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Zachman Enterprise Architecture Planning (Study Case: E – Government's General Election Services on Karadenan Sub-District in Bogor Regency

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Abstract.
Purpose: This study examines enterprise architecture planning using the Zachman Framework as an effort to automate citizen administration in Bogor Regency. Furthermore, this planning is a solution in the simultaneous step of preparing voter lists down in general election commission data, especially connected to the Citizen Administration Bureau in Karadenan Sub District as a pilot plant project. This study aims to analyze enterprise architecture planning for citizen administration involved in the General Election Commission on collection, updating, and changing citizen data in Karadenan Sub District in Bogor Regency.
Methods: Data analysis was carried out from 122 heads of neighborhood units and 19 heads of residential units in Karadenan Subdistrict Bogor Regency. After that, using a qualitative method using the Zachman Framework, an Enterprise Architecture Planning of Citizen Administration was designed.
Result: According to the results, this study provides a new role model-based service scheme for citizen administration, especially in election conditions.
Novelty: The results of this study are valuable for the government in implementing new digital citizen administration services, especially empowering general elections by providing high-quality data on voters.

Keywords: Citizen administration, Subdistrict, General election commission, Zachman framework
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INTRODUCTION

One approach to improve governance is by implementing e-government, a technology-based system referenced by the World Bank. E-government is used by government agencies to implement information technology, including wide area networks, the internet, and mobile computing. These systems have the potential to transform relationships with citizens, businesses and government departments [1]. While the government has implemented good governance principles in managing the country, there are areas requiring improvement. Typically, provinces have direct responsibilities, while cities, districts, and subdistricts follow. As a result, the city's performance in land management, urban planning, systematic construction, public services, and sustainable development has fallen short of expectations. Furthermore, management regulations are incomplete, and organizational structures need to be revised to reflect the conditions of each specific location [2].

E-government involves the application of information technology to enhance the provision of government services to citizens, employees, businesses, and agencies. In implementing e-government, agencies have the responsibility of ensuring universal access to eligible individuals, including those with lower incomes and disabilities. The challenge of providing universally accessible online government is exacerbated by the digital divide. Providing services in the public sector presents several challenges. Furthermore, the

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organizational structure of businesses differs from that of public sector agencies. In government agencies, decision-making authority is less centralized than in businesses [3].

The emergence of smart cities strongly encourages the integration of sensors and big data via the Internet of Things (IoT). This surge of information opens new possibilities for city design and management, as well as economic prospects. While AI-enabled processing of Big Data can significantly contribute to the urban fabric, we must not neglect sustainability and liveability in favor of technological advancements [4].

The most important tool to deliver high-quality information technology on public services to citizens is enterprise architecture (EA). The public is demanding information technology and control because of the advancement of wireless technology and the cloud environment [1]. Information technology always develops and has a positive impact [5], [6] on the stability of the public service business process. Every business entity tries to implement it to increase the effectiveness of business processes, and competition in doing business will feel easier. They must always be able to keep abreast of information technology developments. These efforts involve all components, business actors, and internal resources on an ongoing basis by utilizing information technology developments in the business sector to obtain an effective and efficient system. [2]

Enterprise architecture (EA) is essentially planning to distribute IT resources for the best-served business objectives. When those situations are implemented effectively, EA enables enterprise architects and decision-makers to gain insights into the inner workings of an organization, identify opportunities, and address inefficiencies. An organization's current state can be analyzed through the use of enterprise architecture (EA). An organization's current state can be analyzed through the use of enterprise architecture (EA). Moreover, EA can help companies identify future objectives and devise strategies to attain them. To fully exploit EA, architects should be proficient in comprehending and outlining their organization's IT infrastructure. Identify and comprehend the current state of business architecture and establish the future objectives of the organizational business (to-be). As soon as the goals have been set, conduct a gap analysis to ascertain how IT can facilitate the attainment of the corporate objectives [7].

Reliable population administration services are needed with technological adaptation through strategic planning activities [8]. In the strategic planning process, we can use the enterprise architecture planning (EAP) method. This method was developed by Steven H. Spewak with the approach of building an integrated information system architectural planning framework for services by adjusting the presence of data and user needs [9]. By implementing suitable population services, organizations can consistently monitor their operations and simplify standardization. These systems leverage environmental knowledge as a primary asset for technology development. It should be noted that management systems and platforms are distinct, with unique prototypes needed for each organization type. To achieve optimal outcomes, it is advisable to integrate management systems into the creation of strategic plans, facilitating the alignment of system implementation with intended objectives and thus guaranteeing enhanced development success [10].

Bogor Regency is the second regional administrative area of West Java Province, Indonesia. As one of the buffer zones around the capital city, it is a matter of great importance. In 2022, the number of people in Bogor Regency was 5,566,840, accounting for 11,3% of West Java Province's total population, according to a report issued by the Statistical Agency of West Java Province [11]. In contrast to other districts, Cibinong District functions as the center of government for the Bogor Regency and is unique in that it lacks a system of local government over its whole administrative area. Cibinong District can be thought of as an urban area or as Cibinong City. Most residents of this district have access to higher-quality infrastructure amenities, acceptable-quality infrastructure, and a robust banking literacy network [12]. Karadenan is a subdistrict in Cibinong District, the capital of Bogor Regency, which has a population of 34,742 people consisting of 19 residential units (RW) and 122 neighborhood units (RT) [13].

Karadenan, as the largest population in Cibinong District, has a big challenge for the Karadenan subdistrict government apparatus to provide public services that can respond quickly to the needs of the community [13]. The main functions and duties of the Karadenan Subdistrict Office are as follows:

1. Has the responsibility to assist the main task of the subdistrict in providing services to society;
2. Functions of the Karadenan Subdistrict Office:
   a. Carries out subdistrict scope activities;

b. Empowering the community;
c. Public services;
d. Maintaining public order;
e. Maintaining infrastructure and facilities general;
f. Implementing disaster prevention and management;
g. Prepare reports and evaluate the implementation of activities;
h. Perform other functions given by the District Head in accordance with their duties.

Every member of the community is always associated with various services to meet their needs. Various services provided by the government not for profit or profit are still provided by prioritizing quality under applicable operational standards. Indeed, the low awareness of the Karadenan subdistrict community in reporting changes in population administration data is caused by several factors, including because they still have an interest in certain agencies. It is an interesting fact that the services provided by the Karadenan subdistrict for the community still use work patterns and handwritten reports that are susceptible to loss of records and evidence of service [14],[15].

Various services, which involved various issues such as human interventions, lack of confidence, doubts, and time consumption, have been used in the initial years for manual provision. Electronic governance initiatives have been implemented to improve the process as much as possible to avoid such a great number of other problems [16]. In 2024, the Indonesian government will hold general elections using a database of all people who are alive and over 17 years old. The speed of updating changes in the data of voters who are eligible, alive, and residing in a certain area requires recording and reporting to the General Election Commission as the election organizer. The report comes from the subdistrict office [17].

The concept of urban governance has undergone a significant transformation in the past 15 years. Democratization and political pluralism movements, decentralization emphasis and civil society rise have affected the governance of cities in developing countries. Several legal and institutional changes have also taken place. In many countries, institutional reforms have been implemented at the local and municipal levels, indicating a shift toward seeking solutions to urban problems at the local level rather than at the state or national level. These trends highlight the pressing need to construct and develop. The capability of local authorities to handle the environmental and social complications that coincide with swift urban expansion should be enhanced [18].

In 2024, the General Election Commission will hold a general election using the direct voting method. Direct voting in governance systems is expected to fulfil two primary objectives. First, direct elections are assumed to render political leaders more accountable, thereby resulting in an increase in public expenditures. This assumption is based on the hypothesis that politicians would be motivated to deliver results to enhance their prospect of re-election. Supported by significant empirical evidence, public spending rose during the democratization processes of the 19th century in Britain and France, as well as during democratization in Latin America after 1980 and throughout the region's development. Transitioning of 44 African countries between 1980 and 1996.[19].

It is crucial to implement information and communication technology (ICT) governance within government to ensure that sustainable service integration, adoption, and performance improvement of public services can be carried out sustainably. Enterprise architecture (EA) is instrumental in designing e-government programs that avoid redundancy. The progress of such programs requires a well-structured approach, as well as periodic evaluation and development. The EA model has gained extensive usage, specifically for IT infrastructure in public sectors. Its usage is anticipated to aid in service integration, connect technology, organizations, and processes, and further the e-government's plan for a smart city [20].

Considering these facts on the ground, it is necessary to design a service standard for the community so that the resulting service output can be uniformly linked to the Population and Civil Registry Service and the General Election Commission. Voters who die should immediately lose their right to vote, but the speed of updating the voters list by the General Election Commission is often late. The implication is that it was only during the election that it was discovered that citizens had passed away. Technology is a large part of elections and is needed in some situations, such as when building voter records, drawing electoral boundaries, managing, and training staff, printing ballots, running voter education campaigns, recording

votes cast, tabulating votes, and compiling and broadcasting election results. If used properly, technology can boost political accountability, reduce long-term costs, and improve election organization [21].

Reliable and up-to-date population data can make the process of population administration services easier. In addition, the data can be passed on to the general election commission so that the voter data are more accurate and consistent with the facts in the field [22]. Therefore, before creating a reliable information system, it is necessary to define an architecture plan that has passed the feasibility test to create alignment and accuracy of the output of the population administration public service system in accordance with the service level agreement (SLA) to the community [23]. Using a qualitative method of group discussion with key individuals knowledgeable in the Zachman Framework, all data were analyzed. The study's findings will be useful for the development of a new approach to a role-based service scheme.

METHODS

In this study, data analysis was carried out from 122 heads of neighborhood units and 19 heads of residential units in Karadenan Sub District, and a large amount of information on birth, death, and moving in and moving out data was carried out using a questionnaire. After that, authors conducted an interview with Cibinong District Head as the highest responsible official for administrative services related to citizenship in the Cibinong District and The Chairperson of the Cibinong District election committee as a part of the Bogor Regency General Elections Commission. In the last stage, researchers, together with the subdistrict head and members of the general election commission, discussed Karadenan Sub District as a pilot project for the design of population administration services, especially in updating the permanent voters list.

The ZFEA aims to provide a comprehensive and structured approach to understanding, documenting, and managing an organization's complex architecture, fostering alignment between business needs and technological solutions. Minimum computer hardware specifications at least equivalent to Intel core i5 processor, 8 Gigabytes (GB) RAM, 256 GB Solid State Drive (SSD) storage and 500 GB Hard Disk Drive (HDD) for backup storage. The Zachman Framework in Figure 1 is often depicted as a matrix with six rows and six columns, resulting in a 6x6 grid. Each row represents a different perspective or viewpoint of an organization, and each column represents different aspects or concepts related to enterprise architecture. The rows are typically labeled as follows[24]:

1. Scope: Defining the context, boundaries, and overall goals of the organization.
2. Business Model: Describing the business processes, functions, and activities of the organization.
3. System Model: Specifying the information systems and technologies used to support the business processes.
4. Technology Model: Detailing the physical components, software, and infrastructure used in the organization.
5. Detailed Representations: Providing specific design and implementation details for the various models.

Functioning Enterprise: Encompassing the actual operational systems and processes in use.

	What? (Data)	How? (Function)	Where? (Location)	Who? (People)	When? (Time)	Why? (Motivation)
Business Concept Planner	Inventory Identification	Process Identification	Distribution Identification	Responsibility Identification	Timing Identification	Motivation Identification
Business Concept Owner	Inventory Definition	Process Definition	Distribution Definition	Responsibility Definition	Timing Definition	Motivation Definition
Business Logic Designer	Inventory Representation	Process Representation	Distribution Representation	Responsibility Representation	Timimg Representation	Motivation Representation
Business Physics Builder	Inventory Specification	Process Specification	Distribution Specification	Responsibility Specification	Timing Specification	Motivation Specification
Business Component Implementer	Inventory Configuration	Process Configuration	Distribution Configuration	Responsibility Configuration	Timing Configuration	Motivation Configuration
User	Inventory Instantiations	Process Instantiations	Distribution Instantiations	Responsibility Instantiations	Timing Instantiations	Motivation Instantiations

Figure 1. The zachman framework for enterprise architecture (Reproduced from reference [24])

Central to the EA discipline is an EA framework that represents a holistic enterprise for approaching the problem of managing change, complexity, and coordination between enterprise elements. In an ever-changing and complex environment, the EA framework helps practitioners understand complexity and drive sustainability [25]. The results of the research that has been carried out are presented in the form of a qualitative description of planning for the governance of the application of information technology in the subdistrict. "Kelurahan" is a government agency that manages basic population administration, including births, deaths, and moving in and out, as shown in Figure 2 below.

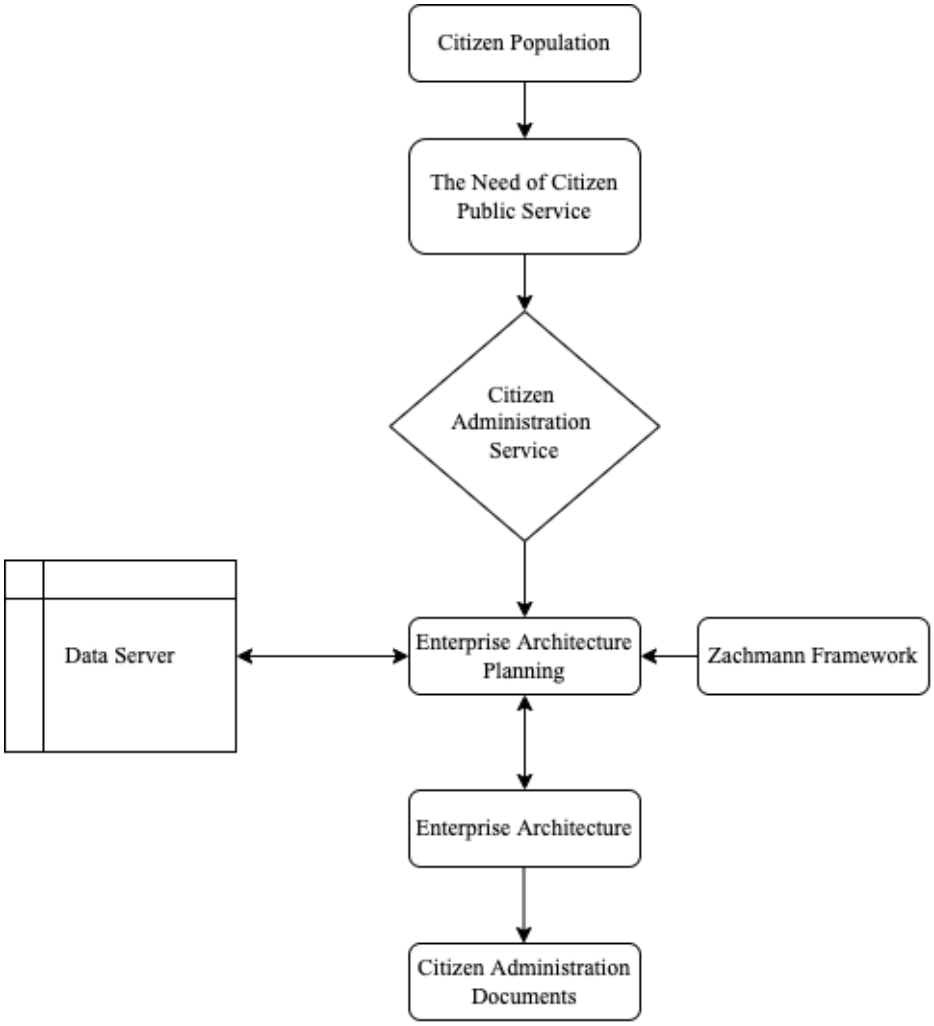

Figure 2. Research framework (modified and combined from [26], [27]).

Identify and comprehend the current state of business architecture and establish the future objectives of the organizational business (to-be). Identify and comprehend the current state of business architecture and establish the future objectives of the organizational business (to-be). As soon as the goals have been set, conduct a gap analysis to ascertain how IT can facilitate the attainment of the corporate objectives. Enterprise architecture enables organizations to achieve excellent performance by ensuring a smooth flow of information and services throughout the company. This demands that processes and systems be effectively aligned and managed to support business objectives [7].

An analytical design technique and a management program are routinely used at various levels of scope in enterprise architecture, a management and technology discipline that aims to improve organizational performance. Building and arranging the structural environment for the alignment of technology and business planning, with strategic planning as its main driver, constitutes the essence of enterprise architecture (EA) [28]. Initially, several services were offered manually, which involved a number of problems, such as human intervention, a lack of confidence, and dubious and time-consuming processes. It

is beyond the scope of this article to prescribe a specific approach. Each organization and enterprise architect must determine the optimal approach for their needs. However, the discipline of systems engineering would be well advised to consider long-term implications. Consider adding basic coverage of the key elements from the disciplines of organizational behavior, psychology and management [29].

E-government projects were launched to automate the procedure as much as feasible to avoid these and other problems [16]. Enterprise architecture is a well-defined methodology for undertaking enterprise analysis, design, planning, and implementation, employing a holistic approach at all times for the effective creation and execution of strategy. To help navigate the business, information, process, and technological changes needed to carry out their strategies, it employs architecture principles and techniques. These procedures make use of the numerous facets of an organization to pinpoint, inspire, and implement these changes [30].

When there is a death of a resident, RT makes some reports to RW, after which it is reported to the subdistrict office and then forwarded to the Cibinong District head and the General Election Commission. The government functions similarly to a business that uses big data to benefit all stakeholders. The government continues to develop cutting-edge technology and best practices to process such massive amounts of data for successful e-Government with Process Reengineering implementation of strategic planning. However, if the strategy is not supported by the right architecture, the initiatives could fail. The government may use an enterprise architecture framework when developing and redesigning processes to help prevent such occurrences. A framework is how architectural strategies are put into practice. These procedures make use of the numerous facets of an organization to pinpoint, inspire, and implement these changes [31].

The commemoration of Indonesian democracy in 2024 is poised to be vibrant, culminating in the simultaneous election of presidential and vice-presidential candidates for the term 2024-2029. Elections are a crucial tool in a representative, democratic country. Furthermore, elections are considered a concrete expression of procedural democracy since, in a democratic state, elections serve as a customary method for appointing political representatives in the executive and legislative branches at both national and regional levels. According to the provisions stated in Article 198 of the General Elections Law Number 7 of 2017, a first-time voter is any Indonesian citizen who is either 17 years old on a general election day or has been married and gained their right to vote. The legislation also offers classifications for individuals who are voting for the first time, specifically citizens who will be exercising their right to vote for the first time during general election activities, or Indonesian citizens who are either 17 years old or younger but married. As the number of inexperienced voters increases, this will inevitably impact the general election at both the regional and national levels [32].

Government processes are complex, as is the related prepared project. Reengineering government processes involves taking action to address process irregularities in simple, standardized, committed, and scheduled programs. However, it needs to be redefined when the project's complexity increases significantly. Serious initiatives have varying perspectives, scopes, and dependencies. Enterprise architecture best practices can be used to conduct a systematic and thorough assessment of functional and nonfunctional dependencies [16], [33].

RESULTS AND DISCUSSIONS

Figure 3 shows the current pattern of basic population administration services. Communities who will make changes and/or update data (births, deaths, moving in, moving out) first report changes and/or update data to the heads of the neighborhood units (RT) and residential units (RW) in their area of residence to obtain a letter of recommendation. With the letter of recommendation, the public goes to the population administration service counter at the front office of Karadenan Sub-District Office.

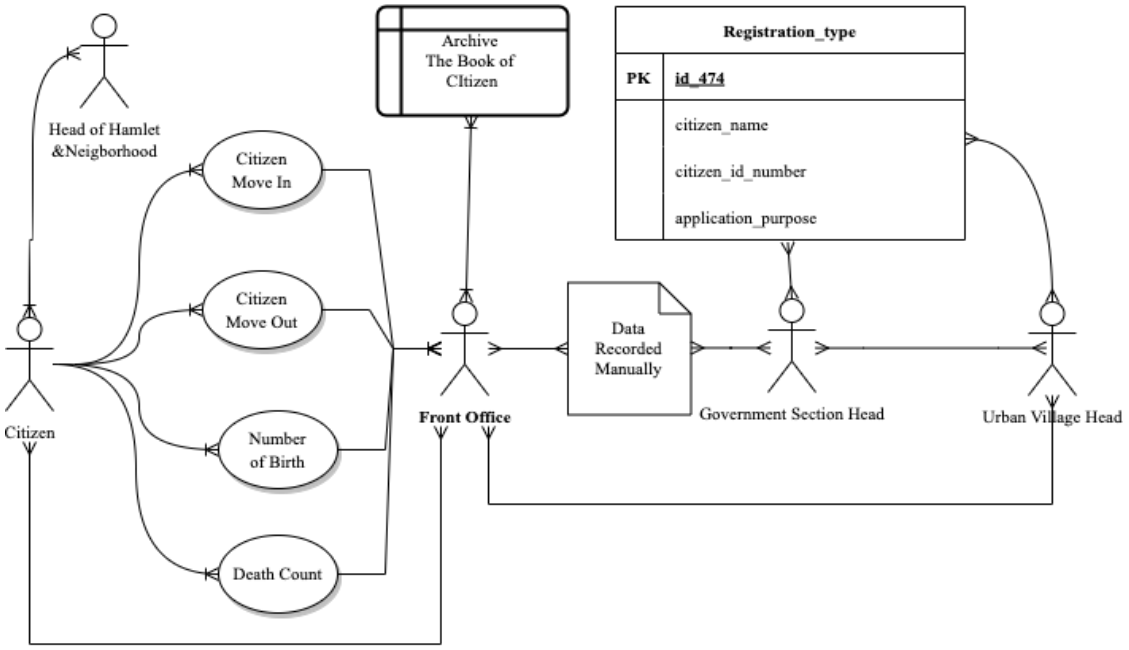

Figure 3. Service framework

The counter officer, after receiving the needed documents, then searches the population registration book archive. After the file is received by *the front office*, the application document will be processed manually according to the designation of the applicant's needs. An officer will issue a population administration processing recommendation sheet to the head of the government section to obtain approval for verification [34]. The next stage is a ratification of the recommendation sheet by the Karadenan Sub-District Head. A recommendation sheet that has been approved by the officer submitted to the applicant is to be forwarded to the Office of Population and Civil Registration to be processed and published upon request. Data on changes in population administration will be recorded in the population register book for Sub-District residents.

The process is still manual by handwritten notes. This is very vulnerable to scattering or inaccuracy and even losing filing documents and bookkeeping at the Karadenan subdistrict office. The alternation of officers who handle this process as a result of the organizational regeneration process is also a cause [35]. This of course has an impact on the negligence of elements of the community to take care of basic population administration files as soon as possible. When entering the stage of compiling the voter list for the general election, subdistrict officials and the KPU encountered problems in verifying the truth of death, first-time voters, and new voters who came or left the Karadenan area [36]. RT and RW officials who previously made cover letters manually can now start using a system that can record population administration until the Bogor Regency General Election Commission is given special access to be able to update data, especially the Voter List in general elections.

Architectural Planning

A logical or mechanical design is needed to create a database. From a business point of view, the logical design models the database. Its key business processes and decision-making requirements should be considered by the organization's data entities. Normalization is a process in which, during the construction of a Relational Database, data structures from large sets of data are created with small, stable, flexible, and adaptable [37]. Making the application matrix as presented in Figure 4 is the design of data entities as one of the products of the application architecture that will be able to describe the use of data by applications. An application can create/create (C), read/reference (R), and change/update (U) or not access a data entity at all [38], [39]. The advantages of this matrix are as follows:

1. Indicates where there is a state of information sharing in the application architecture.
2. Used to create an application implementation sequence.

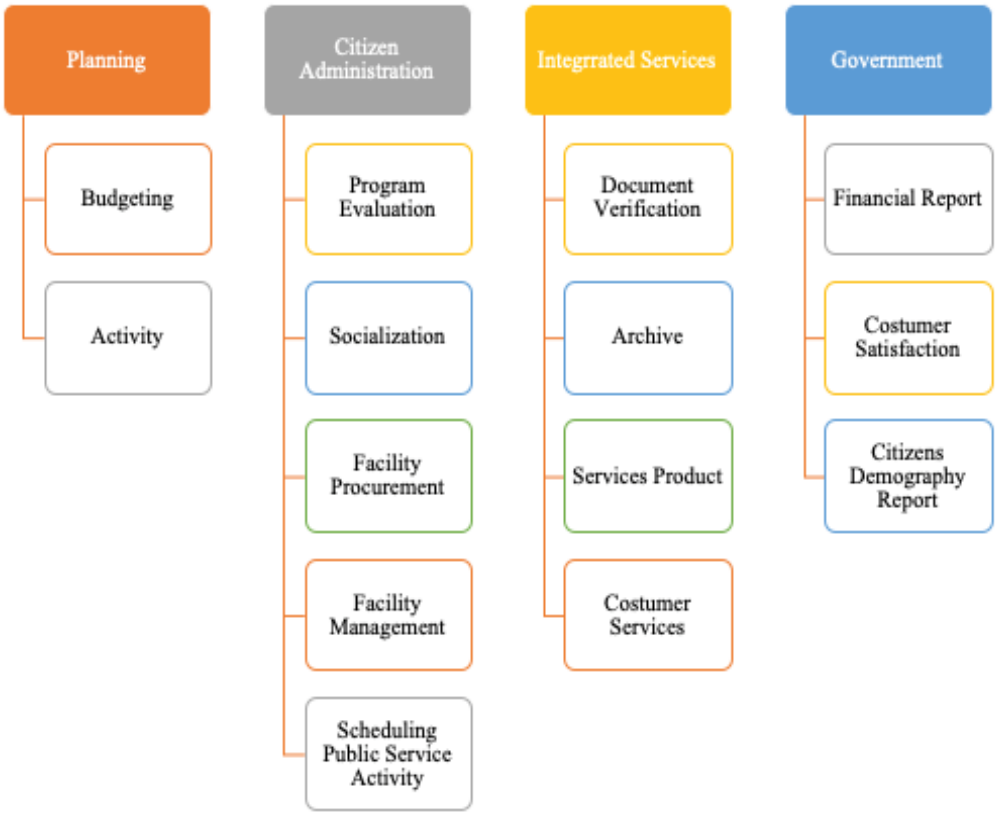

Figure 4. Application matrix

In compiling an architecture that is easy to implement, a good plan is drawn up starting from preparing the budget to detailing the activities in the EAP design. The next step is documentation of citizenship administration, which starts with evaluating programs in the subdistrict area and conducting socialization of future program plans. Furthermore, the necessary facilities will also be prepared along with arrangements for their use and maintenance [26].

The integrated service that will be implemented starts from verifying the application file carried out by the front office followed by file processing and data storage that has been updated by the back office. The issuance of population administration service documents to residents is accompanied by brief questions regarding the services that have been provided. Thus, at the subdistrict level, it can make it easier for users to prepare reports, including regarding finance, community satisfaction index, and population demographic reports.

Data Architecture

The use of the Internet has contributed to the credibility of e-government by facilitating access and empowering communities, improving the quality of government services to communities, and enabling effective and efficient administrative smooth management. Information technology is constantly evolving. It has a positive impact on business process stability. Therefore, each business unit tries to adopt it to increase the efficiency of their business processes, and they feel that the competition to do business is reduced. All companies must be able to keep up with the development of information technology. These efforts involve the ongoing involvement of all components, business stakeholders and internal resources, exploiting developments in information technology in the business sector to achieve effective and efficient systems [40].

There are 15 activities with 10 entities arranged in this design framework. It can be seen that the majority of the relationships between activities and entities are created because the services currently being carried out are still manual and just recorded in a notebook [41]. Reintegrate data entities into business functions. Each data entity to be defined with respect to the business function area. Regarding the processing and use

of data for the purposes of meeting business function objectives, it is relevant that data entities are connected to enterprise function areas. A matrix of relationships between data bodies having business functions is used to define this relationship. Individual cells in the matrix determine the created entity data (C), namely, the function for creating data. Read/reference (R) is a function that uses data and updates (U), which is a function that changes or updates data. The preparation of this architecture will produce informative, actual and reliable population data, as presented in Table 1.

Table 1. Entity activity process elations

		Entity									
		A[1]	B[2]	C[3]	D[4]	E[5]	F[6]	G[7]	H[8]	I[9]	J[10]
Activity	Budget	C	C	C	C						
	Activity	C	C	C	C						
	Service Evaluation Population Administration		C	C U	R						
	Socialization	C		C	C						
	Facility Procurement			C	C						
	Facility Management			C							
	Service Activity Scheduling		C								
	Application File Verification	C									
	Application File Validation			C	C						
	Files		C			C	C	C	C	C	C
	Publication		C			C	C	C	C	C	C
	Management of Community Complaints	C		C	C						
	Financial Statements		C	C	C						
	Community Satisfaction Index	C	C	C	C						
	Population Demographics Report		C			C	C	C	C	C	C

Remarks: [1]Front Office, [2]Back Office, [3]Head of Government Section, [4]Lurah, [5]Population Data, [6]Birthdata, [7]Death Data, [8]Move in Data, [9]Move Out Data, [10]Population Above 17 years old.

Application Architecture

Zachman defined EA as a set of descriptive expressions that relate to an enterprise and ensure through design that the enterprise is consistent with its technology, resources, and current and future objectives of the organization [42]. According to Zachman, a company or architecture description created using the ZFEA schema will necessarily represent the entire set of descriptive representations related to the company description [42]. The preparation starts from making application candidates, the need for business function interactions, and conducting an impact analysis on the applications that are made [43].

The enterprise architecture framework, as applied to an enterprise, is simply a logical structure for classifying and organizing the descriptive representations of an enterprise that are relevant to the management of the enterprise and the development of the enterprise's systems. Manual and automatic systems are derived from similar structures found in the old fields of architecture/construction and engineering/manufacturing that classify and organize design artifacts that arise in the process of designing and manufacturing complex physical products [44].

The system architecture design to be made is as follows:

1. Information System Planning and Budgeting;
2. Determination of Provisional Voters to facilitate the General Election Commission in the holding of elections;
3. Reliable population data;
4. Reporting on changes in population administration by the head of the RT through the head of the RW;
5. Application for uploading online related to submission and updating of population administration results digitally;
6. Application for tracing the results of submitting changes to population administration data;
7. Municipal office site;
8. Reporting portal;
9. Service Activity Scheduling.

The Application of the ZFEA as Theory to Public Services

EA is portrayed as a crucial element for companies seeking to effectively manage their various aspects, including business processes, data, infrastructure, and information technology. This implies that EA provides a structured approach to aligning these components with the organization's goals and strategies [45]. The adoption of EA is deemed highly important in the public sector, specifically within e-government initiatives. EA is seen as a means to enhance the efficiency and effectiveness of electronic-based services offered by government entities. This suggests that EA can play a pivotal role in modernizing and optimizing government service delivery.

The government is the authority in charge of providing services such as citizen services, which are being given a focus on automation due to e-government initiatives. This must provide a fast and transparent manner of ensuring effective and efficient trustworthy services [16]. The critical role of EA is in addressing the complex and interconnected needs of organizations, whether they are private companies or government entities. EA is portrayed as a strategic tool that can bring about positive changes in service delivery, operational efficiency, and alignment with modern technological advancements [46].

The implementation of EA is complex due to several factors. For example, the ever-changing requirements, new technological advancements, inferior products, fluctuating dependencies over time, and the challenge of keeping up with constant changes. Moreover, scope creep could further complicate EA, which is why it should not be considered a one-size-fits-all solution. Scoping ought to be utilized to decrease the general complexity of EA projects instead of allocating resources to managing uncontrolled complexity because EA is not a miraculous remedy [47]. Organizations need professionals who can convert a strategic aim into practical planning and understand how to utilize existing enterprise architecture knowledge. Architects must be able to contextualize operational enterprise architecture procedures and routines, as enterprise architecture is strongly dependent on context [48].

Readings for enterprise architecture (EA) professionals often use technical or operationally focused terminology that can be challenging for non-EA experts to comprehend. Numerous white papers or industry reports have been produced by EA consulting, communities, and consortiums to highlight the benefits of EA. However, these reports are frequently fragmented, superficial, and focused on marketing. To avoid failure, organization staff should be familiar with EA and its roles [49].

Strong communication skills are needed of architects and enterprise architecture consultants. This is often mentioned in white papers or enterprise architecture handbooks, but effective methods of improving communication are rarely provided. Instead, commonly used management strategies often focus on their own means of communication. To enhance communication and collaboration within different business divisions, the lean management strategy advocates the use of value stream mapping and delegates responsibility to workers instead of lean experts. EA could follow a similar approach by granting staff members autonomy instead of instructing them. It would be advantageous to devise a distinct communication strategy that centers on value creation before implementing it [50].

Many EA employees possess technical expertise given EA's solid technical foundation. EA scholars and practitioners have historically emphasized the modeling tools employed in constructing EA models, such as the ArchiMate language. Analogous to value stream mapping in the lean management approach, these tools are solely intended for use by experts and are not accessible to nonexperts. Accordingly, only a limited number of individuals possess the necessary skills, raising concerns about the accuracy of the models and whether they mirror reality. Additionally, it is challenging to manage and utilize EA models with only a limited number of participants. Therefore, the threshold for using EA tools must be lowered. Achieving a balance between creating and employing intelligent EA technologies is crucial [51].

This indicates that instead of trying to manage endless complexity, EA initiatives should start by reducing complexity through scoping. The focus of research should be on identifying effective strategies with positive impacts on businesses rather than creating a new framework. Employees should understand the purpose and nature of EA. EA techniques ought to provide appropriate communication channels. Finally, to avoid reliance on a limited number of individuals, personnel should be empowered to adopt EA and EA technologies. Further research is needed for a comprehensive understanding of the underlying causes [52].

Technology Architecture

The architectural structure to be built consists of an operating system, software, hardware, data storage, and cloud computing. Through this structure, it is useful to prioritize the platforms that will be presented in the form of sites and mobile web [53]. Every people want to update their citizen and family's data, especially birth, death, moving in, and moving out residents, which can be served only in the front office. In this step, citizens must complete and update the form. officer, and the application data will be input into the population administration service application.

The application will go through several stages of verification and validation in the bac office until a recommendation for data changes is issued. The results of the reporting will be directly stored in a database connected through cloud computing with the Election Commission's servers and databases. Most importantly, the identity and data of eligible people will be included in the voter list so that they are entitled to participate in general elections. Figure 5 shows the technological architectural design that will be developed in the Karadenan Subdistrict.

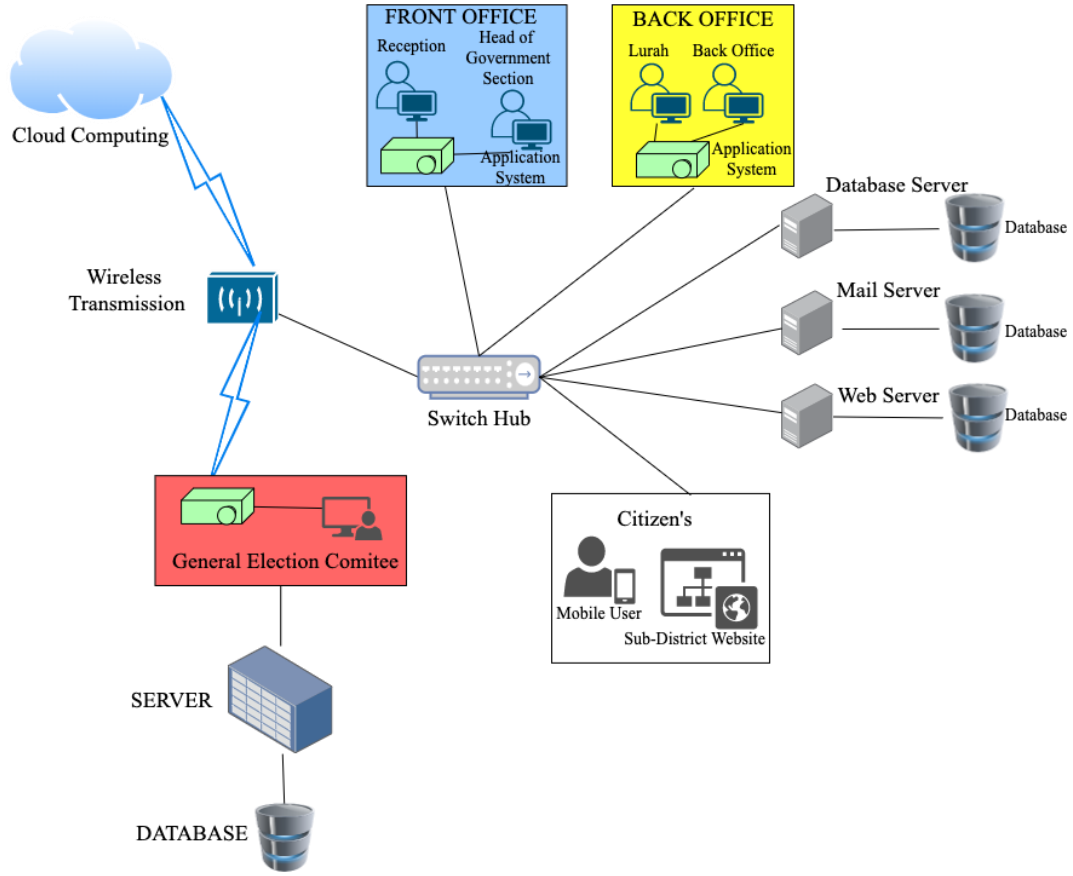

Figure 5. Architectural design

The population data obtained via the use of an enterprise architecture-designed population data application is up-to-date and may be connected to the General Election Commission database to improve the accuracy of voter data and furthermore can be used as primary data for electronic voting, an appealing option for national elections in many countries due to its potential to address several issues with traditional paper-based elections [54]. Election integrity is essential for promoting public trust and voter accountability in democracies as well as in all other cultures. According to the administration, electronic voting technologies have the power to increase voter participation and confidence while also reigniting interest in the electoral process. A recent study found that using computerized voting procedures might increase security [55].

In this article, we report on a study that used ZFEA as a theory to look at improving public services in a region. To conduct the study, we first had to consider information system (IS) theory and determine whether

ZFEA should be considered an explanatory IS theory. He then used ZFEA as a basis for analyzing and understanding public service information systems through the detection of focus patterns based on ZFEA.

Enterprise architecture (EA) plays a crucial role in the context of enterprise information systems (EISs). EA provides a holistic framework for understanding and designing an organization's structure, processes, information systems, and technology infrastructure. Depending on the specific enterprise view chosen within the EA framework, it can greatly influence or direct the requirements, design, and implementation of an EIS. This means that enterprise architecture helps guide and align the development and evolution of EIS with the overall strategic goals and needs of the organization [56].

In essence, enterprise architecture acts as a guiding force that ensures the alignment between business strategy, technology solutions, and information systems, thereby enabling the creation of effective and efficient enterprise information systems that support the integrated functions of the organization. This alignment helps organizations optimize their processes, enhance decision-making, and adapt to changing business environments [57].

However, over time, the focus shifted to the practical aspects of EA implementation. Scholars and practitioners often rely on practical experience and case studies to focus on the implementation and application of EA in real-world organizational situations. In recent years, there has been renewed interest in revisiting the original theoretical underpinnings of EA. Researchers recognize the need to understand and define the role of EA as a theoretical concept beyond just a practical implementation. This return to theory recognizes the importance of grounding EA practice in a solid conceptual framework and understanding its core principles [58].

Poor communication and collaboration can be a catalyst for failed EA initiatives, as identified by Banaeianjahromi and Smolander [59]. This is particularly prevalent when various external parties, including supply chain partnerships or governmental regulating bodies, become involved or when businesses themselves lack the necessary comprehension or support. It is crucial that enterprise architects effectively communicate and collaborate with business and technology stakeholders to produce successful outcomes [47]. It may prove difficult to implement EA if architects cannot bridge the divide with their stakeholders. Organizational culture was the root cause of the issue, impacting communication and collaboration during the implementation of EA [60].

Initially, Zachman's EA work was rooted in a system engineering perspective. EA saw this perspective as a structured framework for analyzing and designing complex systems within an organization. This perspective is consistent with system theory, which emphasizes the interrelationships and interactions between components within a system [57], [58].

EA is portrayed as a crucial element for companies seeking to effectively manage their various aspects, including business processes, data, infrastructure, and information technology. This implies that EA provides a structured approach to aligning these components with the organization's goals and strategies [45]. The adoption of EA is deemed highly important in the public sector, specifically within e-government initiatives. EA is seen to enhance the efficiency and effectiveness of electronic-based services offered by government entities. This suggests that EA can play a pivotal role in modernizing and optimizing government service delivery.

It would be an invaluable source for organizations in the current era of digital transformation if EA theory could help to understand and analyze and explain how interventions and transformations are working. EA offers a structured framework that allows organizations to map and visualize their current situation, target states, and transitions that are needed to achieve strategic objectives. This framework, for example, in the areas of business processes, IT infrastructures, and data management, lays down a clear path to organize changes and interventions across all aspects of an organization [61]. EA theory can guide organizations' integration of technological progress into their overall approach in the digital transformation era, where technology is at the heart of change. This ensures that the organization's digital initiatives conform with its business objectives and help it be successful for decades to come.

With the design of the population administration service application architecture connected to the General Election Commission, the data updating process at the office committee, especially in updating population

administration data, will be more systematic and reliable. Therefore, general elections can run smoothly and have minimal obstacles. Overall, this article highlights the dynamic nature of EA as a field of research and practice. This suggests that while practical implementation is important, a solid theoretical foundation is essential to fully grasp the potential impact and importance of EA within an organization. Researchers are reviewing the theoretical underpinnings to better understand the role EA plays in designing and optimizing organizational structures, processes, and technologies.

CONCLUSION

This study offers insights that could be utilized to attain harmony between organizational objectives and enterprise architecture. To ensure that the enterprise architecture framework aligns the functions and duties of the subdistrict office, the validation process is pivotal. The citizen data that meet the requirements as voters in general elections obtained via the use of an enterprise architecture-designed population data application is up-to-date and may be connected to the General Election Commission database to improve the accuracy of voter data and furthermore can be used as primary data for electronic voting, an appealing option for national elections in many countries due to its potential to address several issues with traditional paper-based elections [54].

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