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RESEARCH ARTICLE

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COMPARING BLOCKCHAIN AND TRADITIONAL DATABASE FOR ISABELA STATE UNIVERSITY ADMINISTRATIVE AND FINANCE DEPARTMENT

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ABSTRACT

Amidst the ongoing issues regarding the transparency and efficiency of Philippine government operations, Senator Bam Aquino proposed Senate Bills, including the Citizen Access and Disclosure of Expenditures for National Accountability (CADENA) Act, to address the problems faced by the government. Inspired by the issues, this research studies if blockchain can offer much better improvements in the university administrative processes. Using a mixed methods approach, data was collected from 30 process owners of different units of Administrative and Finance Services (AFS) department. Respondents evaluated both systems based on the criteria of *transparency, security, usability, performance, and scalability*. Results show that blockchain outperformed traditional database systems in transparency (4.5 vs. 3.2) and security (4.6 vs. 3.5), owing to its decentralized and cryptographic features. On the other hand, traditional databases still remain more friendly, particularly in the senior citizen process owners, and still demonstrate better performance and scalability in current implementations. The overall findings suggest that blockchain holds a better performance in terms of transparency and accountability; challenges related to usability and scalability must be addressed effectively for future adoption. The study concludes by recommending a training for future implementation so that the university administration will benefit.



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I. INTRODUCTION

One of the major issues of the Philippines is corruption, and it is one of the reasons why many Filipinos stay poor. Senator Bam Aquino proposed the "Blockchain the Budget" initiative on November 9, 2025; these problems continue to occur in this country. The official name of the initiative is the Citizen Access and Disclosure of Expenditures for National Accountability (CADENA) Act (Senate Bill No. 1330) [1]. Many Filipinos think that this step would make it much easier to handle taxes and government budgets, especially in the education sector, which gets the most money each year. Because Isabela State University falls under the education sector of the government, it is likely to be interested in and willing to adopt changes aimed at promoting transparency. Currently, the university still uses a traditional database system for its transactions and processes. However, the continued reliance on a traditional database system raises concerns about whether this approach is sufficient to ensure transparency and efficiency in the university's administrative and financial processes. This study seeks to address the problem of whether transitioning to a blockchain-based system could offer improvements over the existing setup. Blockchain and traditional databases are very different in how they are built and how they are used. Scientists in Nigeria and Japan believe that blockchain is safer because it is decentralized and uses cryptography. But traditional databases are usually faster and cheaper [2]. According to [3], both technologies have different ways of storing and organizing data. For a long time, traditional databases were the norm, but blockchain technology is starting to change a lot of industries. A lot of blockchain projects have been for big government or corporate projects that needed a lot of money and technical know-how [4].

One big problem with using blockchain in the government is that it can be challenging to figure out how it is governed. This piece uses a systematic literature review to look at the different approaches to blockchain governance across different fields. It then comes up with a complete conceptual framework for studying choices made by blockchain governance in the public sector [5]. But there isn't much proof that blockchain would work for smaller groups like community groups, NGOs, and local governments, which usually have fewer resources and transactions [6]. This gap is especially important in the Philippines, where many groups, like universities, need to be open about their budgets as calls for accountability grow. In light of these considerations, the objective of this study is to examine and compare blockchain-based and traditional database systems within the Administrative and Finance Department of Isabela State University. Specifically, the study aims to evaluate these systems in terms of transparency, effectiveness, and user-friendliness, to help determine which approach would better support the university's goals for accountability and efficient management of resources.

II. THEORETICAL REFERENCE

II.1 BLOCKCHAIN AND TRADITIONAL DATABASES IN ADMINISTRATIVE SYSTEMS

This study employed a mixed methods approach to examine and compare blockchain and traditional database systems inside the Administrative and Finance Department of Isabela State University. We got information from 30 process owners by providing them formal questionnaires and interviews. The questionnaires and interviews were all about what they believed and how they felt about both technologies [1–3]. Respondents assessed the two systems on how clear, safe, easy to use, rapid, and scalable they were using Likert-scale ratings and open-ended questions. We utilized descriptive statistics to get the average scores for each criterion from the quantitative data. The qualitative responses provided additional information for the comparison. This analytical method made it easier to compare the merits and weaknesses of each system in light of the department's goals of transparency and accountability [4]. A complete framework for considering blockchain governance in the public sector identifies nine types of governance decision these are architecture, interoperability, mechanisms (*such as decision-making, incentives, and consensus*), organization, accountability, and control. These decision types are divided into micro, meso, and macro levels. Using the theory of public management, this approach makes it clear how different choices about governance affect how blockchain-based public sector systems are designed and put into use [5]. The study used a systematic literature review method, based on the data of the publications from Scopus database that were published between on the year 2019 and 2024. We chose 78 articles because they were relevant to use of blockchain in government. Using VOSviewer, citation and term co-occurrence analysis were done to find research trends, thematic links, and influence in the area. We also looked at how articles were spread out among journals to find transdisciplinary tendencies [6]. Advancement in the computer networks have enabled the development of new protocols for government services. A study designed a peer-to-peer framework using blockchain technology for managing and verifying official documents. Implemented in Java, the system demonstrated efficient transaction throughput and document retrieval, with performance results comparable to popular applications like bitcoin [7]. Overall, by harnessing blockchain technology for processes such as certification issuance and verification, institutions can significantly reduce processing times and enhance data authenticity, security, and control over information sharing, marking a substantial improvement over traditional centralized system [8].

III. MATERIALS AND METHODS

The study utilizes a 3-step method. The first step is the use of data collection, where researchers will gather information and surveys from the process owners of administrative and finance services. This will focus on their current experience using traditional database systems and their perception of blockchain, comparative analysis and evaluation, and recommendations. Another method is the comparative analysis, wherein the data will be collected and analyzed to compare the traditional database and blockchain using three criteria: transparency, security, usability, performance, and Scalability. Systems will be evaluated through qualitative and quantitative surveys and records. Findings from the comparative analysis will be used to assess which system better supports the university's goals for accountability and efficient resource management. Based on the results, the study will provide clear recommendations for the Administrative and Finance Department.

IV. RESULTS AND DISCUSSIONS

1. The respondents of this study are the process owners of the Administrative and Finance Department. There are 30 of them who participated in the surveys; they are from different offices under Admin and Finance that involved in daily operations, approvals, and financial processes. Below is the list of offices that participated:

Table 1: Shows the overall list of Respondent per office.

Name of Office	Number of Respondents
Campus Admin	2
Admin and Finance Director	1
Records	2
Human Resource	1
Cashier	3
Accounting	2
Budget	1
Supply	2
Procurement	2
MIS	2
Planning	2
IICT	10
Total of Respondents	30

Source: Authors, (2026).

2. Comparative Analysis of Traditional Data Base System and Blockchain

Table 2: Overall Data of Traditional Database System and Blockchain.

CRITERIA	TRADITIONAL DATABASE		BLOCKCHAIN	
	Key Observations	Overall Rating	Key Observations	Overall Rating
Transparency	The data is accessible, and the audit and tracking processes may change	3.2	It enhances transparency, full disclosure, as well as real time	4.5
Security	Improvement needs for advance data security and transparencies	3.5	It has an appropriate level of privacy and security for the information because of cryptographic methods.	4.6
Usability	Manual, benefited by the Senior Citizens process owners	3.8	Requires a technical familiarity to non techie process owners	3.5
Performance	Slow, need upgrade, large datasets	3.6	Since it is centralized, there is a large possibility that is especially for large networks	3.2
Scalability	Can handle a simple task Needs upgrade and large expansion	3.0	Scalability is an ongoing problem, yet there are always new ways to fix it, such as with Layer 2 technologies.	3.2
		3.42		3.8

Source: Authors, (2026).

3. Findings of the Results

Transparency

The traditional database system got an average transparency score of 3.2 out of 5. Respondents noted that data is accessible to authorized personnel audit and tracking processes may change.

In contrast, when asked about blockchain, a total of 4.5 out of 5 score believed blockchain would enhance transparency. They cited features such It enhances transparency, full disclosure, as well as real time. Many agreed that blockchain's transparent ledger would help strengthen budget monitoring and foster greater trust in administrative processes.

Security

Security on the Traditional Database system scored 3.6 out of 5. Respondents noted that Improvement needs for advance data security and transparencies while Security on Blockchain scored 4.6 out of 5. Respondents agreed that it has an appropriate level of privacy and security for the information because of cryptographic methods.

Usability

Respondents gave the traditional database a total score of 3.8 out of 5 for usefulness, which means that senior citizens process owners are still happy with it. On the other hand, Blockchain only got 3.5 out of 5 because respondents said that non-technical process owners need to learn more about it first.

Performance

As for how effectively the Traditional Database System worked, it got 3.6 out of 5 because it is slow, needs to be updated, and has a lot of data to store. Blockchain performance, on the other hand, gets 3.2 out of 5 because it is centralized, which means that it may not work well for big networks.

Scalability

Scalability got a score of 3.0 out of 5 from those who answered. Can handle a simple task. Needs to be upgraded and largely expanded. Blockchain received a score of 3.2. Scalability is always a problem, but there are new ways to solve it, like when Layer 2 technologies are used. Overall Result shows that Blockchain achieves a higher overall average score (3.8) compared to the traditional database (3.42), mainly due to its strengths in transparency and security.

V. CONCLUSIONS

Based on the result and discussion, the comparative analysis between the traditional database and blockchain technology and process owners within the Admin and Finance Department highlights a very important advantage of blockchain, particularly in the area of transparency and security. On the other hand, the traditional database system remains user-friendly, especially to those staff that are not updated in technologies (senior citizens). The limitation is very evident in the fields of transparency, scalability, and performance. Blockchain also achieved a higher score because of its upgraded transparency and high security features, which are enabled by cryptographic methods. However, it also has challenges in the usability for result non-technical process owners and requires ongoing improvements to address scalability and good performance in large networks. Overall, the findings suggest that blockchain has the potential to improve the process of the Admin and Finance Department of Isabela State University as long as process owners have adequate training advancement to support the adoption.

VI. AUTHOR'S CONTRIBUTION

Conceptualization: Clammie S. Cullanan & Thelma D. Palaoag.

Methodology: Clammie S. Cullanan & Thelma D. Palaoag.

Investigation: Clammie S. Cullanan & Thelma D. Palaoag.

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Writing – Review and Editing: Clammie S. Cullanan & Thelma D. Palaoag.

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Approval of the final text: Clammie S. Cullanan & Thelma D. Palaoag.

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