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# Modernization of Regional Government Inventory Management: A Community Service Activity at the Regional Financial and Asset Management Agency of Karo Regency

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A B S T R A C T

Modernizing regional asset management is an essential component in supporting effective and sustainable governance. This community service activity was conducted at the Regional Financial and Asset Management Agency of Karo Regency in response to the limitations of a desktop-based, offline, and non-integrated inventory system. The objective of this activity was to develop a web-based inventory application to enhance efficiency and optimize regional asset management. The implementation methods included partner needs analysis, system design, as well as socialization, training, and implementation assistance. The results indicate that the developed online inventory system significantly improves the speed of asset management, enhances data accuracy and integration, and facilitates monitoring and decision-making processes across 46 Regional Government Organizations.

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## INTRODUCTION

Asset and inventory management is a fundamental element in the administration of local government (Pauweni et al., 2017; Sriastiti et al., 2020). Properly managed public assets enable governments to deliver optimal public services, maintain financial accountability, and support long-term development planning (Ibrahim & Ridwan, 2020; Nadhia & Suwarno, 2023). Conversely, unsystematic inventory management may lead to inefficiencies, data inaccuracies, and complications in audit processes (Safitri, 2020).

Along with the advancement of information technology, governments are required to modernize their operational systems through the implementation of e-government. E-government is not merely understood as the use of digital technology but as an effort to transform governmental business processes to become more efficient, transparent, and responsive to public needs (Ibrahim & Ridwan, 2020; Wahyu, 2021). However, in many local governments, the implementation of e-government remains partial, and the adaptation of organizational work systems to e-government initiatives is still progressing slowly (Sapardi et al., 2023). In addition, many institutions lack a comprehensive understanding of the institutional transformation required to effectively adopt e-government implementation (Aituarauw, 2021; Murdiaty et al., 2021)

This community service activity was conducted in collaboration with the Regional Financial and Asset Management Agency of Karo Regency (Umbora et al., 2018). This agency is a local government institution that has primary duties and functions in managing regional finance and public assets, including the planning, recording, controlling, and reporting of assets owned by the local government (Martini et al., 2023). As the main authority responsible for regional asset management, the agency plays a strategic role in ensuring accountability and transparency in the management of public assets(Jadid et al., 2024; Nursalim, 2018).

Karo Regency has a wide geographical area with challenging terrain conditions. The distance between local government organizations and the Regional Financial and Asset Management Agency office is relatively far, and access to these locations is not always easy. Under the previous inventory management system, manual data transfer required local government organizations to visit the agency office directly to submit inventory data (Pinem & Pakpahan, 2020; Usnaini et al., 2021). This condition created significant constraints in terms of time efficiency, operational costs, and work effectiveness, particularly for organizations located in remote areas.

The objectives of this community service activity are as follows:

1. To identify inventory management problems at the Regional Financial and Asset Management Agency of Karo Regency.
2. To develop an online inventory system as a means of modernizing operational systems.
3. To enhance institutional capacity in managing regional assets through information technology–based systems.

Based on the identified challenges and institutional needs, this community service activity is designed to provide a practical and sustainable solution through the development and implementation of an online inventory management system. By integrating information technology into regional asset management processes, the activity is expected to support more efficient, accurate, and transparent inventory management practices. Furthermore, this initiative aims to strengthen institutional capacity and contribute to the broader agenda of digital transformation in local government administration, particularly in the management of public assets.

## IMPLEMENTATION AND METHODS

This community service activity was conducted with the involvement of 46 local government organizations in Karo Regency under the coordination of the Regional Financial and Asset Management Agency of Karo Regency. The implementation of the activity focused on the development and application of a web-based inventory management system as an effort to modernize regional asset management. In addition to system development, the activity also included training, technical guidance, and implementation assistance to ensure that the system could be utilized optimally and sustainably by local government personnel.

**Figure 1. Site Visit Activities at the Regional Financial and Asset Management Agency (BKAD) of Karo Regency**

The community service activity was conducted during the second semester of 2024 through four visits to the Regional Financial and Asset Management Agency of Karo Regency. Each visit focused on a different stage of the activity, namely identifying the needs and problems of the existing inventory management system, designing an online inventory system, implementing and testing the system, and providing system usage assistance accompanied by an initial evaluation. All stages of the activity were systematically structured to ensure that the developed solution aligned with user needs and could be implemented effectively.

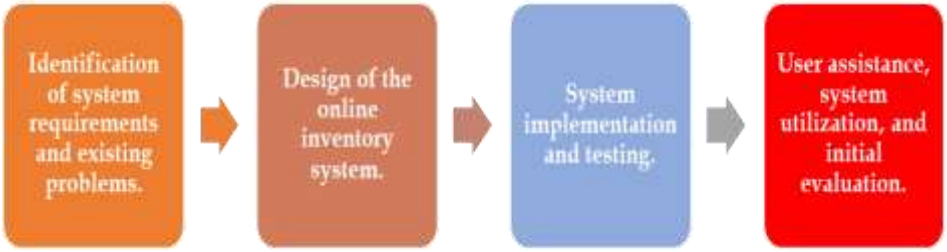


**Figure 2. Process Framework of the Community Service Activity**

The initial stage of the activity began with the identification of problems in the existing inventory management system. This process was carried out through interviews and direct observations with system operators. The identification results indicated that inventory data management and the determination of item prices were still conducted offline and centralized on a single computer. Data exchange between local government organizations and the Regional Financial and Asset Management Agency was performed manually using external storage media, which required local government organizations to visit the asset management office directly. This condition caused the data management process to become slow and inefficient.

Furthermore, manual data management increased the risk of human error, data format inconsistencies, and delays in information updates. The use of external storage media also posed data security risks due to potential virus attacks and hardware failures. Another issue identified was that the mechanism for determining inventory prices was not integrated into the system, preventing automatic price updates. The previous system was also developed under a one-time purchase scheme, resulting in limited institutional capacity to independently maintain and further develop the system.

Based on these findings, an integrated web-based inventory management system was designed and developed. The system implementation was accompanied by socialization activities, training sessions, and hands-on assistance for operators and personnel of local government organizations to ensure independent system operation. The final stage of the activity involved an initial evaluation to assess the effectiveness of the system in improving efficiency, accuracy, and transparency in regional asset management, as well as the institution's readiness to adopt information technology–based systems in a sustainable manner.

## RESULTS AND DISCUSSION

A web-based online inventory system was developed to support centralized recording, updating, and reporting of inventory data. The system was designed to reduce dependence on manual data exchange and to enable the integration of inventory pricing data through a conversion mechanism from spreadsheets into a database.

***Application System Requirements***

The formulation of application system requirements was conducted using several approaches, including stakeholder interviews, workflow observation, and technical analysis of the available infrastructure. During the implementation of the community service activity, four direct interviews were conducted with staff and operators of the Regional Financial and Asset Management Agency of Karo Regency. These interviews aimed to identify key problems, user expectations, and operational constraints encountered in regional inventory management.

In addition to interviews, observations of the existing inventory management workflow were carried out. The observation results revealed inefficiencies in data communication processes between Regional Apparatus Organizations (OPDs) and BKAD, particularly in the mechanism for submitting inventory data, which remained manual and unintegrated. This process led to delays in data updates, potential information inconsistencies, and a high operational workload for system operators.

A technical analysis was also conducted to assess the readiness of supporting infrastructure. Although BKAD of Karo Regency operates in a geographically challenging area with limited accessibility, the analysis indicated that the availability of hardware and internet connectivity was sufficient to support the implementation of a web-based system. Therefore, the developed system needed to address logistical and geographical constraints by providing remote accessibility and ease of maintenance.

Based on the results of interviews, workflow observations, and technical analysis, the developed online inventory system was required to meet the following key requirements:

1. Client–Server Architecture: The system must be designed using a client–server architecture to allow multiple users to access and update inventory data simultaneously from different locations. This approach is essential to support data coordination between BKAD and OPDs without reliance on manual data exchange.
2. User Authentication and Access Control: The system must be equipped with secure authentication mechanisms to ensure that only authorized users can access and modify data. In addition, role-based access control should be implemented so that users can only access functions corresponding to their responsibilities.
3. Real-Time Inventory Tracking: The system must support real-time inventory data updates and tracking. This feature aims to prevent data discrepancies between work units, improve information accuracy, and enhance operational efficiency in regional asset management.
4. User-Friendly Interface: The system interface must be designed to be simple and intuitive to accommodate users with diverse levels of technical expertise. Ease of use is a critical factor in ensuring optimal system adoption within the local government environment.

5. Transaction Logging and Inventory Reporting: The system must be capable of storing complete records of all inventory transactions in a structured log format. Recording and reporting processes should comply with official formats, templates, and procedures established by the Regional Financial and Asset Management Agency. Reporting features should also enable users to generate data summaries and supporting information related to inventory conditions and trends.
6. Scalability and Sustainable Development: The system must be designed to allow future development in accordance with evolving organizational needs and policy changes. This scalability aspect is essential to ensure that the online inventory system remains relevant and usable in the long term without requiring the development of a new system from scratch.

By comprehensively and contextually defining system requirements, the online inventory system developed through this community service activity is expected not only to address short-term operational issues but also to support the sustainable modernization of regional asset management systems.

***Application System Architecture***

The architecture of the online inventory application system was designed using a web-based client–server approach to support distributed and hierarchical inventory management needs within the Karo Regency Government. This approach was selected to ensure flexible system access from various locations while minimizing reliance on manual data exchange mechanisms previously employed.

The system was developed using the Laravel framework as the server-side application framework. Laravel was chosen because it supports structured web application development, provides built-in security mechanisms, and facilitates system maintenance and continuous development. The application runs on an Apache web server, which handles client requests and forwards them to the application layer. For data management, the system uses a MariaDB database to store all inventory information in a centralized and structured manner.

In this architecture, users access the system through a web browser on their respective devices without requiring additional software installation. Each user request is processed by the Laravel application layer, which then interacts with the MariaDB database to retrieve, store, or update data. This approach supports data consistency and simplifies system administration. Figure 2 illustrates examples of the application interface for item entry (top) and the item list display (bottom).

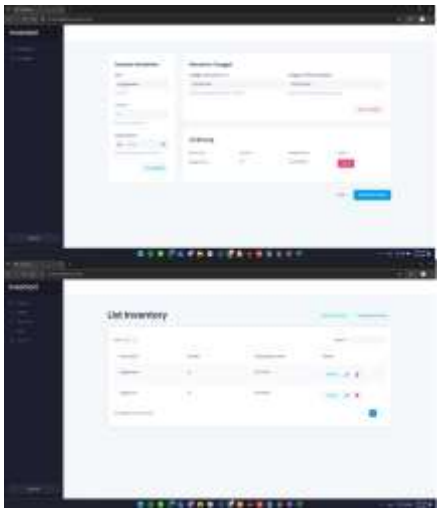

**Figure 3. Example of the Application User Interfac**

***User Role Management and Hierarchical Structure***

To align with the organizational structure of local government administration, the system was designed with three types of user roles, each having different levels of access and authority, as follows:

1. Administrator (Regional Financial and Asset Management Agency): The Administrator role is assigned to operators at the Regional Financial and Asset Management Agency (Badan Keuangan dan Aset Daerah). This role has the highest level of authority within the system, including comprehensive inventory data management, validation of data submitted by Regional Government Organizations (Organisasi Perangkat Daerah), user management, and generation of regency-level inventory reports. The Administrator functions as the central data control unit and ensures the consistency of information originating from all Regional Government Organizations.
2. Regional Government Organization – Level 1: Level 1 Regional Government Organization users are assigned to operators within technical departments, such as the Department of Education or the Department of Health. Users at this level are responsible for managing and supervising inventory data under the authority of their respective departments. Level 1 Regional Government Organizations serve as intermediaries between the Regional Financial and Asset Management Agency and operational implementation units.
3. Regional Government Organization – Level 2: Level 2 Regional Government Organization users are assigned to operators at technical implementation units, such as schools, public health centers, or hospitals. Users at this level are responsible for recording and updating inventory data within their respective work units. Access for Level 2 users is limited to the scope of their units, thereby ensuring data security and traceability.

The implementation of this hierarchical role structure enables a more proportional distribution of inventory management responsibilities in accordance with the local government bureaucratic structure. Moreover, this

mechanism supports accountability principles, as every data modification can be traced based on the user's role and organizational unit.

***Online Inventory System Process Flow***

The process flow of the online inventory system was designed to reflect the bureaucratic structure of local government administration as well as the asset management workflow applied within the Karo Regency Government. The system process begins at the level of technical implementation units as the primary source of inventory data and then flows hierarchically to the regional asset management authority.

Figure 4 illustrates the inventory procurement data flow process starting from Level 2 Regional Government Organizations and progressing to the Regional Financial and Asset Management Agency.

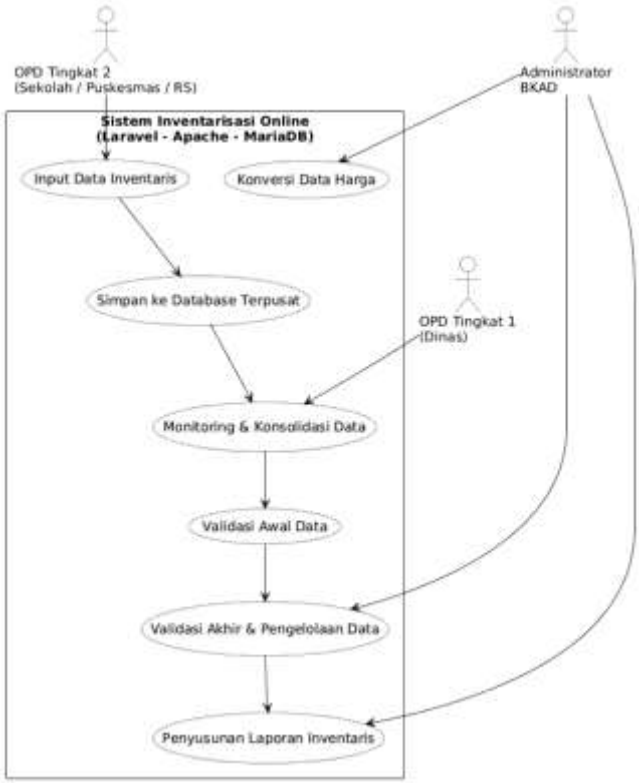


**Figure 4. Use Case Diagram of the Online Inventory System at the Regional Financial and Asset Management Agency of Karo Regency**

The process begins with users from Level 2 Regional Government Organizations, namely operators at technical implementation units such as schools, public health centers, or hospitals. At this stage, users record and update inventory data for their respective work units through the system interface. The entered data include basic inventory information, asset condition, and other relevant attributes in accordance with standardized formats. All input data are stored directly in a centralized database through the web-based system, without requiring physical data submission or manual file exchange.

After the inventory data are recorded by Level 2 Regional Government Organizations, the information becomes accessible to Level 1 Regional Government Organization users, who are operators at the departmental level. At this stage, Level 1 users are responsible for monitoring, reviewing, and consolidating inventory data from all technical units under their authority. If inconsistencies or incomplete data are identified, Level 1 users can coordinate further with Level 2 users to correct the data through the same system.

The next stage involves the Administrator of the Regional Financial and Asset Management Agency as the primary manager of regional inventory data. The Administrator has access to view all inventory data from all Regional Government Organizations, perform final validation, and ensure data consistency and completeness. At this stage, the Administrator can also manage inventory pricing data determined by local government policies by utilizing a data conversion mechanism from spreadsheet documents into the system database.

In addition to recording and validation processes, the system also supports inventory reporting workflows. The Administrator of the Regional Financial and Asset Management Agency can generate inventory reports based on data stored in the system, following officially established formats and procedures. These reports can be used for internal evaluation, decision-making support, and reporting to regional leadership.

Overall, the system process flow was designed to reduce reliance on manual data exchange mechanisms, minimize the risk of human error, and overcome geographical constraints that previously required Regional Government Organization personnel to visit the Regional Financial and Asset Management Agency office in person. With an integrated and online-based process flow, regional inventory management becomes more efficient, transparent, and aligned with the principles of government system modernization.

***Reporting and Document Generation System***

The online inventory system developed through this community service activity was also designed to support the preparation of inventory reports and procurement documents in accordance with official templates established by relevant authorities. Inventory data that have been recorded, validated, and stored in the centralized database can be directly utilized as the basis for generating reporting documents. This approach reduces dependence on manual document processing and minimizes the potential for discrepancies between inventory data and the resulting administrative documents.

Support for template-based reporting has a positive impact on administrative efficiency and accountability within the Regional Financial and Asset Management Agency of Karo Regency. The preparation of reports and procurement documents becomes faster, more consistent, and easier to trace, as all information is derived from validated inventory data. In addition to improving operator efficiency, this feature strengthens regional asset governance by ensuring that all reporting documents comply with applicable administrative procedures and standards.

## CONCLUSIONS AND RECOMMENDATIONS

The implementation of the online inventory system has had a significant impact on the operational efficiency of the Regional Financial and Asset Management Agency. Administrative processes have become faster, the risk of errors has been reduced, and data transparency has increased. From a government modernization perspective, this activity demonstrates that community service programs can serve as effective catalysts for digital transformation at the local government level.

The community service activity conducted at the Regional Financial and Asset Management Agency of Karo Regency successfully supported the modernization of inventory management through the development of an online inventory system. The developed system not only addresses technical challenges related to inventory data management but also strengthens institutional capacity for sustainable regional asset management. This study confirms that the modernization of local government systems requires a holistic approach that integrates technology adoption, organizational readiness, and capacity development.

Based on the results of this activity, several recommendations can be proposed. First, continuous system maintenance and periodic evaluation are recommended to ensure system reliability, data security, and adaptability to future regulatory or organizational changes. Second, further capacity-building programs, including advanced training and technical support, should be conducted to enhance user proficiency and encourage optimal system utilization across all local government organizations. Third, system integration with other government information systems is recommended to support data interoperability and comprehensive asset management. Finally, the implementation model developed in this activity can be adopted and replicated by other local governments facing similar challenges in inventory and asset management as part of broader e-government initiatives.

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