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DESIGN AND DEVELOPMENT OF CACAO FARMERS AND GROWERS INFORMATION MANAGEMENT SYSTEM OF CAGAYAN STATE UNIVERSITY - LASAM

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Abstract

Managing information efficiently has become increasingly important yet difficult as organizations continue to handle growing amounts of data. This study aimed to identify issues in the manual information management of cacao farmers and growers at Cagayan State University-Lasam and to develop a system to improve records management and reporting. Using the Agile Model, the study combined descriptive-analytical and developmental approaches, with data collected through surveys and interviews. System evaluation was conducted using ISO 25010 and the Technology Acceptance Model (TAM).

Findings showed that the existing system is manual and fragmented, indicating the need for a centralized solution. A Cacao Farmers and Growers Information Management System was successfully developed and positively evaluated by IT experts, suggesting good software quality, although improvements are needed in portability and resource utilization. End-users highly accepted the system, implying that it effectively supports task performance and usability. While it is recommended that future development may explore advanced technologies to further improve farm monitoring, decision-making, and productivity; generally the system displays favorable responses, suggesting perceived good efficiency, accuracy, and decision-making, strengthening institutional record management.

Keywords: Cacao, Information Management System, Farmers and Growers, Technology Acceptance Model, Agile.

INTRODUCTION

In today's 21st century, organizations across all sectors rely on technology most especially in handling information. Modern technology and innovations evolved all over the world wherein computer-controlled system is now part of the organizations and business industry. This computer-controlled system is to enhance quality of work, reduce workload of an individual and accurate information needed in an organization. Information Management System or IMS is a structured framework in collecting, storing, processing and dissemination of data to support organizations in helping decision-making, coordination and control within an organization.

Cacao farmers and growers of Lasam is increasing and they don't have existing Information Management System to automate records in order to produce reliable, accurate reports and automated file management of Cagayan state university – Lasam. They are still using manual recording of data of their farmers and growers of cacao of Cagayan State University – Lasam. Manual recording of data is crucial, prone to errors, time consuming, lack of accuracy and consistency, poor data storage and retrieval, and no proper automation. These experiences in using manual shows that the data is not secure and inefficiencies and there is a need for more reliable and efficient data management system. The researcher believes that manual recording of data needs to replace with an Information Management System (IMS) that could enhance and manage data security and integrity. A more efficient Information management system is necessary.

Cacao Farmers and Growers information management system is aligned on legal basis and policy of the Philippine Cacao Industry Roadmap 2021-2025. This roadmap, while not a law but serves as a strategic policy document that caters the government's commitment to establishing a national cacao database that support planning and monitoring, expanding production using suitability maps, enhancing traceability and quality control through data driven systems, and to promote clustering and value chain development for cacao farmers.

This study is aligned with Sustainable Development Goals 9 (SDG 9) – Industry, Innovation and Infrastructure. The Information Management System falls under innovation and digital infrastructure and it supports industry and agricultural development, specifically cacao farmers and growers. Information Management System enhances efficiency, data management, and technology adoption in a local agricultural sector. It can also align with SDG 2: Zero Hunger and SDG 8: Decent work and Economic growth. SDG 2 is by improving agricultural productivity and supporting farmers while SDG 8 is by helping strengthen the local cacao industry and providing them a better opportunity for growers but the primary SDG is SDG 9.

Despite these advancements made in Information Management System, research gaps have been identified in these mentioned studies. Specifically, the records of farmers and growers are outdated and prior to the system's development, the organizations used paper-based records, which were difficult to organize and retrieve, prone to damage, loss and duplication and time-consuming for employees to update and maintain. Additionally, there were no existing Information Management System was tailored to the specific needs of local farmers. These studies were limited use of structured development methods and without digital systems, organizations are lack of real time decision support tools.

Considering these results, the researcher aimed to design and develop a cacao farmers and growers information management system at Cagayan State University- Lasam. This research examined the develop Information Management System of Cacao farmers and growers. The objective of this study is to automate records of cacao farmers and growers of Lasam, in order to produce reliable, accurate reports and automated file management and provides back-up databases of all records.

Additionally, this study aimed to discover if Cacao Farmers and Growers Information Management System can be applied to other organizations with similar needs. In doing so, this study would not only contribute to the understanding of Information Management Systems in Cagayan State University - Lasam but also provided recommendations for improving these systems to enhance their reliability, perceived ease of use, and long-term utility.

Objectives of the Study

This study aimed to determine the problems with the existing manual process and to design and develop a new system of Cagayan State University – Lasam's records of cacao Farmers and growers.

Significance of the Study

The significance of this study brings positive changes in the management of Cacao Farmers and Growers of Cagayan State University – Lasam. This study brings importance at many levels including academic and institution. The result of this study is favorable to the University, benefited the students in the university in making research similar in this study. This study offered several strategic assets to the CSU-Lasam Administrators especially if the university is aiming to lead in innovation, agricultural research, community extension, or regional development. The administrator would easily manage, maintain, and upgrade facilities depending on the data of Cacao Farmers and Growers and to the extension coordinator would play a vital role in the operation of Cacao farmers and Growers Information System. The extension coordinator would easily track farmers profile and provide sufficient information needed and other reports. This study would help cacao farmers and growers in managing their records orderly and easily update their records. Additionally, it would easily automate and find records in order to produce reliable, accurate reports and automated file management and to the Researchers, this study offered researchers a knowledge base opportunity to deepen their understanding in technology, innovation and agriculture. It would contribute meaningfully to policy and community development. Researchers would explore technologies and integrate the Cacao farmers and Growers Information management system similar in their study. This study also offered substantial value for the future researchers, particularly those exploring agriculture innovation, and technology development.

METHODOLOGY

Research Design

In this study, it discussed the methods used in the collection and analysis of data. The methods focused on the experiences of those involved and to identify the causes of specific descriptions. Interviews and data collection methods was use to conduct the assessment process.

This study used Agile Model framework to combine Descriptive Analytical and Developmental Approach. The assessment of CSU Lasam existing Cacao farmers and growers' management procedures, rules and concern is the descriptive section. Another

application is the ISO 25010:2023 Standards and Technology Acceptance Model (TAM) for the participants evaluation of Cacao Farmers and Growers Information Management System.

The Agile lifecycle Model was used in developing Cacao Farmers and Growers Information Management System, which contains of the following sequential stages - plan, design, develop, test, deploy, review, and launch, this were used during the developmental phase as seen in Figure 2.



Figure 2. Agile Model

Respondents

The participants of this study includes stakeholder involved in the development, implementation, and usage of the system. To identify the participants of the study, a purposive sampling was use.

The study involved 2 business officer, 1 extension coordinator, 1 staff and the CEO from Cagayan State University – Lasam, 20 Cacao farmers and growers from Natalged a Lasam Sustainable Cooperatives and 10 IT experts from Cagayan State University Aparri and Lasam Campus. This are the respondents who would contribute to the analysis, design, testing, and implementation of the system, system assessment, major and minor issues, and other concerns in the process.

Research Instrument

The following instruments was use to collect information or data of the Cacao farmers and Growers Information Management System:

Interviews: One on One interview with the extension coordinator, president/chairperson of Cacao, staff, and farmers and growers to gather in-depth insights, opinions, suggestions, and important information regarding Cacao Farmers and Growers practices, rules and regulations, policies, challenges, and expectations.

Survey and Questionnaires: The researcher used two (2) sets of questionnaires for the evaluation and assessment of the system:

- ISO 25010:2023 software quality standard
- Technology Acceptance Model (TAM)

These questionnaires composed of different criteria and various interpretations that would assess the extent of the project's compliance to ISO 25010:2011 software quality standard and User Acceptability. Structured sets of questions was distributed to participants to collect quantitative data.

Observations: The researcher observed the settings of Cacao farmers and Growers management to gain better understanding about the process, policies, current practices, and identify areas of improvement.

Document Review: The researcher gather and collect historical data, policies, and documentation. Examines the existing documents, records, and reports related to Cacao Farmers and Growers.

Data Gathering Procedures

An ethics clearance was acquired in the Cagayan State University Ethics Committee with reference code: CSU-IERB-2026-02-281. This established that the study behavior was ethical in line with the university ethics.

After that, a formal communication was made to the office of Campus Executive Officer of Lasam Campus. Then after receiving the approval from the CEO of Cagayan State University – Lasam, this communication was extended to the concerned office. The researcher conducted a personal visit to the agency to know the process and standard operating procedures of the Cacao Farmers and Growers. During the visit, the general objectives, the purpose of the study, and the benefits to the participants was being presented. An interview was conducted to collect relevant information to ensure the validity of data gathered. Before the system's development began, user participants was interviewed using a guide questionnaire to identify current practices and issues encountered using manual operation.

The researcher conducted extensive research using internet sources, and thesis books, tutorials relevant to the system development. To assess the quality and effectiveness of the develop system, feedback was gathered from end users and IT experts. Evaluation tool such as the ISO 25010:2023 standard and Technology Acceptance Model (TAM), questionnaires was distributed accordingly to IT experts and end users. The collected data was tabulated, analyzed, and the results was discussed and presented. These data gathering procedures is adaptable based on the future needs of the Cacao Farmers and Growers Information Management System.

Data Analysis Plan

Data analysis used descriptive statistics especially frequency count, weighted mean and percentage in describing and interpreting the data. Frequency count and percentage was utilized in the practices, policies and issues concern in the study. Weighted mean was use in the assessment of the developed system. The scale shown in table 2 is the interpretation of the result.

$$\text{Weighted Mean} = \frac{\sum(w_i \cdot x_i)}{\sum w_i}$$

The analysis of the gathered data involved the utilization of the following descriptive statistical tools. The Weighted Mean used to calculate the system's extent of compliance to ISO 25010:2023 and Technology Acceptance Model Tool (TAM). The Likert Scale will employ to obtain the point scales and descriptive equivalents of the participants' responses on the system through the survey questionnaire. The Likert scale consisting of five points, with each point corresponding to a descriptive equivalent as presented in table 1 and 2, which will measure the extent of compliance of the system.

Table 1. Interpretation for IT Expert assessment tool using ISO 25010:2023 software quality standards.

Scale	Mean Range	Descriptive Value	Verbal Interpretation
5	4.20-5.00	Very high Extent	The measure described in the item is compliant to the VERY HIGH EXTENT

4	3.40-4.19	High Extent	The measure described in the item is compliant to a HIGH EXTENT or VERY SATISFACTORY
3	2.60-3.39	Moderate extent	The measure described in the item is compliant to the MODERATE EXTENT or SATISFACTORY
2	1.80-2.59	Low extent	The measure described in the item is compliant to the LOW EXTENT or FAIR
1	1.00-1.79	Very low extent	The measure described in the item is compliant at the LOWER EXTENT

Table 2. Interpretation for End-users evaluation using Technology Acceptance Model (TAM).

Scale	Mean Range	Descriptive Value	Verbal Interpretation
5	4.20-5.00	Strongly Agree	The measure described in the item is VERY USEFUL or VERY EASY
4	3.40-4.19	Agree	The measure described in the item is USEFUL or EASY
3	2.60-3.39	Neither Agree or Disagree	The measure described in the item is NEUTRAL or MODERATE
2	1.80-2.59	Disagree	The measure described in the item is LESS USEFUL or DIFFICULT
1	1.00-1.79	Strongly Disagree	The measure described in the item is NOT USEFUL or VERY DIFFICULT

RESULTS AND DISCUSSION

Current Practices, Problems, and Issues in the Information Management System

This section presents the result of the thematic Analysis done on the Current Practices, Problems, and Issues in the Information Management System, as a response to the first problem statement.

The thematic analysis discovered the respondents' experiences, revealing five distinct but interrelated themes that describe the

current state of the information management system, namely: (1) *manual and non-integrated record management*, (2) *time-consuming and repetitive work processes*, (3) *challenges in record organization, retrieval, and access*, (4) *data integrity, security, and storage concerns*, and (5) *limited reporting and need for system integration*.

For the first theme (Manual and Non-Integrated Record Management), it shows that records are handled manually, with digital tools used separately rather than as a unified system. Meanwhile for theme 2 (Time-Consuming and Repetitive Work Processes), it reflect tasks that require multiple steps and repeated processes of recording data that takes time. Moreover, theme 3 (Challenges in Record Organization, Retrieval, and Access) reflects record handling to be difficult when needed to organize, track, retrieve, search, and access data. Theme 4 (Data Integrity, Security, and Storage Concerns) contains issues related to data accuracy, protection, and physical storage. For the fifth and final theme (Limited Reporting and Need for System Integration) it is shown that reporting is indeed, inefficient, and respondents suggested a centralized system for improvement.

The first theme, *Manual and Non-Integrated Record Management*, shows that records are managed through manual processes and the use of separate digital tools such as Excel, Word, and Google Drive. In a verbatim example when respondents are asked about their workflow, respondent 2 (R2) stated “...manual profiling of cacao growers and compiling it in a folder”. Additionally, respondent 1 (R1) answered with “...we used manual process of recording of data...”; describing practices such as manual recording and storing files in separate folders, reflecting the absence of an integrated or centralized system.

The theme reflects the current problems encountered in data integration due to “siloes data organisation” (Ceh & Tekavec, 2023). Moreover the result is consistent with ABBE Technology Solutions (2025), which noted that disconnected systems and inconsistent data formats hinder coordination and efficiency. Li et al. (2024) also mentioned data silos or scattered collection of data, present challenges because integrating data from many sources demand a lot of manual work and means; and that integrating and evaluating data across different methods is difficult (Tripathi et al., 2024). Additionally, scattered data have been described as a factor that long prevented seamless data sharing (Abdu et al., 2023), resulting in insufficient resource and decision-making (Patidar, 2023). Similarly, Laudon and Laudon (2020) emphasized that information management systems support the integration of data for organizational use. The current practice identified, however, shows reliance on multiple independent tools rather than a single system, resulting in fragmented record management that calls for a need of centralized system to improve work processes.

For the second identified theme titled *Time-Consuming and Repetitive Work Processes*, it shows that record-related tasks involve multiple steps, including compiling, scanning, and reprocessing files, aside from manually doing it. Verbatim evidence like “*Compiling files on folders then scanning it and putting the e files again on the desktop*” from R2 and both respondents indicating agreement that record processing take excessive time, these factors contribute to inefficiency and delays in completing tasks.

The current reliance on manual processes results in repetitive work and increased processing time. This result is related to an identified

issue: workload imbalance that increases the chance of error (Dhaja et al., 2025). The findings suggest that the absence of streamlined processes contributes to operational inefficiency, which is consistent to the study of Nasution et al. (2025) where they identified documentation problems brought on by inconsistent processes; same goes with the study of Yulia et al (2025) that by identifying bottlenecks could improve service delivery. Yusof et al. (2024) further noted that error rates are generally lower in standardized workflows compared to tasks that are complex, highly customized, or workload-intensive. In contrast, this supports the observation of Quitain et al. (2024) that automation in information management systems can reduce manual workload and improve efficiency.

For theme 3: *Challenges in Record Organization, Retrieval, and Access*, the theme reflects records that are difficult to organize, track, retrieve, and access. When asked about the problems encountered daily, R1 mentioned that “...most of the files are not in proper place”; while R2 stated that the most challenging part would be “on sorting the files and segregating it on different folders”. In addition, the respondents indicated agreement in difficulty in tracking files and inefficient retrieval, limited search and filtering functions, and that accessing these records make it difficult to locate needed information in a timely manner.

Studies show alignment with these results. Laudon and Laudon (2020) discussed how dispersed data storage limits accessibility and usability; and can negatively affect data retrieval (ABBE Technology Solutions, 2025). Moreover, the lack of digital backups made tracking documents difficult (Agwatu et al., 2025) because despite considered as a concern; manual transactions are continued even if they are now considered outdated (Hambre, 2024). The current system reflects these issues, as the lack of centralized organization leads to inefficiencies in accessing records. These evidences backed the notion that digitalization of records can permit reliable and faster access (Uy et al., 2023) compared to the traditional means of organizing and retrieval practices.

Data Integrity, Security, and Storage Concerns, is the fourth identified theme. The findings reveal issues related to data accuracy, storage, and protection. Respondents identified concerns such as inconsistencies, vulnerability to damage, storage limitations and “data that is prone to errors and misplaced” as stated by R1 regarding manual record management.

These findings are supported by studies: Ponemon Institute (2021), which reported increased risks related to data management, particularly when systems lack adequate controls. Abella (2025) also noted that poor handling of records can result to interrupted daily process or even data breach. Additionally, this theme is consistent with a study noting that isolated systems result in issues like data redundancy and inconsistency (Abdu et al., 2023) and can hinder data integration and reuse (Al-Subhi & Al-Suqri, 2025). In the context of this study, the reliance on poor storage conditions and manual management increases the likelihood of errors and inconsistencies; along with noticeable delays (Agwatu et al., 2025) and were shown to be very vulnerable to mistakes, missing records, and even possible manipulation (Agwatu et al., 2025). These findings indicate the need for improved data handling and storage practices.

For the fifth and final theme titled: *Limited Reporting and Need for System Integration*. The results indicate that reporting processes

are limited and inefficient. Respondents noted difficulties in generating reports and expressed the need for a system that can consolidate processes within a single platform, as evidenced: “...I wish we have a system that caters all the needs we want especially in recording of data and information of the farmers and growers” (R1); and “...to improve our workflow, I think it would be better if we have a system in our office where in all files was compiled inside 1 app only so that sorting and searching for files would be easier”(R2).

The theme is consistent with a study highlighting the urgent need for improved system to lessen human error (Dhaja et al., 2025); and with limited reporting capabilities, Quitain et al. (2024) emphasized that systems indeed improve data accessibility and reporting efficiency. Moreover, a system ensures that users can securely access it and that their identity is verified before being granted access (Revathi et al., 2023). In the same way, a centralized system helps maintain more accurate information and minimizes delays by managing everything in one place (Otuagoma et al., 2023); and that improved records systems can enhance performance and operational efficiency (Abella, 2025). These concepts highlight the importance of having an integrated, secure, and centralized system in improving overall information management.

The current setup, which relies on separate tools makes reporting more difficult and time-consuming with practices that are manual, fragmented, and process-heavy, with challenges in organization, accessibility, data handling, and reporting. These conditions contribute to inefficiencies and increase the likelihood of errors, highlighting the need for a more centralized and organized system. As noted by Hambre (2024), “Management” refers to a system that should enable easy file access, organization, retrieval, and is automated.

Overall, the findings show that the current practice of information management in Cagayan State University-Lasam for Cacao farmers and growers is weak and needs upgrading. Aside from slowing processes down, this also affects the local governments’ efficiency and in return reduces the public trust in them, indicating that strengthening records management is essential not only for improving internal operations but also for maintaining credibility and public confidence (Agwatu et al., 2025).

Developed Information Management System Addressing the Identified Challenges and Issues Encountered

This section presents the system interface of the developed Cacao Farmers and Growers Information Management System of Cagayan State University-Lasam, providing a visual representation of its key features and functionalities. These interface views illustrate how the system addresses the identified challenges and issues encountered by users.

The log-in interface. This feature will require the intended user to input his/her username and password to proceed. This feature highlights the upgraded factor relating to security and storage; which are one of the identified themes and equally, problems encountered of the users.

The system consists of three main sections: Data Collections, Miscellaneous, and System Maintenance. Under Data Collections, the system includes Farmers Information, Growers Information, Farm Land Management, and Cacao Planters Monitoring.

In the Farmers Information unit, users can add new farmers and

input relevant details, including cacao-related information. Upon saving, the farmer automatically receives a welcome SMS message. Users can also update, delete, or close records. The same functions are available in the Growers Information section.

The Farm Land Management allows users to select a farmer and input details such as farm location, total land area, and upload a Google Earth geotag indicating where the farm is located. Multiple farmland entries can be added by clicking “New” and then saving. To generate the location, users must open Google Earth Pro, search for the location, and select the specific land area.

Lastly, the Cacao Planters Monitoring section displays the progress of cacao planting. Once data is entered under Farm Land Management, it is automatically reflected in this module, including the total number of hectares; and by clicking New Transaction, users can select a farm, input the number of trees, and specify the stage of the trees (e.g., seedling, newly planted, or matured), enabling hassle-free monitoring of progression.

These features address manual and non-integrated record management (theme 1) by centralizing all data into a single system. They also reduce time-consuming and repetitive processes (theme 2) by enabling efficient encoding, updating, and retrieval of information, as the Data collection comes with a Reports Generation (Farmers association directory, growers directory, agricultural farm land report, and cacao transaction can be printed out). Additionally, they improve record organization, retrieval, and access (theme 3) through structured modules for easier data management.

Meanwhile, under the Miscellaneous section, the system includes Cacao Variety, Cacao Commodity, Investment Guide, SMS Notification, SMS Contacts, and SMS Templates.

In Cacao Variety, users can view different cacao varieties and add new ones by clicking “New” and entering the variety name, description, and key characteristics. Records can also be updated, deleted, or closed.

In Cacao Commodity, users can view different cacao products available for market trading.

The Investment Guide provides information and guidance for farmers and growers regarding cacao seeds and products.

For SMS Messaging and SMS Contacts, farmers and growers receive notifications, and other announcements regarding cacao. In SMS Templates, users can create and manage messages to be sent, including adding new templates, as well as updating, deleting, or closing existing ones.

The Miscellaneous function addresses several identified challenges. It supports the themes identified particularly on limited reporting and information needs (theme 5), through the Investment Guide, Cacao Variety, and Cacao Commodity. It improves organization and access (theme 3) by structuring related data into organized modules. The SMS features further addresses time-consuming processes (theme 2) by enabling automated communication and promote data consistency (theme 4) through standardized message templates.

Lastly, under System Maintenance, the system includes System User Management, System Logs History, Association Setting, Frequently Asked Questions, System Information and Back up.

In System User Management, users can add new system users by

entering details such as username, full name, address, contact number, password, retype password, and access level. This section also allows users to refresh, create, update, and manage user roles. Moreover, the System Logs History displays records of user activities within the system; and in Association Setting, users can create new associations as well as update, delete, or close existing records. The Frequently Asked Questions section can also provide answers to common questions related to cacao, while System Information contains general information about the system. The back up section allows user to back up the file to avoid data loss and ensure quick recovery in case of hardware failure, malware attacks or accidental deletion.

The System Maintenance module addresses key themes identified. System User Management and System Logs History directly support data integrity and security concerns (under theme 4) by managing user access and tracking system activities. The Association Setting contributes to record organization (theme 3) and management (theme 1) by allowing structured handling of related data. Meanwhile, Frequently Asked Questions and System Information address limited information access (under theme 5). This provides users with readily available references. Overall, this function supports controlled system use, accountability, and organized management of system-related data.

IT Experts’ assessment of the developed system’s compliance with ISO 25010

Table 3. Summary of IT Experts’ assessment of the developed system’s compliance with ISO 25010

Summary	Weighted Mean	Descriptive Value
A. Functional Suitability (What does the app or technology do?)	4.2	High extent
B. Performance Efficiency (Does the app or technology use an optimal amount of resources?)	4.03	High extent
C. Compatibility—can the app or technology work cross-platform or share data with other products, systems or components?	3.95	High extent
D. Usability—can specific users use the app in specific conditions?	4.22	Very high extent
E. Reliability—an extremely important issue	4.3	Very high extent
F. Security (Does the app or technology protect information and data?)	4.32	Very high extent
G. Maintainability (Will it be possible for the app to be modified or improved in the future, or will it adapt to changes in the environment?)	4.22	Very high extent

H. Portability (can the software be used in various environments?)	3.17	Moderate extent
General Weighted Mean	4.05	High extent

Legend: 4.20 - 5.00 Very high extent; 3.40 - 4.19 High extent; 2.60 - 3.39 Moderate extent; 1.80 - 2.59 Low extent; 1.00 - 1.79 Very low extent

Table 3 presents the summary of IT experts' assessment of the developed system based on ISO 25010 components. The system obtained a general weighted mean of 4.05, interpreted as high extent. Among the components, security (4.32) received the highest rating, interpreted as very high extent, indicating that the system is highly effective in protecting data and ensuring safe operations. In contrast, portability (3.17) obtained the lowest rating, interpreted as moderate extent, suggesting that the system has limitations in terms of adaptability across different platforms or environments.

With the system having obtained a result of high extent, this implies that the evaluated quality attributes were generally rated positively. This suggests that the system meets acceptable standards of software quality, consistent with what a quality management would include, as defined: the degree to which a system satisfies specified requirements and user expectations (Tarranco, 2026). This supports the perspective of Mugambwa et al. (2025), that automation in particular, can enhance operational efficiency. Similarly, a study highlighted that automating routine tasks, such as report generation save time (Kayanja et al., 2025).

Overall, the findings indicate that the system developed for Cagayan State University-Lasam in managing information of Cacao farmers and growers was generally evaluated positively across most ISO 25010 characteristics, with portability identified as the least rated area. Additionally, relatively lower scores in resource utilization and interoperability suggest specific aspects where further improvements may be considered. These results align with existing studies which notes that there are increasing innovations in technological development, particularly in the field of information technology (Canlas et al., 2022), and as devices and operating systems continue to expand; the demand for software applications that can run smoothly across different environments has become increasingly important (Segun-Falade et al., 2024).

End-Users' assessment of the developed system using the Technology Acceptance Model

Table 4. Summary findings of End-users' assessment of the developed system using the Technology Acceptance Model—User Acceptance of the Developed and Perceived ease of use and usefulness as efficacy.

Technology Acceptance Model	Weighted Mean	Descriptive Value
A. Performance Expectancy	4.88	Strongly Agree
B. Effort Expectancy	4.64	Strongly Agree
C. Social Influence	4.67	Strongly Agree
D. Facilitating	4.6	Strongly

Conditions		Agree
E. Behavioral intention	4.8	Strongly Agree
F. Perceived Ease of Use	4.8	Strongly Agree
G. Perceived Usefulness	4.8	Strongly Agree
H. Self-Efficacy	4.76	Strongly Agree
I. Response Efficacy	4.72	Strongly Agree
J. Adoption Intentions	4.74	Strongly Agree
General Weighted Mean	4.74	Strongly Agree

Legend: 4.20 - 5.00 Strongly Agree; 3.40 - 4.19 Agree; 2.60 - 3.39 Neither; 1.80 - 2.59 Disagree; 1.00 -1.79 Strongly disagree

Table 4 presents the overall assessment of end-users on the developed system, with a general weighted mean of 4.74, interpreted as strongly agree. Among the components, performance expectancy (4.88) obtained the highest mean, indicating that users strongly believe the system enhances their performance and productivity. In contrast, facilitating conditions (4.60) received the lowest mean, although still interpreted as strongly agree, suggesting that while users perceive adequate support and resources, this aspect is relatively less emphasized compared to other factors.

The consistent high ratings across all components indicate that users had a uniformly positive experience with the system, suggesting that it effectively meets their needs in terms of performance, usability, and functionality. This can be explained by the strong influence of performance expectancy, as users are more likely to develop positive perceptions when they believe that a system enhances their work efficiency and productivity (Li, 2025). Beyond individual experience, the findings also reflect the broader relevance of digital technologies in agriculture, as such innovations can enhance data management and improve service delivery (Shamshiri et al., 2024), while agri-food technologies continue to reshape the sector through evolving technological and environmental influences (Abiri et al., 2023). In this context, ICT-based systems can support improved farming practices and contribute to farm resilience (Dujali et al., 2025; Finger, 2023), reinforcing that the developed system is relevant not only at the institutional level but also within the wider agricultural scope. However, it is important to recognize that digitization does not replace core value-creating activities but rather supports and transforms them (Verhoef et al., 2021), serving as a mechanism for innovation and efficiency (Xu et al., 2022). Thus, integrating technology into information management is not merely an operational improvement but a strategic necessity, as organizations must adapt their internal processes and external services in response to digital technologies to remain competitive (Tagscherer & Carbon, 2023).

Conclusion

The findings of the study revealed that the existing information management practices of Cagayan State University-Lasam for cacao farmers and growers are inefficient due to fragmented and manual processes, resulting in disorganized, inaccessible, and unreliable records, thus confirming the need for system improvement. The developed information management system effectively addressed these issues by centralizing data, streamlining workflows, and enhancing reporting capabilities, thereby meeting needs. The IT experts' evaluation based on ISO 25010 confirmed that the system meets acceptable quality standards, with security rated highest and portability lowest, indicating the need for improved cross-platform adaptability. Meanwhile, the end-users' assessment using the TAM showed a high level of acceptance, with performance expectancy rated highest, reflecting strong perceived usefulness, while facilitating conditions, though still positively rated, suggest the need for better support and resources. These findings imply that adopting a centralized and automated system significantly improves operational efficiency, data accuracy, and service delivery. Overall, the study concludes that the system effectively resolves existing limitations and meets technical and user requirements, while continuous improvement is necessary to ensure long-term efficiency and sustainability.

Recommendations

Based on the findings and conclusions of the study, several recommendations are proposed. System development should focus on improving portability by ensuring cross-platform compatibility through web-based and mobile-based versions, as well as optimizing resource utilization for efficient performance across various devices. University stakeholders, particularly users and IT personnel of Cagayan State University-Lasam, are encouraged to strengthen facilitating conditions by providing reliable technical infrastructure, continuous system maintenance, and structured user training programs to support effective and sustained system adoption. Cacao farmers and growers are advised to consistently utilize the system for accurate data entry and record management, while actively participating in training initiatives to enhance their digital skills and maximize the system's benefits in farm management. Furthermore, future researchers may expand the study by enhancing system scalability, usability, and integration with other agricultural technologies, and by evaluating its long-term impact on productivity, data management efficiency, and user adoption.

Declaration of no conflict of interest

The author hereby declares that this article is her original work and that there was no conflict of interest.

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