

THE URGENCY OF TECHNOLOGY AND INFORMATION TECHNOLOGY (ICT) DEVELOPMENT IN REALIZING THE TRANSFORMATION OF ADVANCED NIAS REGENCY IN THE ERA OF CIVIL SOCIETY 5.0 AND INDUSTRIAL REVOLUTION 4.0

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ABSTRACT

This research discusses the significant impact of e-government implementation in improving efficiency of public administration and community participation in the era of digital disruption. The focus is on analyzing the development and challenges of integrating information technology integration in governance to create transparent and accountable public services. This research aims to analyze the influence and benefits of e-government implementation in improving government efficiency, public service transparency, and participation. Government efficiency, public service transparency, and public participation in Indonesia, as well as identifying the barriers and challenges of e-government implementation. Participation in Indonesia, as well as identifying barriers and challenges faced in its implementation. This research uses a comprehensive literature review method to integrate various perspectives and empirical findings. This approach includes topic exploration, collection of relevant literature, and analysis and synthesis of data to answer the research questions. In addition, SWOT analysis was used to evaluate the condition of e-government in Nias Regency and develop improvement strategies that include Nias Regency and develop improvement strategies that include strengthening strengths, utilizing opportunities, reducing weaknesses, and addressing threats. The research This research shows that the implementation of information and communication technology (ICT) in Nias Regency is still at the maturation stage, with strong local government commitment but faced with challenges of geography, limited infrastructure and human resource competencies. SWOT analysis identified potential development potential and opportunities, as well as threats and weaknesses that need to be addressed through collaboration with various stakeholders. Improving ICT in Nias Regency requires an integrated strategy that includes developing infrastructure, improving human resource competencies, and collaboration with the private sector, to realize the transformation of Nias Regency towards an effective and efficient e-government.

Keyword: *Government Efficiency, Public Service Transparency, Community Participation, e-Government Implementation, Nias Regency.*

INTRODUCTION

The utilization and benefits of Information and Communication Technology (ICT) or e-government have significantly impacted society, particularly in the current era of disruption. This progress has facilitated tasks and activities, especially in the dynamic and fast-paced environment of the present era. The current era of disruption necessitates government operations to align with the changing governance landscape, focusing not only on present needs but also anticipating future requirements. This is particularly crucial as Indonesia has reached Civil Society 5.0 and the 4.0 Industrial Revolution, signifying active participation

and the "no left behind" principle mandated by the Sustainable Development Goals (SDGs). The literature provides insights into various aspects related to the utilization and benefits of ICT and e-government. For instance, studies have shown the positive and significant influence of public participation and public accountability on financial oversight (Bure et al., 2023). Additionally, the importance of technology literacy in the context of distance learning during the COVID-19 pandemic has been emphasized, encompassing knowledge and skills in utilizing technology for information processing and communication (Kartika et al., 2024). Furthermore, the

role of community participation in achieving good governance has been highlighted, particularly in the context of village development and budgeting (Bure et al., 2023; Handayani et al., 2023). Moreover, the application of Six Sigma for analyzing the utilization of ICT in micro, small, and medium enterprises (MSMEs) has been discussed, emphasizing the need for enhanced utilization of ICT to support production and internet-based marketing processes (da Silva et al., 2022). The significance of e-government in public service delivery has been underscored, particularly in streamlining processes and ensuring accountability (Savary-Torres, 2021). Furthermore, the readiness and importance of ICT in educational settings have been emphasized, indicating that the provision of facilities and infrastructure to support ICT utilization is now a standard requirement in schools (Hero, 2020). Additionally, the obstacles and challenges in the adoption and utilization of ICT, particularly in the context of public services, have been identified, highlighting the need for improved access and equitable distribution of benefits (Bariu, 2020a).

E-government has been recognized as a crucial tool for improving public service delivery and enhancing the performance of governments to meet the expectations of citizens (Almaiah & Nasereddin, 2020). The integration of technology in public administration, particularly through e-government, has been identified as a means to facilitate the efficient and effective functioning of government operations and service delivery (Tsybulnyk et al., 2020). The use of digital technologies in public administration has become increasingly urgent due to the global spread of the informatization process, emphasizing the need for the introduction of digital technologies in the field of public administration (Bariu, 2020b). Furthermore, the transition to digital public administration has been highlighted as a global trend, signifying a shift from manual to technological methods of service delivery (Schumann et al., 2012). In the context of e-government, barriers to integration have been identified, including common goals and objectives, delivery timeframes, and ownership and governance issues (Bastida et al., 2019). Additionally, the evolution of information and communication technology (ICT) in public administration has been linked to institutional changes, including government operations, public service delivery, citizen participation, policy and decision making, and governance reform (Alahakoon & Jehan, 2020). However, it is essential to note that while technology is often portrayed as unproblematic, the perspective of citizens in this digital transformation is sometimes overlooked (Nielsen et al., 2024). Moreover, the capacity for public service innovation development in local government has been recognized as a determinant of public service innovation, emphasizing the importance of multi-actor involvement in front-end innovation processes to construct an open innovation model for developing well-being services (Kania-Lundholm, 2019).

The role of citizen participation in electronic public administration has also been explored, with statistical results indicating positive effects on citizen participation in electronic public administration (Lee-Geiller & Lee, 2019). Additionally, the landscape of inclusive public service innovation in Indonesian local government has shown a positive trend in increasing inclusive services, particularly targeting vulnerable groups (Muluk et al., 2021). In conclusion, the adoption of e-government and digital technologies in public administration is crucial for enhancing public service delivery and government performance. However, it is essential to address barriers to integration, consider citizen perspectives, and promote multi-actor involvement in innovation processes to ensure the successful implementation of e-government and inclusive public service innovation.

E-government can support more efficient government management and can enhance communication between the government and the community and industry sectors. The public can provide input on policies designed by the government so as to improve government performance, considering that technology can make services transparent, easy and cannot be intervened by any party. The following is an understanding of e-government, namely:



Figure 1. Definition of E-Government

Indonesia as one of the largest countries both in the World and Southeast Asia is able to see and analyze the latest development of its e-government. This is so important because by knowing the value and position of the State of Indonesia, it can be seen where the weak points that need to be evaluated in order to improve the ICT system in Indonesia are getting better. So that it can be re-formulated and formulated related to ICT planning in Indonesia as a real form, namely the ICT Master Plan in Indonesia. In the master plan, there will be real targets and indicators that need to be achieved by the Government of Indonesia in order to produce ICT. Therefore, we need to see the progress of development from time to time in the Southeast Asia E-Government Development Index Rating for the Last Decade 2010-2020, as shown in the table below:

Table 1. Southeast Asia E-Government Development Index Ranking Last decade 2010-2020

No.	Negara	Nilai Rata-Rata					
		2010	2012	2014	2016	2018	2020
1.	Singapura	0,7476	0,8474	0,9076	0,8828	0,8812	0,9150
2.	Malaysia	0,6101	0,6703	0,6115	0,6175	0,7174	0,7892
3.	Brunei Darussalam	0,4796	0,625	0,5042	0,5298	0,6923	0,7389
4.	Thailand	0,4653	0,5093	0,4631	0,5522	0,6543	0,7565
5.	Filipina	0,4637	0,513	0,4768	0,5766	0,6512	0,6892
6.	Vietnam	0,4454	0,5217	0,4705	0,5143	0,5931	0,6667
7.	Indonesia	0,4026	0,4949	0,4487	0,4478	0,5258	0,6612
8.	Timor Leste	0,2773	0,2365	0,2528	0,2582	0,3816	0,4649
9.	Kamboja	0,2878	0,2902	0,2999	0,2593	0,3753	0,5113
10.	Myanmar	0,2818	0,2703	0,1869	0,2362	0,3328	0,7892
11.	Laos	0,2637	0,2935	0,2659	0,309	0,3056	0,3288
	Asia Tenggara	0,3828	0,4793	0,4434	0,4712	0,5555	0,6321
	Dunia	0,4199	0,4882	0,4712	0,4922	0,5491	0,5988

Source: *United Nation E-government Knowledgebase*.

Table 1. shows that the more developed a country is, the higher the average e-government score achieved. Since the issuance of Presidential Instruction Number 3 of 2003 concerning National Policy and Strategy for E-government Development, it has been approximately seventeen years since Indonesia introduced e-government to be implemented by government agencies. Until 2020, Indonesia has experienced improvements from previous years. In the international arena, Indonesia, which in 2018 ranked 107th in the world, in 2002 increased to 88th in the world. It can be seen from the index obtained by Indonesia that it has also increased and exceeded the average index of Southeast Asia and the World. However, on the other hand, when compared to neighboring countries, Indonesia is still somewhat behind neighboring countries. In Southeast Asia, Indonesia only ranked 7th and that lasted from 2010 to 2020.

E-government refers to the use of news technology by governments, such as using intranets and the internet, which has the ability to connect the needs of residents, businesses and other activities. According to the World Bank (Kadewandana & Kaligis, 2024). E-Government is the use of information technology by government agencies such as wide area Networks (WAN) internet, mobile competing, which can be used to build relationships with the community, the business world and other government agencies. What is conveyed implies that it can be used as a business transaction process between the public and the government through automation systems and internet networks, more commonly known as the world wide web (www).

While in the book E-Government In Kipyegon (2018) describes that e-government is an effort to create an atmosphere of government administration in accordance with the shared objectives of a number of communities of interest. Therefore, the vision of local government that is proclaimed must also reflect the shared vision of existing stakeholders, for example:

1. Improve the productivity and performance of government operations in serving its citizens;
2. Promote a clean and transparent government;
3. Improve the quality of people's lives through the performance of public services;

4. Ensure the creation of a democratic state administration.

Since the vision comes "from, by and for" the people or community where the e-government is implemented, for example in Nias Regency, its time will depend on the situation and conditions of the local community. As stated above that in local government, the implementation of e-government is an effort to organize local government, especially in Nias Regency, which is electronically based in order to improve the quality of public services effectively and efficiently. From the above definitions, it can be interpreted that e-government is the process of utilizing information technology as a tool to help run the government system in Nias Regency efficiently.

In the past, the utilization of e-government was still limited to experiments but now it is so urgent as the most important tool in the transformation of public services, especially for Nias Regency towards an Advanced Nias Regency. The vision for the development of Nias Regency in 2021 - 2026, based on the Regional Medium-Term Development Plan is: "ADVANCED NIAS REGENCY". In the context of efforts towards achieving the Vision of regional development of Nias Regency in 2021-2026, it is determined that the regional development mission related to e-government is the Accessible Village Mission, Manageable Capital City, which has a focus on the program: Public information and communication program and Informatics application program. To carry out this mission, attention is given to structuring regional apparatus organizations, improving personnel management, financial and asset governance, planning, supervision, public services, administrative procedures, implementing IT-based information systems, so that a professional and high-performing local government bureaucracy is formed, which is marked by the improved quality of public services. So that in order to succeed in this mission, it is necessary to develop e-government and its implementation in Nias Regency is an action that must be carried out.

METODE PENELITIAN

Based on existing references, research on e-government in Nias Regency can benefit from a comprehensive literature review and analysis. The literature review method is essential for integrating various perspectives and empirical findings to strengthen research (Trein et al., 2023). This method involves exploring the topic, obtaining relevant literature, and analyzing and synthesizing data to answer research questions or hypotheses (Negri et al., 2021). Analysis of e-government in Nias Regency can be done using the SWOT (Strengths, Weaknesses, Opportunities, and Threats) framework (Faraji et al., 2022). This approach aims to describe the current state of e-government in Nias Regency and develop strategies for its improvement. SWOT analysis can lead to the identification of strategies such as leveraging strengths to exploit opportunities (SO), using strengths

to overcome threats (ST), minimizing weaknesses to take advantage of opportunities (WO), and overcoming weaknesses to avoid threats (WT) (Ulewicz & Brycht, 2025).

In addition, the implementation of e-government in Nias Regency can benefit by considering the factors that influence trust in e-government adoption from the community's perspective (Ginting et al., 2024). This is important because trust is an important aspect of e-government success. In addition, a review of end-user adoption of e-government services in general highlights the importance of national culture, trust, information system success models, and knowledge services for citizens' acceptance of new systems (Novianti & Agustian, 2018). Understanding these factors is critical to the successful use of e-government services in Nias Regency. In addition, the literature review can draw insights from the analysis of the effect of e-government implementation on information quality on intergovernmental interactions. This analysis can explain factors such as user resistance, organizational culture, management support, human resource competencies, and information technology, which are critical to the success of e-government implementation. In addition, studies on the impact of organizational culture on e-management adoption emphasize the importance of organizational culture in the adoption of e-government initiatives (Mulia, 2021). This highlights the need to consider organizational culture within government agencies in Nias Regency to ensure successful implementation of e-government.

In addition to the literature on e-government, SWOT analysis can be informed by research in other fields. For example, a SWOT analysis of water-induced disaster management policies in Nepal identified weaknesses related to institutional ownership and jurisdictional issues, which can provide insight into potential challenges in e-government policy implementation (Thapa & Paudel, 2023). Similarly, a SWOT analysis of aquaculture development in Indonesia can provide a PEEST (policy, economic, environmental, social, technical) overview, which can be adapted for a comprehensive analysis of e-government in Nias Regency (Minh-Thu et al., 2023).

This research may also benefit from considering the impact of COVID-19 on agri-food, as it emphasizes the need for government investment in technology to ensure a sustainable flow of agricultural products, which aligns with the broader context of government initiatives and investments in e-government (Abdel-Hady et al., 2024). Overall, this synthesis of high-quality and relevant references can provide a solid basis for literature review and SWOT analysis in research on e-government in Nias Regency.

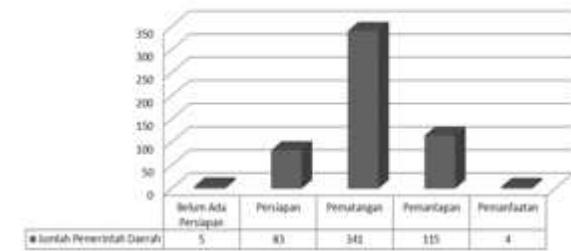
RESULTS AND DISCUSSION

Overview of ICT in Nias Regency

To achieve effective application of technology in local government, it is essential to computerize

government processes and improve human resource capabilities and education. This is supported by the idea that optimal application of information technology requires users to have a deep understanding of the technology. In addition, the use of information technology can improve the quality of public services, in line with the local government's goal to improve the quality of services for the community. Furthermore, the application of technology in local government can result in more efficient and effective organizational performance. Therefore, technology integration in local government is essential to improve service delivery and overall governance.

Perkembangan Implementasi E-Government pada Pemerintah Daerah di Indonesia



Source: processed from (Yunita & Aprianto, 2018)

Figure 1. Graph of the Development of E-Government Implementation Implementation in Local Government in Indonesia

The graph above shows how many local governments in Indonesia are still at the maturation stage. From there it can be seen that there is a lot of homework that needs to be done by each local government to reach the utilization stage. The local government of Nias Regency is also still in the preparation stage towards maturation, which in this case needs to be done seriously and focused. Nias Regency began to think about ICT implementation by following Presidential Instruction Number 3 of 2003 concerning National Policies and Strategies for E-Government Development which was translated into the Vision and Mission of the Regent of Nias for the 2021-2024 period. The support and commitment of the Regent as the leader in Nias Regency brings fresh air to ICT in Nias Regency. Although there are many challenges and obstacles, solutions and solutions will be found with the encouragement of the supreme leader.

The first step in developing ICT in realizing the transformation of Advanced Nias Regency is to analyze the extent of the condition of ICT in Nias Regency. This is often a trivial matter for other local governments because they are unable to know the weaknesses and shortcomings for their area so that the planning made does not touch the core ICT problems in their area. Therefore, the following is an overview of ICT in Nias Regency:

Source: processed by the author from various references



Figure 2. Overview of ICT in Nias Regency

Based on the overview of ICT in Nias Regency above, it can be seen that there are still many tasks and homework for local governments to be able to reach the utilization stage. Cooperation with various stakeholders is common and must be done by other local governments for the implementation of ICT in their regions. The following is a picture of cooperation between stakeholders in the region, namely:



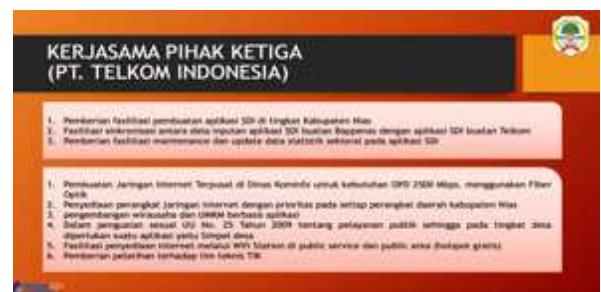
Source: Processed by the author from various references
Figure 3. E-Government Relationship Model

The explanation of the picture above is described as follows:

1. Government to society (G2C) is an E-Government model where the delivery of public services and information is one-way by the government to the community.
2. Community to government (C2G) is an E-Government model that allows the exchange of information and communication between the community and the government.
3. Government to business (G2B) is an E-Government model where electronic transactions and the government provide various information needed for businesses to transact with the government. Example: e-procurement system.
4. Business to government (B2G) is an E-Government model which will lead to the marketing of products and services to the government to help the government become more efficient; business process improvement and electronic data management. An e-procurement system is an example of an application that facilitates both G2B and B2G interactions.
5. Government to employee (G2E) is a model of E-Government which consists of initiatives that facilitate service management and internal communication with government employees.

6. Government to government (G2G) is an E-Government model that enables online communication and information exchange between government departments or agencies through integrated databases, resulting in efficiency and effectiveness.
7. Government to non-profit organization (G2N) is an E-Government model where the government provides information to non-profit organizations, political parties, or social organizations.
8. Non-profit organization to government (N2G) is an E-Government model that enables information exchange and communication between the government and non-profit organizations, political parties and social organizations.

Once we understand the relationships that can be made by local government then we can formulate the right collaboration so that ICT in Nias Regency can take place step by step. One of the exploratory forms of cooperation that will be launched by the Nias Regency Government through the Communication and Informatics Office of Nias Regency with the private sector or G2B is as follows:



Source: Author's data processing.

Figure 4. Concept of G2B Cooperation between the Regional Government of Nias Regency with Telkom Indonesia

Discussion

Stages and Analysis of ICT in Nias Regency to Realize the Transformation of Advanced Nias Regency ICT Stages in Nias Regency

ICT stages need to be carried out and examined step by step, when done in a leapfrog manner, it will disrupt the planning that has been made. These leaps will make the results of e-government not perfectly successful and not achieve the indicators set. The stages of ICT or e-government levels are as follows:



Figure 5. Stages of ICT in Indonesia and Implemented in Nias Regency

Source: Presidential Instruction No. 3 of 2003 on National Policy and Strategy for E-Government Development

Based on the five stages above, Nias Regency implemented it by focusing on the following five important steps:

- Step 1: Create e-leadership build a core of high level e-government to facilitate and coordinate e-government activities at all levels of government in Nias Regency.
- Step 2: Enable the environment, develop appropriate e-government regulations and Cyber laws.
- Step 3: Build ICT infrastructure, expand utilization and efficient allocation of existing ICT capacity and develop ICT infrastructure.
- Step 4: Pilot projects, develop a prioritized list of pilot projects and outline a phased implementation strategy.
- Step 5: Change Management and BPR, incorporating change management practices as integral to the deployment of any e-Government program.

The various stages above led Nias Regency to formulate an ICT Grand Design approach in Nias Regency to realize the transformation of the Advanced Nias Regency, with the following stages:

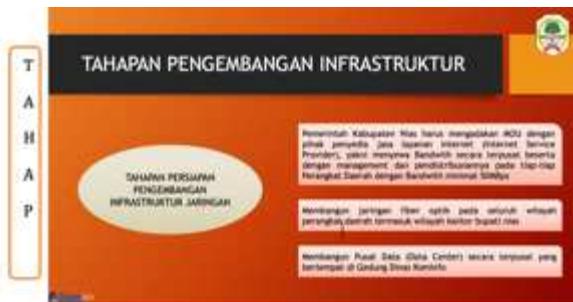


Figure 6. ICT Stages in Indonesia and Implemented in Nias Regency

At this stage the focus of implementation is on infrastructure development, because no matter how well the implementation and application of ICT in Nias Regency if it is not supported by adequate ICT facilities and infrastructure, the results that will be achieved will also definitely not be maximized.

Strengths (S)

1. The local government's commitment to improving the development of communication and informatics.
2. Potential development of ICT infrastructure that supports public information and communication services.
3. Potential development of interconnection of regional devices and development of informatics applications that support the implementation and

improvement of e-government.

4. Potential development of management information systems (SIM) of regional apparatus online through websites.

Weaknesses (W)

1. The geographical condition of Nias Regency causes limitations in telecommunication network services to reach communities in blankspot areas.
2. Lack of quality and competence of ICT human resources.
3. Not maximizing the interconnection of all regional devices through internet and intranet network integration.
4. The absence of adequate facilities and infrastructure to support the implementation of ICT.
5. The lack of innovative ideas and thoughts and thinking ahead in the Nias Regency Government.

Opportunities (O)

1. Ministry of Communication and Informatics policies that support the optimization and capacity building of human resources in the field of communication and informatics through education and training at BPPTIK and training at BPPTIK.
2. Provision of easier public internet access.
3. Increased public awareness of the importance of information.
4. Development of telecommunications infrastructure Base Transceiver Station (BTS) infrastructure development by Bakti Kominfo and providers/private sector is commercially oriented (profit oriented) commercial (profit oriented).

Threats (T)

1. The existence of a network of national and transnational cybercrime groups national and transnational cybercrime groups, which are provocative in nature, have the potential to disrupt local government information systems information systems belonging to local governments.
2. The proliferation of hoaxes and negative content that contain elements of SARA have the potential to damage the order of national life and the integrity of the Republic of Indonesia the integrity of the Republic of Indonesia.
3. The breadth of the region.
4. High threat of data theft from other parties.
5. The low level of regular monitoring and evaluation carried out when the The application of a preventive mindset is not balanced with a repressive attitude.

Formulation of ST Strategy:

1. Utilize the government's commitment to improving development in the field of communication and informatics in line with the establishment of a legal umbrella on ICT security systems to target district and city coverage.
2. The application of organizing in accordance with the potential for infrastructure development is a challenge in formulating the right strategy based on an analysis of the potential of the region due to Indonesia having a geographical and demographic

bonus that is diverse in ethnicity.

3. The development of Management Information System (SIM) is a further step in emphasizing a strong foundation for the sustainability of the e-government structure to welcome the industrial revolution 4.0 based on national security and local wisdom.

Formulation of SO Strategy:

1. The harmonization of tiered integrated support from the central government to the regions has made a bright spot in the ICT architecture in Indonesia in general and in Nias Regency in particular.
2. ICT infrastructure development that always prioritizes security factors makes it easier for people to access the internet and store things that are private.
3. The impact of the sustainability of the community's sense of security in accessing the public internet strengthens the awareness of how important ICT is so that it becomes a supporting force that strengthens e-government.
4. The cruising power and ability of the government in developing ICT infrastructure is of course very lacking so that it requires a private party / provider to maintain existence can be maintained both online and on the website.

Formulation of WO Strategy:

1. Although there are limitations in the competence of ICT human resources in Nias Regency, they can be slowly eroded with the existence of policies from the Ministry of Communication and Information that support the optimization and capacity building of ICT human resources through training.
2. The geographical condition of Nias Regency as an archipelago is a classic factor and an obstacle in building facilities and infrastructure and developing ICT infrastructure so that this is a gap for the Nias Regency Government to see this as a promotional event in embracing all parties, both central, provincial and provider / private governments to alleviate these problems.
3. The alleviation of some of the problems of the Nias Regency Government as a city district area that is classified as developing (not yet advanced and not yet independent) in terms of ICT, namely infrastructure, infrastructure, budget and human resources, makes people realize how important it is to get information where according to the saying people who control information are people who control the world.

Formulation of WT Strategy:

1. The geographical condition of Nias Regency which is an archipelago (which is difficult to overcome blindspots due to accessibility factors) coupled with the lack of ICT infrastructure that has been built makes it easy to become a gate for things that threaten ICT such as piracy, cyber crime, containing negative SARA content.
2. Nias Regency's weak ICT human resources in terms of quantity and quality further adds to the list of

homework in improving an integrated, coordinated and controlled ICT security architecture.

3. Regular monitoring and evaluation must be carried out to encourage dynamic policies in accordance with the rapidly changing situation and conditions of society and ICT.

ICT Strategy in Realizing the Transformation of Advanced Nias Regency

Basically, e-government is the use of information technology that can improve the relationship between the Regional Government of Nias Regency and other parties including the community. The benefits of e-government that can be felt include:

- a. Better service to the people
Information can be provided 24 hours a day, 7 days a week, without having to wait for the opening of the workplace. news can be sought from the office, home, without having to physically arrive at the government office.
- b. Improved relationship between government, business people, and the general public
The existence of openness (transparency) requires better correlation between various parties. This openness eliminates mutual suspicion and resentment from all parties.
- c. Empowerment of the people through easily obtainable issues
Using sufficient information, people will learn to make choices. For example, data about schools: number of classes, student capacity, passing grade, etc., can be displayed online and used by parents to choose the right school for their children.
- d. More efficient government operations
For example, government coordination can be done through e-mail or even video conferencing. For Indonesia, which has a very large area, this is very helpful. Questions and answers, coordination, discussions between regional leaders can be done without all of them having to be in the same physical location. no longer all have to fly to Jakarta for meetings that only last one or two hours.

One of the expected solutions is the integration of the government administration system through a network of on-line information systems between central and regional government agencies to access all data and information, especially those related to public services. In the government sector, changes in the strategic environment and technological advances encourage government officials to anticipate new paradigms using efforts to improve bureaucratic performance and improve services towards the realization of good governance. The most important thing that must be seen is that the government sector is the driver and facilitator of the success of various development activities, therefore the success of development must be supported by the speed of data and info flow between agencies so that there is a system integration between the government and other users.

CONCLUSION

From the discussion above, it can be concluded that the implementation of E-Government in local governments, especially developing local governments, has seen rapid development. For the achievement of the results of its application is not in accordance with what is expected. Causes of E-Government Implementation Failure according to Robert Heeks (2003) that most of the failures of e-government applications in developing countries are due to a misunderstanding of "the current situation" with "what we will achieve with e-government projects".

DISEMINATION

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