

Original Article

# Architectural Framework to Support Smart Government Service Quality

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**Abstract** - The Indonesian government issued Presidential Regulation No. 95 of 2018 on Electronic-Based Government Systems (EBGS). The regulation set forth guidelines for the implementation of EBGS, which organizations adopted. The absence of a standardized architectural model often hampers the efficient use of a local government application that is consistent. This challenge led the study to attempt to address this problem by exploring the question of this problem through literature, factor analysis, descriptive statistical analysis, and validation through expert opinion. The analysis revealed ten key drivers and thirty-seven criteria that have a strong influence on the smart government process. Ten key drivers and thirty-seven criteria that strongly contribute to the smart government process were found in the analysis. The researchers described a set of architectural models in combination of four interdependent layers according to the findings: (i) business, (ii) data and information, (iii) services and solutions, and (iv) technology and infrastructure. The framework generated was then used to provide an application based on a case study conducted in the East Java local government. The implementation results showed strong advancements in smart government maturity and the quality of IT service produced. The study offers both theoretical and practical advances. In concept, it is expected that in some way the framework integrates governance, organizational structure, and service quality into an integrated model. This gives a more comprehensive and organized outlook than earlier studies have offered. In practice, this framework offers practical guidance for policymakers and practitioners alike who wish to enhance digital governance and promote the implementation of smart government in Indonesia.

**Keywords** - Electronic-based governance systems, IT governance, Smart government, IT service quality, Enterprise architecture.

## 1. Introduction

An Information Technology Architecture (ITA) is the fundamental framework used in developing IT data. Enterprise architecture serves as the backbone of IT governance [1] for IT development planning. Enterprise architecture consists of a comprehensive composition of components and aspects that form a series of stages for IT development according to the business mission, vision, and goals to enhance performance and gain a competitive advantage. A smart city must be used to build a complete enterprise architecture, which includes all government-related elements and their functions, as well as responsibilities. As a government is itself an organization, it plays a central role in any smart government initiative. Indonesia is one of the countries that has information technology governance management for its government entities. The Indonesian government is endorsing the Electronic-Based Government System (EBGS) as one of the frameworks for smart government. This system comprises various domains and components that facilitate its deployment and measurement, as expressed by the President of the Republic of Indonesia in 2018 [3]. In this regard, Presidential Regulation No. 95 of

2018 [3] introduces the concept of a smart government as a framework for integrating numerous important elements, including data and information, business processes, EBGS applications, EBGS infrastructure, and EBGS security. This framework serves the central aim of providing integrated EBGS services. As stated by the Ministry of Communication and Information (2019), this concept adds to the effectiveness and efficiency of government functions since it provides a clearer picture of the essential principles of smart governance [3]. Effective under Presidential Regulation No. 95 of 2018, Indonesia makes it mandatory for smart governance via the Electronic-Based Government System (EBGS) to be integrated in both the central and local governments. Nevertheless, many local authorities, such as those in East Java, face obstacles in the establishment of long-term and systematic integration. The underlying issue stems from the absence of a uniform architectural framework and assessment system [4, 5]. With respect to the practical aspects of EBGS implementation, there are a number of barriers that obstruct the attainment of the appropriate levels of EBGS maturity for each local government organization. The biggest challenge is the absence of structured guidelines for their implementation.



In the absence of clear guidelines, many aspects of the EBGs implementation process remain unclear, resulting in missed opportunities to maximize the effectiveness of EBGs implementation in local government organizations.

Research conducted to date remains fragmented, focusing on implementation issues or individual cases. Meanwhile, not much research has addressed the need for comprehensive approaches such as architectural modeling or maturity assessments in local government [6, 7]. On the other hand, enterprise architecture efforts tend to yield limited results, primarily due to poor strategic alignment and inadequate organizational readiness [8]. Several previous studies [9-11] exploring EBGs in Indonesia have identified its prospective benefits and inherent challenges. EBGs promises to improve accountability, transparency, service delivery, and citizen participation. However, its success is hampered by inadequate infrastructure, funding, limited expertise, and gaps in the legal framework. This study concludes with guidance for policymakers and stakeholders to mitigate these barriers and realize the full potential of EBGs.

Research conducted by Panjaitan et al. [5] identified the absence of a maturity-based audit mechanism capable of supporting pre-implementation and post-implementation evaluation. Furthermore, existing quality management systems within local governments are still unable to accommodate the dynamic needs of IT service provision. This underscores the need for consistent improvements to existing frameworks such as ITIL V4 [12, 13]. These gaps hinder local government units, such as those in East Java, from developing coherent enterprise architectures or ensuring continuous improvement in IT service quality. Therefore, an integrated architectural and evaluation framework is needed to guide the successful implementation of smart government and ensure its continuous effectiveness through structured service improvements, inter-organizational coordination, and performance monitoring.

This study aims to develop an architectural framework and reference model aligned with Presidential Regulation No. 95 of 2018 on EBGs, design and apply an IT service quality improvement method based on ITIL V4, and evaluate its impact on smart government maturity and IT service quality compared to existing frameworks.

## 2. Related Works

The following are some reviews of a few previous research journals in the past, concerned with the implementation of information technology governance in the present study. In 2021, Ariffin and Ahmad [14] analyzed research conducted in Malaysia to investigate how digital forensic organizations are prepared and evolving within the context of the capability to carry out investigations against the backdrop of the Fourth Industrial Revolution. Conducting a formal Systematic Literature Review (SLR) will serve as an

indicator of the DF company's readiness and maturity in relation to IR 4.0. These phases include DF challenges in IR 4.0, traceability and readiness of DF, existing maturity models, and benchmarking of maturity elements, forming four stages of SLR.

The study identified five markers of DF organizational maturity and readiness: 1) Organization, policy, and collaboration, 2) HR and capacity building, 3) Process, 4) Technology and technicalities, and 5) Law. Hartanti et al. investigated the ability to assess public trust in smart government service monitoring in a study [15]. This study attempts to understand the determinants affecting trust and the use of smart government services by citizens. It pinpoints the key drivers, including technology quality, the performance of the government, and citizens' engagement. Based on empirical research findings, a framework is suggested that combines the information systems success model with additional components, showing that trust plays a major role in service adoption and perceived value.

A study in West Java Province, Indonesia, emphasizes service quality assurance and government transparency, both of which are critical for building public trust. This further indicates the importance of future research to conduct research in other regions. Research by Almuraqab, Jasimuddin, and Mansoor [16] studied the determinants of smart government service adoption in the UAE. The variables that were evaluated were influences on social relationships, facilitating conditions, performance expectancy, effort expectancy, and trust in the government. They modeled 273 survey responses using structural equation modeling. Results demonstrated that performance expectancy and trust played a strong role in adoption, while demographic characteristics had more variable moderating effects. In summary, trust and simplicity of use are the main determinants of smart government services adoption. Triyanto et al. conducted a study on the application of collaborative governance on smart city implementation in the implementation of smart cities in Bengkulu City. The authors conclude from this study that strong cooperation between public and private sector actors in all spheres and community organizations is critical in order to achieve collaborative governance in smart cities. Using technological innovation and policy advocacy tools to strengthen governance.

Through the qualitative research, with these findings, we demonstrate that collaborative governance is a potentially rich and fruitful model, but that it is hindered in practice due to a weak regulatory framework and a lack of stakeholder involvement. Clearer regulations and a formal collaborative platform to foster confidence and trust are suggested by the authors. This should improve the provision of public services and solve current governance problems. Safitri [18] performed a literature review in 2021 to investigate the factors and obstacles to the adoption of big data for smart cities. Key

drivers like high infrastructure readiness, good quality data, sufficient funds, human resources, appropriate policies, and adequate privacy and security safeguards were also the factors that the study identified. The research results showed that although private organizations have achieved substantial progress in leveraging big data, smart city initiatives in the public sector are minimal. The interlinkages between these factors and calls for systematic preparation are captured by the proposed conceptual framework. This is simultaneously an illustration of how big data can enhance both service evaluation and citizen engagement, while also posing challenges in implementing similar practices. Kuzior et al. [19] examine global trends in smart cities. The investigators emphasize the significant aspects that allow them to be built into practice. Summary:

This work examines numerous academic references on smart city governance, digitalization, and e-government, centering on the topic of SCGI and its determinants among several clusters of cities. It discusses one such study from Silesian University of Technology. It examines socio-economic and technical indicators and classifies smart cities into four clusters based on their governance capabilities. The results of the study reflect the complex role of SCGI with other related development indicators, which in this respect suggest the role of human development in the development and quality of life, and also challenge traditional beliefs regarding the role of economic development on e-government. In 2023, Myeong and Bokhari [20] found the effect of institutional and technological factors on the evolution of participatory e-governance models in smart cities in a quantitative study. Specifically, it investigated how e-governance, technological innovation, and institutional innovation interacted to improve stakeholder satisfaction in smart cities.

This research emphasizes the need for collaboration among the public, private, and civil society sectors. Using a case study from Seoul and data from surveys in South Korea and Pakistan. Here, the study results demonstrated that technological and institutional innovation was found to reduce the influence of e-governance on stakeholder satisfaction and promote stakeholder satisfaction, indicating that successful stakeholder involvement in the policy-making process is essential. In 2023, Shareef [21] investigated the potential of IoT to improve e-government. This research aimed to help us make the transition to relatively advanced smart government services. The study looked at how to extend this concept into the public sector, with a particular focus on developing countries using the Internet of Things (IoT) and then combining it to create Smart Government (SG). They emphasized for the state a citizen-centered approach-the need to have new frameworks and citizen participation, and technology to enhance efficiency and responsiveness within government. The opportunities and challenges of deploying IoT for e-government systems-trust, security, and efficient processes are highlighted in the review. The researchers also

promoted a bottom-up and collaborative approach that emphasizes public awareness. Khalil et al. [22] performed research on governance structures and how they influence smart city policies in Aceh, Indonesia. This is a comparative study of the implementation of smart city ideas in Indonesia, specifically in Aceh Province. One study looked at how poverty can be reduced through sustainable development. Various studies defined smart cities as well as their respective obstacles and challenges in their context, which are emphasized in this study. Tension between government paradigms and local visions surfaced in the study. It was observed that Banda Aceh City has taken great strides in the sphere of smart city governance; meanwhile, other city segments within Aceh are still trailing. It shows the importance of the socialisation of smart city projects and the adjustment with respect to technological advances for better provision of public solutions and the welfare of local citizens.

In 2021, Alsaid [23] examined the use of performance measurement frameworks in smart city governance. This research case study was on the Egyptian city council. This research specifically investigates the performance evaluation systems in smart city governance on a grand scale, particularly considering New Cairo, Egypt. This research explains how they, based upon politico-military relationships, guide public policies towards urban development and decision-making after the 2011 revolution.

By applying a multi-level institutional framework, this study highlights the interaction between macro-political pressures and micro-organizational practices. The data also highlights the significance of performance metrics to spur public-private partnerships and accountability in smart city endeavors. Althunibat et al. [24] proposed the Smart Government Adoption Model (SGA-M) to examine the determinants of smart government service acceptance. Researchers conducted a survey of 807 Jordanian respondents. It was found that compatibility, information quality, trust, and security are constructs that impact adoption in three stages: static, interaction, and transaction.

The authors point out that sustainable adoption also needs targeted user education and awareness programs. Based on Indonesian evidence, Panjaitan et al. [5] scrutinized knowledge gaps during such transformations and standardization to the development of smart cities, especially in the context of their transformation and standardization. The study uncovered ongoing difficulties faced in Indonesian initiatives. One of its most obvious problems is that knowledge transfer between key government areas and local governments does not exist, so many projects are incorrectly called real smart city efforts. This study showed how important it is to integrate knowledge in several domains, for example, through research into ICT and socio-cultural characteristics, so as to work together as a group and contribute jointly with stakeholders towards results that are

pleasing. The authors also suggested that knowledge capacity is to be created and adaptive strategies are to be used so that smart city projects contribute towards public welfare and societal well-being, and are not just digitalization exercises.

In a study by Nguyen et al. [25], they designed and presented a systematic risk management framework for smart city governance. This study was conducted with an eye toward policy outcomes and decision-making. Through the analysis of organizational, social, and technological risks, they contend that models of traditional governance are insufficient. They recommended an integrated model integrating technology, citizen engagement, and strategic risk management. In their 10 years of literature review, the researchers found strong challenges to governance around issues like data privacy, cybersecurity, and stakeholder integration that culminated in a proposed governance model that can benefit from external processes and feedback loops. Ngo and Le [26] introduced the concept of smart cities in 2021 by examining the role of smart urban governance in urban innovation in the modern era. This article explores the idea of smart cities, highlighting the integration of ICT into city management and smart urban governance. By 2050, 68% of the world's population will be living in urban areas as urbanization accelerates, according to forecasts. A smart city is a system built on such infrastructure and technological advancement, but the authors argue that it also considers social resources and effective governance.

They argue for citizen participation in governance and e-democracy to improve transparency and accountability, while censuring technocratic models. It also addresses the increasing smart city opportunities in Vietnam, such as Ho Chi Minh City and Binh Duong, which, with their state-led e-government program, focus on further developing public administration, which is still hindered by the problems of data sharing and citizen engagement. Nur et al. [27] studied how the integration of public service management in local government can be enhanced with smart governance.

This research examined the transition of Makassar City, Indonesia, to develop a smart city environment to adopt smart governance. Under national law, this calls for an e-government system to provide a responsible, transparent, efficient, and clean government. To offer integrated public services through ICT, the Makassar City Communication and Information Agency has a master plan that includes a strong emphasis on e-administration, internal coordination, and teamwork. The research underscores the significance of technology and innovation to enhance bureaucratic effectiveness and public services. Researchers recommend the development of standards for digital public services and the establishment by the State of infrastructure for e-governance. Katuk et al. [28] analyze the ecosystem of smart technology, and the results include its impacts, challenges, and room for further development. The study highlights the role of individuals, communities, businesses, and governments in

promoting responsible adoption and development and recommends some steps. Educate, use ethically, and have equitable distribution of benefits are the focus of the study. It also presents its consequences for the disaster response, day to day, societies, businesses, and the public administration of smart technologies.

As the authors point out, it is important to continue to work in collaboration with other stakeholders to help tackle critical issues like data privacy, loss of employment, and sustainability. Narang et al. [29] examined the determinants of CSFs that influence the adoption of IoT-based solutions in the water industry, aimed at enhancing decision-making. Building upon real-time Delphi models and fuzzy cognitive mapping, the study distilled the expert view and found seven CSFs: leadership, technology awareness, data privacy, interoperability, usability, implementation costs, and community involvement. The findings underscored leadership as a key force in technological change, emphasised the necessity of ongoing learning on IoT, and a careful framework to manage data privacy and interoperability.

Finally, the study provides policy recommendations for integrating IoT systems with water management systems that address resource scarcity and legacy infrastructure. Meher et al. [30] investigated how a learning culture influences an organization's performance through serial mediators of organizational intelligence and knowledge management. The interaction between Knowledge Management (KM), Organizational Innovation (OI), Organizational Performance (OP), and Organizational Learning Culture (OLC) in Indian IT firms was examined. The study also found that while KM had no direct impact on OP, a strong OLC positive effect on KM, OI, and OP. The study found OI as one major mediator that helps OP improvements through successful KM practices. This study concluded that organizations have to achieve a positive learning culture and well-developed KM practices to nurture an innovative and performance-enhancing culture. The study noted limitations in its breadth, but encouraged more research across sectors.

In 2023, Dimmera and Purnasari [31] explored problem areas and solutions proposed by the Smart Indonesia Program to drive educational equity in Bengkayang Regency. This paper focused on the Smart Indonesia Program (PIP) in Bengkayang and investigated some of the challenges for the project. These challenges pointed to the importance of uneven distribution of the Smart Indonesia Card (KIP), incomplete disbursement of funds, misallocation of beneficiaries, and poor citizens' engagement. The study also highlighted the necessity of working together on the stakeholders' perspectives and recommendations to strengthen the monitoring and evaluation of the implementation of PIP. The study provided guidance on how schools should help underprivileged students to apply for PIP. Furthermore, to this end, this study also emphasized the need for communication

regarding the PIP policy, especially in addressing it to parents and students. The study found that even with the program being designed to support poor students, there are barriers to educational equity for this group of students.

### 3. Method

The method covers research activities such as literature study, survey, data analysis, validation, and framework evaluation. Based on the related research conducted for the

study, Figure 1 illustrates the interrelationships among the many elements that affect how well the Electronic-Based Government System (EBGS) is implemented in Indonesia as part of Smart Governance. The steps are built based on the results of in-depth literature studies, factor analysis, and input from regional planning and information technology architecture experts. Providing a conceptual foundation for data collecting, analysis, framework validation, and implementation of the suggested architectural framework is the aim of the design.

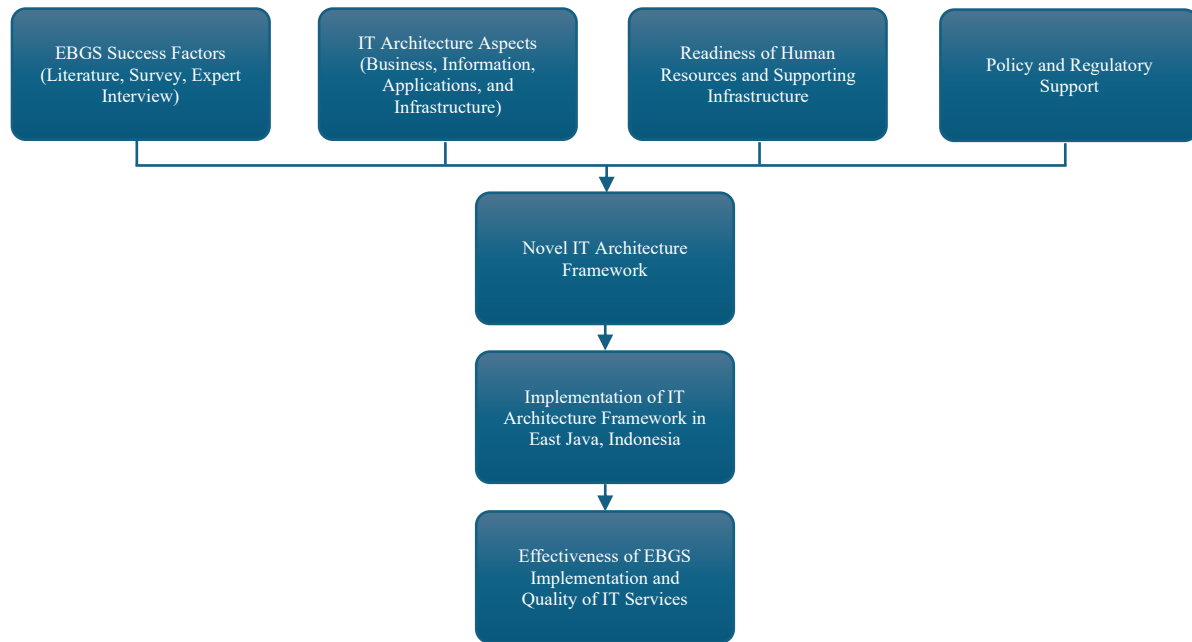


Fig. 1 Steps in designing the architectural framework

Based on Figure 1, the design for the architectural framework consists of four major components:

- **EBGS Success Factors:** Identified through literature analysis, surveys, and expert input, including governance structure, stakeholder engagement, digital readiness, system integration, etc.
- **IT Architecture Aspects:** Includes the Business, Information, Application, and Infrastructure (BIAI) domains mentioned in the TOGAF framework previously in this chapter. These aspects are the technical foundation for building a robust and adaptable architecture.
- **Readiness of Human Resources and Supporting Infrastructure:** Emphasizes the implementation needs, including organizational capacity, digital skills, and the availability of supporting IT infrastructure.
- **Policy and Regulatory Support:** Includes national digital governance regulations, institutional policies, and standards frameworks that provide legitimacy and direction for system implementation.

This research uses these four input components to develop a new architectural framework specifically designed for the context of public sector institutions in Indonesia. This framework is then applied to a case study focusing on the implementation of IT architecture in East Java, Indonesia. The goal is to examine its practical application and impact. Ultimately, the framework aims to assess the effectiveness of EBGS implementation and the quality of IT services, including service efficiency, integration, transparency, and citizen satisfaction.

### 4. Results and Discussion

The analysis in this study is based on insights gained from the literature review. This provides an initial foundation for identifying relevant frameworks, models, and critical success factors in smart government and IT governance. To position this research within the broader academic context, the first step is to map the approaches used in previous studies, highlighting contributions and unaddressed gaps. Table 1 presents this mapping, summarizing the authors, frameworks, applied models, main focuses, and identified research gaps.

**Table 1. Mapping matrix of literature review journals**

| <b>Author (Year)</b> | <b>Framework / Model Used</b>                                                                                                                | <b>Main Focus / Contribution</b>                                                                                      | <b>Research Gap Identified</b>                                                    |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| [14]                 | PPT Model (People, Process, Technology - measuring organizational readiness and capabilities from three main aspects)                        | Identified five indicators for maturity/readiness in digital forensic organisation (IR 4.0)                           | Not in the public sector; no link to IT governance or smart government frameworks |
| [15]                 | IS Success Model (evaluating the system's performance according to its information quality, user satisfaction, and system quality)           | Measured citizen trust in smart government; transparency and tech quality emphasized                                  | Limited regional scope (West Java)                                                |
| [16]                 | Modeling technology adoption based on social contexts and expectations is known as UTAUT (Unified Theory of Adoption and Use of Technology). | Determined the main elements affecting the UAE's adoption of smart gov (e.g., trust, performance expectancy)          | Not focused on the governance framework or service maturity evaluation            |
| [17]                 | Collaborative Governance (participatory model between stakeholders)                                                                          | Emphasized cooperation issues in smart city policy in Bengkulu                                                        | No maturity or service evaluation; lacks architecture integration                 |
| [18]                 | Big Data Readiness Framework (conceptual)                                                                                                    | Proposed big data success factors (quality, skills, policy) for a smart city                                          | Conceptual only; lacks linkage to EA or maturity assessment.                      |
| [19]                 | Smart City Governance Index (SCGI – combined digital and socio-economic indicators)                                                          | Clustered cities by governance enablers globally                                                                      | No specific reference to architecture or IT governance in Indonesia               |
| [20]                 | Institutional & Technological Innovation (stakeholder engagement model)                                                                      | Assessed innovation & participation in smart governance (Seoul & Pakistan)                                            | Case-specific; lacks integration with architectural or service quality model      |
| [21]                 | IoT-based Smart Government Model                                                                                                             | Investigated IoT's role in smart gov adoption (citizen-centric)                                                       | Theoretical only; the implementation model is underdeveloped                      |
| [22]                 | Qualitative Smart City Analysis                                                                                                              | Reviewed policy-society alignment in Aceh's smart governance                                                          | No clear EA structure; limited transferability across cities                      |
| [23]                 | Institutional Framework (multi-level)                                                                                                        | Analyzed performance metrics in Egypt's smart city governance                                                         | Lacks direct integration with the ICT/e-government strategy                       |
| [24]                 | SGA-M (Smart Government Adoption Model – Trust and security-based smart service adoption framework)                                          | Measured smart gov adoption factors in Jordan (trust, compatibility)                                                  | Localized scope; lacks architecture/service linkage                               |
| [5]                  | Thematic Knowledge Mapping                                                                                                                   | Identified knowledge gaps in Indonesian smart city practices                                                          | Lacks a formal framework for EA or an evaluation/maturity model                   |
| [25]                 | Systemic Risk Governance Model                                                                                                               | Proposed integrated risk framework in smart cities                                                                    | Mostly conceptual; lacks empirical implementation                                 |
| [26]                 | Smart Urban Governance (integrative model of technology and citizen participation)                                                           | Advocated citizen involvement in Vietnam's smart city development                                                     | Weak in implementation strategies; gaps in data policy                            |
| [27]                 | Local Smart Gov Masterplan                                                                                                                   | Explains how Information and Communication Technology (ICT) was used to support Makassar's government transformation. | Descriptive; lacks assessment tools for maturity/impact.                          |
| [28]                 | Ecosystem-Based Smart Tech Framework                                                                                                         | Highlighted societal and ethical aspects of smart tech                                                                | General; no sector-specific smart governance focus                                |

|      |                                                                                 |                                                                                        |                                                         |
|------|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|---------------------------------------------------------|
| [29] | Fuzzy Cognitive Mapping + Delphi                                                | Identified IoT success factors for the water sector                                    | No EA/maturity connection                               |
| [30] | Serial Mediation Model (learning culture drives performance through innovation) | Showed that learning culture improves innovation & performance                         | Corporate context only; not focused on smart governance |
| [31] | Policy Implementation Review                                                    | Identified distribution and monitoring issues in the Smart Indonesia education program | No link to IT service architecture                      |

The literature discussed in this study is rich in aspects, frameworks, and success factors impacting smart government implementation globally. These features lend generalizable intelligence, but, in this study, adapt and evaluate their applicability to the localized East Java through empirical approaches. The objective is to create a tailored framework that captures both world-class practices and the specific governance conditions of East Java Province.

Based on the literature study results, this research identifies the main elements that influence the implementation of information technology governance, as shown in Table 2. According to Table 2, the questionnaire was developed based on a comprehensive literature review that identified critical success factors in EBGs implementation. In this study, 39 items were constructed as positive items on a 5-point Likert scale. 1 indicates strongly disagree; 5 indicates strongly agree.

**Table 2. Matrix mapping factors from journal references**

| No | Factor                                                 | Reference    |
|----|--------------------------------------------------------|--------------|
| 1  | People and Capacity                                    | [14, 17, 19] |
| 2  | Function and roles                                     | [19]         |
| 3  | Financial Performance                                  | [18]         |
| 4  | Resource management                                    | [18, 19]     |
| 5  | Organization, Policy, and Cooperation                  | [14, 17]     |
| 6  | Flexibility and agility are related                    | [20]         |
| 7  | Strategic alignment                                    | [16]         |
| 8  | Value delivery                                         | [15]         |
| 9  | Clear planning, scope, and coverage, Strong governance | [16]         |
| 10 | Strategic and political                                | [16]         |
| 11 | Legislation, Regulation, and Standardization           | [22]         |
| 12 | Enterprise Architecture (EA) Governance                | [19]         |
| 13 | Top Management Support of EA                           | [18]         |
| 14 | Change management                                      | [18]         |
| 15 | Interorganizational Collaboration and Culture          | [15, 17]     |
| 16 | Program/project life cycle management                  | [23]         |
| 17 | Project Benefits                                       | [23]         |
| 18 | IT decision making                                     | [29]         |
| 19 | Data & Information                                     | [18]         |
| 20 | Data Exchange and Integration                          | [18]         |
| 21 | Application and Technology                             | [14, 18-20]  |
| 22 | Integration and interoperability                       | [20]         |
| 23 | Process flexibility                                    | [14]         |
| 24 | Mimetic, Normative, and Coercive pressure              | [5, 24]      |
| 25 | Service Capability                                     | [15, 16]     |
| 26 | Central service                                        | [15, 16]     |
| 27 | Infrastructure                                         | [18]         |
| 28 | Network services                                       | [28]         |
| 29 | Process Agreement                                      | [15]         |
| 30 | customer /society orientation                          | [15, 16]     |
| 31 | Risk Management                                        | [25]         |
| 32 | Monitoring & Performance measurement                   | [16]         |
| 33 | Continuous Improvement                                 | [26]         |
| 34 | Event management                                       | [27]         |

|    |                              |          |
|----|------------------------------|----------|
| 35 | Incident management          | [27]     |
| 36 | Problem management           | [27]     |
| 37 | Knowledge management-related | [18, 21] |
| 38 | Learning culture             | [30]     |
| 39 | Access management            | [31]     |

The study thematically categorized the items reflecting the different dimensions of smart government success factors.

The method used in the survey is non-probability purposive sampling, specifically focusing on government officials actively engaged in planning, implementing, or managing EBSG initiatives.

This choice guaranteed respondents had relevant experience and responsibilities in government IT and digital transformation. This study applied the recommendations in

[32] to determine the right sample size, which requires a minimum of five respondents for each item in the questionnaire and a minimum of 50 in total, with an optimum target of at least 200 respondents for multivariate analysis. The instrument had 39 items; 195 was the minimum required sample size. Therefore, the study focused on gathering responses from 200 participants and successfully collected responses. Table 3 shows the descriptions of survey questions. The study categorized each of the 39 items into conceptual domains representing critical elements of EBSG success factors.

**Table 3. Description of survey questions (39 Element)**

| No | Element                                                | Survey Question Description                                                         |
|----|--------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1  | People and Capacity                                    | Human resources are adequate and competent in supporting EBSG implementation.       |
| 2  | Function and roles                                     | Organizational functions and roles are clearly defined in EBSG processes.           |
| 3  | Financial Performance                                  | Financial resources for EBSG are sufficient and used efficiently.                   |
| 4  | Resource management                                    | EBSG resources are managed effectively and efficiently.                             |
| 5  | Organization, Policy, and Cooperation                  | There is good organizational alignment and interagency collaboration.               |
| 6  | Flexibility and agility are related                    | The system is adaptable to changes and dynamic needs.                               |
| 7  | Strategic alignment                                    | EBSG initiatives are aligned with institutional strategic goals.                    |
| 8  | Value delivery                                         | EBSG provides tangible value to the organization and stakeholders.                  |
| 9  | Clear planning, scope, and coverage, Strong governance | EBSG is guided by clear plans, scope definitions, and strong governance structures. |
| 10 | Strategic and political                                | There is sufficient political will and strategic support for EBSG.                  |
| 11 | Legislation, Regulation, and Standardization           | EBSG implementation complies with relevant laws and standards.                      |
| 12 | EA Governance                                          | EA is supported by appropriate governance structures.                               |
| 13 | Top Management Support of EA                           | Top leadership is committed to supporting EA and EBSG.                              |
| 14 | Change management                                      | The organization is capable of managing change related to digital transformation.   |
| 15 | Interorganizational Collaboration and Culture          | Social, cultural, and institutional collaboration affects EBSG implementation.      |
| 16 | Program/project life cycle management                  | EBSG projects are well-managed throughout their life cycle.                         |
| 17 | Project Benefits                                       | The outcomes of EBSG projects deliver measurable benefits.                          |
| 18 | IT decision making                                     | IT-related decisions are well-informed and timely.                                  |
| 19 | Data & Information                                     | Data is managed and utilized effectively across departments.                        |
| 20 | Data Exchange and Integration                          | Systems can harmonize and integrate data across agencies.                           |
| 21 | Application and Technology                             | Supporting applications and technologies are functional and reliable.               |
| 22 | Integration and interoperability                       | Systems are interoperable across government units.                                  |
| 23 | Process flexibility                                    | Government processes are flexible to accommodate digital systems.                   |
| 24 | Mimetic, Normative, and Coercive pressure              | External pressures (e.g., standards, policies) influence adoption.                  |
| 25 | Service Capability                                     | Public services are delivered reliably and responsively.                            |
| 26 | Central service                                        | Centralized services adequately support regional units.                             |
| 27 | Infrastructure                                         | Digital and physical infrastructures are available and sufficient.                  |

|    |                                      |                                                                          |
|----|--------------------------------------|--------------------------------------------------------------------------|
| 28 | Network services                     | Communication networks are reliable and support service delivery.        |
| 29 | Process Agreement                    | Formal process agreements exist between collaborating institutions.      |
| 30 | customer /society orientation        | EBGS is responsive to citizen needs and service expectations.            |
| 31 | Risk Management                      | Risks in EBGS are identified and managed proactively.                    |
| 32 | Monitoring & Performance measurement | Performance is regularly monitored and evaluated.                        |
| 33 | Continuous Improvement               | EBGS services are continuously evaluated and improved.                   |
| 34 | Event management                     | Unexpected events affecting EBGS are handled systematically.             |
| 35 | Incident management                  | IT incidents are resolved through structured processes.                  |
| 36 | Problem management                   | Recurring problems are diagnosed and resolved systematically.            |
| 37 | Knowledge management-related         | Institutional knowledge is documented and accessible.                    |
| 38 | Learning culture                     | There is support for learning, training, and innovation.                 |
| 39 | Access management                    | Data access is controlled based on user roles and security requirements. |

This research used Exploratory Factor Analysis (EFA) based on data collected through a survey of 200 respondents from government agencies. The analysis included thirty-nine input variables from the responses of these participants. This was an attempt to uncover the fundamental elements underlying the important dimensions at issue with smart government initiatives. The rotated component matrix from factor analysis of the survey data is shown in Table 4. Results

of rotation show the means of distributing variables across factors according to their highest loading values, which helps to identify meaningful and coherent factor types. Moreover, by evaluating the magnitude and pattern of these loadings, the analysis confirms the association of each variable with its most representative factor, thus enhancing the construct validity and reliability of the model used to measure the variable.

**Table 4. Rotated component matrix**

|                                                                                                     | Component |      |      |   |   |   |   |   |   |    |
|-----------------------------------------------------------------------------------------------------|-----------|------|------|---|---|---|---|---|---|----|
|                                                                                                     | 1         | 2    | 3    | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| The influence of inter-organizational collaboration and the influence of social and cultural change | .999      |      |      |   |   |   |   |   |   |    |
| Top Management Support of EA                                                                        | .999      |      |      |   |   |   |   |   |   |    |
| Legislation, Regulation, and Standardization                                                        | .999      |      |      |   |   |   |   |   |   |    |
| EA Governance                                                                                       | .999      |      |      |   |   |   |   |   |   |    |
| Clear planning, scope, and coverage, Strong governance                                              | .999      |      |      |   |   |   |   |   |   |    |
| Value delivery                                                                                      | .999      |      |      |   |   |   |   |   |   |    |
| Strategic and political                                                                             | .999      |      |      |   |   |   |   |   |   |    |
| Change management in the environment                                                                | .999      |      |      |   |   |   |   |   |   |    |
| Organization, Policy, and Cooperation                                                               | .999      |      |      |   |   |   |   |   |   |    |
| Flexibility and agility are related                                                                 | .999      |      |      |   |   |   |   |   |   |    |
| Strategic alignment                                                                                 | .999      |      |      |   |   |   |   |   |   |    |
| Data & Information                                                                                  |           | .993 |      |   |   |   |   |   |   |    |
| Application and Technology                                                                          |           | .993 |      |   |   |   |   |   |   |    |
| Integration and interoperability related                                                            |           | .993 |      |   |   |   |   |   |   |    |
| Project Benefits                                                                                    |           | .993 |      |   |   |   |   |   |   |    |
| Approval of exchange data harmonization and data integration                                        |           | .993 |      |   |   |   |   |   |   |    |
| Program/project life cycle management                                                               |           | .993 |      |   |   |   |   |   |   |    |
| IT decision making                                                                                  |           | .993 |      |   |   |   |   |   |   |    |
| People and Capacity                                                                                 |           |      | .988 |   |   |   |   |   |   |    |
| Function and roles                                                                                  |           |      | .988 |   |   |   |   |   |   |    |
| Financial Performance                                                                               |           |      | .988 |   |   |   |   |   |   |    |

|                                           |  |  |      |      |      |      |      |      |      |      |
|-------------------------------------------|--|--|------|------|------|------|------|------|------|------|
| Resource management                       |  |  | .988 |      |      |      |      |      |      |      |
| Problem management                        |  |  |      | .989 |      |      |      |      |      |      |
| Event management                          |  |  |      | .989 |      |      |      |      |      |      |
| Incident management                       |  |  |      | .989 |      |      |      |      |      |      |
| customer /society orientation             |  |  |      |      | .979 |      |      |      |      |      |
| Process Agreement                         |  |  |      |      | .979 |      |      |      |      |      |
| Risk Management                           |  |  |      |      |      |      |      |      |      |      |
| Monitoring & Performance measurement      |  |  |      |      |      | .996 |      |      |      |      |
| Continuous Improvement                    |  |  |      |      |      | .996 |      |      |      |      |
| Learning culture                          |  |  |      |      |      |      | .989 |      |      |      |
| Knowledge management-related              |  |  |      |      |      |      | .989 |      |      |      |
| Access management                         |  |  |      |      |      |      |      |      |      |      |
| Service Capability                        |  |  |      |      |      |      |      | .992 |      |      |
| Central service                           |  |  |      |      |      |      |      | .992 |      |      |
| Mimetic, Normative, and Coercive pressure |  |  |      |      |      |      |      |      | .986 |      |
| Process flexibility                       |  |  |      |      |      |      |      |      | .986 |      |
| Infrastructure                            |  |  |      |      |      |      |      |      |      | .976 |
| Network services                          |  |  |      |      |      |      |      |      |      | .976 |

In this regard, for the 10 factor categories supporting an effective deployment of the Electronic-Based Government System (EBGS), 37 distinct items are included according to their influence level. The outputs of factor mapping from this analysis indicate which factors most exert influence on smart

governance implementation. Most influential factors for the successful implementation of EBGS are presented in order of influence, according to Table 5, which facilitates decision-makers and government officials to focus their efforts and resources accordingly.

Table 5. Factor mapping

| No | Factor                                                                                             | Type of Factor            | Factor Group       |
|----|----------------------------------------------------------------------------------------------------|---------------------------|--------------------|
| 1  | The influence of interorganizational collaboration and the influence of social and cultural change | Relationship              | Inter-Organization |
| 2  | Top Management Support of EA                                                                       | EA                        |                    |
| 3  | Legislation, Regulation, and Standardization                                                       | Regulation                |                    |
| 4  | EA Governance                                                                                      | EA                        |                    |
| 5  | Value delivery                                                                                     | Organization              |                    |
| 6  | Strategic and political                                                                            | Regulation                |                    |
| 7  | Change management in the environment                                                               | Change Management         |                    |
| 8  | Clear planning, scope, and coverage, Strong governance                                             | Organization              |                    |
| 9  | Organization, Policy, and Cooperation                                                              |                           |                    |
| 10 | Flexibility and agility relate.                                                                    |                           |                    |
| 11 | Strategic alignment                                                                                |                           |                    |
| 12 | Data & Information                                                                                 | Data & Information        |                    |
| 13 | Application and Technology                                                                         | Application               | Technology         |
| 14 | Integration and interoperability related                                                           |                           |                    |
| 15 | Project Benefits                                                                                   | Program & project         |                    |
| 16 | Approval of exchange data harmonization and data integration                                       | Data & Information        |                    |
| 17 | Program/project life cycle management                                                              | Program & project         |                    |
| 18 | IT decision making                                                                                 | Decision making           |                    |
| 19 | People and Capacity                                                                                | Human Resource Management | Resource           |
| 20 | Function and roles                                                                                 |                           |                    |
| 21 | Financial Performance                                                                              |                           |                    |
| 22 | Resource management                                                                                | Financial                 |                    |
|    |                                                                                                    | Other resource            |                    |
| 23 | Problem management                                                                                 | Problem                   | Problem &          |

|    |                                           |                |                       |
|----|-------------------------------------------|----------------|-----------------------|
| 24 | Event management                          | Even           | Incident              |
| 25 | Incident management                       | Incident       |                       |
| 26 | customer /society orientation             | Agreement      | External Relationship |
| 27 | Process Agreement                         |                |                       |
| 28 | Monitoring & Performance measurement      | Performance    | Monitoring            |
| 29 | Continuous Improvement                    | continuous     |                       |
| 30 | Learning culture                          | knowledge      | Knowledge             |
| 31 | Knowledge management-related              |                |                       |
| 32 | Service Capability                        | Service        | Service               |
| 33 | Central service                           |                |                       |
| 34 | Mimetic, Normative, and Coercive pressure | pressure       | Process               |
| 35 | Process flexibility                       | process        |                       |
| 36 | Infrastructure                            | Infrastructure | Infrastructure        |
| 37 | Network services                          |                |                       |

The various factor analysis processes aim to produce outputs that help establish the modeling framework using the layer method. Based on the factor mapping output from the previous chapter's factor analysis, the identified factors were categorized within architectural framework domains to support the development of a new modeling framework. Table 6 shows the details of the grouping factors.

**Table 6. Factor mapping for architectural framework**

| Architectural Framework  | Factor Group                                                       |
|--------------------------|--------------------------------------------------------------------|
| Business Architecture    | 1. Inter-Organization<br>2. Resource<br>3. External Relationship   |
| Information Architecture | 1. Knowledge                                                       |
| Solution Architecture    | 1. Problem & Incident<br>2. Monitoring<br>3. Service<br>4. Process |
| Technology Architecture  | 1. Technology<br>2. Infrastructure                                 |

Subsequent research conducted additional analyses to confirm the resulting framework. The confirmatory survey employed a random sampling method to select respondents from the larger population.

Using Solvin's formula as the basis for sample size calculation, and considering that the total population in East Java is around 39.74 million people, this study calculated that the minimum sample size needed was 400 respondents. To attain this threshold, they distributed 500 questionnaires to residents and smart governance experts throughout the region. Table 7 shows the response rate from this distribution in this study.

**Table 7. Respond rate**

|                                  |       |
|----------------------------------|-------|
| Total Distributed Questionnaires | 500   |
| Total Questionnaires Received    | 489   |
| Percentage of Respond Rate (%)   | 97,8  |
| Usable Questionnaires            | 478   |
| Adjusted Respond Rate (%)        | 95.6% |

The researchers organized the questionnaire into three sections. Section A discusses the demographics of the questionnaire respondents. Section B discusses the elements of the IT Architecture proposed in the framework.

Section C discusses the views of the questionnaire respondents on the elements of the IT Architecture proposed in the framework. Table 8 presents the description of survey questions.

**Table 8. Description of survey questions (26 Domain)**

| No | Domain   | Description                                                                                                                                      |
|----|----------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Business | Elements of the IT Architecture<br>An Intern Organization must exist in components or elements of Business in the smart governance framework.    |
| 2  | Business | Elements of the IT Architecture<br>Resources must exist in components or elements of the Business in the smart governance framework.             |
| 3  | Business | Elements of the IT Architecture<br>External Relationship must exist in components or elements of the Business in the smart governance framework. |
| 4  | Business | Views of The Questionnaire Responden<br>Smart Governance aims to improve the performance of the government bureaucracy.                          |

|    |                             |                                                                                                                                                                                                                                                                                                                                                |
|----|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 5  | Business                    | Views of The Questionnaire Responden<br>Faster, more productive, efficient, communicative, and constantly improving corporate processes are all possible with smart governance.                                                                                                                                                                |
| 6  | Business                    | Views of The Questionnaire Responden<br>In order to handle management and governance more rapidly, effectively, efficiently, responsively, and communicatively, smart governance is both a concept and a practice.                                                                                                                             |
| 7  | Business                    | Views of The Questionnaire Responden<br>With patterns, culture, and business procedures of the government's internal bureaucracy and public services becoming more succinct, quick, simple, responsive, and communicative, as well as efficient in terms of time, money, and effort, smart government is an organizational governance concept. |
| 8  | Data & Information          | Elements of the IT Architecture<br>Knowledge must exist in components or elements, Data & Information, in the smart governance framework.                                                                                                                                                                                                      |
| 9  | Data & Information          | Views of The Questionnaire Responden<br>With the implementation of smart government, it is possible to realize bureaucratic governance that is oriented towards justice (fairness), accountability (accountability), and transparency (transparency) of data and information.                                                                  |
| 10 | Data & Information          | Views of The Questionnaire Responden<br>Information management in the form of knowledge management is important in implementing the smart government concept.                                                                                                                                                                                  |
| 11 | Data & Information          | Views of The Questionnaire Responden<br>Important components in smart governance are included: transparency and open data.                                                                                                                                                                                                                     |
| 12 | Data & Information          | Views of The Questionnaire Responden<br>Comprehensive identification of the data, the data flows, and the data interrelations in the smart government concept is able to improve automated data-handling.                                                                                                                                      |
| 13 | Services & Solutions        | Elements of the IT Architecture<br>Problem & Incident must exist in components or elements, Services & Solutions in the smart governance framework.                                                                                                                                                                                            |
| 14 | Services & Solutions        | Elements of the IT Architecture<br>Monitoring must exist in components or elements, Services & Solutions, in the smart governance framework.                                                                                                                                                                                                   |
| 15 | Services & Solutions        | Elements of the IT Architecture<br>Services must exist in components or elements, Services & Solutions in the smart governance framework.                                                                                                                                                                                                      |
| 16 | Services & Solutions        | Elements of the IT Architecture<br>Process must exist in components or elements, Services & Solutions in the smart governance framework.                                                                                                                                                                                                       |
| 17 | Services & Solutions        | Views of The Questionnaire Responden<br>Smart Governance aims to improve the performance of public services.                                                                                                                                                                                                                                   |
| 18 | Services & Solutions        | Views of The Questionnaire Responden<br>Smart governance is a concept and a method that aims to manage public services more quickly, effectively, efficiently, responsively, and communicatively.                                                                                                                                              |
| 19 | Services & Solutions        | Views of The Questionnaire Responden<br>Easy access to services can be efficiently supported and ensured by smart governance.                                                                                                                                                                                                                  |
| 20 | Services & Solutions        | Views of The Questionnaire Responden<br>One of the main impacts that will be obtained with the adoption of the smart government concept is that the organization can run excellent public services.                                                                                                                                            |
| 21 | Technology & Infrastructure | Elements of the IT Architecture<br>Technology must exist in components or elements, Technology & Infrastructure in the smart governance framework                                                                                                                                                                                              |

|    |                             |                                                                                                                                                                                                                                                                    |
|----|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 22 | Technology & Infrastructure | Elements of the IT Architecture<br>Infrastructure must exist in components or elements. Technology & Infrastructure in the Smart Governance Framework                                                                                                              |
| 23 | Technology & Infrastructure | Views of The Questionnaire Responden<br>The application of technologies is needed to support smart government                                                                                                                                                      |
| 24 | Technology & Infrastructure | Views of The Questionnaire Responden<br>The quality and efficacy of public services can be enhanced through the use of technology.                                                                                                                                 |
| 25 | Technology & Infrastructure | Views of The Questionnaire Responden<br>Improve bureaucratic effectiveness over time by embracing integrated technologies and being innovative.                                                                                                                    |
| 26 | Technology & Infrastructure | Views of The Questionnaire Responden<br>Technology can help government internal bureaucracy and public services run more efficiently in terms of time, money, and effort by making business processes more succinct, quick, simple, responsive, and communicative. |

Researchers utilized data analysis tasks with several data preprocessing procedures. This involved reviewing that data for quality, looking for missing data, looking at response rates, and performing normality tests. In addition, the researcher used descriptive statistics to examine the frequency of demographic data, as well as the descriptive statistics aspect of smart governance and the views of communities. By rigorous data analysis methods, the researchers ensured that data derived from the study adhered to statistical theory. Descriptive statistics provide a general perspective of a data

set, supporting the conclusion. Central tendency can be determined by the mean measure, allowing us to compare multiple variables. The median is the middle value of an ordered statistic, whether from highest to lowest or vice versa. The mode is the most frequent observation in a sample [33]. Validity and reliability testing were conducted at the pilot study stage. Using the product-moment approach, 30 pilot study responses underwent validity testing. The results of validity testing are shown in Table 8, and the 26 questions are listed in Table 9.

Table 9. Validity test result

| Question No. | Rxy   | Rtable | Sig. Value (2-tailed) | Result |
|--------------|-------|--------|-----------------------|--------|
| 1            | 0,947 | 0,361  | 0,000                 | VALID  |
| 2            | 0,947 | 0,361  | 0,000                 | VALID  |
| 3            | 0,947 | 0,361  | 0,000                 | VALID  |
| 4            | 0,947 | 0,361  | 0,000                 | VALID  |
| 5            | 0,947 | 0,361  | 0,000                 | VALID  |
| 6            | 0,947 | 0,361  | 0,000                 | VALID  |
| 7            | 0,947 | 0,361  | 0,000                 | VALID  |
| 8            | 0,947 | 0,361  | 0,000                 | VALID  |
| 9            | 0,543 | 0,361  | 0,002                 | VALID  |
| 10           | 0,543 | 0,361  | 0,002                 | VALID  |
| 11           | 0,543 | 0,361  | 0,002                 | VALID  |
| 12           | 0,909 | 0,361  | 0,000                 | VALID  |
| 13           | 0,947 | 0,361  | 0,000                 | VALID  |
| 14           | 0,600 | 0,361  | 0,000                 | VALID  |
| 15           | 0,606 | 0,361  | 0,000                 | VALID  |
| 16           | 0,738 | 0,361  | 0,000                 | VALID  |
| 17           | 0,604 | 0,361  | 0,000                 | VALID  |
| 18           | 0,947 | 0,361  | 0,000                 | VALID  |
| 19           | 0,947 | 0,361  | 0,000                 | VALID  |
| 20           | 0,947 | 0,361  | 0,000                 | VALID  |
| 21           | 0,947 | 0,361  | 0,000                 | VALID  |
| 22           | 0,947 | 0,361  | 0,000                 | VALID  |
| 23           | 0,947 | 0,361  | 0,000                 | VALID  |
| 24           | 0,741 | 0,361  | 0,000                 | VALID  |
| 25           | 0,741 | 0,361  | 0,000                 | VALID  |
| 26           | 0,741 | 0,361  | 0,000                 | VALID  |

The reliability testing analyzed 30 pilot study responses using Cronbach's alpha. Table 10 presents the results of reliability testing. During the descriptive statistics analysis stage, several tests and procedures were carried out. In particular, a demographic frequency analysis was performed on the "A" questionnaire data, a descriptive statistical analysis on the smart governance components on the "B" questionnaire data, and a descriptive analysis on the community responses, based on the "C" questionnaire data.

**Table 10. Reliability test result**

| <b>Cronbach's Alpha</b> | <b>Rtable</b> | <b>No of Items</b> | <b>Result</b> |
|-------------------------|---------------|--------------------|---------------|
| 0.980                   | 0.361         | 26                 | RELIABLE      |

Following a process of data preparation tests, follow-up analyses were included in this phase. The descriptive statistics section of the report provides the results of the analysis of research data collected here. The main findings of the analysis were that, on the whole, respondents were male (81.6%) or female (18.4%), according to the analysis. Those 31-40 years of age were the biggest percentage of respondents (58.5%, or 286 individuals). 58.5% of respondents had jobs in government, 30.9% in the private sector, and 10.6% self-employed. Education-wise, 64% had a master's degree, 25.2% an undergraduate degree, and 10.8% a doctoral degree. Last, the East Java region was lived in for over a decade by the

majority of the respondents (53.4%). These statistics were extracted based on the analysis of 489 research data points. Using the collected data, the researchers used the Descriptive Statistical Component to calculate the frequency and tendency of each component in the Smart Governance Indicator. Taking this perspective enabled us to pinpoint the trends and the frequency with which these indicators are operating, which in turn allowed us to improve the proposed framework. Table 11 presents the descriptive statistics based on the results of the Smart Governance analysis.

As evidenced by Table 11, presenting descriptive statistical analysis of the smart governance components, the results show that the proposed framework scores for each of the smart governance components had mean values above 4. Moreover, for each component, there were 5 points for median as well as mode, indicating strong consistency between the answers from the respondents. The resulting findings indicate that all components are properly aligned with their intended functions within the framework and are considered highly relevant to the actualization of smart governance objectives. One such approach is to conduct descriptive statistical analysis of awareness and community views to determine the trends and frequencies of each collected indicator. These trends and frequencies guide improvements to the proposed framework. Descriptive statistics are outlined in Table 12 for awareness and community views.

**Table 11. Descriptive statistic component of smart governance**

| <b>Construct</b>            | <b>Item</b>            | <b>N</b> | <b>Sum</b> | <b>Mean</b> | <b>Median</b> | <b>Mode</b> |
|-----------------------------|------------------------|----------|------------|-------------|---------------|-------------|
| Business                    | Intern Organiza-tion   | 489      | 2394       | 4.90        | 5,00          | 5           |
|                             | Resource               | 489      | 2365       | 4.84        | 5,00          | 5           |
|                             | External Relation-ship | 489      | 2377       | 4.86        | 5,00          | 5           |
| Data & Informa-tion         | Knowledge              | 489      | 2390       | 4.89        | 5,00          | 5           |
| Service & Solutions         | Problem Incident       | 488      | 2389       | 4.90        | 5,00          | 5           |
|                             | Monitoring             | 487      | 2287       | 4.70        | 5,00          | 5           |
|                             | Service                | 488      | 2440       | 5.00        | 5,00          | 5           |
|                             | Process                | 489      | 2394       | 4.90        | 5,00          | 5           |
| Technology & Infrastructure | Technology             | 489      | 2407       | 4.92        | 5,00          | 5           |
|                             | Infrastructure         | 489      | 2390       | 4.89        | 5,00          | 5           |

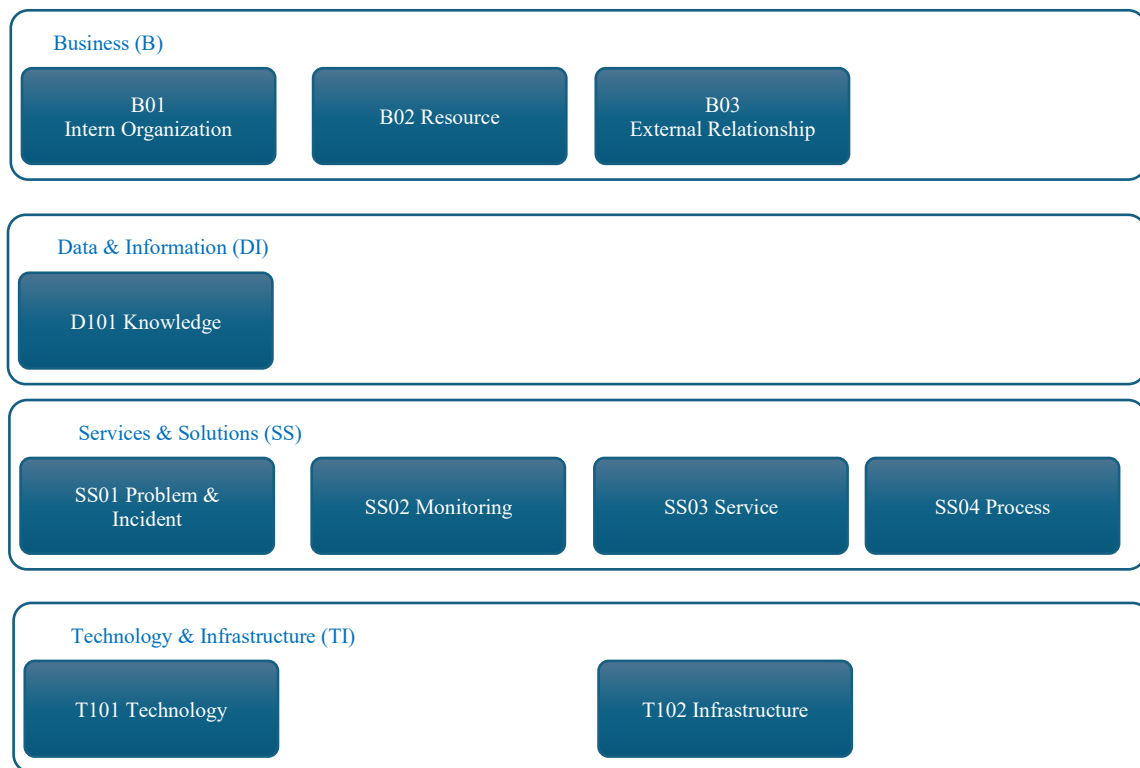
**Table 12. Descriptive statistic awareness & community views**

| <b>Construct</b>    | <b>Item</b>          | <b>N</b> | <b>Sum</b> | <b>Mean</b> | <b>Median</b> | <b>Mode</b> |
|---------------------|----------------------|----------|------------|-------------|---------------|-------------|
| Business            | Business_Q1          | 489      | 2407       | 4.92        | 5,00          | 5           |
|                     | Business_Q2          | 487      | 2367       | 4.86        | 5,00          | 5           |
|                     | Business_Q3          | 488      | 2402       | 4.92        | 5,00          | 5           |
|                     | Business_Q4          | 488      | 2372       | 4.86        | 5,00          | 5           |
| Data & Information  | Data_Informati-on_Q1 | 488      | 2389       | 4.90        | 5,00          | 5           |
|                     | Data_Informati-on_Q2 | 489      | 2299       | 4.70        | 5,00          | 5           |
|                     | Data_Informati-on_Q3 | 488      | 2385       | 4.89        | 5,00          | 5           |
|                     | Data_Informati-on_Q4 | 488      | 2360       | 4.84        | 5,00          | 5           |
| Service & Solutions | Service_Solutions_Q1 | 488      | 2389       | 4.90        | 5,00          | 5           |
|                     | Service Solutions_Q2 | 489      | 2390       | 4.89        | 5,00          | 5           |

|                              |                               |     |      |      |      |   |
|------------------------------|-------------------------------|-----|------|------|------|---|
|                              | Service_ Solutions_ Q3        | 486 | 2362 | 4.86 | 5,00 | 5 |
|                              | Service_ Solutions_ Q4        | 486 | 2350 | 4.84 | 5,00 | 5 |
| Technology & Infrastruc-ture | Technology Infrastruc-ture Q1 | 489 | 2299 | 4.70 | 5,00 | 5 |
|                              | Technology Infrastruc-ture Q2 | 489 | 2390 | 4.89 | 5,00 | 5 |
|                              | Technology Infrastruc-ture Q3 | 488 | 2294 | 4.70 | 5,00 | 5 |
|                              | Technology Infrastruc-ture Q4 | 489 | 2365 | 4.84 | 5,00 | 5 |

Based on the descriptive statistical analysis presented in the table above, which examines awareness and community perceptions of smart governance, the proposed framework demonstrates that each component achieved a mean score exceeding 4, with both median and mode values of 5. These findings indicate a high level of agreement among respondents and suggest that all components are appropriately positioned within their respective domains, thereby reinforcing the

internal consistency and suitability of the proposed framework. Figure 2 illustrates the comprehensive framework for a smart governance IT architecture, which was developed based on the results of an in-depth data analysis. The proposed framework provides a robust structural foundation for the effective implementation of smart governance practices, ensuring better integration between organizational processes, information systems, and technological infrastructure.



**Fig. 2 Proposed conceptual architectural framework**

The proposed IT architecture framework had been subjected to rigorous validation in accordance with academic standards. Two IT architecture experts evaluated the framework, providing suggestions and criticisms for its conceptual soundness and practical applicability. The researcher then refined and ultimately completed the framework, conducting further reviews, followed by a number

of detailed analyses, testing methods, and validation evaluations to ensure that it is effective and reliable. The researcher meticulously chose two experts in IT architecture to confirm the proposed framework in this research. The evaluation process in this context and detailed results are shown in Table 13, which describes the experts' opinions of the framework and their validation, as well as its usefulness

and applicability. Through rigorous testing, comprehensive data analysis, and meticulous validation, several critical refinements were made to the proposed architectural framework.

Figure 3 illustrates these modifications, which were introduced to improve the framework's accuracy, consistency, and practical applicability within the context of smart governance implementation.

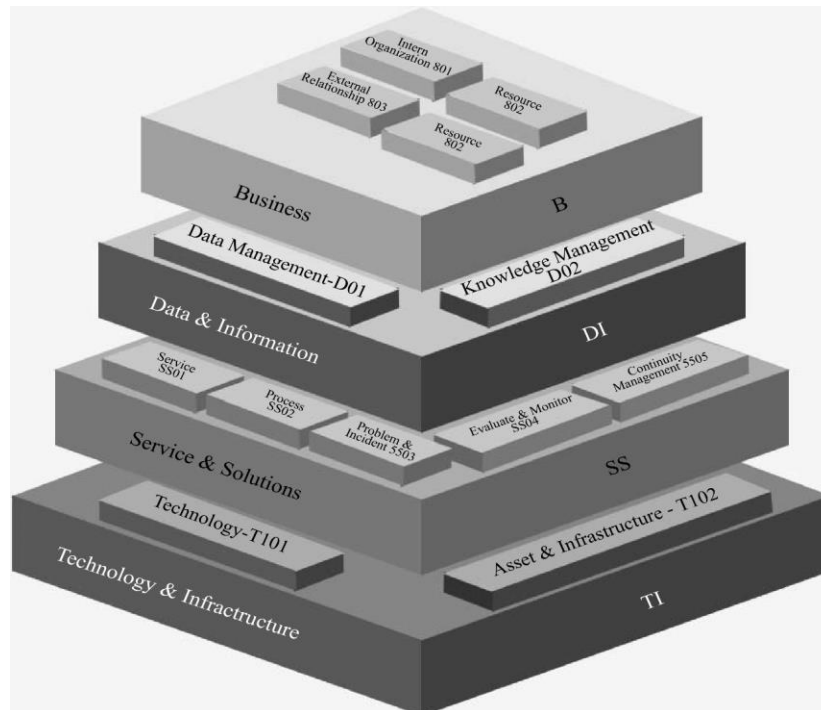
The proposed smart government architecture was systematically aligned with the key dimensions of the Information Technology Infrastructure Library (ITIL) V4 to

demonstrate its potential in enhancing governance effectiveness. Such alignment is expected to foster higher service quality and ensure closer adherence to the principles and best practices of ITIL V4.

The accompanying figures and tables provide a comprehensive overview of the framework's correspondence with these dimensions, illustrating the extent to which the proposed model supports efficient, standardized, and service-oriented digital governance. Table 14 presents a comparison of the framework developed in this study with the Electronic-Based Government System (EBGS) framework [3] and ITIL V4 [34].

**Table 13. Experts' view on the framework**

| Experts  | Inputs                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Expert 1 | <ul style="list-style-type: none"> <li>a. Researchers should change the monitoring component in the Service &amp; Solution group to Evaluate &amp; Monitor</li> <li>b. Add data management in the data and information area</li> <li>c. Add continuity management to the service and solution area</li> <li>d. Adding Information Security to the data and information area</li> </ul>                                                       |
| Expert 2 | <ul style="list-style-type: none"> <li>a. It is better to add risk to the business domain.</li> <li>b. Replace knowledge with knowledge management.</li> <li>c. Please replace the infrastructure with Aset &amp; Infrastructure.</li> <li>d. Change the order based on the sequence of processes in the service and solution domain to Service, Process, Problem, and Incident, Evaluate and Monitor, and Continuity Management.</li> </ul> |



**Fig. 3 Proposed final architectural framework**

Unlike EBGs and ITIL V4, the architectural framework proposed in this paper shows a more appropriate application under Indonesia's smart government transformation. It integrates governance, enterprise architecture, and service

improvement elements in an empirically validated and context-sensitive manner suited to Indonesia's contextual administrative environments.

**Table 14. Framework comparison**

| Aspects                          | Proposed Framework<br>(This Study)                                                         | EBGS Framework                                                                    | ITIL V4                                                                                     |
|----------------------------------|--------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| Focus                            | Smart government architecture, IT service quality, and governance integration              | Electronic-Based Governance Systems                                               | IT service management and value delivery                                                    |
| Coverage Area                    | National and regional governments with practical implementation (East Java case study)     | Central and local government institutions                                         | Primarily, IT departments across various sectors                                            |
| Compliance Basis                 | Aligns with EBGS + ITIL V4, contextualized with local/regional government needs            | Presidential Regulation No. 95 of 2018                                            | Industry best practices and ISO standards                                                   |
| Customization                    | High - based on empirical data, stakeholder interviews, expert validation                  | Medium - national policy-based but rigid                                          | High - modular, but not tailored to the government context                                  |
| Adaptability to Smart Government | High - designed specifically to transition toward smart government in Indonesia            | Limited - focuses on digital government but lacks architectural depth             | Low - not designed for smart governance, focused on service ops                             |
| Outcome Orientation              | High - aims at measurable improvement in smart government maturity and IT service quality. | Moderate - provides targets and indicators but lacks an implementation mechanism. | High - focused on value co-creation, but hard to translate into a public governance context |

EBGS, on the one hand, provides the regulatory foundation and ITIL V4 expertise that leads the best practices in service management, which is also a basis for its development in Indonesia; however, our proposed framework integrates the two approaches by enhancing both through testing, adaptability, and contextualization relevant for the Indonesian environment in terms of its digital governance.

The comparison of the two frameworks, as seen in Table 14, is such that while the EBGS framework lays a regulatory foundation and ITIL V4 offers internationally accepted management practices for service, both frameworks are flawed when considering Indonesia's smart government context. By contrast, the presented framework captures a better outcome by consolidating governance and enterprise architecture at the same time as IT service quality improvement in the frame of an empirically validated model. The proposed framework is, however, flexible, customizable, and results-based as compared to EBGS, which is very much policy-driven and prescriptive, or ITIL V4, without fit with public sector governance. The proposed framework provides more flexibility. Using a case study in East Java to validate it further confirms the effectiveness of the framework to enhance smart government maturity and IT service quality, and demonstrates the reasons why it significantly outperforms the current state-of-the-art frameworks outlined in literature.

## 5. Conclusion and Future Works

This study successfully achieved its primary objective of developing a novel architectural framework for smart government, in alignment with Presidential Regulation No. 95

of 2018 on the Electronic-Based Government System (EBGS). The proposed framework is organized around four principal architectural domains: Business, Data & Information, Service & Solutions, and Technology & Infrastructure, providing a robust foundation for enterprise architecture implementation within government institutions. By structuring the framework in this manner, it facilitates a systematic approach to integrating governance, information management, and technological capabilities in support of Indonesia's digital government initiatives.

This study offers both theoretical and practical contributions to the fields of smart governance and IT architecture. From a theoretical perspective, it presents a novel integration of enterprise architecture concepts and IT service management practices within the context of smart government. The proposed framework addresses a critical gap between EBGS, which provides a strategic national directive, and ITIL V4, which offers operational IT service guidance, thereby delivering a comprehensive model that aligns architectural design with service quality objectives. From a practical standpoint, the framework's implementation and validation in East Java demonstrate its applicability for other regional governments seeking to adopt similar approaches. Additionally, it serves as a tool for monitoring compliance, enhancing the performance of government services, and advancing IT governance maturity across public sector organizations. While the proposed framework has demonstrated validity and applicability, further development is warranted to enhance its adaptability and scalability. Expanding the validation process to include a broader panel of experts in enterprise architecture and public sector IT

governance could yield deeper insights and highlight areas for refinement. Future research may also consider the development of a digital tool or platform to facilitate the automated assessment and implementation of the framework within government institutions. Moreover, applying the framework across additional provinces or at the national level in Indonesia, as well as in countries with comparable governance structures, would provide an opportunity to evaluate its generalizability and broader applicability.

## Ethical Considerations

Formal ethics approval was not required for this study, in accordance with institutional and/or national research ethics guidelines, as the study posed no more than minimal risk to

respondents. Researchers gave the respondents information about the study's purpose, procedures, and rights before the survey. Participation was entirely voluntary, and respondents could withdraw at any time without consequence. Respondents' responses were anonymous, kept confidential, and used solely for research.

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