EVALUATION OF THE EFFECTIVENESS OF THE USE OF DIGITALIZATION SYSTEMS IN THE IMPLEMENTATION OF E-GOVERNMENT IN INDONESIA
(Case Study in Data Integration and Exchange Management Applications-MANTRA)

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ABSTRACT

This article examines the evaluation of the effectiveness of the digitalization system in the implementation of e-government in Indonesia with a case study on the MANTRA Application developed by the Ministry of Communication and Information Technology (Kemkominfo). The development of this application began in 2011. The beginning of the concept of E-Government in Indonesia was formed through public policy in the form of Presidential Instruction Number 6 of 2001 which described government support in the use of information and communication technology (ICT) to improve the quality of public services in the digital system. Based on data from the Central Statistics Agency (BPS), it shows that in 2022, 66.48% of the Indonesian population has accessed the internet. However, data on internet users will increase in 2024. This can be seen through a survey by the Indonesian Internet Service Providers Association (APJII) that the level of internet users in Indonesia will reach 79.5% in early 2024. The data collection techniques used in this study are by means of documentation, interviews, and observations in data collection through documents related to the use of digital systems in the implementation of e-government. The findings of this research will be presented based on the analysis of data obtained that the application of applications with technological advances in the current era is considered more effective and efficient in assisting the bureaucracy in solving community problems and supporting the development of public services as a link in achieving common goals.

Keywords: *Digitization, Evaluation, e-Government, Effectiveness, Public Services*

INTRODUCTION

The concept of E-Government was formed based on Presidential Instruction Number 6 of 2001 concerning Government Support in the Use of Information and Communication Technology (ICT). The implementation of E-Government improves the quality of public services that connect the government, the private sector, and the community. A quality bureaucratic system implements applications through advances in information technology. This technological development is a supporting factor in the implementation of e-government in digital government. This is marked by the issuance of a new regulation of the Presidential Instruction of the Republic of Indonesia Number 3 of 2003 concerning creating a clean, transparent, and responsive government to change.

The implementation of E-Government in Indonesia aims to increase efficiency and effectiveness in public services through digital government processes. Rizky in research on policies, benefits, challenges, and

examples of regions such as Denpasar and Pare-Pare that have been successful in implementing E-Government. The results of the study show that E-Government can speed up administrative processing, increase service transparency, and expand public access to public information. However, the implementation of this program faces several obstacles, such as the lack of infrastructure in remote areas, limited human resources with technological capabilities, and risks related to data security. To overcome these challenges, it is recommended to strengthen telecommunication networks, train human resources in the field of information technology, integrate systems between various institutions, and implement stricter data security regulations. With these steps, it is hoped that E-Government can encourage inclusive and sustainable digital transformation (Rizky *et al.*, 2022)

Understanding and measuring willingness to pay (WTP). (WTP) society is an important step to implement effective e-government in developing countries. The WTP reflects the value that individuals place on digital public services and serves as a key indicator in the planning and development of these services. Barlian and his colleagues refer to a study by Carson and Mitchell (1993) that emphasizes that WTP measurement provides an understanding of individual preferences for public goods that have no price in the market, such as e-government services.

For policymakers, it is important to consider the elements that influence WTP in the planning and implementation of digital public services. Aspects such as perception of benefits, trust in the government, digital literacy, and individual economic situation have an important role in determining the level of WTP. Meanwhile, another study based on a study by Carter and Belanger (2005) shows that the perspective of ease of use and usability influences the intention of individuals to choose e-government services. In addition, studies by Belanger and Carter (2008) show that trust is a crucial element in the acceptance of e-government.

Therefore, suggestions for policymakers include: (1) improving digital literacy by implementing education and training programs to increase public understanding and skills in using structured information technology to encourage the adoption of e-government; (2) build public trust by ensuring data security, transparency in operations, and responsiveness to input from the public; (3) setting affordable service rates by taking into account the economic conditions of the community and providing subsidies for low-income groups; and (4) improve information and communication technology infrastructure by ensuring equitable access to technology and the internet in all regions, including in remote areas.

By considering the above factors, policymakers can design and implement *e-government services* that are more effective, inclusive, and sustainable, and in accordance with the needs and capacities of communities in developing countries (Ujang Cepi Barlian, Siti Solekah, 2022)

The results of research on independent curriculum planning at SDN 244 Guruminda Bandung City, were carried out by analyzing learning outcomes (CP) to design learning objectives and flow of these goals, plan diagnostic assessments, and develop learning modules that are tailored to the stages of achievement and characteristics of students. In addition, planning for formative and summative assessments is also carried out. The implementation of the independent curriculum at SDN 244 Guruminda includes the implementation of diagnostic assessments, learning based on project teaching modules, and the application of formative and summative assessments. The evaluation of learning in the implementation of the independent curriculum at SDN 244 Guruminda is carried out through diagnostic assessments, as well as the implementation and processing of formative and summative assessment plans. The implementation of the independent curriculum at SDN 244 Guruminda includes efforts to conduct diagnostic assessments, implement learning in accordance with project-based teaching modules, and carry out formative and summative assessments. In learning evaluation, SDN 244 Guruminda implements diagnostic assessments and manages formative and summative assessments. The results of this study recommend that SDN 244 Guruminda in the city of Bandung continue to monitor and develop themselves by improving the curriculum for better school quality, and also disseminate the success in implementing freedom to schools that have not implemented it, digitally (Mulik Cholilah, Anggi Gratia Putri Tatuwo, Komariah, Shinta Prima Rosdiana & Fatirul, 2023)

Based on the literature review and the results of existing research, it can be stated that there is a continuous relationship between the KKNI curriculum and the Independent Curriculum, and there are

similarities and compatibility in accordance with the principles in educational technology. Therefore, in the implementation of the Independent Curriculum, all of these aspects, especially the use of information technology, are basically focused on improving the competence of students along with various support systems that aim to produce quality graduates (Rahardjo, 2024)

Thus, E-government functions to create good governance through: (1) providing more optimal services for the community. Data and information are available around the clock without the need to wait for the office to open. People can access information from home or other places without having to come directly to the service office and interact face-to-face; (2) the establishment of better relations between the government, the business sector, and society in general, so that transparency is expected to increase interaction between parties; (3) community empowerment through easier access to information. With sufficient information available, people can learn to access and display data online; and (4) Implementation of more effective governance. For example, collaboration between agencies can be done via email or even video conferencing (Damara, 2017)

Understanding and measuring citizens' willingness to pay (WTP) is a crucial step in the effective implementation of e-government in developing countries. WTP reflects the value that individuals place on digital public services and serves as an important indicator in the planning and development of those services. Researchers Barlian and colleagues by reviewing studies by Carson and Mitchell (1993) emphasized that WTP measurement provides insight into individual preferences for public goods that do not have a market price, such as e-government services.

For policymakers, considering the factors influencing WTP in the planning and implementation of digital public services is essential. Factors such as perception of benefits, trust in government, digital literacy, and individual economic conditions play a significant role in determining the level of WTP. Meanwhile, another study of the results of research by Carter and Belanger (2005) found that the perception of ease of use and usability affects the intention of individuals to adopt e-government services. In addition, studies by Belanger and Carter (2008) show that trust is a key factor in the adoption of *e-government*.

Therefore, recommendations for policymakers include: (1) improving digital literacy through education and training programs designed to improve people's understanding and skills in using structured information technology to increase the adoption of e-government; building public trust, namely by ensuring data security, operational transparency, and responsiveness to citizen feedback; (3) setting affordable service rates by taking into account the economic conditions of citizens and providing subsidies to low-income groups; and (4) improving information and communication technology infrastructure, namely ensuring equitable access to technology and the internet throughout the region, including remote areas.

By considering these factors, policymakers can design and implement e-government services that are more effective, inclusive, and sustainable, according to the needs and capabilities of communities in developing countries (Ujang Cepi Barlian, Siti Solekah, 2022)

Based on data from the Indonesian Internet Service Providers Association (APJII), the internet penetration rate in Indonesia will reach 79.5% in early 2024. This figure shows a consistent increase over the past five years. In 2018, Indonesia's internet penetration rate was only 64.8%. Not only that, this has also increased compared to 2022 which can be seen through data from the Central Statistics Agency (BPS) showing that 66.48% of the Indonesian population has accessed the internet in 2022. The high use of the internet reflects the increase in information disclosure and public acceptance of technological developments

The MANTRA application is a software that supports electronic information systems from the interoperability framework, either using web-based service technology (web services) as a data exchange interface or between electronic information systems. This can be seen from several examples achieved by the implementation of the MANTRA application: Population Information System (SIKP): Population data from various regions can be accessed and shared between government agencies. This simplifies the public service process, such as making ID cards, family cards, and birth certificates. Goods and Services Procurement System: Data on the procurement of goods and services in various government agencies can be accessed and shared, thereby increasing transparency and accountability. Tax Service System: Tax data from various regions can be accessed and shared, making the process of tax payment and supervision easier.

The problem of this research is related to the use of the Integration and Data Exchange Management Application (MANTRA) needed to support the implementation of *e-Government* in Indonesia, inhibiting and supporting factors in the use of the MANTRA digitization system for integration and data exchange between agencies, the MANTRA digitization system in meeting the needs of users in the implementation of *e-Government.*

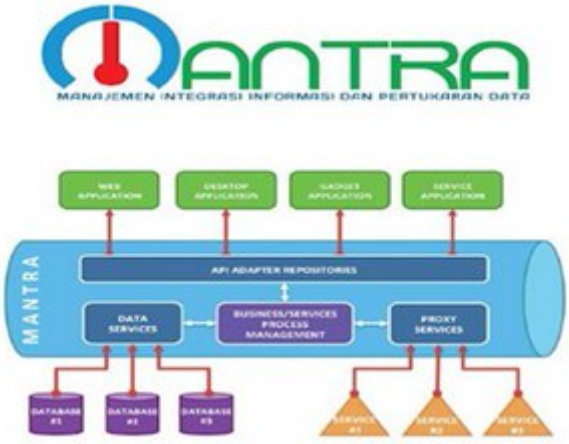
METHOD

In this study, a qualitative descriptive analysis method was used with a case study approach. This research focuses on the application of Integration and Data Exchange Management (MANTRA) as a form of e-government implementation in Indonesia. The methods used are documentation, interviews, and observations. Secondary data collection was carried out through literature studies, documents related to the implementation of MANTRA, government reports, and relevant scientific publications. This data is used to build an understanding of the context of e-government implementation in Indonesia and the specification of MANTRA functionality. Qualitative data were analyzed thematically to identify the main themes that emerged regarding the effectiveness of MANTRA. This analysis will identify the factors that support and hinder the effectiveness of the system.

RESULTS

The results of the qualitative analysis are described by providing an overview of the effectiveness of the use of the digitalization system in the implementation of e-government through MANTRA. Data is used to improve the validity of research findings. The effectiveness of MANTRA is measured based on several indicators, including: efficiency in the form of reducing time and costs in the government administration process, accessibility in the form of facilitating access and use of the system by users, the level of data and system security from irresponsible party threats, and the level of user satisfaction with the services provided by the system. The results of the analysis will be used to evaluate the effectiveness of MANTRA and provide recommendations for improving the implementation of e-government in Indonesia.

MANTRA Application Overview



Drawing of MANTRA Application Form and Application Usage System Flow

The MANTRA application was developed by the Ministry of Communication and Information Technology (Kemkominfo). The development of this application began in 2011. A software developed by the Ministry of Communication and Information Technology (Kemkominfo) to support the interoperability

framework of electronic information systems and function as a bridge for data exchange between electronic information systems in the government environment.

The application was created by facilitating the exchange of data using the principles of resource-based architecture (resource-oriented architecture/ROA) and the use of Web API technology (web application programming interface).

DISCUSSION

The Role of the Government in the Implementation of E-Government

The role of the government in realizing the implementation of e-government in Indonesia is very crucial. This is a factor in the success of e-government which depends on the commitment and actions of the government in various fields in policy formulation. The government must create a clear, comprehensive, and conducive legal framework for the development and implementation of e-government. This includes regulations regarding data security, privacy protection, system interoperability, and technology standards. Through a directed, measurable, and integrated national strategy for e-government, which includes specific goals, targets, and action plans. This strategy must be adaptive to technological developments and the needs of society.

In addition, the national strategy that has been determined by the government is also obliged to establish technical standards and guidelines to ensure that the information system runs smoothly. This is important so that data can be used efficiently between agencies. Not only that, the government is also responsible for providing adequate information and communication technology infrastructure and reaching to the entire community, including internet access, especially in remote areas. Build and maintain a secure and reliable data center in storing and processing government data. This includes investing in cybersecurity to protect the e-government system from external attacks.

The Role of the Private Sector in the Implementation of E-Government

The role of the private sector is also a very important external factor in the successful implementation of e-government. Private companies are the main providers of the hardware (computers, servers, networks, mobile devices) and software (operating systems, applications, platforms, databases) needed to build and run e-government systems. In addition, the private sector can also support through the development of applications and platforms specifically for e-government services, such as government portals, document management systems, online payment systems, population management systems, and mobile applications for access to public services.

Cloud computing services from private companies provide the flexibility and scalability needed for e-government systems, reducing the burden of infrastructure investment for governments. Telecommunication companies and internet service providers play a crucial role in building and maintaining a quality network infrastructure that is easily accessible to the entire community for access to e-government services.

The company provides expertise in the planning, design, and implementation of e-government strategies, assisting governments in determining priorities, selecting the right technology, and managing projects. Through system integration, the private sector has expertise in integrating different government information systems, ensuring data and service interoperability. By assisting in the implementation of the e-government system, including training for civil servants (PNS) and the public in the use of the system, and providing ongoing maintenance services and technical support for the e-government system, ensuring the smooth operation and security of the system.

Public-Private Partnership (KPSP) is a form of collaboration between the government and the private sector in developing and implementing e-government. KPSP utilizes resources and expertise from both parties. Private investment in infrastructure and the development of e-government systems can speed up the implementation process and improve the quality of public services. However, it is important to ensure that cooperation with the private sector is carried out in a transparent and accountable manner, taking into account aspects of data security,

privacy protection, and the public interest. Clear contracts and agreements need to be created to avoid conflicts of interest and ensure compliance with ethical and legal standards.

The Role of the Community in Supporting the Use of E-Government

The role of the community in supporting the use of e-government is very important for the success of its implementation. The active participation of the community will encourage improvement in service quality and government efficiency. Participation in training and workshops organized by the government or related institutions will improve the ability of the community to utilize e-government services. People can take advantage of a variety of online learning resources, such as tutorials, videos, and guides, to improve their understanding of e-government technologies and services.

The public also needs to improve digital literacy in understanding and using e-government services. This includes the ability to access the internet, use a computer, and understand a variety of online applications. With the use of available e-government services, such as population administration management, tax payments, and reporting. The public can provide input and criticism to the government regarding the quality of e-government services. This feedback is essential to improve public quality services and overcome the obstacles that occur in the process of implementing the e-government system. If the community finds problems or inconsistencies in e-government services, then the community is obliged to report it to the authorities so that it can be handled immediately. In addition, the public is obliged to protect their personal information when using e-Government services. This includes maintaining password confidentiality and being aware of potential online fraud.

By ensuring that the website used to access e-government services is safe and reliable. Therefore, the prevention of the spread of false information can be done before things happen that can harm external parties and external parties. In addition, the public can also become an e-government ambassador by promoting the use of e-government through social media with a wider reach. Through videos or photos that contain positive experiences in using e-government services, they can encourage others to use them. This can play a role in supporting the change by encouraging the adoption of e-government in Indonesia. With active participation and high awareness from the public, the implementation of e-government in Indonesia will be more successful and provide optimal benefits for all levels of society.

Evaluation of the Effectiveness of the Use of the MANTRA Application in the Implementation of E-Government

The MANTRA (Information Integration and Data Exchange Management) application is an e-government support software that aims to improve the interoperability of electronic information systems between government agencies. The effectiveness of the use of the MANTRA application in the implementation of e-government can be evaluated from several aspects. Research shows that the success of the implementation of MANTRA is still limited to the technical and semantic level, while at the organizational level it includes commitment, coordination, and communication between agencies has not been optimal.

The MANTRA application can enable cost savings in the development of data processing applications through the use of Web-APIs. This reduces development duplication and increases efficiency. Existing services in MANTRA can be further developed into new services, reducing the need to build systems from scratch. This improves the efficiency and effectiveness of development. In terms of data accuracy, the application makes it easier to validate and verify data at the right source, improving the accuracy of the data used in e-government.

The effectiveness of MANTRA depends on the availability of adequate ICT infrastructure, including quality and secure internet access. In terms of human resource skills, for example, civil servants and system users need to have adequate technical skills to operate and utilize the MANTRA application effectively and efficiently. Data security and privacy are very important in e-government. The MANTRA application must be equipped with strong security mechanisms to protect sensitive data and irresponsible external parties.

In terms of continuous evaluation, one of them is in the field of monitoring. The government needs to conduct periodic monitoring and evaluation to assess the effectiveness of the use of the digitalization system for the implementation of e-government, one example is the application of MANTRA in improving interoperability, efficiency, and data accuracy in the quality of public services in the modern era. Feedback from users is essential to identify areas that need improvement and develop new features that are needed.

Overall, the MANTRA application has the potential to improve the effectiveness of e-government by improving data interoperability, service efficiency, and data accuracy. However, its success depends on factors such as infrastructure availability, HR skills, and data security.

Sustainability evaluation and user feedback are very important to maximize the benefits of this application in the implementation of e-government.

CONCLUSION

The MANTRA application aims to support the interoperability framework of electronic information systems in the government environment. The main goal is to facilitate the exchange of data between electronic information systems within the government. This means that it allows various government agencies to share data securely and efficiently, without the need to build a separate information system for each agency. Increase efficiency and effectiveness in data management in the government environment. By using the MANTRA application, government agencies can reduce data duplication, save application development costs, and improve data accuracy. Realizing a good e-government with the MANTRA application which helps build a more integrated and transparent electronic government system, so that it can improve services to the community.

The implementation of the digitalization system in e-government in Indonesia, as evaluated through the case study of the MANTRA application, shows significant potential in improving the efficiency and transparency of public services. However, its success is still hampered by several factors, including limited infrastructure, lack of human resource training, lack of optimal integration between systems, and lack of monitoring from the government. Recommendations for improvement include investment in electronic information system infrastructure, human resource capacity building, and improved regulations that support system interoperability. Effective collaboration between the government, the private sector, and the public is crucial to achieving a comprehensive and sustainable digital transformation in Indonesia's e-government.

RECOMMENDATION FOR DEVELOPMENTS

Recommendations for the Government

1. The government needs to increase investment in information and communication technology infrastructure, especially the expansion of reliable and affordable internet access throughout Indonesia, especially remote and outermost areas.
2. Capacity development of human resources in the public sector to be able to operate and maintain the digitalization system effectively. Focus on digital literacy and cybersecurity.
3. Strengthening regulations that support the implementation of e-government, including personal data protection and cybersecurity. Regulations must be adaptive to technological developments.

Recommendations for the Private Sector

1. Increasing private sector participation in the development and implementation of the e-Government digitalization system, through transparent and accountable public-private partnerships.
2. development and provision of innovative technology solutions that are in accordance with the needs of e-government in Indonesia, paying attention to security and interoperability aspects.
3. providing training and consultation support to the government in terms of the implementation and maintenance of the digitalization system.

Recommendations for the Community

1. Increasing people's digital literacy in order to be able to utilize e-government services effectively and responsibly.
2. actively participate in providing input and feedback on e-government services to improve their quality and effectiveness.
3. Increased awareness of cyber threats and irresponsible practices in the use of digital services.

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