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Public Service Quality at the Office of Investment and One-Stop Integrated Services of Natuna Regency

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Abstract
The attainment of the licensing administration arrangement program, such as the Business Identification Number (NIB), remains suboptimal, compounded by the geographical challenges of Natuna Regency as an archipelagic region, which complicates access to the DPMPTSP office for the public. This study aims to analyze public service quality, identify service constraints, and formulate an optimal public service model for the Office of Investment and One-Stop Integrated Services (DPMPTSP) of Natuna Regency. The research uses a qualitative approach with the Service Quality (Servqual) method, covering five dimensions: Reliability, Responsiveness, Assurance, Empathy, and Tangibles. Data were collected through in-depth interviews, observation, and documentation. The results indicate that public service quality at the DPMPTSP of Natuna Regency still faces various challenges, particularly regarding geographical access constraints, limited modern supporting facilities, and the need for more responsive service systems. This study proposes a public service model based on Artificial Intelligence chatbot technology using the Retrieval-Augmented Generation (RAG) approach as a strategic solution to improve efficiency, transparency, and accessibility for the public in real-time, unhindered by distance and time. The implementation of this technology is expected to be a concrete step toward adaptive bureaucratic reform within the framework of e-government and smart government to enhance public service quality at the regional level.

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1. INTRODUCTION

The needs and demands of the public regarding the improvement of public services have become increasingly critical for government bureaucracy to address, especially in the current era of globalization. To respond to these changes, government officials must possess professional capabilities and high discipline in facing various challenges toward improving service quality, which impacts the regional economy (Andhika, 2022). Public service in Natuna Regency, as one of the regencies experiencing problems that are very interesting to analyze, is noteworthy because public service focuses not only on providing services but also on developing the capacity of administrators to serve their community as part of the progress of a regional government agency, given its geographical location as an archipelagic region bordering directly with foreign countries.

The current problem is the span of control and the costs that the public must incur to receive public services. Services that are expected to be maximal and targeted become one of the factors in assessing the success of a government agency. However, this is inversely proportional to the challenges that still hinder the running of services due to

distance and time, one of which is found in public service activities at the Office of Investment and One-Stop Integrated Services (DPMPTSP) in Natuna Regency.

The indicator targets for the NIB administration arrangement program in Natuna Regency show results that are not yet optimal and require better services. The public must travel approximately 1/2 to 2 hours to reach the DPMPTSP to obtain a single approval letter for NIB administration. This becomes an indicator of responsiveness that is regressing if the government does not take firm steps to provide solutions for the people of Natuna Regency.

Simplifying solutions by shifting from traditional to modern systems is an integral part of the e-government and smart government framework. E-government emphasizes the use of ICT to improve internal efficiency, expand access to public information, and strengthen government-citizen relations (OECD, 2019). Meanwhile, smart government focuses on the use of smart technology to support data-driven decision-making and provide predictive and personalized services (United Nations, 2022).

Another solution to overcome the challenges of improving public service quality in Natuna Regency focuses on strategic and innovative solutions. Providing quality services must include the provision of automated information services, whenever needed, without requiring direct human intervention. Previous studies have shown that a modern system is capable of increasing operational efficiency, accelerating information distribution, and improving service user satisfaction (Pandey et al., 2024); (NZE, 2024). Furthermore, the utilization of Large Language Models (LLM) and Retrieval-Augmented Generation (RAG) technology allows for a centralized and modern system that provides not only generic answers but also contextual responses based on specific organizational documents and data (Ajayi et al., 2024).

Ansell and Gash (2021 dalam (Noor et al., 2022)) also emphasized that ultimately, the handling of activities carried out by work units in a government agency is a necessity for the government itself to formalize the involvement of parties outside the government in a formal forum to achieve common goals through consensus and deliberation to respond to failures in policy implementation at the downstream level, high costs, and policy politicization, as well as involving cooperation between regional leaders such as the Regent of Natuna, the Natuna Regency DPRD, the Head of DPMPTSP, sub-districts (kelurahan), and the local community as service users.

The researcher conducted preliminary observations of the community coming directly to the Natuna Regency DPMPTSP regarding the obstacles faced in the services provided. Several obstacles were encountered, ranging from the issue of "free tariffs" that lack socialization, the span of control between the DPMPTSP location and the geographical condition of Natuna Regency which is an archipelago, and network failures that often cause delays in NIB issuance. Consequently, the current problems faced are a shortage of human resources and limited budget due to efficiency. Therefore, acceleration of bureaucratic reform is needed through the utilization of technology in public service implementation, as the demand for maximal public service still encounters challenges that hinder the running of services, one of which is in the public service activities at the Office of Investment and One-Stop Integrated Services of Natuna Regency.

2. RESEARCH METHODS

The research method used in this study is a qualitative method with a qualitative-descriptive approach. The qualitative research process involves important efforts, such as posing various questions and procedures, collecting specific data from participants, analyzing data inductively starting from specific themes to general themes, and interpreting the meaning of the data (Ghazali, 2016). This study also uses a phenomenological dimension used in two fundamental ways: first, to theorize substantial problems, and

second, to increase the adequacy of sociological research methods. This means that this study attempts to uncover the meaning of how e-government in public service functions at the Natuna Regency DPMPTSP.

The researcher attempts to understand the informant's understanding of the phenomena arising from their awareness, as well as the phenomena experienced by the informants by conducting participant observation, intensive interviews, conducting analyses of small groups, and understanding the state of public service at the Natuna Regency DPMPTSP. The research informants totaled five people, including the Head of Natuna Regency DPMPTSP (I_{1-1}), the IT Department of Natuna Regency DPMPTSP (I_{1-2}), the Sub-district Head and Village Head (I_{1-3}), the Regional Apparatus Organization (I_{1-4}), and the Community (I_{2-1}). The selection of informants was in accordance with the inclusion criteria in this study.

The data collection technique used in this study was open interview questions given to the research informants and observation (Denzin & Lincoln, 2009); (Creswell, 2014). The aspects of this research are Reliability, Responsiveness, Assurance, Empathy, and Tangibles. The final stage is the interpretation of data and information that has been verified with a triangulation analysis approach. The data collection procedures in this study consisted of several stages: (1) mapping and identifying actors (individuals or organizations) involved in e-governance in the implementation of regional innovation systems, (2) compiling categories and classifications of the roles of these collaborating actors (individuals or organizations), (3) identifying the relationship linkages between the collaborating actors (individuals or organizations), (4) interpreting and explaining the dynamics of actor relationships (individuals or organizations) in collaboration and other dimensions that are formed, (5) drawing conclusions based on the results of the previous stages.

3. RESULTS AND DISCUSSION

3.1.Research Results

1. Public Service Quality at the Office of Investment and One-Stop Integrated Services of Natuna Regency

Public service standards to achieve public service quality at the Office of Investment and One-Stop Integrated Services of Natuna Regency are measured by referring to the theory put forward by Parasuraman et al. (1985 dalam (Wahyuni et al., 2015)) with the 5 Servqual dimensions as a guide and understanding of public service quality, with explanations as follows.

a. Reliability

Reliability relates to the willingness and ability of the service provider to provide accurate, error-free, and timely services. The scope of public service at the Office of Investment and One-Stop Integrated Services of Natuna Regency is described in the initial conditions as follows.

Table 1. Reliability Interview and Observation Results

Informant	Interview Results	Field Findings
I_{1-1}	Public satisfaction is still low. There are still complaints from service users	The Office of Investment and One-Stop Integrated Services has service edicts and established service standards. The established service standards include: 1) Service procedures, 2) Service time, 3)

		Service costs, 4) Technical and administrative requirements, 5) Service criteria and indicators, 6) Facilities and infrastructure, 7) Complaint management, 8) Transparency and accountability, 9) Service quality improvement. The service edict states that the DPMPTSP promises and is capable of carrying out services in accordance with service standards, providing services according to obligations, carrying out continuous improvements, and is willing to accept sanctions and/or provide compensation if the services provided are not in accordance with the standards. This edict provides confirmation of the interview statement delivered by the Head of DPMPTSP, namely that the current quality of service must be improved according to service standards.
I_{1-2}	Business licensing services based on AI chat have not been implemented, and there are no regulations for it.	At the DPMPTSP, there is a mechanism for direct licensing/non-licensing services at the office. The DPMPTSP has a service performance website that can be accessed and viewed by the entire community without any restrictions. This website can assist with the information needed by the community.
I_{1-4}	There are no specific regulations regarding the acceleration of AI chat implementation in public services.	The regulations currently held by the Natuna Regency DPMPTSP to implement service standards are based on the Law on Personal Data Protection and the ITE Law.

Source: Researcher's Data, 2026

b. ***Responsiveness***

Responsiveness relates to the willingness and ability of officers/employees of the Office of Investment and One-Stop Integrated Services to assist and respond to every request, complaint, and grievance of the community, as well as speed in providing services.

Table 2. Responsiveness Interview and Observation Results

Informant	Interview Results	Field Findings
I_{1-3}	There are no rules and implementation of rules regarding the implementation of AI chat technology in DPMPTSP.	Natuna DPMPTSP has fixed regulations including: 1. Presidential Regulation No. 95 of 2018 concerning Electronic-Based Government Systems. 2. Law No. 27 of 2022 concerning Personal Data Protection. 3. Circular Letter of the Minister of Communication and Informatics No. 9 of 2023 concerning ethical guidelines for AI use. Technology-based services include: 1. Licensing service and complaint hotline. 2. Business license processing with OSS. 3. Professional license processing with SICANTIK. 4. "Sekapur Sirih" for electronic surveys. 5. LAPOR for online public aspiration and complaint services. These

		applications provide the Natuna Regency DPMPTSP with technology-based improvements.
I_{1-1}	There are several licensing services that I know of, namely SIMBG, Amdalnet, and Sicantik.	Technology-based services include: 1. Availability of a licensing and complaint service hotline 2. Business license processing via OSS 3. Professional license processing via SICANTIK 4. 'Sekapur Sirih' for electronic surveys 5. LAPOR for online public aspiration and complaint services These applications demonstrate that the DPMPTSP of Natuna Regency has implemented technology-based improvements

Source: Researcher's Data, 2026

c. ***Assurance***

Assurance relates to the attitude of officers/employees in fostering customer trust, and the service-providing agency/company in providing a sense of security for customers.

Table 3. Assurance Interview and Observation Results

Informant	Interview Results	Field Findings
I_{1-1}	At Natuna DPMPTSP, there have been several "pick-up the ball" (proactive) service innovations, but there are no specific rules established to assist services related to the application of technology-based services at DPMPTSP.	AI chat has not been implemented in the licensing services of Natuna Regency. Currently, the service is based on the OSS, Amdalnet, and Sicantik systems.
I_{1-2}	While regulations regarding service compliance with Standard Operating Procedures (SOPs) are already in place, there are currently no specific rules governing the implementation of AI chat technology.	The DPMPTSP (Department of Investment and One-Stop Integrated Services) of Natuna Regency maintains established Licensing Service Standards and a Service Pledge (Maklumat Pelayanan) to serve as the definitive guidelines for all licensing service activities.
I_{1-3}	While there is a Service Standard (SP) in place to measure the compliance of service delivery with established regulations, specific guidelines regarding the implementation of AI chat technology have not yet been established.	While the DPMPTSP Service Standards provide clear regulations for licensing services, the current absence of specific rules regarding AI Chat technology has hindered its full and effective implementation.

Source: Researcher's Data,2026

d. ***Emphaty***

Empathy meaning that the service provider understands customers' issues, acts in their best interests, offers personalized attention, and maintains service hours convenient for them is demonstrated by the Natuna Regency

DPMPTSP regarding its AI-chat-based licensing service aimed at improving public service delivery, as follows:

Table 4. Empathy Interview and Observation Results

Informant	Interview Results	Field Findings
I_{1-1}	It appears that the leadership of DPMPTSP is actively promoting the use of technology. They are also actively encouraging the Communication and Informatics Agency (Diskominfo) to support service delivery via the agency's website.	There is a single-window website, such as OSS, for business license applications issued by the DPMPTSP. Additionally, the DPMPTSP utilizes websites such as Amdalnet, SiCantik, and LAPOR.
I_{2-1}	Staff members are responsive to directives from leadership. Program evaluation meetings are held at least once a month to assess progress and the depth of service program implementation.	The public receives services that meet their expectations. Performance evaluations are conducted monthly to enhance the performance of all DPMPTSP staff.

Source: Researcher's Data,2026

e. *Tangibles*

Tangibles or physical evidence relate to the attractiveness of the facilities, equipment, and materials used by the service provider agency/company, as well as the physical appearance of officers/employees when dealing with customers. The scope of public services at the Natuna Regency Investment and One-Stop Integrated Service Office in the application of CHAT AI-based technology is described in the following conditions.

Table 5. Tangibles Interview and Observation Results

Informant	Interview Results	Field Findings
I_{1-1}	There is not yet a program to implement AI technology in business licensing services.	The technology implemented is OSS RBA, a licensing system accessible to the public.
I_{1-2}	Specific programs regarding the implementation of business services using AI chat technology are not yet available.	The AI Chat program has not yet been implemented due to the lack of data integration readiness; consequently, the accuracy of AI-generated responses to public inquiries cannot yet be guaranteed.

Source: Researcher's Data, 2026

2. Constraints on Public Services at the Office of Investment and One-Stop Integrated Services of Natuna Regency

The leadership of the Natuna Regency Investment and One-Stop Integrated Service Agency (DPMPTSP) is highly progressive regarding the use of technology. However, various obstacles encountered in the field have hindered public service delivery. Researchers conducted preliminary observations of members of the public visiting the agency in person to identify the challenges they faced regarding the services provided.

Table 6. Results of Interviews and Observations on Constraints of Public Services at Natuna Regency DPMPTSP

Informant	Interview Results	Field Findings
I_{1-1}	DPMPTSP Natuna has received channels and aspirations from Natuna Regency	The digital technology owned includes OSS, LAPOR, Sekapur

	DPRD members, but for the AI chat technology program, it has never been received.	Sirih, SiCantik, and a Licensing and Complaint Hotline. AI Chat has not been implemented because there are no clear rules.
I_{1-2}	The implementation of technology clearly has a major influence on the quality of public services at the Natuna Regency DPMPTSP, where it will be a solution for applicant communities residing in places far from Ranai City.	The geographical condition of Natuna Regency, which is an archipelago, is one of the strong reasons why AI Chat is needed.
I_{1-4}	When passenger ships from sub-districts outside Bunguran Island arrive in Ranai and service applicants come at the same time to obtain business licensing services, the queue is usually overwhelmed in serving them quickly.	The long travel distance for each sub-district due to geographical conditions (an archipelago) makes the DPMPTSP office full just to ensure that business licenses are complete when the ship docks.

Source: Researcher's Data, 2026

3. Public Service Model at the Office of Investment and One-Stop Integrated Services of Natuna Regency

Sistem chatbot yang dikembangkan untuk Dinas Penanaman Modal dan Pelayanan Terpadu Satu Pintu (DPMPTSP) Kabupaten Natuna merupakan representasi nyata dari adopsi teknologi mutakhir berbasis kecerdasan buatan dalam pelayanan publik. Arsitektur sistem ini menggabungkan konsep modular dan interoperabilitas, yang dirancang agar mampu beradaptasi dengan kebutuhan 33 informasi yang dinamis dan kompleks di sektor publik. Desain sistem mengimplementasikan pendekatan *Retrieval-Augmented Generation* (RAG), yang telah terbukti efektif dalam menggabungkan kemampuan pencarian dokumen dari basis pengetahuan dengan generasi jawaban kontekstual oleh model bahasa besar (LLM) seperti GPT-4 (Pujiono et al., 2024).

Table 7. Results of Interviews and Observations on Public Service Models at the Office of Investment and One-Stop Integrated Services of Natuna Regency

Informant	Interview Results	Field Findings
I_{1-1}	Service agencies in Natuna Regency have cooperated quite well, where synergy has occurred from several agencies, for example, the National Land Agency (BPN) and the Licensing Office.	There is cooperation between BPN and DPMPTSP for technology system supervision.
I_{1-2}	Through a hearing mechanism, political parties or factions quite often conduct supervision as well as encouragement for the improvement of public services, including business licensing services.	Technology systems such as complaint channels or supervision are available but are not AI Chat.
I_{1-4}	The implementation of communication technology such as chatbots would ideally accelerate and facilitate political parties in their efforts to voice and continue the community's aspirations in improving the quality of public services in the region.	AI Chat technology implementation has not been carried out, but there are already OSS, LAPOR, SiCantik, and others for every license or service needed by the community.

Source: Researcher's Data, 2026

3.2.Discussion

1. Public Service Quality at the Office of Investment and One-Stop Integrated Services of Natuna Regency

Public service quality based on interviews with the Head of the Office shows a gap between community expectations and the reality of services provided. Complaints still arising are a sign that there are procedures, facilities, or officer attitudes that have not met the minimum standards expected by the community. Loss of trust can occur if satisfaction is allowed to remain low, which can result in community resistance to new policies. The observations made at the Office of Investment and One-Stop Integrated Services found a Service Edict.

This service edict states that DPMPTSP promises and is capable of carrying out services in accordance with service standards, providing services according to obligations, carrying out continuous improvements, and is willing to accept sanctions and/or provide compensation if the services provided are not in accordance with standards. This edict provides confirmation of the interview statement delivered by the Head of DPMPTSP, namely that the current quality of service must be improved according to service standards. These statements and observations are in accordance with the theory expressed by (Mardiasmo, 2015). The theory mentions that the principles of service provide guidelines regarding effectiveness, efficiency, and accountability of service. The researcher provides the view that AI Chat in licensing is not just answering general questions but will validate the necessary legal information. The current absence of AI Chat imposes a high manual workload on the reliability of DPMPTSP.

The implementation of this AI chatbot can proceed if the Natuna Regency DPMPTSP deems it consistent with existing regulations—such as Presidential Regulation No. 95 of 2018 concerning the Electronic-Based Government System, Law No. 27 of 2022 concerning Personal Data Protection, and the Minister of Communication and Informatics Circular Letter No. 9 of 2023 regarding ethical guidelines for AI usage. Based on these regulations, the DPMPTSP may formulate internal Standard Operating Procedures (SOPs) or conduct a limited trial, provided that the implemented system undergoes periodic evaluation (Presiden Republik Indonesia, 2018);(Presiden Republik Indonesia, 2022);(Kementerian Komunikasi dan Informatika Republik Indonesia, 2023).

Given the remote location of the DPMPTSP office, an AI chat system governed by fixed rules is essential to facilitate automated digital interactions. The current proactive outreach approach assists the public in the licensing process, particularly given the archipelagic geography of Natuna Regency. Licensing data constitutes a sensitive asset that every entrepreneur must possess. Implementing AI-based service standards will help the public access information regarding licensing requirements. Public interviews indicate that the empathy demonstrated by the Natuna Regency DPMPTSP reflects sound performance management within the agency. Staff and leadership respond to requests and directives with the expected level of speed, a result of consistent control systems. Conducting evaluations at least once a month ensures that technical or administrative service issues do not persist for extended periods. The current top priority is ensuring the stability and seamless integration of the core system—the OSS RBA (Online Single Submission Risk-Based Approach). Without a foundation of clean data and a robust system, an AI chat system risks introducing bias or critical errors into legal licensing decisions.

The absence of an AI chat system at this stage highlights a phase of maturing digitalization, where data integration across all services must be secured first.

2. Public Service Challenges at the Investment and One-Stop Integrated Service Agency of Natuna Regency

The leadership of the Natuna Regency Investment and One-Stop Integrated Service Agency (DPMPTSP) demonstrates a highly progressive attitude toward the adoption of technology. However, various obstacles hindering public service delivery have been identified in the field. Researchers conducted preliminary observations among citizens visiting the agency to understand the challenges they faced regarding the services provided. Issues encountered ranged from a lack of awareness regarding "zero-cost" services and the logistical difficulties posed by the regency's archipelagic geography, to network failures that frequently delayed the issuance of Business Identification Numbers (NIB). Compounding these issues are shortages in human resources and budget constraints resulting from efficiency measures. Consequently, there is a need to accelerate bureaucratic reform—specifically through the implementation of chatbots—to optimize public service delivery, as significant challenges continue to impede operations at the Natuna Regency DPMPTSP.

AI Chat requires stable data so that there are no wrong or biased answers, thus ensuring information is conveyed correctly. The statement of the Head of DPMPTSP provides an explanation that technological adaptation in the Natuna Regency area, which is an archipelago, still lags behind global AI developments. Observations made indicate that DPMPTSP has digital systems such as OSS or LAPOR. Good governmental collaborative relationships are very necessary, as in the theory put forward by Ansell & Gash (2007). AI Chat can be a solution in the question-and-answer process or document completeness check before the public comes directly to the DPMPTSP office. Applicants who are at a long distance can ensure all requirements are complete first by having a direct chat with AI from a distance. AI Chat will provide solutions starting from time efficiency, costs, or health conditions that can affect the community or DPMPTSP officers.

3. Public Service Model at the Office of Investment and One-Stop Integrated Services of Natuna Regency

The model to be adopted by the Natuna Regency DPMPTSP (Investment and One-Stop Integrated Service Agency) involves leveraging technology to deliver public information and services efficiently, transparently, and inclusively. E-government evolves through four key stages: (1) information provision, (2) two-way interaction, (3) online transaction services, and (4) digital-based institutional transformation. Each stage adds value by enhancing bureaucratic efficiency and increasing citizen engagement. E-government implementation offers strategic benefits, including administrative efficiency, improved service access, reduced operational costs, and greater accountability through transparent reporting systems.

The collaboration between the National Land Agency (BPN) and the Natuna Regency DPMPTSP represents a prudent step toward boosting the local economy. The impact of this collaboration is evident in Natuna Regency's ability to deliver high-standard public services through its one-stop service model and proactive outreach initiatives. The DPMPTSP maintains a service charter and established service standards, ensuring transparency in all licensing processes. This approach saves the public money by eliminating the need for in-person visits to the

office. Political party involvement in licensing policy need not benefit only specific groups.

Political parties can help optimize the performance of AI chatbots or applications like the OSS (Online Single Submission) system. Given Natuna Regency's archipelagic geography, political oversight is crucial to ensure that budgets for internet and digital infrastructure are effectively utilized, thereby enabling licensing processes to be conducted remotely. The implementation of AI chatbots by political parties in conjunction with the Natuna Regency DPMPTSP is a fitting modernization measure. The region's island geography necessitates the use of AI chatbots for licensing, allowing residents on various islands to inquire about requirements or submit complaints regarding licensing and other public services. AI chatbots can be programmed to provide answers regarding OSS licensing procedures and administrative requirements, thereby enabling political parties to fulfill their roles effectively. These AI chatbots should be integrated into internal systems to provide genuine assistance to the public. Strengthening internet signals at various locations across Natuna Regency is essential to ensure service stability and facilitate optimal oversight. Through this system, the public can monitor the status of permit applications currently being processed and provide feedback on the services provided. This helps boost confidence in the public services offered by the DPMPTSP office.

4. CONCLUSION

The quality of public services at the Natuna Regency DPMPTSP is quite good, but from the factors studied, such as Reliability, Responsiveness, Assurance, Empathy, and Tangibles, they have not met the expected quality standards. The obstacles faced from the results of this study are found in the assurance factor, namely, the sense of security intended includes the community's sense of security for themselves when traveling from their place of residence to the DPMPTSP. Innovations in the form of technological advancements and the role of AI chatbots that are starting to be applied in providing quality services are being carried out by Natuna Regency to provide better services.

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