

How does local government implement e-government: A case study from Bali Province, Indonesia

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Abstract: The assessment of the E-Government Development Index in Indonesia began in 2018. This year, the Bali Province E-Government Development Index was only 1.6 (maximum 5). In 2021, 2022, and 2023, the Bali Province E-Government Development Index is 3.68, 3.84, and 4.07, respectively. This index is the highest for the provincial category and higher than the national E-Government Development Index. This study aims to determine the triumphant factor in implementing e-government in the Bali Province. The research was conducted using structured and in-depth interviews with stakeholders related to e-government management in the Bali Province. Furthermore, a strengths, weaknesses, opportunities, and threats analysis was used to formulate the e-government implementation. The study has discovered five factors influencing the success of e-government implementation in Bali Province, including regional leaders' commitment, regulations, planning, governance and management, and human resources. The result also shows that leadership is the most influential factor in the successful implementation of e-government in Bali Province. Determination of the vision, mission, technical policies, planning, and performance evaluation is carried out in an organised and structured manner. Other evidence of support is realised through allocating a particular budget, providing human resources, and adequately delegating authority. While the findings of this paper will only close a small part of the knowledge gap, further research is still needed by sampling other provinces in Indonesia.

Keywords: e-government, Bali Province, leadership, decision-making

1. Introduction

The public's demand for improving the quality of public services that are effective, efficient, transparent, and accountable continues to align with the disruption 4.0 era, which requires all sectors to use various technologies to improve their performance through digital and integrated service processes. (Choi & Moon, 2023). Governments in different countries implement this through Electronic-Based Government Systems or e-government. E-government is a government administration that utilises information and communication technology (ICT) to provide services to the public. (Malodia et al., 2021). E-government has been implemented in various countries. From 2010 to 2018, 170 countries were implementing e-government. (Zou et al., 2023), such as South Korea, which has been one of the world leaders in e-government implementation for the last two decades (Turner et al., 2022), China, where government employees have a positive attitude toward adopting e-government services (Iong & Phillips, 2023), India, which shows that the success of e-government is influenced by customer orientation, channel orientation, and technology orientation (Malodia et al., 2021), as well as various other countries, including Indonesia.

The implementation of e-government in Indonesia is regulated in Presidential Instruction (Inpres) Number 3 of 2003 concerning the National Policy and Strategy for the Development of e-government. In 2018, the Presidential Instruction was enhanced by Presidential Regulation Number 95 of 2018 concerning Electronic-Based Government Systems (e-government), which explains the importance of e-government integration and efficiency in e-government and management nationally. The implementation of e-government can create public services that are effective, efficient, inexpensive, easy, fast, fair, and accountable (UN e-government survey, 2022) in the delivery of public services, which will ultimately increase public confidence in governance. Implementing e-government can also promote economic development and improve social welfare (Department of Economic and Social Affairs; United Nations, 2022). Based on a survey of the implementation of e-government in various countries by the United Nations (UN) in 2022, Indonesia's e-government index is 2.34, ranking 77th out of 193 countries. This was an increase of 11 places since 2020.

Zou et al. (2023) stated that e-government positively affects government dimensions through voice accountability and the rule of law. Furthermore, to determine the extent of the development and implementation of e-government in ministries/institutions and regional governments, the Ministry of State Apparatus Empowerment and Bureaucratic Reform issued Ministerial Regulation Number 5 of 2018 concerning monitoring and evaluation of e-government. E-gov monitoring and evaluation are carried out annually by measuring the maturity level of e-government implementation in ministries/institutions and regional governments as outlined in the e-government Index.

The evaluation results of e-government's implementation in Bali Province in 2018 were considered unsuccessful, with 1.62 of 5 points obtained. However, in 2021, the Bali Province E-Government Development Index increased significantly to 3.68 points, 3.84 points in 2022, and 4.07 points in 2023, the highest among 33 other provinces. This achievement certainly requires good strategy and implementation. Several previous studies examining the implementation of e-government in Bali Province include the lack of success (Jayanti, 2017), maturity level (Muka et al., 2020), evaluation of improving the quality of public services (Agustina, 2021), e-government development until 2020 (Wisnumurti et al., 2022), review of the preparation of public service complaint applications (Narayana, 2020), and plans to develop Bali Province as a smart island (Sanjaya & Darma, 2023).

Many articles highlight the failure of E-gov (Erhan et al., 2017), the challenges (Ndou, 2004; Al-Shboul et al., 2014; Samsor, 2021; Ismail et al., 2022), the readiness of public service applications (Yuhefizar & Chadri, 2019; Narayana, 2020), its development (Huda & Yunas, 2016; Aritonang, 2017; Jayanti, 2017), maturity level, and the improvement of its public services (Agustina, 2021). This paper emphasises management, governance, the successful process of increasing the e-government index, and the factors influencing it in the Bali provincial government. This research also offers an analysis using a strengths, weaknesses, opportunities, and threats (SWOT) matrix that can be used to increase the success of e-government, which can be adopted in other provinces. Based on these facts, it is necessary to study further how the efforts of the Bali provincial government in increasing the achievement of the e-government index include: 1) What has been done by the Bali provincial government in implementing e-government; 2) What factors influence the success of implementing e-government in the Bali Province, and 3), What are the efforts to maintain and improve these achievements?. This paper can be considered for local governments or other institutions developing

e-government. The novelty of this research is that this research directly links e-government and good governance which has not yet been done much. To establish an equitable government under good governance principles, it is thought that combining technology with e-government innovation will be beneficial (Syahputri & Kusdarini, 2021). The study also shows the factors that influence the success of e-government implementation in developing countries. A study by Heeks (2008) shows that the failure rate for implementing e-government, especially in developing countries, is quite high, reaching 85%. This condition then changed for improvement, as later updated by Meiyanti et al. (2019), who said the failure rate for implementing e-government had decreased to 60%.

1.1. Methodology

The research was carried out in Bali Province. Respondents in this study were regional officials in various government agencies, such as the Office of Communications, Informatics and Statistics, and the Organizational Bureau. Bali Province was chosen because it had Indonesia's most extensive e-government Index in 2021, 2022 and 2023. Apart from that, Bali Province is also a major world tourist destination in Indonesia.

1.2. Data collection method

Two kinds of data sources are used in this study: primary data was obtained through a focus group interview method with certain respondents who have the same characteristics, namely those who are directly involved in determining policies, preparing budgets and work plans, as well as young computer experts in the ICT field. Meanwhile, secondary data was obtained from the results of the monitoring and evaluation of e-government, which is carried out annually by the Ministry of State Apparatus Empowerment and Bureaucratic Reform of the Republic of Indonesia. In this qualitative study, the key informants carried out the Strengths, weaknesses, opportunities, and threats analysis (SWOT). A purposive sampling technique was used to target these key informants. In-depth interviews were conducted with e-government policymakers in Bali Province. The respondents interviewed in this research were the e-government management team at the Bali Province Communication and Information Service, including 1) The head of the Ministry of Communication and Information as sub-coordinator of e-government in the field of information and communication technology; 2) the secretary of the Bali Province Communication and Information Service, as the person responsible for preparing the Bali Province budget and work plan; and 3), Computer officer as sub coordinator of the Informatics Application Substance Unit of the Bali Province Communication and Information Service. The informants were selected using purposive procedures considered to represent and master the issues to be studied (Bungin, 2007) or key informants that contributed to providing information to researchers. Indrawan & Yaniawati (2016) explained that data collection techniques suitable for use in research using a qualitative approach (postpositivism) are in-depth interviews, observation, and documentation studies. Questions submitted to respondents included: 1) Stakeholders related to e-government implementation; 2) The role of decision-makers; 3) The e-government implementation process; 4) Policies that have been issued; and 5) Results achieved in implementing e-government, primarily related to the impact felt by the community. The in-depth interview method was conducted with stakeholders related to the e-government implementation policy to analyse the operationalisation of the policy implementation concept.

The e-government index assessment is carried out nationally by the government of the Republic of Indonesia based on the Minister of State Apparatus Empowerment and Bureaucratic Reform regulation, Number 59 of 2020, concerning the monitoring and evaluation of e-government. The e-government index measures four domains, consisting of 1) internal policy, 2) e-government governance, 3) e-government management, and 4) e-government services. The four domains are then described in 9 aspects, which include: (i) e-government governance policy; (ii) e-government service policy; (iii) e-government organising institution; (iv) Planning and strategy; (v) Information and communication technology; (vi), Implementation of management; (vii), Information and communication technology audit; (viii), Government administration services; and (ix) Public services, as well as 47 indicators.

1.3. Data analysis

The interview results were sorted based on categories, including policies, regulations, and e-government programs. The data was further analysed narratively and descriptively to map the factors that influence the success of e-government in Bali Province. The relevant literature on e-government was used as a tool to carry out descriptive analysis and to triangulate research data. Triangulation functions to validate qualitative research themes through cross-verification of conceptualisation, data, methods, respondents, and theory (Jonsen & Jehn, 2009). Efforts need to be made to maintain the success of achieving the e-government index and optimising e-government, including developing an e-government implementation strategy.

1.4. Strategy formulations

SWOT analysis is used to formulate this strategy, which is expected to be used as a reference by local governments or other institutions. SWOT analysis refers to the assessment and evaluation of various strengths, weaknesses, opportunities, threats, and other factors that influence a specific topic (Wang & Wang, 2020). It comprehensively describes the scenario in which the topic is located (Wang & Wang, 2020). This method can be used to identify favourable and unfavourable factors and conditions, solve current problems in a targeted manner, recognise the challenges and obstacles faced, and formulate strategic plans to guide scientific decisions (Wang & Wang, 2020). By listing favourable and unfavourable internal and external issues in the four quadrants of a SWOT analysis grid, planners can better understand how strengths can be leveraged to realise new opportunities and understand how weaknesses can slow progress or magnify organisational threats (Helms & Nixon, 2010). SWOT helps look at the organisation's or situation's current performance (strengths and weaknesses) and the organisation's future (opportunities and threats) by accounting for the factors that exist in the external environment (Abay et al., 2016). SWOT analysis is used as a tool for maintenance management from a strategic perspective (Jasiulewicz-Kaczmarek, 2016). SWOT analysis aims to identify the extent to which the current strategy of an organisation and its more specific strengths and weaknesses are relevant to and capable of dealing with the changes taking place in the business environment (Jasiulewicz-Kaczmarek, 2016).

1.5. Data limitation

The main purpose of the paper is to explain the success of e-government implementation in Bali Province. To achieve this goal, we used purposive sampling in determining research respondents. The limitation of the data is that the respondents selected are the main stakeholders only in managing e-government in Bali Province, namely e-government managers/administrators in the Bali provincial government.

2. Literature review

Implementing e-government in both developed and developing countries is a complex process with various challenges and critical success factors. Implementing e-government in both developed and developing countries is a difficult process with numerous hurdles and essential success criteria. Apleni & Smuts (2020), and Rajapakse et al. (2012), both emphasise the necessity of interoperability, resources, and management commitment to adopt e-government effectively. Moreover, Weerakody et al. (2012), underlines the importance of addressing political, fiscal, social, strategic, and organisational challenges when implementing e-government, citing the UK and Slovakia's experiences. In addition, Chen et al. (2007), conducts a comparative analysis of e-government implementation in the United States and China, finding crucial success criteria and providing an implementation strategy. These studies collectively highlight the need to address several technical, organisational, and strategic elements to successfully implement e-government.

2.1. E-government technology and its benefits

e-government refers to government ICT systems to deliver public services (Ismail et al., 2022). ICT use and e-government implementation can reinforce critical aspects of good governance and contribute to a more cooperative democracy (Behrens, 2012). The implementation of e-government, which utilises information technology (IT) to provide public services, is a complex process that requires careful consideration of key success factors (Sagheb-Tehrani, 2007). This is particularly true in transition countries, where the effectiveness of such implementations can vary widely (Ramaswamy, 2009). Web services play a crucial role in the design and implementation of e-government, as demonstrated in a case study of the Valimar Digital Project (Gomes & Ribeiro, 2009). In India, the low e-readiness index poses a significant challenge to the effective implementation of e-government, necessitating the development of a conceptual framework to address these issues (Devikala, 2019).

The case in Indonesia, Law Number 25 of 2009, concerning public services, emphasises that the administration of public services must comply with the expectations and demands of the community and can provide legal certainty. Public service delivery must be carried out professionally and affordably, so it is necessary to create an electronic-based public service information system that at least contains profiles of administrators and executors, service standards, service announcements, complaint management, and performance appraisal. Aritonang (2017) argues that the central government has made various efforts to support the development of e-government.

2.2. Implementation of e-government in Indonesia and various countries

The application of e-government in Indonesia has been widely carried out in several provinces, such as in Bekasi City, West Java Province (Harisanty & Anugrah, 2022), Gorontalo Regency, Gorontalo Province (Mohi & Botutihe, 2020a), Pekanbaru City, Riau Province (Warman et al., 2022) in Kuningan Regency, West Java Province (Kuru et al., 2021), and in West Sumatera Province (Yuhefizar & Chadri, 2019). The results of this study indicate that the implementation of e-government, so far, has been exemplary. The community has felt the benefits of information disclosure, getting practical and efficient services, and the government being more transparent and accountable.

However, there are also local governments that unsuccessfully implement e-government, such as in Tabanan Regency (Prawira & Paraniti, 2023). This failure relates to several obstacles in the implementation of e-government. According to Meiyanti et al. (2018), there are five categories of barriers: 1) IT infrastructure, 2) Managerial issues, 3) Digital culture, 4) Budgeting, and 5) Law and legislation. Meanwhile, according to Altameem et al. (2006), there are three other obstacles: 1) Political, 2) Geographical, and 3) Cultural. These constraints are undoubtedly different in each region, such as the Gorontalo Regency. The main factor is the problem of providing infrastructure and the availability of HR (Mohi & Botutihe, 2020), in Tabanan Regency regarding the policy of e-government, governance, management, and e-government service domains (Prawira & Paraniti, 2023).

As innovation in public services, e-government is also developing in various countries, such as Afghanistan (Samsor, 2021), Jordan (Al-Shboul et al., 2014), and Denmark (Overgaard, 2011), with all the dynamics that occur in its application in these countries, related to funding, policies, HR, and so on. Malodia et al. (2021), stated that the most significant factors influencing the success of e-government implementation are citizen orientation, channel orientation, and technology orientation. Meanwhile, Li & Shang (2020), explained that six dimensions contribute to improving e-government services: 1) System quality, 2) Reliability, 3) Security, 4) Accessibility, 5) Interactivity, and 6) Responsiveness. In the case of Indonesia, Erhan et al. (2017) concluded that the critical problems faced in implementing e-government in local governments are not just technical problems but system management and public awareness.

2.3. What should be considered so that the implementation of e-government runs optimally?

The above conditions require various efforts so that e-government can run optimally. The implementation of e-government in Indonesia needs to pay attention to technical aspects, logistical and cultural challenges (Behrens, 2012), and the central government needs to intervene for better e-government adoption in local governments (Erhan et al., 2017).

According to Prawira & Paraniti (2023), several efforts must be made to improve the e-government index, such as perfecting e-government-related policy regulations, as well as designing the e-government architecture and regional government e-government plan maps, compiling the ICT budget in the e-government master plan, managing application governance so that it is integrated with the data centre, forming the e-government Coordination Team and The e-government internal assessor team, who performed their responsibilities effectively, compiled standard operating

procedures (SOPs) related to e-government management, carried out periodic ICT audits and perfected e-government services which were able to run in two directions. It has been stated that the community's readiness to use e-government is needed because of the huge costs in regional government; this also includes the willingness of government administration to use e-government. Furthermore, Huda & Yunas (2016) concluded that to fulfil technological resources, the government must allocate sufficient funds to fulfil various tools related to e-government development.

Currently, efforts to develop e-government are mostly carried out by public bureaucracies such as ministries, non-ministerial government institutions, and provincial/district/city regional governments in the governance system (Junaidi, 2015). However, the implementation of e-government in Indonesia is not yet optimal because it has not been carried out evenly at all levels of government (Nugroho & Purbokusumo, 2020). The failure to implement e-government was caused by many factors, including the government's lack of understanding about e-readiness and decision-making without considering adequate evidence (Nugroho & Purbokusumo, 2020). Samsor (2021) grouped three challenges in implementing e-government, namely: 1) organizational obstacles, 2) social obstacles, and 3) ICT obstacles. Apart from that, there are still problems that need to be overcome, such as limited budget, HR, regulations, technology, and infrastructure, as well as a lack of a supportive environment (Nugraha, 2018; Nugroho & Purbokusumo, 2020).

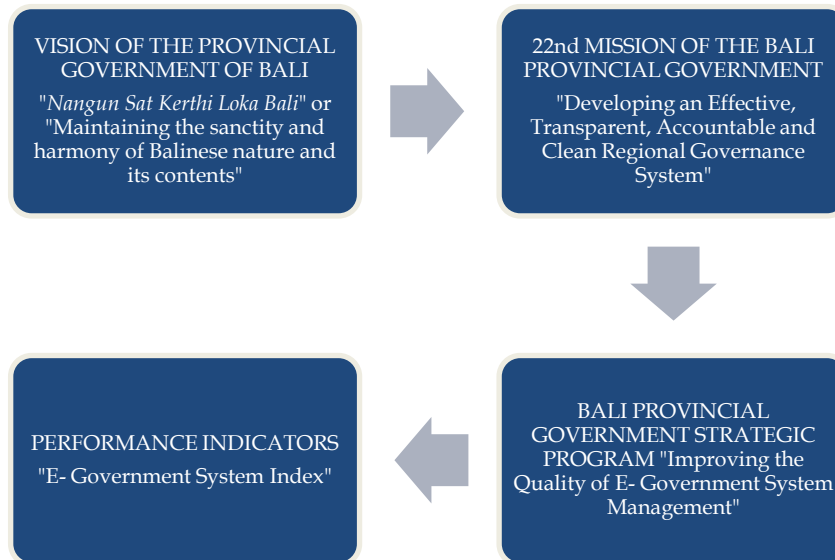
Several locations that have successfully implemented e-government have become interesting studies so that they can be referenced in formulating models for e-government development that are appropriate to the conditions of each government. This research uses the Indonesian e-government ranking dimensions, which are the standard in assessing the implementation of e-government in Indonesia, namely policy, institutional, infrastructure, application, and planning (Fardiyah et al., 2020; Fatmasari et al., 2022; Masyhur, 2017).

3. Result

3.1. The e-government policy for Bali Province

To support the national priority agenda and national development goals, especially those related to e-government development, Bali Province has determined governance and public services to be one of the regional development priorities for 2019-2023, which is the elaboration of the 22nd mission for the development of Bali Province. This mission is carried out by building public service infrastructure facilities integrated between local government agencies. The e-government index was determined to be an achievement performance indicator of the E-government Management Quality Improvement Program in Bali Province and briefly presented in Figure 1.

Figure 1. Linkage of e-government development with the Bali Province Medium Term Development Plan (Source: Bali Province Medium Term Development Plan 2018-2023)



3.2. Regulations, roadmaps, and several electronic-based public services

To implement the E-government Management Quality Improvement Program, the Bali provincial government has drawn up several regulations that become the legal umbrella for the development and implementation of e-government, as presented in Table 1.

Table 1. List of e-government supporting regulations in Bali Province

Regulation	Concerning
Governor of Bali Province Regulation Number 52 of 2019	The bureaucratic reform roadmap for 2019-2023 and e-government development are part of the development of bureaucratic reform.
Governor of Bali regulation Number 44 of 2021	e-government Bali provincial government
Decree of the Head of the Bali Province Communication, Informatics, and Statistics Office Number 05 of 2020	e-government Roadmap towards Bali Smart Island 2020-2024
Governor Instruction Number 15727 of 2021	Implementation of e-government Bali provincial government. Fourteen instructions must be carried out by the Head of the regional apparatus and the Bali Province e-government Coordinating Team.
Circular letter of the Regional Secretary of Bali Province Number 5532 of 2022	Use of virtual office applications. This circular letter regulates inter-related business process innovations in an effort to accelerate digital transformation for all employees within the Bali provincial government.

Source: Office of Communication, Information, and Statistics of Bali Province

Furthermore, Bali Province Governor Regulation Number 44 of 2021 is outlined in the e-government vision for Bali Province, namely "Sad maha kerti". These are translated into 6 Missions, namely: 1) Creating harmonised and integrated e-government-Bali Smart Island internal policies; 2) Strengthening integrated and measurable e-government-Bali Smart Island governance; 3) Building and strengthening the implementation of collaborative e-government services; 4) Creating essential smart city services, industry 4.0 services, and society 5.0; 5), Strengthening ICT infrastructure and security; and 6) strengthening HR in implementing e-government.

The Bali provincial government already has an e-government roadmap towards Bali Smart Island 2020-2024. The roadmap is prepared based on the level of need and urgency for each program, including a roadmap for e-government services, modern traditional village digital services, Krama Bali Unggul Digital Services, independent Bali digital services, One Island One Management Digital Services and Bali Economy Digital Services. Various government administration services in Bali Province are electronically based, covering planning, budgeting, finance service applications, goods and services procurement applications, staffing service applications, and other administrative service applications.

Bali provincial government has also built several electronic-based public services, such as:

- 1) The LOVE BALI application (<https://lovebali.baliprov.go.id/>), which is an information system for protecting nature, Balinese culture, and tourism information, as well as receiving tourist contributions that are integrated with the payment system for both domestic and foreign tourists.
- 2) The employment information system in Bali Province (<https://sisnaker.baliprov.go.id/>) is used by regional apparatus, Indonesian migrant workers (Pekerja Migran Indonesia/PMI), and PMI recruiting/ placement companies.
- 3) Cooperative Online Data System (ODS) (https://koperasi.baliprov.go.id).
- 4) Online Data System (ODS) for micro and medium enterprises and small and medium industries. (<https://officeumkm.baliprov.go.id/>).
- 5) COVID data collection system (<https://pendataancovid.baliprov.go.id/data>).
- 6) Electronic-Based Legal Documentation and Information Network Services.

3.3. SWOT analysis for e-government implementation in Bali Province

The results of the focus group discussion (FGD) with the Head of the Bali Province Communication, Informatics, and Statistics Office and the Head of the Organizational Bureau of the Bali Province Regional Secretariat and their staff and the results of a review of secondary data and research results related to e-government became the basis for preparing the SWOT matrix for e-government implementation in Bali Province, as presented in Table 2.

Table 2 SWOT matrix of e-government implementation in Bali Province

IFE EFE	Strength	Weakness
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	<ol style="list-style-type: none"> 1) Strong commitment from the highest leadership (Governor). 2) There are supporting regulations at the provincial level. 3) A strategic planning aspect, outlined in the MTDP document, IT master plan, enterprise architecture, and road map. 4) e-government governance and management, which is manifested by the availability of SOPs in almost all aspects of management (risk management, information security, ICT assets, HR, changes, services). 5) Human resource support (technical team, selection for ICT HR, training and capacity building and competence of ICT HR, internalisation of work culture). 6) Collaboration/ cooperation has been established with the central government, regional and district/city apparatus, and external parties. 	<ol style="list-style-type: none"> 1), The distribution of ICT HR is not evenly distributed in the regional apparatus. 2.) The availability of ICT infrastructure is not evenly distributed. 3) Coordination between regional apparatus is not optimal.
<p>Opportunity (O)</p> <ol style="list-style-type: none"> 1) Creative millennial generation. 2) Digital transformation policies and bureaucratic reform. 3) The development of ICT in a global world. 4) Existence of higher education in Bali Province. 	<p>Strategy (S-O)</p> <ol style="list-style-type: none"> 1) Maximizing existing support to improve the quality of HR by utilising ICT developments to make it easier for people to apply. (S1, S5, O2, O3) 2) Strengthen and regulate to establish cooperation with external parties following the applicable legal basis. (S2, S6, O4) 	<p>Strategy (W-O)</p> <ol style="list-style-type: none"> 3) Conduct training and standardisation of e-government actors and provide infrastructure by utilising available ICT developments. (W1, W2, O2, O3)
<p>Threat (T)</p> <ol style="list-style-type: none"> 1) Frequently changing the central government policies. 2) The architecture of the national e-government has not yet been established. 	<p>Strategy (S-T)</p> <ol style="list-style-type: none"> 4) Maximizing HR in the IT field to improve website and application security to avoid hackers not only for websites and applications, including data and information and IT infrastructure (Network, Data Center, and Government service bus). (S5, T3) 	<p>Strategy (W-T)</p> <ol style="list-style-type: none"> 6) Improving competence and cultivating the use of electronics for e-government actors to adapt to policy changes. (W1, W2, T1, T2)

<p>3) Interference from outsiders (hackers).</p> <p>4) Existence of a third-party (non-government) network system.</p> <p>5) Community digital literacy is still low (although relatively high compared to other provinces).</p>	<p>5) Complete the legal basis and establish change management to anticipate changes in internal and external policy patterns. (S2, T1, T2)</p>	
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The six aspects determining the success of implementing e-government in Bali Province are the strengths of the Bali Provincial government, which are the basis for implementing the strategy prepared in the SWOT matrix.

a. SO Strategy (Strengths-Opportunities)

This strategy is created by using existing strengths to take advantage of existing opportunities. Therefore, the strategy used is to maximise existing support to improve the quality of HR by utilising ICT developments to make it easier for people to implement e-government (S1, S5, O2, O3). In addition, the SO strategy is strengthening regulations to establish cooperation with external parties following the applicable legal basis (S2, S6, O4).

b. WO Strategy (Weakness-Opportunity)

This strategy is created by taking advantage of opportunities by minimising weaknesses. The existence of opportunities in terms of the availability of digital transformation policies and bureaucratic reform (O2), as well as the rapid development of ICT in the global world (O3), can be utilised to minimise existing weaknesses. The weaknesses are the unequal distribution of ICT HR in regional apparatus (W1) and the uneven availability of ICT infrastructure (W2). The strategy can be implemented to train and standardise e-government actors and provide infrastructure by utilising available ICT developments (W1, W2, O2, O3).

c. ST Strategy (Strength-Threat)

This strategy is created by using existing strengths to face or avoid existing threats. The threats faced are frequent changes in policies from the central government (T1), the lack of a national e-government architecture (T2), and interference from outside parties (hackers) (T3). With the strength of human resource support (technical team, selection of ICT HR, training and increasing the capacity and competency of ICT HR, internalisation of work culture) (S5), and the existence of supporting regulations at the provincial level (S2), the strategy that can be implemented is: 1), Maximizing human resources who competence in the IT field to improve website and application security to avoid hackers (S5, T3), and 2), Completing the legal basis and establishing change management to anticipate changes in internal and external policy patterns (S2, T1, T2).

d. WT Strategy (Weakness-Threat)

This strategy is created by reducing weaknesses to avoid threats. Weaknesses in terms of the unequal distribution of ICT HR in regional apparatus (W1) and the unequal availability of ICT infrastructure (W2) are faced with challenges in the form of frequent policy changes from the central government (T1) and the lack of a national e-government architecture (T2). The strategy that can be implemented is increasing human resource competency and cultivating the use of electronics for e-government actors to adapt to policy changes.

4. Discussion

Some of the progress made by the Bali provincial government in 2021 can be mapped out in regional heads' governance. Explanation of each aspect is as follows:

4.1. Leadership aspects

In the previous government, e-government in Bali Province was not well developed, as evidenced by the 2018 e-government Index measurement results, which only reached 1.62 points. The main factor that has become the starting point for the revival of the e-government in Bali Province is the Governor's commitment to accelerate the development of the e-government to support good governance. In both the pre-and post-implementation phases of e-government implementation for funding, political support, program awareness, and stakeholder endorsement and adoption, – as well as for the latter, the financial sustainability of e-government projects, the role of top management or leadership is crucial (Aditya et al., 2023; Samsor, 2021).

In some countries, the leadership barrier is one of the organisational and cultural barriers to e-government (Mujali Al-rawahna et al., 2018; Samsor, 2021). However, this is not the case in Bali Province. The government commitment was then well translated by the Head of the Bali Province Communication, Informatics, and Statistics Office, his staff, and the heads of other regional apparatuses within Bali Province to continue improving digitalisation development. It turned out that the results significantly impacted the results of the e-government index measurement. It is proven that the results of the 2021 e-government Index measurement increased drastically to reach 3.68 points. Siddique (2016), shows that e-leadership is one of the most influential aspects of the successful implementation of e-government policies in Pakistan. The study by Napitupulu et al. (2018), also shows that e-leadership and top management support are determining factors for the success of e-government implementation in Indonesia. The e-leadership items that influence the success of e-government are strong leadership, leadership vision, and missions, aligning IT and strategy goals, commitment, and leadership functions (Herlambang & Susanto, 2019). Strong leadership is needed to change the culture from conventional to ICT-based (Kifle & Low, 2009). Siddique (2016), also explained that e-government policies cannot be implemented without top leadership commitment, especially in financial allocation, because e-government development requires considerable funds. In the Indonesian context, the central government's efforts to implement e-government by issuing various regulations will be meaningless if they are not supported by the commitment of regional heads (Herlambang & Susanto, 2019).

The commitment of the governor of Bali Province, I Wayan Koster, is outlined in the e-government Development Policy, which is an elaboration of the vision of Bali Province for 2018-2023, namely "Nangun Sat Kerthi Loka Bali" through a planned universal development pattern. In a more in-depth elaboration of the vision above, namely that the Balinese ancestors/elders have passed down a Balinese way of life that unites and maintains balance/harmony between Balinese nature, Balinese Krama (humans) and Balinese culture, which includes customs, religion, tradition and art in a scalable way, the way of life for the Balinese, which can be called authentically Balinese. A vision and mission understood by the public will support the success of e-government (Takavarasha Jr et al., 2012). According to Jackson et al. (2013), the cultural factors of people with high collectivity values, such as those in Bali Province, also influence the birth of commitment at the middle management level (Head of Regional Apparatus) in supporting the policies of the highest leadership, in this case, the Governor.

Several manifestations of e-government implementation include reducing the number of Regional Apparatus Organizations (OPD) from 49 to 38. The Bali provincial government has also implemented a merit system for employee promotions and transfers. In addition, they have also digitised from planning to providing services to the community (Parliament of Indonesia, 2021).

4.2. Regulation aspect

In particular, the implementation of the e-government is part of a change in bureaucratic reform in which the implementation of transparent, efficient, and measurable work systems, processes, and procedures is supported by the performance of e-government. To realise the Governor's commitment, the Bali provincial government put it into action as a policy regulation that becomes the legal umbrella for the development and implementation of e-government.

Processing e-government principles and functions requires a series of rules, policies, laws, and legislative changes to deal with electronic activities, including electronic signatures, electronic filing, freedom of information, data protection, computer crime, intellectual property rights, and copyright issues (Ndou, 2004). Thus, the success of e-government initiatives and processes depends on the government's role in ensuring the appropriate legal framework for operating e-government (Basu, 2004). While the central government establishes an e-government vision, institutions, including local governments, need guidance on translating this vision into more concrete specifications for e-government services (Lam, 2005). In this case, the Bali provincial government has implemented a series of regulations and policies so that e-government implementation runs well.

4.3. Planning aspect

All e-government implementation and development needs can be mapped out clearly through the planning mechanism. This mechanism has been stated in at least 4 (four) planning documents for Bali Province, namely:

- 1) The Medium-Term Development Plan (MTDP) is a regional development plan document. In the MTDP, the quality improvement program has become one of the priority programs

during the 2018-2023 regional development planning period by establishing the e-government Index as its performance indicator.

- 2) The e-government Master Plan, namely the e-government planning document, supports the implementation of e-government.
- 3) e-government architecture is the basic framework that integrates business processes, data and information, Provincial e-government infrastructure, Provincial e-government applications, and Provincial e-government security to produce integrated Provincial e-government services. Bali provincial government has developed e-government architecture.
- 4) The e-government plan map describes the directions and steps for preparing and implementing an integrated Provincial e-government. The e-government plan map for Bali Province has been stipulated in the decree of the Head of the Bali Province Communication, Informatics and Statistics Office Number 05 of 2020 concerning the roadmap of e-government towards Bali Smart Island 2020-2024.

Planning is one of the dimensions in assessing e-government in Indonesia (Kurnia et al., 2003; Masyhur, 2017). Planning is also one of the determining factors for the success of e-government implementation in Indonesia (Napitupulu et al., 2018).

4.4. Governance and management aspects

Management was identified as a key challenge in the implementation of e-government (Giri et al., 2018). Law Number 30 of 2014 concerning government administration is the basis for implementing good governance to prevent corruption. E-gov governance is a framework that ensures the implementation of regulations, direction, and control in implementing e-government in an integrated manner. At the same time, e-government management is effective and sustainable.

E-government application development refers to the application development policy. In practice, the Bali Province e-government Application Development Team uses the SCRUM and KANBAN methods to refer to standard agile frameworks. In addition to application development, the Bali provincial government also implements e-government management, which is carried out by preparing policies (SOPs). E-gov management plays a central role in overcoming or reducing the impact of the above problems, such as risk management, change, HR, IT assets and knowledge, which will provide adaptive power to implementing e-government. One of the essential steps that must be taken regarding e-government management is regular and severe monitoring and evaluation every year of all aspects of e-government-Bali Smart Island implementation so that e-government Bali Province has high adaptive power. Change management strategies, project management, knowledge management, and ICT governance, according to Napitupulu et al. (2018), are some of the determining factors for the success of e-government implementation in Indonesia.

The Bali provincial government has carried out an audit of the e-government application regularly every year. Currently, an Internal Application Auditor Team has been formed to carry out the duties and functions of the application audit. Bali provincial government has also prepared and allocated a budget for security audit activities within Bali provincial government, as stated in the 2020 Work Plan Amendment document.

4.5. Human resources aspect

The implementation of e-government in poor nations faces six different types of problems. They are: 1) HHR; 2) Regulations and legislation; 3) Budgeting; 4) Digital culture; 5) Management issues; and 6) IT infrastructure. To guarantee the effective deployment of e-government, the government needs to be aware of and concentrate on these issues (Meiyanti et al., 2019). In the HR aspect, the Provincial Government of Bali formed an e-government Technical Team by conducting an open selection to obtain competent HR in the IT field. The COVID-19 pandemic in 2020 was also a turning point for developing e-government in the Provincial Government of Bali.

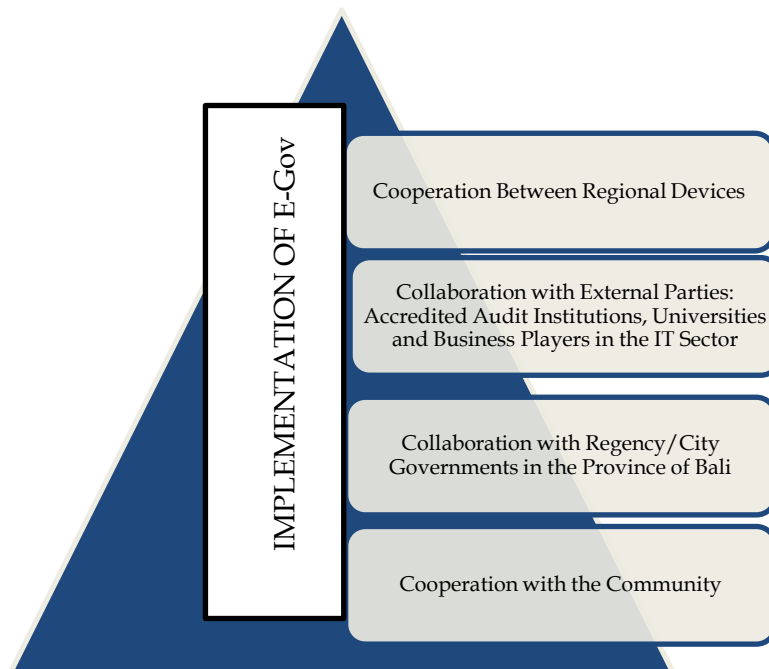
In addition to competency development, the Provincial Government of Bali has also built a work culture for Government employees so that digitisation is necessary to support their performance. The e-government program has full support from the Regional Head. On several occasions, the Governor and Regional Secretary of the Province of Bali always gave directions so that the civil servants of the Provincial Government of Bali could implement the e-government properly without exception. It is essential because of the lack of internal management and relevant technical skills within government agencies. According to Lam (2005) become a significant concern and another obstacle faced in the development of e-government. The same thing was also conveyed that the lack of ICT skills in the public sector is a particular problem in developing countries, where a critical shortage of qualified staff and inadequate training of HR has been a problem for many years.

The study from Karunia et al. (2023) strengthens that HR has a positive impact on the implementation of e-government. HR are very important for the development of good governance (Kimsean, 2011). The quality of HR is one of the challenges faced by developing countries in implementing e-government (Napitupulu et al., 2018). Furthermore, Napitupulu et al. (2018) stated that regular training, as well as skills and expertise, are determining factors for the success of e-government implementation in Indonesia.

4.6. Cooperation aspect

In developing e-government, the Bali provincial government cooperates with various parties through the Governor's Instruction Number 15727 of 2021. The Governor of Bali instructed the Head of Regional Apparatuses and the Bali Province e-government Coordination Team to strengthen and accelerate the implementation of an integrated e-government. The Bali Province Communication, Informatics, Statistics, and Coordination Service builds cooperation and collaboration with various parties, both with regional apparatuses within the Bali provincial government and with Bali Province reGENCY/city regional governments and central agencies.

Figure 2 Cooperation between stakeholders in the implementation of e-government in Bali Province



- 1) Cooperation between regional apparatus organisations: This collaboration is carried out through the activities of the e-government Coordination Team, which involves all related regional instruments. Apart from that, a regional apparatus e-government working group was also formed to strengthen the implementation of the Bali Province e-government in these regional apparatuses.
- 2) Cooperation with external parties: In developing e-government, the Bali provincial government has collaborated with external parties, such as academics and business actors in the IT sector. In conducting internal audits in collaboration with related tertiary institutions, external auditors cooperate with accredited audit institutions.
- 3) Collaboration with regency/city governments: The involvement of regency/city governments in utilising the e-government of Bali Province is in the aspect of data and information integration through the Bali Province One Data Indonesia (Satu Data Indonesia/SDI) Portal. SDI Bali Province is a form of data governance policy in the Bali provincial government to create quality data that is easily accessible, integrated, and shared between agencies in the provinces, regencies, and cities throughout Bali Province.
- 4) Collaboration with the Community: Community involvement in using e-government is through the Bali Province SDI portal application (Bali Satu Data). Through this portal, the Provincial Government of Bali continues to make full efforts to improve data governance to realise government transparency and accountability and support national development. The public can apply for data and information through this portal. However, until now, there has never been a measurement of the level of digital literacy in society.

The implementation of e-government in Bali Province is carried out in an integrated and comprehensive manner involving all internal organisations under the coordination and supervision of the

Bali Province Communication, Informatics and Statistics Service. Their cooperation is manifested in the form of 1) Making regulations; 2) e-government application development; 3) special recruitment of IT Professionals who will then become members of the e-government Development Team; 4) Use of the government service liaison system; 5), Collaboration on e-government implementation; 6), Implementation of e-government management; To improve e-government management; 7), Audit; 8), Legal documentation and information network services; and 9), the use of an integrated virtual office that allows employees to implement agile working.

The government must build public trust and have a strategic vision and plan to implement new technologies to ensure public and stakeholder participation in e-government efforts (Stratu-Strelet et al., 2021). Collaboration between the private and public sectors is also needed to provide resources that the government does not own. For example, the private sector facilitates technical skills and ICT infrastructure, while academia facilitates learning and training for government and community staff. Ministries and other government agencies can contribute data and information flow and share knowledge for problem-solving (Talero & Gaudette, 1996).

In the aspect of policy science, the successful implementation of a policy is influenced by three main factors: 1) The procedure itself, 2) The implementor, and 3) The policy environment (Dunn, 2003). These three factors are fulfilled in the e-government development policy in Bali Province. This fulfilment is reflected in the availability of various technical and administrative regulations, commitment support from multiple levels of policy implementers, and the strengthening of the social culture of people who have high collective values.

4.7. Challenges in e-government implementation

It has been projected that over 60% of e-government projects fail to achieve the intended objective (Meiyanti et al., 2019). The failure rate of e-government system adoption is somewhat greater in underdeveloped nations because of the numerous governmental hurdles (Meiyanti et al., 2019), poor policy frameworks, inadequate ICT infrastructure, and restricted finance (Giri et al., 2018; Ismail et al., 2022; Mujali Al-rawahna et al., 2018). organisational barriers (resistance to change, leadership, information sharing, collaboration, stakeholder involvement, and legal impacts), social obstacles (culture, the digital divide, and ICT literacy), and ICT obstacles (infrastructure, finance, security, privacy, and policy) (Samsor, 2021)

Digitalisation is crucial, particularly for developing nations' rising economies. Digital inequality is a problem for countries that cannot digitise quickly enough. The efficient application of ICT is a major factor in social progress, economic growth, and efficient government. (Jamil, 2021; Nawafleh, 2020; Ragnedda & Mutsvairo, 2018).

Broadband and internet infrastructure are becoming increasingly crucial for building community resilience, particularly in rural regions (Conley, 2016). In many established and developing nations worldwide, the advancements in ICT have had a major impact on some important societal sectors, including commerce, transportation, health, education, and communication. However, there is a worldwide digital gap because of the internet's uneven global proliferation (Jamil, 2021). There is a digital gap in every society, ranging from extremely vast to extremely small. It can happen between

males and females in rural and urban areas, economically developed and developing nations, skilled and unskilled individuals, and large and small businesses (Ritzhaupt et al., 2013). There is a significant gap in digital access between industrialised and underdeveloped nations. In this context, it is critical to understand that as digital devices like smartphones, computers and tablets become more affordable, more people with modest incomes can access them. However, the issue of the digital divide persists since not everyone has access to the internet and the newest ICT gadgets (Jamil, 2021).

Promoting digital inclusion, which is essential to achieving sustainable development, particularly in developing countries, has been one notable reaction to the issue of digital disparities in the last ten years. (Jamil, 2020; Network, 2019; Ragnedda & Mutsvairo, 2018). Equal access to the Internet and technology is crucial for enhancing people's quality of life since it provides them with the means to obtain helpful services and information. (Ragnedda, M., & Gladkova, 2020).

The digital gap poses a serious issue for local governments working to guarantee fair and inclusive access to sufficient public services for the whole community. Through enhancing public services, ICT offers many potential for regional development. (Mensah et al., 2021). Regions can use ICT to improve communication with businesses and the community, highlight their potential, and expedite service delivery (Ismagilova et al., 2019).

5. Conclusions

e-government is an innovation in public services that supports transparency and accountability, which leads to good governance. Regulations regarding e-Gov in Indonesia have been issued since 2003. However, the Indonesian government has only seriously implemented e-government since 2018, when the government began to assess the implementation of e-government in ministries, provincial government, and local government. The success of the Bali provincial government in increasing the achievement of the e-government index in a short period was supported by several factors: 1) Firm commitment from the highest leadership (Governor); 2) Supporting regulations are available at the provincial level; 3), Substantial planning aspects, outlined in the MTDP document, master plan, architecture, and plan maps; 4), e-government governance and management which is manifested by the availability of SOPs in almost all aspects of management (risk management, information security, ICT assets, HR, changes, services); 5), HR support (technical team, selection of ICT HR, training and capacity building and competence of ICT HR, internalisation of work culture); 6), Collaboration and cooperation that has been built with the central government, regional apparatus, and district/city, as well as with external parties. Among all these factors, leadership is the determining factor for successful e-government implementation in Bali. This leadership is manifested in infrastructure and superstructural support, budgeting, and regular monitoring and includes e-government as one of the province's priority programs.

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