation, interviews, and 1-4 Likert-scale questionnaires, analyzed using Aiken's V validity index, Cronbach's Alpha reliability coefficient, and descriptive percentage analysis. The system-which integrates Google Sheets as the database with a Telegram Bot providing /input, /saldo, and /laporan commands as the user interface-was rated highly valid, with Aiken's V of 0.924 for the IT/system aspect and 0.928 for the financial-management aspect. The small-group trial produced a practicality score of 89.0% (highly practical category), with the system-benefit aspect scoring highest (95.0%). The system was thus shown to speed up recording, reduce manual input errors, and improve financial transparency for small-to-medium sports facilities. Managers are advised to adopt the system gradually while observing the daily quota of the free Google Apps Script tier, and future researchers are encouraged to test its effectiveness experimentally on a broader sample and to add features such as budgeting and cash-flow projection.

KEYWORDS: Telegram bot, sports facility, Google Sheets, financial management, information system

I. INTRODUCTION

Sport plays a strategic role in improving the quality of human resources, and its activities depend on adequately managed facilities and infrastructure. A sports facility is not merely a venue for physical activity but part of an organization that requires systematic and professional management to support effective service and optimal use of its resources.

As the sport industry grows, managing facilities such as gyms, futsal courts, and sport clubs becomes increasingly complex, encompassing not only the use and maintenance of equipment but also administration, human resources, scheduling, and-critically-financial management. Because activities such as facility maintenance, staff payment, procurement, utilities, and service development all depend on sound cash-flow management, effective financial management and performance measurement are essential for an organization's sustainability and for supporting evidence-based strategic decisions.

In practice, financial management at many sports facilities is still manual or semi-manual, relying on cash books or unintegrated spreadsheets. This creates recurring problems: human error in recording, delayed input and reporting, difficulty obtaining real-time financial information, and limited monitoring and decision-making capability. These problems intensify as transaction volume grows-covering court rentals, memberships, coaching fees, equipment sales, event income, and operational expenses such as utilities, salaries, cleaning, and maintenance-so a more structured and efficient recording system is clearly needed.

This need aligns with the broader trend of digital transformation, which changes not only the technology organizations use but also how they run their processes to increase efficiency, create value, and support data-driven decision-making. Digitalizing accounting and financial-information systems has also been shown to improve the accuracy and timeliness of information used for managerial decisions in small and medium enterprises, reinforcing the argument that digitalization improves information quality rather than simply replacing manual bookkeeping.

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One accessible technology for this transformation is Google Sheets, a cloud-based platform that allows structured, multi-user storage of income and expense transactions. Used alone, however, a spreadsheet still requires the user to open and access the file directly, which is impractical for fast, on-the-go recording. Integrating a Telegram Bot addresses this limitation by giving users a conversational interface for input and reporting; prior work has shown that integrating a Telegram Bot with Google Sheets can support real-time reporting and data management, using Google Sheets for storage and the bot for user interaction.

That prior integration, however, was applied to delivery-service reporting rather than sports-facility financial management, revealing a research gap: sports facilities have distinctive transaction characteristics-court rentals, memberships, coaching, event income, maintenance, and other operational needs-that call for a system specifically tailored to this context. This study therefore develops a Google Sheets-based financial management system integrated with a Telegram Bot for sports facilities, intended to support faster, more structured transaction recording, balance monitoring, recapitulation, and presentation of financial information as one practical, low-cost form of digital transformation in sports-facility management.

Based on this background, the objectives of this development study were to: (1) analyze sports-facility managers' needs regarding the urgency of a financial management system; (2) produce an interface and integration-architecture design for a Google Sheets-based financial management system using a Telegram Bot; (3) determine the system's validity and feasibility based on assessments by management and IT experts; (4) implement and test the system directly with end users; and (5) evaluate end-user practicality based on trial results.

II. METHODS

A. Research Design

This was a research and development (R&D) study aimed at producing a Google Sheets-based financial management system for sports facilities integrated with a Telegram Bot, using the ADDIE model (Analyze, Design, Development, Implement, Evaluate). The scope of ADDIE implementation in this study was limited to the development stage-expert validation and a small-group practicality trial-without proceeding to large-scale implementation or a comprehensive experimental effectiveness test. This scope reflects the study's primary focus: producing a system that is valid in content, conceptually feasible, and ready for use at an early development stage.

B. Development Procedure

The Analyze stage identified development needs through a literature review of sports-facility management, sport-organization financial management, chatbot-based financial services, and Telegram Bot-Google Sheets integration, followed by a field study using observation and semi-structured interviews with managers of small-to-medium sports facilities (futsal courts, gyms, and sport clubs). The field study found that transaction recording at most facilities was still manual and unintegrated, that managers struggled to monitor finances in real time, that existing recording practices did not adequately support transparency and accessibility, and that managers wanted a practical recording medium accessible through an application they already used daily-Telegram. The Design stage produced an initial blueprint: the Google Sheets database structure (income-transaction, expense-transaction, automatic-recap, and monthly-report sheets), a system workflow, the Telegram Bot's interaction design (the /input, /saldo, and /laporan commands), an access-rights scheme based on registered Telegram IDs, and the automated financial-report format. Instruments for IT/system expert validation, financial management expert validation, and user response were also prepared at this stage.

In the Development stage, the design was realized as a working product: the researcher built the spreadsheet database and Telegram Bot script, integrated the Telegram Bot API with Google Sheets, and tested the system's basic functions (transaction input, automatic recap, reporting) before submitting the product for expert validation. Expert feedback was then used to revise the product until it was judged valid and conceptually feasible. The Implement stage consisted of a small-group trial with sports-facility managers, who recorded transactions via the Telegram Bot, accessed reports in Google Sheets, and used the recap and monitoring features, while researchers observed and collected user-response questionnaires. The Evaluate stage was formative, integrating expert-validation results, user-trial results, and qualitative feedback to finalize the product for future research on broader implementation and effectiveness testing.

C. Trial Subject and Instrument

Subjects were selected purposively and comprised two groups: expert validators and end users. Expert validation involved two IT/system practitioners, who assessed 22 items covering functional suitability, reliability, security, compatibility, usability, and efficiency, and three financial-management academics, who assessed 17 items covering the fit with basic accounting/financial-management principles, completeness of financial features, calculation accuracy, applicability to sports facilities, and clarity of report information. The small-group trial involved five managers/administrative staff of small-to-

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medium sports facilities, who completed a 15-item practicality questionnaire covering ease of use, clarity of display and instructions, system benefit, time efficiency, and user satisfaction. All instruments used a modified 1-4 Likert scale.

D. Data Analysis Technique

Content validity was analyzed using Aiken's V index, $V = \sum S / [n(c-1)]$, where S is the difference between a rater's score and the lowest possible scale score, n is the number of raters, and c is the number of scale categories; $V \geq 0.80$ was interpreted as highly valid, 0.60-0.79 as valid, 0.40-0.59 as moderately valid, and below 0.40 as invalid, with items required to reach $V \geq 0.60$ to be retained. Instrument reliability was analyzed with Cronbach's Alpha, interpreted as very high ($\alpha \geq 0.90$), high (0.80-0.89), adequate (0.70-0.79), or low (below 0.70), with $\alpha \geq 0.70$ considered acceptable. Product practicality was analyzed using descriptive percentage statistics, $P = (f/N) \times 100\%$, where f is the obtained score and N is the maximum possible score, categorized as highly practical (81-100%), practical (61-80%), moderately practical (41-60%), or impractical (below 40%). Qualitative feedback from validators and users was analyzed through data reduction, thematic presentation, and conclusion drawing to guide product revision.

III. RESULTS AND DISCUSSION

A. Initial Product Development

The Analyze and Design stages produced a financial management system with Google Sheets as the backend database-storing structured income, expense, automatic-recap, and monthly-report data-and a Telegram Bot as the user interface, providing /input for recording transactions, /saldo for an instant balance check, and /laporan for an automatic monthly recap in text or file form, together with an access-control mechanism restricted to registered Telegram user IDs.

B. Expert Validation Results

IT/system experts rated the product highly valid overall (mean Aiken's V = 0.924, 92.4%), with functional suitability scoring highest (96.7%) and security lowest, though still highly valid (87.5%). Financial-management experts likewise rated the product highly valid overall (mean Aiken's V = 0.928, 92.8%), with completeness of financial features scoring highest (97.2%) and clarity of report information lowest, though still highly valid (85.2%). Table 1 summarizes both assessments.

Table 1. Summary of Expert Validation Results (AIKEN'S V)

Validator Group	Items	Mean Aiken's V	Category	Cronbach's Alpha
IT/System experts (n = 2)	22	0.924 (92.4%)	Highly valid	0.757
Financial management experts (n = 3)	17	0.928 (92.8%)	Highly valid	0.727

All 22 IT/system items and all 17 financial-management items met or exceeded the $V \geq 0.60$ acceptance threshold, so none were dropped; item-level V ranged from 0.833-1.000 for the IT/system instrument and 0.778-1.000 for the financial-management instrument. Reliability for both instruments fell in the adequate category ($0.70 \leq \alpha < 0.80$); given the small number of expert raters, feasibility judgments were therefore based primarily on the Aiken's V results as a form of expert judgment.

C. Implementation: Small-Group Trial

Five managers/administrative staff from small-to-medium sports facilities took part in the small-group trial, recording transactions via the Telegram Bot, checking reports in Google Sheets, and using the recap and monitoring features after a brief orientation. The trial produced an overall practicality score of 89.0% (highly practical), with system benefit scoring highest (95.0%) and time efficiency lowest, though still highly practical (85.0%). Table 2 summarizes the results.

Table 2. User Practicality Trial Results (N = 5)

Aspect	Percentage	Category
Ease of use	86.3%	Highly practical
Clarity of display and instructions	88.3%	Highly practical
System benefit	95.0%	Highly practical
Time efficiency	85.0%	Highly practical
User satisfaction	90.0%	Highly practical
Overall mean	89.0%	Highly practical

The 15-item practicality instrument itself was found highly valid (mean Aiken's V = 0.853, item range 0.800-1.000, all items retained) and reliable (Cronbach's Alpha = 0.807, high category), indicating that the five users' assessments can be considered methodologically dependable.

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D. Product Revision and Final Product

Based on expert and user feedback, the product was revised before finalization: access control was strengthened by restricting the bot to a single registered administrator ID (rather than multiple admins, given security considerations) and by improving Telegram-token handling; the user guide's cover was updated with a sports-facility image and the supervisor's name; a usage-flow diagram and a daily-recap feature were added; and the guide itself was made more concise. The revised product-integrating Google Sheets for storage and reporting with a Telegram Bot providing /input, /saldo, and /laporan commands under single-administrator access control-was judged ready as the study's final output for small-to-medium sports facility managers, particularly those without an accounting background, to record transactions without requiring specialized training.

E. Discussion

Before empirical testing, the initial design underwent expert judgment to reduce researcher subjectivity and align the system with information-systems and financial-management scholarship. The highly valid IT/system rating (92.4%) indicates that the design met technical standards for functionality, reliability, security, compatibility, usability, and efficiency as a cloud-based financial information system with a messaging-bot interface, consistent with the view that functional quality and security are central to information systems supporting data-driven decisions. The highly valid financial-management rating (92.8%) indicates that the system's substance-its fit with basic accounting principles, feature completeness, calculation accuracy, and applicability to sports-facility operations-met the standards expected of sport-organization financial management.

The 89.0% practicality score suggests that combining a Telegram Bot as the input interface with Google Sheets as the reporting database sped up recording, reduced manual errors, and made real-time financial monitoring easier for users, consistent with the study's original objectives. The comparatively lower (though still highly practical) time-efficiency score likely reflects users' limited familiarity with the bot's commands during this early adoption period-an expected pattern in a formative Implementation-stage evaluation.

These findings support the broader argument that effective financial management depends on an information system that supplies accurate, real-time data for decision-making, and they are consistent with prior studies showing that integrating a Telegram Bot with Google Sheets is an effective, low-cost digitalization solution for small-to-medium organizations, and that text-based chatbots can improve service efficiency and access to financial information more generally. Together, the results reinforce the case that small-scale sports organizations benefit from practical, applicable management-support systems to operate professionally and sustainably.

F. Limitations

The system's scope was limited to basic financial functions-recording income, expenses, and simple reporting-and did not extend to budgeting, cash-flow projection, or integration with a full accounting system. It depends entirely on the free tiers of Google Sheets and Google Apps Script, which impose an execution quota of roughly 500 transactions per day and require a stable internet connection, and user interaction is limited to the predefined /input, /saldo, and /laporan commands rather than a graphical interface. The practicality trial involved only five purposively selected managers, so results cannot be generalized to the broader population of facility managers or to facility types with different transaction patterns, and-consistent with the study's scope-testing stopped at a limited-scale implementation and formative evaluation rather than a large-scale experimental effectiveness test, so the system's benefits are so far based on user perception rather than long-term quantitative field data.

IV. CONCLUSIONS

This study successfully developed a sports-facility financial management system that integrates Google Sheets as the database with a Telegram Bot as the user interface, following the ADDIE model through a limited-scale implementation stage. Expert validation rated the system highly valid on both the IT/system aspect (Aiken's $V = 0.924$) and the financial-management aspect (Aiken's $V = 0.928$), indicating that the design meets information-systems and sport-organization financial-management standards. The small-group trial rated the system highly practical (89.0%), with the system-benefit aspect scoring highest (95.0%), showing that the Telegram Bot-Google Sheets integration can speed up recording, reduce manual errors, and improve financial transparency for small-to-medium sports facilities. Managers of such facilities are encouraged to adopt the system in stages while observing the free-tier daily transaction quota, and future research should test the system's effectiveness experimentally with a larger and more varied sample and extend it with features such as budgeting and cash-flow projection.

REFERENCES

- 1) Aiken, L. R. (1985). Three coefficients for analyzing the reliability and validity of ratings. *Educational and Psychological Measurement*, 45(1), 131-142.
<https://doi.org/10.1177/0013164485451012>

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- 2) Bintang, A., Hananto, A. L., & Hananto, A. (2025). Telegram bot application development integration with Google Sheets for sending service reporting. *Journal of Artificial Intelligence and Engineering Applications*, 4(3), 2208-2214. <https://doi.org/10.59934/jaiea.v4i3.1136>
- 3) Borg, W. R., & Gall, D. (1983). *Educational research*. Longman.
- 4) Branch, R. M. (2009). *Instructional design: The ADDIE approach*. Springer.
- 5) Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297-334. <https://doi.org/10.1007/BF02310555>
- 6) Da Silva, R., Sinnun, A., & Tabrani, M. (2025). Utilization of Telegram bot for integrated data visualization with Google Sheets. *Journal of Artificial Intelligence and Engineering Applications*, 4(3), 2260-2266. <https://doi.org/10.59934/jaiea.v4i3.1148>
- 7) Gunawan, A., Mahendra, I., & Hidayat, A. (2021). *Pengelolaan sarana dan prasarana olahraga*. Salus Cultura: Manusia, 1(1). <https://doi.org/10.55480/saluscultura.v1i1.1>
- 8) Hoyer, R., Smith, A., Nicholson, M., & Stewart, B. (2018). *Sport management: Principles and applications* (5th ed.). Routledge. <https://doi.org/10.4324/9781315163908>
- 9) Kobets, V. M., & Kozlovskiy, K. H. (2022). Application of chat bots for personalized financial advice. *Herald of Advanced Information Technology*, 5(2), 187-196. <https://doi.org/10.15276/hait.05.2022.18>
- 10) Laudon, K. C., & Laudon, J. P. (2020). *Management information systems: Managing the digital firm* (16th ed.). Pearson.
- 11) Sugiyono. (2017). *Metode penelitian pendidikan*. Alfabeta.
- 12) Wube, H. D., et al. (2022). Text-based chatbot in financial sector. *Data Science in Finance and Economics*. <https://doi.org/10.3934/DSFE.2022011>



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