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Suta: A Loan Collector Monitoring System with GPS-Based Geolocation Tracking for AIMCoop, Zamboanga del Sur

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Abstract

Cooperatives have used cutting-edge technical solutions in response to the growing need for transparent and effective loan collector monitoring. Suta: A Loan Collector Monitoring System with GPS-Based Geolocation Tracking, created especially for AIMCoop in Zamboanga del Sur, is presented in this study. The system attempts to solve the problems with manual loan collector monitoring, such as insufficient accountability, ineffective route tracking, delayed reporting, and a lack of real-time supervision. SUTA increases operational oversight and boosts the general effectiveness of loan collecting actions by incorporating contemporary mobile and web technology.

The system's design and deployment were guided by the developmental research approach and the Agile Software Development Framework. Iterative development, ongoing stakeholder feedback, and gradual improvement of system features were made possible by this method. To determine current issues and system needs, information was obtained through surveys, observations, and interviews with AIMCoop management staff and loan collectors. The development of a user-centered and responsive monitoring system was based on these inputs.

Important features including real-time GPS tracking, route history display, live monitoring, and automatic reporting are all included in Suta. The solution guarantees transparency and enhances field accountability by allowing managers or supervisors to track collectors' whereabouts and actions in real time. Additionally, loan collectors gain from streamlined reporting procedures and organized task assignments via a mobile application that lowers paperwork and boosts productivity. The incorporation of geolocation technology guarantees precise tracking and reduces the possibility of fraud or inefficiencies.

Suta is a useful technical solution for updating cooperative loan collector administration. Incorporating GPS-based geolocation tracking enhances accountability and oversight while facilitating data-driven operations. To increase loan collection processes' effectiveness, transparency, and service delivery, this study advises other cooperatives and financial institutions to use comparable methods.

Keywords: Loan Collector Monitoring System, GPS-Based Geolocation Tracking, Cooperative Management System, AIMCoop, Loan Collection Efficiency, Real-Time Tracking, Field Personnel

Monitoring, Mobile Application, Route Tracking, Financial Technology (FinTech), Operational Transparency, Data-Driven Decision Making, Zamboanga del Sur

1. Introduction

In a time where digitalization rules operational effectiveness, organizations, especially those in the financial sector, need to conform to technology-based solutions to keep up. The implementation of updated tools like geolocation services, real-time monitoring, and data analysis has become central to numerous sectors. Financial institutions around the globe are adopting innovations not just to simplify operations but also to provide security, accountability, and transparency. This change corresponds to the increased need to facilitate service delivery in a manner that ensures effective monitoring systems, particularly in positions working outside the ambit of conventional offices.

The banking sector is important in initiating economic growth, especially in rural areas. Cooperatives, or co-ops, have historically been an available financial source for marginalized groups of people. In the Philippines, cooperatives are effective in providing members with financial services such as saving, credit, and lending, especially in regions where formal banking is either not readily available or infeasible. These organizations are highly dependent on loan collectors who have the assigned function of collecting payments from members scattered over geographical locations. The character of their job demands strict work in the field, with perhaps least supervision. Therefore, tracking their movement, efficiency, and accountability is a daunting task for cooperative administration. Conventional monitoring techniques like manual logs, paper reports, and telephone call confirmations are slow, error-prone, and susceptible to manipulation. Further, they lack real-time information, which restricts the cooperative from making informed and timely decisions. Such a discrepancy between operational requirements and available tools highlights the need for technological interventions that enable precise, efficient, and real-time monitoring of loan collectors' activities. A geolocation tracking system based on GPS offers a viable solution to these operational issues.

Focusing on the case of the AIMCoop in Zamboanga del Sur, a reputable cooperative famous for its lending services and outreach services, the problem of keeping track of field staff has become more evident. As more members and service areas are added, the cooperative needs to ensure that its loan collection is efficient and secure. Loan collectors tend to cover several barangays and municipalities, and without a computerized system to monitor their activities, collection discrepancies, skipped schedules, and even security issues may occur.

This research aims to conceptualize and create Suta: A Loan Collector Monitoring System with GPS-Based Geolocation Tracking specifically suited to the requirements of AIMCoop. The system will allow the management of the cooperative to see the real-time location of its loan collectors, map areas visited and assess their route optimality. Also, the system can record visit durations, help verify reports, and enhance transparency in the company. From a management perspective, this type of monitoring tool is crucial not just for performance assessment but also for optimizing resources and maintaining field employees' safety. At a micro level, the deployment of a GPS-based monitoring system is not just a technological enhancement, it is a move toward institutional accountability and evidence-based decision-making. By streamlining the monitoring process, the cooperative can eliminate administrative hassles, ensure field

activities are in line with organizational objectives, and enhance member trust through transparent operations.

The justification for this research arises from the perceptible requirement for AIMCoop to enhance its monitoring systems for remotely operating loan collectors. With the handicaps of the existing manual systems, cooperative runs the risks of inefficiency, reporting inaccuracies, and minimal field visibility. Additionally, when customer complaints or differences in collections occur, the lack of valid location information renders it challenging to solve such cases objectively and expeditiously.

The CIPP evaluation model is well-suited to the systematic development and assessment of a Suta. In Figure 1, it shows how we can apply the four pillars of CIPP – Context, Input, Process, Product – to our design, implementation, and evaluation of Suta. In Context, Suta confronts the deep-rooted issues of the least supervision of loan collectors when they are in the field. Management has a traditional or manual monitoring system on what their activities are remotely, if they have religiously complied to the itineraries assigned to them for the day. This converts an issue to the loan collector's transparency and accountability in their work. In Input, Suta is a multi-platform system which can be accessed through desktop and mobile devices (smartphones). In this way, Suta can utilize the GPS tracking system of the mobile devices to determine and track its location. Mobile devices have built-in GPS receivers that detect signals from orbiting GPS satellites. A collection of tools called the Google Maps API (visual representation and Geofencing API (virtual boundary. All these technologies will be maximized with the help of the internet. Integration and communication between every other Inputs discussed is bridged by the internet. In Process, batch itinerary upload is the process uploading the predefined schedule in the system for batch processing. This represents the assignment of each loan collector's debt collection and recovery activity of the day. Mapping and location display is the integration of GPS technology and Google Maps API is cohabitation that GPS System constantly broadcasts satellite signals that include their orbital data and the precise time the signal was sent, and Google Maps then uses this location data to place marker on its map, showing the device's position. In essence, GPS System provides raw location data, and Google Maps provides visual representation and map data to make it more understandable and usable for the user. Geofencing API handles the alert system and notifications, that once the device or loan collector deviates to the designated virtual fence, it sends messages of notification alerting the occurrence of the event. In Product phase, Suta can show route validation and time management of every loan collector. It can display tracking history and live location of each loan collector, in this way, security of the loan collectors in the field can be monitored remotely. It can also monitor the debt collection and recovery activity of each loan collector, which shows their accountability of the cash collection.

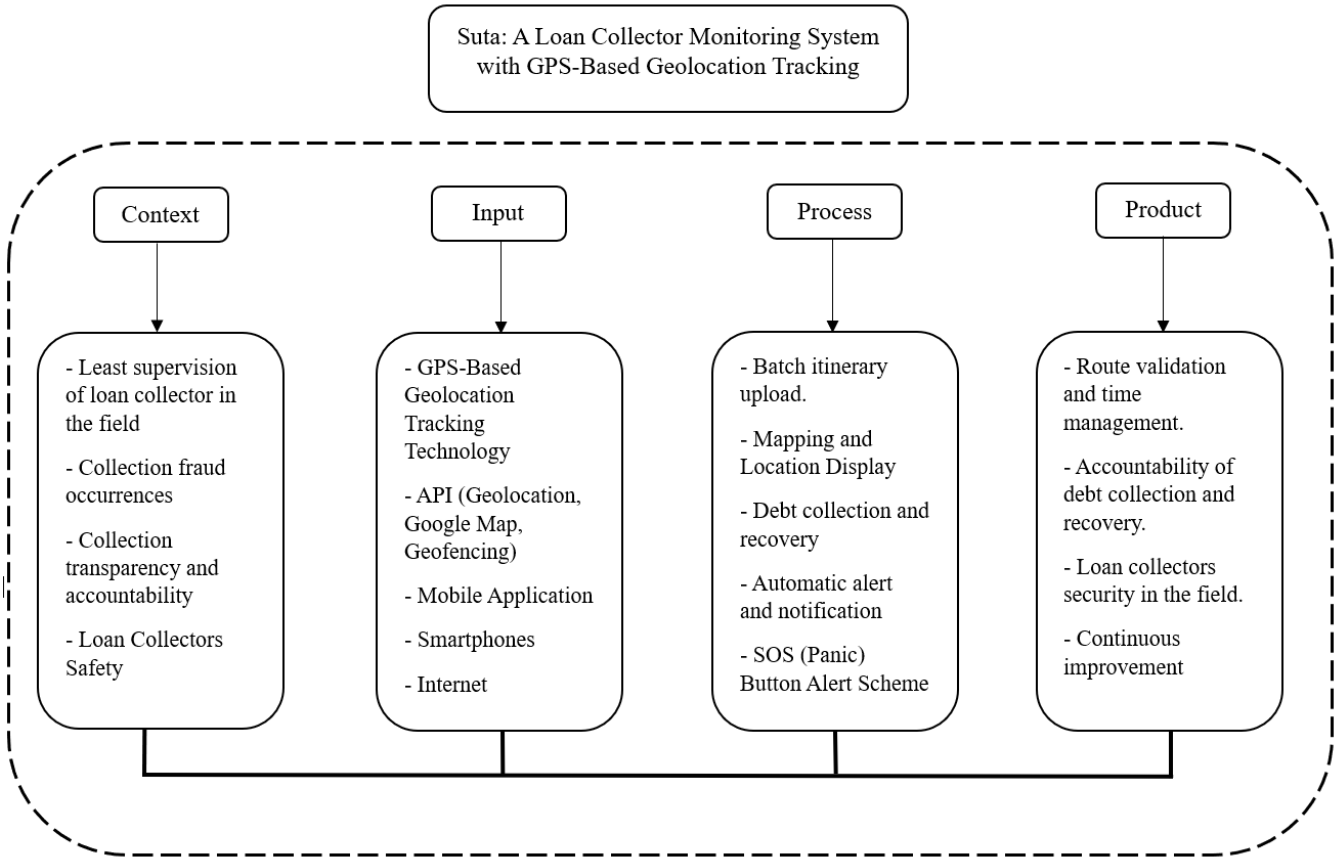

Figure 1: Schema of the Study

Loan collection is a critical part in financial service cooperative operations such as AIMCoop in Zamboanga del Sur. Operational transparency and efficiency are hindered by challenges in tracking the location and productivity of the loan collectors, ensuring their security, and validating field visit reports. To enhance accountability, optimize route planning, and monitor geolocation information in real-time, this research aims to develop a Suta: A Loan Collector Monitoring System with GPS-Based Geolocation Tracking.

Specific Statements of the Problem:

1.) What is the current state of Loan Collectors' supervision and monitoring in AIMCoop?
2.) How can Loan Collectors Monitoring System with GPS-Based Geolocation Tracking System be developed?
3.) What are the processes involved in the design of the Loan Collectors Monitoring System with GPS-Based Geolocation Tracking System?
4.) How do the respondents rate the developed Loan Collectors Monitoring System with GPS-Based Geolocation Tracking System in terms of:
    4.1 Functionality;
    4.2 Reliability;
    4.3 Usability;
    4.4 Efficiency;
    4.5 Maintainability;
    4.6 Portability and

4.7 Security?

2. Literature Review

Borromeo, J. E. (2021).In his research, Borromeo created a GPS-based vehicle tracking system to provide secure monitoring of vehicle locations. The system has such features as anti-theft functions and real-time tracking, giving an all-inclusive solution to vehicle location monitoring, speed, route, and total mileage. This study demonstrates the utility of GPS technology in improving security and operational effectiveness within transport systems. Yin, F., Lin, Z., Xu, Y., Kong, Q., Li, D., Theodoridis, S., & Cui, S. (2020).The authors presented FedLoc, a federated learning architecture for cooperative localization data-driven and processing location data. The research underscores the employment of decentralized machine learning models to attain precise location services while sustaining user anonymity. The technique is most applicable to applications that involve cooperative localization, including field agent monitoring in financial organizations.

Saxon, J., & Feamster, N. (2021).Saxon and Feamster investigated the validity of geolocation of consumer IP addresses by GPS-based approaches with data drawn from smartphones. The results indicate that GPS information provides better accuracy in IP geolocation, and this has considerable impact on services dependent on location information, such as financial services and fraud detection systems. Thao, T. P. (2020).Thao introduced a location-based behavioral authentication approach based on GPS distance coherence. The research illustrates that examining the location history of users can be used as an effective authentication factor, with high accuracy rates. The approach has the potential to improve security provisions in systems where it is imperative to authenticate the identity of mobile agents, such as loan collectors. Namazi, E., Mester, R., Lu, C., & Li, J. (2022).The authors created a geolocation estimation methodology for target vehicles based on image processing and geometric computation. Through the combination of deep learning and monocular camera information, the research introduces a new method to dynamically estimate the latitude and longitude of vehicles, which can be used to track the movement of field staff in real-time.

Engana, J. M. C., & Faelangca, K. C. (2024).Engana and Faelangca developed a wireless motor vehicle ignition system incorporating GPS tracking and fingerprint identification technology. This system aims to enhance vehicle security and facilitate recovery by preventing unauthorized access and enabling real-time location tracking. The integration of biometric authentication with GPS technology demonstrates a practical approach to improving security measures in transportation.
Borromeo, J. E. (2021).Borromeo suggested a GPS-based vehicle tracking system that is intended to safely track vehicle locations. The system features anti-theft capabilities and real-time tracking, offering an integrated solution for tracking vehicle location, speed, route, and total distance traveled. This study underscores the efficiency of GPS technology in boosting security and operational effectiveness in transport systems.

Bañez, J. H. A., Dimayuga, P. G. M., Limpengco, D. G., & Pepino, L. R. (2023).The authors created a point-to-point bus time and location tracking system through the implementation of LoRa technology. The system allows real-time bus tracking with speed and estimated time of arrival data. This study shows the use of wireless communication technologies in effective fleet management and monitoring.Daculo, K. A. R., Del Rosario, M. A., & Tan, M. C. M. (2018).Daculo et al. created a GPS-enabled mobile application

intended to support drivers during on-road emergency situations. The application identifies the closest establishments able to serve drivers' emergency demands and grants access to appropriate information. This paper emphasizes the usability of GPS technology in road safety and emergency improvement. Authors Unknown (2024).One study investigated the ethical implications of geolocation data sharing in food delivery apps in the Philippines. The study assessed user attitudes towards data privacy and sharing of personal data with food delivery companies. The research found that even though most users feel safe to share their information, data privacy concerns are still relevant.

3. Methodology

The use of the Agile Software Development Framework in this study is justified because it aligns closely with the principles of the developmental research method, which focuses on creating, testing, and refining a functional system through systematic stages. Agile's iterative approach allows the researchers to develop the system in manageable increments, continuously evaluating each version based on feedback from stakeholders, including management and loan collectors. This ensures that the system evolves according to actual user needs rather than relying solely on theoretical designs, increasing the likelihood of producing a practical, user-centered monitoring solution. By integrating development with ongoing evaluation, Agile facilitates rapid problem-solving, timely adjustments, and the delivery of a high-quality system that reflects real-world operational requirements. Furthermore, Agile emphasizes collaboration, transparency, and communication between researcher and stakeholders, which is essential for a project like Suta. Regular feedback loops, sprint reviews, and stakeholder involvement ensure that any issues, feature requests, or improvements are promptly addressed, promoting ownership and acceptance among users. This methodology also allows for flexibility in responding to unforeseen challenges or changes in organizational processes, making the system adaptable and scalable for future enhancements. Overall, employing Agile within the developmental research framework provides a structured yet flexible roadmap for developing a reliable, efficient, and continuously improving monitoring system that meets both current and evolving needs of AIMCoop. Twenty-Six (26) AIMCoop employees, ranging from main office to branches, were chosen as respondents. Prior to random selection, the population is grouped into clusters according to employee's position. To guarantee a thorough assessment of Suta, the study's respondents will fall into three different categories. IT professionals who are knowledgeable about Suta's procedural and technical compatibility. Loan collectors, who specialize in collecting debt and recouping the cooperative loan portfolio. Division Chiefs oversee the strategic movement and day-to-day supervision of the loan collectors' operations. Finally, tellers are responsible for accounting for the money that loan collectors collect and entering it into the AIMCoop's Banking System.

Respondents	No. of Respondents	%
Managers	12	46.15
Loan Collectors	5	19.23
Tellers	4	15.39
IT Experts	5	19.23
Total	**26**	**100**

Table 1. Distribution of Respondents

The study used a customized assessment tool designed to evaluate the quality of the upcoming software and based on ISO/IEC 9126 standards. Functionality, reliability, usability, efficiency, maintainability, portability, and security are the seven main quality indicators that this tool evaluates software based on. Seven distinct criteria are included in each of these indicators to gauge the software's effectiveness. The first factor, functionality, focuses on the characteristics of the system with respect to the existence and adherence to the specified properties of its functions. It seeks to describe the scope and capabilities of the system. The second factor, reliability, highlights the system's ability to function for extended periods of time without experiencing any problems. It measures the system's capacity to consistently perform its intended functions under specific conditions. The third factor, usability, assesses aspects of the system's usability as judged by a specific user group. It looks at the amount of work required for efficient operation. The fourth factor, efficiency, looks at how well the system uses its resources to carry out its operations. This entails evaluating the system's response time and throughput rates in a range of scenarios to make sure it operates at peak efficiency without consuming too much processing power or retaining data. The fifth factor, maintainability, examines characteristics that make certain system modifications simple. This involves assessing the work necessary for upcoming adjustments or enhancements. The sixth factor, portability, evaluates how easily the system can be moved from one environment to another. This enhances its versatility and usability across multiple platforms by enabling it to run on different operating systems, environments, or devices. The last consideration, security, is an essential component of the assessment tool that covers aspects of safeguarding private data, avoiding unwanted access, and defending against possible dangers or breaches. Through an expert panel review, the instrument's relevance, clarity, and alignment with the studies were assessed to establish content validity. Pilot testing was part of the review process, and experts evaluated the relevance, usability, clarity, and effectiveness to make sure it matched the intended measurement and scope based on input from loan collectors, IT specialists, division chiefs, and tellers. This thorough validation procedure made sure the tool was efficient, dependable, and appropriate for the intended assessment of the Suta application. It was guided by the opinions of both primary users, IT experts, division chiefs, and tellers.

Cronbach's Alpha Value	**Interpretation**
$\alpha \geq 0.90$	Outstanding Dependability
$0.80 \leq \alpha < 0.90$	Good Dependability
$0.70 \leq \alpha < 0.80$	Acceptable Dependability
$0.60 \leq \alpha < 0.70$	Questionable Dependability
$0.50 \leq \alpha < 0.60$	Poor Dependability
$\alpha < 0.50$	Unacceptable Dependability

Table 2: Statistical Measure of Internal Consistency and Reliability of Cronbach Alpha

This study used a multifaceted data collection process that included document analysis, in-person interviews, direct empirical observations, and structured questionnaires to thoroughly create and assess the " Suta " system. After receiving official administrative approval, these instruments were methodically distributed to the respondents to collect important operational data, user attitudes, and system requirements. The raw data was then processed using statistical software in order to derive conclusions

that were scientifically significant through inferential and descriptive statistics; in particular, frequency counts and percentages were used to determine the distribution of respondent groups, identify potential system challenges, and outline expected software features; additionally, the weighted mean was calculated to precisely gauge respondents' perceptions and rigorously assess the developed system's overall efficacy, accuracy, and acceptance.

1) Frequency Distribution = n / T * 100%
   Where: n = Number of respondents
   T = Total number of respondents
2) Weighted mean(x) = f (X1 + X2 + …… Xn) n / N
   Where: n = Total numbers of criteria

Likert Scale – A 5-point Likert scale was used in the questionnaire to measure responses from "Strongly Disagree" to "Strongly Agree." The weighted mean scores were interpreted according to the following range:

Scale	Range	Description
5	4.21 – 5.00	Strongly Agree
4	3.41 – 4.20	Agree
3	2.61 – 3.40	Neutral
2	1.81 – 2.60	Disagree
1	1.00 – 1.80	Strongly Agree

Table 3: Rating Scale

4. Result and Discussion

The study found that the current state of manual Loan Collectors' supervision and monitoring in AIMCoop remains largely traditional, paper-based, and highly dependent on human intervention. Supervision primarily relies on manual attendance logs, daily collection reports, route plans, and periodic field visits conducted by supervisors. While these methods provide basic oversight of loan collectors' activities, they offer limited real-time visibility and are prone to delays and inaccuracies. Findings indicate that monitoring is conducted after field activities have already taken place, making it reactive rather than proactive. Supervisors often verify collectors' performance based on submitted reports and verbal explanations, which creates challenges in validating the accuracy of collection data, borrower visitations, and actual field movements. This process increases the risk of reporting errors, intentional or unintentional misstatements, and difficulty in detecting non-compliance promptly. Moreover, the manual system lacks standardized performance metrics and automated tracking tools, making it difficult to evaluate collector productivity, route efficiency, and adherence to assigned schedules. Consolidation of reports is time-consuming, and data analysis for decision-making is limited due to fragmented and unstructured records. Overall, the findings suggest that while the manual supervision and monitoring system in AIMCoop is functional at a basic level, it is inefficient, labor-intensive, and insufficient to meet the growing operational and accountability demands of loan collection activities. These limitations highlight the need for a more

systematic, technology-supported monitoring approach to enhance transparency, efficiency, and supervisory control.

Current Loan Collectors Supervision and Monitoring of AIMCoop	Weighted Value	Interpretation
1. Verifying whether collectors physically visited assigned borrowers is challenging.	4.38	Strongly Agree
2. Supervisors encounter delays in detecting irregularities in collection activities.	4.21	Strongly Agree
3. Monitoring manual loan collectors requires significant time and effort.	4.84	Strongly Agree
4. Manual record-keeping leads to delays in monitoring and reporting.	4.53	Strongly Agree
5. There are challenges in reconciling collected amounts with recorded data.	4.41	Strongly Agree
6. Manual Logbooks are prone to errors or incomplete entries.	4.76	Strongly Agree
7. Upgrading to a digital monitoring system is necessary to improve loan collector monitoring.	4.63	Strongly Agree
8. A system upgrade would enhance transparency and accountability.	4.49	Strongly Agree
Mean	**4.53**	**Strongly Agree**

Table 4: Current Loan Collectors Supervision and Monitoring of AIMCoop

Criteria	Weighted Mean	Interpretation
Functionality	4.47	Strongly Agree
Reliability	4.29	Strongly Agree
Usability	4.61	Strongly Agree
Efficiency	4.48	Strongly Agree
Maintainability	4.29	Strongly Agree
Portability	4.11	Agree
Security	4.38	Strongly Agree
Total Weighted Mean	**4.43**	**Strongly Agree**

Table 5. System Performance Evaluation

The average weighted mean for functionality is 4.47. The results indicate that most respondents gave the created Suta App a favorable functional rating. The system was thought to be successful in precisely documenting field operations, tracking the position of loan collectors in real time, and supplying trustworthy data for reporting and monitoring needs. The average weighted mean for reliability is 4.29. This shows that the respondents gave the created Suta App a high dependability rating. The system was thought to consistently operate flawlessly, seldom crashes or malfunction, maintain accuracy and dependability over time, and be constantly accessible. The average weighted mean for usability is 4.61.

This result shows that the respondents gave the designed Suta App a positive usability rating. The system was thought to be simple and easy for novice users to understand and use. The average weighted mean for efficiency is 4.48. The results demonstrate that the respondents gave the created Suta App a favorable efficiency rating. By delivering results or output without needless delays, operating smoothly even when managing multiple tasks or users, completing tasks more quickly than the current practice, and operating consistently without performance drop, the system was thought to streamline loan collection monitoring processes. The average weighted mean for maintainability is 4.28. According to the results, the created Suta App was assessed well by respondents in terms of maintainability. The system was thought to be simple to update when new features were needed, to fix when issues arose, to modify to meet new needs, and to offer enough technical support for maintenance so that any technical problems could be quickly resolved without interfering with regular business operations. The average weighted mean for portability is 4.11. The findings show that the respondents gave the created Suta App a favorable portability rating. The system was thought to work reliably on all platforms and hardware, be simple to install on many devices, be simply adjusted to fit various environments, and enable backup and transfer without any problems. Respondents emphasized that being able to do monitoring and reporting chores without being confined to a particular location or workstation was made possible by mobility. The average weighted mean for security is 4.38. According to the results, the respondents gave the created Suta App a high security rating. Sensitive data was thought to be effectively safeguarded by the system, which also needs secure login or authentication before access, protects against common security threats, and ensures that personal information is secure. According to the respondents, security measures including data encryption, role-based access, and user authentication increased system confidence.

Criteria	**Cronbach's Alpha**	**Interpretation**
Functionality	0.88	Outstanding Dependability
Reliability	0.90	Outstanding Dependability
Usability	0.93	Outstanding Dependability
Efficiency	0.87	Outstanding Dependability
Maintainability	0.96	Outstanding Dependability
Portability	0.91	Outstanding Dependability
Security	0.93	Outstanding Dependability
Total Cronbach's Alpha	**0.91**	Outstanding Dependability

Table 6: Cronbach's Alpha: Software Quality Reliability Test

The Cronbach's Alpha reliability test, the instrument used to evaluate the Suta App showed extremely high internal consistency across all quality parameters. According to the calculated Cronbach's Alpha values for the seven dimensions, which varied from 0.87 to 0.96, the survey items were dependable and consistently measured the variables that were intended. Functionality ($\alpha = 0.88$), Reliability ($\alpha = 0.90$), Usability ($\alpha = 0.93$), Efficiency ($\alpha = 0.87$), Maintainability ($\alpha = 0.96$), Portability ($\alpha = 0.91$), and Security ($\alpha = 0.93$) were all found to have excellent reliability. Efficiency had the lowest alpha value (0.87) but was still within the range of good reliability, while Maintainability had the highest alpha value (0.96), showing outstanding consistency among its assessment items. All the Cronbach's Alpha values were higher than the typical cutoff of 0.70, indicating that the research instrument is generally very dependable

and appropriate for system evaluation. This suggests that the results of the questionnaire used to evaluate the developed system were reliable and consistent, confirming the validity of the study's respondents' evaluations.

4.1 Findings

The findings from the study are systematically presented below, structured to directly address the research questions and hypotheses outlined in the study.

1. **Processes in System Design**
    - A comprehensive needs analysis, stakeholder consultation, and organizational readiness assessment were all part of the design process. After evaluation, it was found that AIMCoop is keeping an eye on and managing its loan collectors in a conventional manner. Although it is minimal, the manual supervision and monitoring system is operational.
    - Following stakeholder and employee analysis, the development of mobile and web applications was completed. The loan collectors will utilize mobile applications to allow GPS satellites to track cell phones. In contrast, the tellers and the administrator/manager will use web apps for their monitoring needs.
    - By employing the seven (7) stages of the System Development Life Cycle, the researcher successfully applies the Agile Model in creating the Loan Collectors Monitoring with GPS-Based Geolocation System.
    - After assessment, it was discovered that AIMCoop's present loan collector monitoring procedure is ineffective, time-consuming, and inadequate to satisfy the increasing operational and accountability requirements of its collection operations.
    - Another important part of the system design process was determining if stakeholders and staff were ready for a system update. It is useless to include technology in the current loan collector monitoring procedure if stakeholders and staff do not adopt it. They are in favor of implementing new technologies for loan collector monitoring, according to the evaluation.
2. **System Performance Evaluation**
    - **Functionality:** With an average weighted mean of 4.47, the system produced trustworthy reports, accurately documented operations, and successfully tracked the locations of loan collectors.
    - **Reliability:** Respondents observed consistent system performance with few faults or disruptions, with an average weighted mean of 4.29.
    - **Usability:** The system supported both field and management jobs and had an average weighted mean of 4.61, making it simple to use, comprehend, and navigate.
    - **Efficiency:** The system accelerated reporting, decreased manual labor, and increased operational productivity, with an average weighted mean of 4.48.
    - **Maintainability:** Long-term sustainability was ensured by the perception that system updates, troubleshooting, and management were simple, with an average weighted mean of 4.29.

- **Portability:** With a weighted average of 4.11, the system was accessible on mobile devices, facilitating field-based and remote operations.
- **Security:** Users expressed confidence that encryption and access control were protecting sensitive data, with a weighted average of 4.38.

3. **User Group Analysis**

- The system's usability and efficacy were consistent across user groups, as evidenced by the lack of a significant variation in system performance ratings between loan collectors and admin/managers.
- The findings also show that the created Suta App functions consistently across user groups, proving its adaptability, value, and suitability for implementation across the entire organization.

5. Conclusion and Recommendation

Suta App effectively meets the needs of management and employees. It guarantees data confidentiality and dependability, boosts field monitoring, increases operational effectiveness, and may be tailored to various user groups. The system is a sustainable option for loan collection oversight because of its high usability, portability, and maintainability. All things considered, Suta App is a useful, dependable, and efficient instrument that may greatly enhance operational control and accountability in loan collectors monitoring and supervision. To ensure the successful implementation and long-term effectiveness of the Suta, several strategic measures are recommended. First, comprehensive training and orientation programs should be conducted for both management and loan collectors to promote system adoption and minimize resistance to change. Establishing clear policies and guidelines regarding data usage, privacy, and access control is also essential to strengthen user trust and ensure compliance with organizational standards. Continuous monitoring, regular system maintenance, timely updates, and accessible technical support must be provided to maintain system reliability and operational efficiency. Furthermore, integrating regular user feedback from management and staff will help enhance system functionality and overall usability based on actual field experiences. In addition, scalability planning should be considered to accommodate future organizational growth and possible integration with existing or other financial management systems, thereby improving overall efficiency. Providing employee support, such as reimbursement for mobile phones, power banks, and mobile data loads, can further assist staff in effectively carrying out their daily responsibilities using the system. For future researchers, the system may be expanded to incorporate advanced data analytics reporting, customized features tailored to specific business needs, and the adoption of emerging technologies that can be seamlessly integrated into the monitoring platform to enhance its performance and adaptability.

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