Global Journal of Emerging Science, Engineering & Technology 3 (2) November 2025, pp.64-73.

Content lists available at Scientia Global Academia Services

Global Journal of Emerging Science, Engineering & Technology

Journal homepage: ejournals.scieglobal-academia.com/gjeset

Original Article

Investigating the Service Quality of Building Approval (PBG) Issuance in Aceh Besar Regency, Indonesia

Rais Tamim Irham [1,*], Abdullah [1] and Mubarak [1]

[1] Master of Civil Engineering, Faculty of Engineering, Universitas Syiah Kuala, 23111 Banda Aceh, Indonesia.
* Correspondence: raistamimirham1996@gmail.com (R.T.I.)

Citations: Irham, R.T., Abdullah, A., & Mubarak, M. (2025). Investigating the Service Quality of Building Approval (PBG) Issuance in Aceh Besar Regency, Indonesia. *Global Journal of Emerging Science, Engineering & Technology*, 3(2), 64-73.

Academic Editor: Assoc. Professor Dr. Agus Sukoco

Received: 5 September 2025 Revised: 16 October 2025 Accepted: 9 November 2025 Published: 30 November 2025

Abstract: Building Approval (PBG) refers to Building Construction Permit (IMB), which has created a need to understand public expectations regarding the quality of its services, particularly in Aceh Besar Regency, where numerous complaints have been recorded concerning delays in PBG issuance. This study aims to evaluate the Aceh Besar community's expectations regarding the quality of PBG services. The types of buildings reviewed include residential and commercial functions. This research employs a quantitative method by distributing questionnaires to 66 building owners who already possess PBG, using a proportionate stratified random sampling technique. The questionnaire uses a Likert scale to assess 39 service quality indicators (tangibility, reliability, responsiveness, assurance, and empathy). Data were converted into contrast scores, Penalty (Xp), and Reward (Xr), and analyzed using Penalty-Reward Contrast Analysis (PRCA) to classify expectations into Must-be (M), Attractive (A), One-dimensional (O), and Indifferent (I) categories. The PRCA results show variations in expectations across the 39 indicators of PBG service quality, with 14 indicators classified as must-be, 7 as attractive, 15 as one-dimensional, and 3 as indifferent. The people of Aceh Besar Regency expect both the fulfillment of basic standards and improvements in the performance of PBG service quality indicators. Therefore, intervention recommendations should be prioritized according to the PRCA classification to enhance overall satisfaction.

Keywords: Building Approval (PBG); Public Expectations; Quality of Public Service; Penalty–Reward Contrast Analysis (PRCA); Service User Satisfaction.

1. Introduction

Building Approval (PBG) replaces the Building Construction Permit (IMB) as part of a national policy aimed at simplifying licensing procedures and aligning building regulations with spatial planning, environmental impact prevention, and technical reliability. This change is regulated under the Job Creation Law and the Government Regulation on the implementation of building management (Undang-Undang Nomor 11 Tahun 2020 Tentang Cipta Kerja). The transition requires behavioral and conceptual adjustments

from both the public and implementing authorities. Therefore, public understanding of the concept and procedures of PBG is a crucial prerequisite for the effective implementation of this new policy. In Aceh Besar Regency, although the local government has conducted socialization activities and introduced the Building Management Information System (SIMBG), field evidence indicates that gaps remain in public understanding of the differences between IMB and PBG, as well as the procedures for obtaining PBG. This situation has led to low formal compliance and a significant number of buildings still lacking PBG certification.

The quality of PBG's field service delivery also raises concerns about timeliness and service reliability. Complaint data submitted through the Investment and One-Stop Integrated Services Office (DPMPTSP) of Aceh Besar and public service records indicate that the highest number of complaints in 2024 were related to the lengthy processing time for PBG issuance. In addition, the Public Works and Spatial Planning (PUPR) service counter at the Public Service Mall has reportedly received numerous complaints. This phenomenon not only reduces user satisfaction but also has the potential to undermine legal certainty and the investment climate in the region. Thus, the issue of service quality is not merely an administrative matter but is directly related to public expectations of the local government's role in providing licensing services that are fast, transparent, and reliable.

The urgency of this research lies in the need to systematically map and evaluate the expectations of the Aceh Besar community regarding the quality of PBG services, particularly across the five dimensions of service quality: tangibility, reliability, responsiveness, assurance, and empathy. This five-dimensional model has a strong empirical foundation and is widely used in studies assessing service quality in both public and private sectors (Jonkisz et al., 2022). A measurable evaluation of expectations across these dimensions will help identify service indicators that represent basic needs (must-be), differentiating factors (one-dimensional/attractive), or less relevant aspects (indifferent). Consequently, improvement interventions can be prioritized based on their importance to the public. Therefore, the findings of this study are expected to provide operational input for the DPMPTSP Aceh Besar, PUPR Aceh Besar, and other relevant stakeholders in designing socialization strategies, process restructuring, and capacity-building initiatives for PBG services to make them more responsive to public expectations and aligned with the objectives of the national licensing policy.

2. Literature Review

Numerous previous studies reveal that issues related to building permits, whether in terms of procedural complexity, digital transformation, or service quality, constitute an evolving research domain that still faces methodological limitations, fragmented findings, and gaps that open opportunities for novelty. International and national studies collectively provide a comprehensive picture of the complexity, challenges, and the need for transformation within building permit systems and public service delivery. A critical examination of these studies shows patterns of reinforcing findings, several contrasting perspectives, and areas that remain underexplored. The study by Fauth and Soibelman (2022) serve as an important reference in understanding the complexity of building permit processes. Using a qualitative approach, they found that the permitting processes in Germany and the United States are convoluted, time-consuming, and inefficient. The primary issues stem not only from complicated regulations but also from the shortage of experts and regional variations in policy. Their study suggests the need for a conceptual framework to model the permitting process more systematically and transparently. This finding forms the foundation for subsequent studies that consider digitalization as a possible solution.

In line with this, Noardo et al. (2022) highlight the significant gap between the discourse on digitalizing building permits and actual implementation. Through a critical state-of-the-art review, they found that many countries are not ready in terms of infrastructure, regulations, and human resource capabilities to transition to fully digital systems. Their study is more assertive in its criticism of global readiness, showing that only countries like Finland, Estonia, and Singapore have successfully integrated digital building permits. Compared to Fauth and Soibelman (2022), who pointed out inefficiencies in manual procedures, Noardo et al. (2022) add another analytical layer: even when digitalization is considered a solution, readiness remains insufficient. This illustrates a clear gap between identifying problems and implementing solutions.

The study by Hartmann et al. (2024) provide quantitative evidence on the maturity level of building permit digitalization, particularly in Germany. Their findings show that digitalization remains in early to intermediate stages, with inconsistencies across regions. The main barriers, such as a lack of national standards, limited resources, and resistance to change, reinforce the criticisms raised by Noardo et al. (2022) that digital transformation is not merely a technological issue but also an organizational and policy readiness issue. While Fauth and Soibelman (2022) emphasize the need for conceptual modeling, Hartmannet al. (2024) empirically highlight how such frameworks have yet to be fully implemented in modern permitting contexts. The work of Fauth et al. (2024) offer a solution by developing a comprehensive taxonomy encompassing documents, process flows, stakeholders, and technical data. This taxonomy can

serve as the foundation for more systematic digitalization and even support the implementation of automation and artificial intelligence applications. When connected to prior research, this taxonomy fills gaps in data and knowledge, structuring an area that was not deeply discussed in earlier studies. While the 2022 and 2023 studies critique processes and readiness, Fauth et al. (2024) provide the knowledge architecture essential for practical digital transformation.

A subsequent study by Fauth et al. (2025) expands the analysis to the European context. They reveal substantial differences among countries regarding efficiency, transparency, and digital adoption. Countries such as the Netherlands and Denmark achieve greater success due to strong regulatory support and better inter-agency coordination. This comparison strengthens the argument that digitalization cannot succeed in isolation without policy reform and regulatory harmonization. Unlike earlier studies focused on process-related or technological readiness issues, this research foregrounds governance and regulatory factors. In the Indonesian context, studies by Rohadin (2021) and Hendra et al. (2024) reveal that building approval services (PBG) at the local administrative level still face challenges in coordination, accessibility, evaluation, and consistency. Although both studies conclude that services are generally adequate, they agree that improvements are necessary, particularly in inter-agency coordination and the quality of direct public service interactions. Compared with international literature, these weaknesses mirror global challenges: coordination and human resource capacity remain major bottlenecks.

Additionally, the studies by Fitriana et al. (2025), Putri et al. (2023), Najwan et al. (2023), Nasution et al. (2022), and Mutiawati et al. (2021) focus on assessing service quality using approaches such as Importance-Performance Analysis (IPA) and the Customer Satisfaction Index (CSI). Their findings identify several priority indicators needing improvement, including timeliness, clarity of information, staff friendliness, and service facility quality. While these quantitative, survey-based approaches are useful for identifying priority areas, they have methodological limitations: they tend to be descriptive and do not explore underlying structural factors that influence service performance. In contrast to international studies that examine process structures and digital readiness, local studies place more emphasis on measuring public perceptions rather than structural root causes.

Across prior studies, both international and national research, the current investigation complements the others despite their differing approaches. International studies emphasize the need for conceptual frameworks, taxonomies, and digital standards, while local research highlights weaknesses in manual service delivery, such as slow processing, poor coordination, and inconsistent staff performance. When combined, these findings clearly show that digital transformation cannot succeed without addressing bureaucratic inefficiencies, human resource limitations, and institutional coordination at the local level. This suggests the need for integrative research that links digital structural elements with administrative realities on the ground.

3. Materials and Methods

This study employs a quantitative approach using questionnaires. The questionnaire data are utilized to analyze public expectations regarding the quality of Building Approval (PBG) services in Aceh Besar Regency. The data collection process involved directly visiting respondents' locations and distributing questionnaires in person.

3.1. Population and Sample

The population in this study comprised residents of Aceh Besar Regency who are building owners and have already obtained a Building Approval (Persetujuan Bangunan Gedung, or PBG). According to data from the Department of Public Works and Spatial Planning (PUPR) of Aceh Besar Regency for the period 2023–2024, a total of 193 individuals had received PBGs for residential and business purposes. To determine the sample size, the Slovin formula was used with a 10% margin of error, resulting in a manageable number of respondents given the available time, budget, and resources.

$$n = \frac{N}{1+(N\ x\ e^2)} = \frac{193}{1+(193\ x\ 0{,}1^2)} = 65{,}87 \approx 66 \quad (1)$$

The resulting sample size was approximately 66 respondents. The sampling technique used in this research was proportionate stratified random sampling, which is suitable when the population is heterogeneous and stratified proportionally (Tubel Agusven et al., 2023). Using this approach, respondents were proportionally selected across subdistricts in Aceh Besar Regency based on the distribution of PBG holders, with samples randomly drawn from each stratum.

3.2. Data Analysis

The data collected in this study were analyzed using two main techniques: quantitative descriptive analysis and Penalty-Reward Contrast Analysis (PRCA). Quantitative descriptive analysis was employed to describe and summarize the demographic characteristics of the respondents numerically, providing an overview of their distribution across relevant categories such as gender, age, education, and occupation (Creswell & Creswell, 2017). This process involved calculating the frequency and percentage of responses using SPSS software and presenting them in tabular form for ease of interpretation. Meanwhile, PRCA was applied to assess public expectations regarding the quality of PBG services in Aceh Besar Regency. The PRCA method is derived from the Kano Model and is designed to identify the nature of service attributes by examining the relationship between customer perceptions and satisfaction levels (Stöcker & Nasseri, 2020). In this method, responses measured on a five-point Likert scale were converted into contrast score variables, namely Penalty (Xp) and Reward (Xr).

Table 1. Conversion of Likert Scale Responses into Contrast Score Variable

No.	Category	Contrast Score Variables	
		Xp (Penalty)	Xr (Reward)
1	Much worse than expected (1)	2	0
2	Worse than expected (2)	1	0
3	Neutral (neither good nor bad) (3)	0	0
4	Better than expected (4)	0	1
5	Much better than expected (5)	0	2

The conversion process follows a standardized coding scheme, where low satisfaction levels (e.g., “much worse than expected”) are assigned higher penalty scores, while high satisfaction levels (e.g., “much better than expected”) receive higher reward scores. The dependent variable responses remain in their original Likert format, allowing for a balanced regression analysis of perceived service quality. Following the conversion, a T-test regression analysis was conducted to estimate the significance of penalty and reward coefficients for each service indicator. Unlike conventional T-tests that compare calculated and critical t-values, PRCA focuses on the significance (Sig.) values of each variable to determine the importance of specific service attributes (Stöcker & Nasseri, 2020).

Table 2. Classification of Expectation Types

No.	Xp (Penalty)	Xr (Reward)	Expectation Classification	Code
1	Significant	Not significant	Must-be	M
2	Not significant	Significant	Attractive	A
3	Significant	Significant	One-dimensional	O
4	Not significant	Not significant	Indifferent	I

Table 2 indicates that the indicator was categorized into one of four expectation classifications: Must-be (M), Attractive (A), One-dimensional (O), or Indifferent (I). Indicators classified as Must-be represent basic service requirements; if not fulfilled, they lead to dissatisfaction, but if fulfilled, they merely meet expectations. Attractive indicators are those that generate higher satisfaction when present but do not cause dissatisfaction when absent. One-dimensional indicators have a direct, linear relationship with satisfaction: the better they are performed, the higher the satisfaction level. Lastly, Indifferent indicators show no significant effect on satisfaction, as respondents remain neutral regardless of their performance. This analytical framework provides a nuanced understanding of how the public perceives the quality and performance of PBG services in Aceh Besar Regency.

4. Results

4.1. Characteristics of the Community in Aceh Besar Regency Who Have Obtained PBG

A total of 66 respondents from Aceh Besar Regency who have obtained a Building Approval (PBG) participated in this study. The characteristics of these respondents were identified based on several variables, including subdistrict, gender, age, educational background, occupation, and building function. Detailed information on the respondents’ characteristics is presented in Table 3.

Table 3. Characteristics of the Community in Aceh Besar Regency Who Have Obtained Building Approval (PBG)

Indicator	Category	Frequency	Percentage
Subdistrict	Baitussalam	11	16.67
	Darul Imarah	20	30.30
	Darul Kamal	1	1.52
	Darussalam	3	4.55
	Ingin Jaya	10	15.15
	Krueng Barona Jaya	4	6.06
	Kuta Baro	2	3.03
	Kuta Malaka	1	1.52
	Lhoknga	3	4.55
	Lhoong	1	1.52
	Mesjid Raya	1	1.52
	Peukan Bada	6	9.09
	Seulimeum	1	1.52
	Sukamakmur	2	3.03
Gender	Male	53	80.30
	Female	13	19.70
Age	20–30 years	2	3.03
	31–40 years	19	28.79
	41–50 years	24	36.36
	>50 years	21	31.82
Highest Education	Senior High School/Equivalent	18	27.27
	Diploma (D3)	6	9.09
	Bachelor's Degree (S1)	38	57.58
	Master's Degree (S2)	4	6.06
Occupation	Civil Servant (PNS)	17	25.76
	Government Contract Staff (PPPK)	1	1.52
	State-Owned Enterprise Employee	4	6.06
	Military/Police	1	1.52
	Contract Worker	1	1.52
	Private Employee	5	7.58
	Entrepreneur	35	53.03
	Housewife	1	1.52
	Others	1	1.52
Building Function	Residential	37	56.06
	Commercial/Business	29	43.94

Table 3 shows that most respondents came from Darul Imarah Subdistrict. In terms of gender, the respondents were predominantly male. The age group most represented was 41–50 years old, while most respondents held a bachelor's degree (S1) as their highest educational qualification. In terms of occupation, most respondents were entrepreneurs or self-employed, and regarding the building function, many respondents owned buildings used for residential purposes.

4.2. Public Expectations of Aceh Besar Regency Regarding the Quality of PBG Services

The analysis of public expectations regarding the quality of Building Approval (PBG) services in Aceh Besar Regency was conducted using the Penalty-Reward Contrast Analysis (PRCA) method. This approach evaluates how different service quality indicators influence public satisfaction and identifies which attributes are essential for improving service performance. Based on respondents' perceptions collected from building owners who had obtained PBGs. The study classified service attributes into four distinct categories according to the PRCA model. The first category, Must-be (M) indicators, represents the fundamental service attributes that must be fulfilled to prevent public dissatisfaction. If these basic expectations are not met, dissatisfaction will inevitably arise, even if other service aspects perform well. The second category, Attractive (A) indicators, includes features that create additional delight or satisfaction

when present but do not cause disappointment when absent. These attributes are considered strategic levers for enhancing user experience. The third category, One-dimensional (O) indicators, demonstrates a direct, linear relationship between service quality and satisfaction meaning that improvements in these aspects proportionally increase public satisfaction. Finally, Indifferent (I) indicators refer to attributes that do not significantly affect satisfaction levels, regardless of whether they are present or not.

In implementing PRCA, the initial Likert-scale data representing respondents' perceptions of PBG service quality were transformed into contrast score variables, namely Penalty (Xp) and Reward (Xr). These variables were then analyzed using T-test regression for each service quality indicator to determine their statistical significance and classification. The classification of respondents' expectations was determined based on the significance values (Sig.) obtained from the T-test regression results for both variables. Specifically, indicators were classified as Must-be (M) if the Sig. value of Xp < 0.05 and Xr > 0.05; Attractive (A) if Xp > 0.05 and Xr < 0.05; One-dimensional (O) if Xp < 0.05 and Xr < 0.05; and Indifferent (I) if Xp > 0.05 and Xr > 0.05. The results revealed that the majority of service indicators were classified as One-dimensional (O), suggesting that consistent improvement in these areas would directly enhance public satisfaction. Several indicators also fell under the Must-be (M) category, highlighting critical aspects that must be prioritized to avoid dissatisfaction, particularly in administrative responsiveness and service transparency.

Meanwhile, a smaller number of indicators were classified as Attractive (A), representing innovative opportunities to further delight the public, such as introducing digital platforms or proactive customer support. Lastly, a few indicators were found to be Indifferent (I), implying that their improvement would not substantially influence public perception. These findings suggest that while the fundamental expectations of the public toward PBG services in Aceh Besar are being met, there remains significant potential for enhancing satisfaction through strategic service innovations and targeted performance improvements. A detailed summary of these classifications is presented in Table 4.

Table 4. Classification of Public Expectations in Aceh Besar Regency Toward the Quality of Building Approval (PBG) Services

Factor(s) and Indicator(s)	Sig. (Xp)	Sig. (Xr)	Classification	Expectation
Tangible Factors (X1)				
Completeness of facilities and infrastructure (X1.1)	0.022	0.781	M	Must-be
Comfort of service room (X1.2)	0.492	0.035	A	Attractive
Information facilities provided (X1.3)	0.000	0.024	O	One-dimensional
Employee appearance neatness (X1.4)	0.083	0.916	I	Indifferent
Quality of facilities and infrastructure (X1.5)	0.024	0.063	M	Must-be
Online service availability (X1.6)	0.195	0.024	A	Attractive
PBG application submission process (uploading PBG documents) (X1.7)	0.017	0.982	M	Must-be
Verification process of PBG documents in SIMBG application (X1.8)	0.000	0.004	O	One-dimensional
Appointment of Professional Team (TPA)/Technical Evaluation Team (TPT) after document verification (X1.9)	0.359	0.153	I	Indifferent
Scheduling of document review by TPA/TPT (X1.10)	0.001	0.001	O	One-dimensional
Document examination by TPA/TPT (X1.11)	0.046	0.126	M	Must-be
Uploading review reports to SIMBG application (X1.12)	0.395	0.461	I	Indifferent
Calculation of PBG retribution (X1.13)	0.000	0.025	O	One-dimensional
Final verification of PBG application for technical standard certificate issuance (X1.14)	0.000	0.025	M	Must-be
Reliability Factors (X2)				
Clarity of data (X2.1)	0.035	0.000	O	One-dimensional
Clarity of procedures (X2.2)	0.046	0.009	O	One-dimensional
Timeliness in document processing (X2.3)	0.001	0.042	O	One-dimensional
Clarity of responsibility in service delivery (X2.4)	0.039	0.125	M	Must-be
Fairness and clarity of fees (X2.5)	0.04	0.441	M	Must-be

Factor(s) and Indicator(s)	Sig. (Xp)	Sig. (Xr)	Classification	Expectation
Clarity of service requirements (X2.6)	0.01	0.416	M	Must-be
Punctuality of service schedule (X2.7)	0.007	0.033	O	One-dimensional
Ease of service (X2.8)	0.169	0.034	A	Attractive
Responsiveness Factors (X3)				
Employee attitude towards community needs and complaints (X3.1)	0.028	0.282	M	Must-be
Speed and accuracy of service delivery (X3.2)	0.000	0.012	O	One-dimensional
Ability to solve problems quickly (X3.3)	0.000	0.046	O	One-dimensional
Ability to explain details clearly (X3.4)	0.541	0.022	A	Attractive
Assurance Factors (X4)				
Politeness of staff during service delivery (X4.1)	0.025	0.806	M	Must-be
Discipline of staff during service (X4.2)	0.013	0.032	O	One-dimensional
Accuracy of staff in serving the community (X4.3)	0.033	0.026	O	One-dimensional
Competence and skills of staff (X4.4)	0.041	0.049	O	One-dimensional
Ease of understanding communication patterns (X4.5)	0.255	0.005	A	Attractive
Ability to answer questions effectively (X4.6)	0.014	0.059	M	Must-be
Empathy Factors (X5)				
Friendliness of staff in providing services (X5.1)	0.021	0.387	M	Must-be
Ability of officers to understand community needs (X5.2)	0.294	0.013	A	Attractive
Fairness in providing services (X5.3)	0.036	0.52	M	Must-be
Ease of building relationships with staff (X5.4)	0.061	0.030	A	Attractive
Ability to leave a positive service impression (X5.5)	0.013	0.039	O	One-dimensional
Responsiveness to every applicant (X5.6)	0.007	0.067	M	Must-be
Prioritizing community interests (X5.7)	0.002	0.027	O	One-dimensional

Table 4 illustrates variation in public expectations across 39 indicators of PBG service quality in Aceh Besar Regency. Most indicators fall under the one-dimensional (O) classification, comprising 15 indicators, followed by must-be (M) expectations with 14 indicators. Nearly half are classified as attractive (A) expectations, totaling 7 indicators, while a smaller portion, 3 indicators, belongs to the indifferent (I) category. Overall, most factors are dominated by one-dimensional (O) and must-be (M) expectations. This finding indicates that the people of Aceh Besar Regency not only demand the fulfillment of basic service standards (M) but also expect continuous improvement (O) in service performance to enhance overall satisfaction.

5. Discussion

The results of the Penalty-Reward Contrast Analysis (PRCA) revealed that public expectations of Building Approval (PBG) services in Aceh Besar Regency are distributed across four categories: must-be, attractive, one-dimensional, and indifferent, each reflecting a distinct level of importance and influence on user satisfaction. The must-be (M) indicators represent fundamental service requirements that the public considers essential for basic functionality. These aspects, if absent or poorly executed, trigger high dissatisfaction even though their fulfillment does not significantly increase satisfaction. In this study, fourteen indicators were classified as must-be, including completeness and quality of facilities and infrastructure, clarity of responsibilities, fairness and transparency of service fees, responsiveness to applicants, and staff courtesy and professionalism. These findings emphasize the necessity for the Aceh Besar District Government to maintain these core service elements to avoid dissatisfaction and to ensure that the basic administrative and ethical standards of PBG services are met.

The attractive (A) indicators, on the other hand, are features that provide added value and positively surprise the public when delivered effectively. While their absence does not necessarily cause dissatisfaction, their presence significantly enhances perceived service quality. Seven indicators fell under this category, including the availability of comfortable service spaces, online accessibility, ease of procedures, and effective communication. These indicators present strategic opportunities for innovation,

suggesting that local authorities could develop pilot projects or service design experiments to strengthen user engagement and improve public perception.

Meanwhile, the one-dimensional (O) indicators demonstrate a direct, proportional relationship between service performance and user satisfaction. The fifteen indicators within this category, such as timeliness, accuracy, clarity of data and procedures, staff competence, and prioritization of public interest, require continuous operational optimization. Improvements in these areas are likely to have a linear, measurable impact on satisfaction, underscoring the need for administrative efficiency and professional service delivery. Finally, the indifferent (I) indicators, such as staff appearance neatness, appointment of the Technical Assessment Team (TPA/TPT), and uploading inspection reports to the online system, were found to have minimal influence on satisfaction levels. Although these factors should still meet minimum compliance standards, resources would be better allocated toward improving must-be and one-dimensional indicators that have a stronger impact on public satisfaction.

The findings align with prior international research on building permit systems. Fauth and Soibelman (2022) found that the complexity and inefficiency of building permit processes in Germany and the United States were often linked to human resource shortages and regulatory inconsistencies. Similar challenges are evident in Aceh Besar, where technical and administrative bottlenecks, coupled with limited socialization of new regulations, have contributed to public dissatisfaction. Noardo et al. (2022) highlighted that digital transformation in building permit systems often faces gaps between theory and practice, primarily due to inadequate infrastructure, inconsistent regulations, and insufficient human resource capabilities, conditions that are also evident in the implementation of the Building Management Information System (SIMBG) in Aceh Besar.

Further supporting evidence comes from Hartmann et al. (2024), who observed that the absence of standardized digital procedures and resistance to innovation hindered the efficiency of electronic permitting systems in Germany. These findings resonate with the situation in Aceh Besar, where limited integration and uneven digital adoption across local offices have led to inconsistent service performance. Similarly, Fauth et al. (2024) emphasized the importance of developing a comprehensive taxonomy that integrates documents, processes, actors, and technical data to streamline building approval workflows. Aceh Besar's limited digital taxonomy and weak online verification systems indicate a need for a more structured and integrated service framework. From a regulatory perspective, Ataide et al. (2023) demonstrated that clear digitalization strategies and harmonized regulations in countries such as the Netherlands and Denmark significantly improve accountability and efficiency in permit management. In contrast, unclear guidelines and underdeveloped digital systems in Aceh Besar have reduced transparency and accountability, underscoring an urgent need for legal and technological reform.

Local empirical studies in Indonesia provide further context. Rohadin (2021) found that PBG services in Cirebon function relatively effectively but still require improvements in consistency and responsiveness, whereas the overall satisfaction level in Aceh Besar remains low (mean = 2.167, categorized as "dissatisfied"). Similarly, Mahendra et al. (2024) reported accessibility and coordination challenges in Bandar Lampung's PBG services, echoing Aceh Besar's issues with online access and verification. Fitriana et al. (2025) identified six priority indicators in Banda Aceh: document inspection scheduling, data clarity, timeliness, speed, friendliness, and staff professionalism, which closely correspond to Aceh Besar's one-dimensional indicators. Overall, these findings demonstrate that improving PBG service quality in Aceh Besar requires a dual strategy: (1) ensuring compliance with must-be indicators to prevent dissatisfaction, and (2) enhancing attractive and one-dimensional indicators to actively increase satisfaction. Aligning service delivery with the best international practices and national digitalization goals will require coordinated policy reform, investment in capacity building, and stronger integration of digital infrastructure to deliver efficient, transparent, and citizen-centered PBG services.

6. Conclusions

Public expectations in Aceh Besar Regency regarding the quality of Building Approval (PBG) services are classified into four categories: must-be (14 indicators), attractive (7 indicators), one-dimensional (15 indicators), and indifferent (3 indicators). The classification results indicate that the 14 indicators in the must-be category should be given top priority in planning, budgeting, and operational aspects of PBG service delivery to prevent public dissatisfaction. The seven indicators in the attractive category represent strategic opportunities to significantly enhance public satisfaction. Therefore, innovation programs and pilot projects should be allocated to test and scale up these features. The fifteen one-dimensional indicators need to be optimized through improvements in operational capacity, procedural simplification, and overall service quality, as these directly increase user satisfaction. Indicators classified as indifferent suggest that changes in performance have no significant effect on public satisfaction. Hence, resource allocation should focus on more impactful indicators, while indifferent indicators should be maintained at a minimum compliance level and monitored periodically.

Author Contributions: Conceptualization, R.T.I.; methodology, R.T.I.; software, R.T.I.; validation, A.A. and M.M.; formal analysis, R.T.I.; investigation, R.T.I.; resources, R.T.I.; data curation, A.A., and M.M.; writing—original draft preparation, R.T.I.; writing—review and editing, A.A., and M.M.; visualization, R.T.I.; supervision, A.A. and M.M.; project administration, R.T.I.; funding acquisition, R.T.I. All authors have read and agreed to the published version of the manuscript.

Author initials:
R.T.I.: Rais Tamim Irham
A.A.: Abdullah
M.M.: Mubarak

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Acknowledgments: The authors would like to thank Universitas Syiah Kuala, Indonesia, for its support of this research and publication. We also thank the reviewers for their constructive comments and suggestions.

Conflicts of Interest: The authors declare no conflict of interest.

References

Ataide, M., Braholli, O., & Siegele, D. (2023). Digital transformation of building permits: Current status, maturity, and future prospects. *Buildings*, *13*(10), 2554.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Fauth, J., & Soibelman, L. (2022). Conceptual framework for building permit process modeling: Lessons learned from a comparison between Germany and the United States regarding the as-is building permit processes. *Buildings*, *12*(5), 638.

Fauth, J., Bloch, T., Noardo, F., Nisbet, N., Kaiser, S. B., Gade, P. N., & Tekavec, J. (2024). Taxonomy for building permit system-organizing knowledge for building permit digitalization. *Advanced Engineering Informatics*, *59*, 102312.

Fauth, J., Bloch, T., Noardo, F., Nisbet, N., Kaiser, S. B., Gade, P. N., & Tekavec, J. (2024). Taxonomy for building permit system-organizing knowledge for building permit digitalization. *Advanced Engineering Informatics*, *59*, 102312.

Fauth, J., Nørkjær Gade, P., Kaiser, S., Raj, K., Goul Pedersen, J., Olsson, P. O., ... & Tekavec, J. (2025). Investigating building permit processes across Europe: characteristics and patterns. *Building Research & Information*, *53*(4), 417-434.

Fitriana, M., Mubarak, M., Aulia, T. B., Abdullah, A., Bulba, A. T., Saiful, K. P., & Mastura, C. A. W. S. (2025, January). Evaluation of building construction approval service quality performance in Banda Aceh City, Indonesia. In *IOP Conference Series: Earth and Environmental Science* (Vol. 1444, No. 1, p. 012018). IOP Publishing.

Hartmann, S., Matthei, J., Hohmann, C., Mannheim, T., & Klemt-Albert, K. (2024). BIM-based Building Permits: An Assessment of The Current State and Prospects in Germany and Internationally. *Proceedings of the CCC*.

Hendra, A., Oktavia, S. Y., & Asri, J. D. (2024). Kualitas Pelayanan pada Persetujuan Bangunan Gedung (PBG) di Dinas Penanaman Modal dan Pelayanan Terpadu Satu Pintu (DPMPTSP) Kota Bandarlampung Provinsi Lampung. *Jurnal Media Birokrasi*, 140-156.

Heryanto, Y., Sutarjo, M., & Ramadhani, R. (2023). Kualitas Pelayanan Publik dalam Penerbitan Persetujuan Bangunan Gedung di Dinas Penanaman Modal dan Pelayanan Terpadu Satu Pintu. *Jurnal Syntax Transformation*, *4*(4), 35-43.

Jonkisz, A., Karniej, P., & Krasowska, D. (2022). The servqual method as an assessment tool of the quality of medical services in selected Asian countries. *International journal of environmental research and public health*, *19*(13), 7831.

Mahendra, F., Akib, M., & Triono, A. (2024). Bandar Lampung City Government Policy in Provision of Green Open Space Based on Regional Spatial Plan. *Zona Law And Public Administration Indonesia*, *1*(5), 431-442.

Noardo, F., Guler, D., Fauth, J., Malacarne, G., Ventura, S. M., Azenha, M., ... & Senger, L. (2022). Unveiling the actual progress of Digital Building Permit: Getting awareness through a critical state of the art review. *Building and Environment*, *213*, 108854.

Rohadin, R. (2021). Public Service Quality Improvement Strategy by Cirebon City Government Regarding the Granting of Trade-Business-License. *Golden Ratio of Social Science and Education*, *1*(2), 109-120.

Stöcker, B., & Nasseri, A. (2020). Penalty reward contrast analysis (PRCA) for categorizing service components: a new approach. *KIT Scientific Publishing*, *6*(2), 1–20. *https://doi. org/10.5445/KSP/10000*, *98012*(03).

The Data Story Guide. (2022). *Continuous Scale Analysis of the Kano Model*. https://the.datastory.guide/hc/en-us/articles/4634213557519-Continuous-Scale-Analysis-of-the-Kano-Model

Tubel Agusven, S. T., Satriadi, S. A. P., Rihan Hafizni, S. E., Nanda Kristia Santoso, M. P., & Hasnarika, S. S. (2023). *Dasar metodologi penelitian kualitatif*. CV Rey Media Grafika.

Undang-Undang Nomor 11 2020 Tentang Cipta Kerja (2020).