Analysis of the Influence of Service Innovation and Customer Relationship Management on the Satisfaction of Andalalin Applicants at BPTJ with Service Quality as an Intervening Variable

Angga Kusumadiharja[1]; Mudjiardjo[2]; Endang Sugiharti[3];
Cecep Pahrudin[4]; Yana Tatiana[5]

[1;2;3;4;5]Trisakti Institute of Transportation and Logistics, Jakarta, Indonesia

Abstract:

➢ *Background:*

The approval process for Traffic Impact Analysis (Andalalin) in the Jabodetabek area has been hindered by suboptimal service quality wich results in long processing times at the Greater Jakarta Transportation Management Agency (BPTJ). These inefficiencies stem from a reliance on manual systems and limited digitalization, utilizing only Google Mail for data submission and Zoom for discussions as needed. This lack of a fully integrated system has led to reduced transparency in the licensing process. Addressing these challenges requires an evaluation of service quality, service innovation, and Customer Relationship Management (CRM) to enhance applicant satisfaction.

➢ *Materials and Methods:*

This study employs a quantitative approach with a descriptive research design to analyze the influence of service quality, service innovation, and CRM on the satisfaction of Andalalin applicants. Data were collected through surveys of 294 respondents who applied for Andalalin approval from 2017 to June 2024. A non-probability sampling technique with a saturated sampling method was used. Data analysis was conducted using Structural Equation Modeling (SEM) with the Partial Least Squares (PLS) approach.

➢ *Results:*

The findings indicate that technology-based service innovations and effective CRM strategies significantly improve service quality and applicant satisfaction. The results confirm that a more integrated digital system would enhance efficiency and transparency in the Andalalin approval process.

➢ *Conclusion:*

Implementing digital innovations and strengthening applicant relationships are crucial for optimizing the Andalalin approval process. It is recommended that BPTJ develop a comprehensive digital system to improve service effectiveness and overall applicant satisfaction in the Jabodetabek region.

Keywords: Applicant Satisfaction; Customer Relationship Management (CRM); Service Innovation; Service Quality; Traffic Impact Analysis.

I. INTRODUCTION

Changes in urban spatial structure have had a significant impact on people's movement patterns, ultimately burdening the road network (Dündar et al., 2021). The development of activity centers and the expansion of central activity areas create substantial movement attraction, increasing traffic density and potentially causing congestion. According to data

from the Ministry of Transportation (2023), traffic density in urban areas has increased by 25% over the past five years due to unplanned development growth without optimal traffic mitigation planning. Traffic Impact Analysis (Andalalin) is a study aimed at identifying and addressing the traffic impacts of activity centers, residential areas, and infrastructure development. Based on Minister of Transportation Regulation Number PM 17 of 2021, the approval process for Andalalin must be completed within three working days after the documents are declared complete. However, according to data from the Jabodetabek Transportation Management Agency (BPTJ), the average time for Andalalin application processing still reaches 39 days, far exceeding the regulatory limit.

The administrative approval process for Traffic Impact Analysis (Andalalin) at BPTJ faces several challenges, including the dominance of manual systems, a lack of transparency and open information, interference from certain parties in the approval process, and inefficiencies in communication between applicants and evaluators. These challenges have led to longer processing times, inconsistent procedures, and a lack of trust from applicants in the Andalalin service system at BPTJ. Nevertheless, from 2017 to 2024, the number of approved Andalalin applications has shown a significant upward trend, particularly between 2020 and 2023, with an increase of 98%. This growth has been largely driven by regulatory changes that expedited the approval process and the mandatory digitalization of services. In response to the need for more efficient services, BPTJ has actually begun transitioning toward digitalization in managing Andalalin applications.

However, despite these digitalization efforts, its implementation remains limited. Several obstacles in adopting a digital system at BPTJ include suboptimal technological infrastructure, resistance to change from relevant parties, and a lack of integration between the digital system and the stages of Andalalin evaluation and approval. As a result, while the number of approvals has increased, service effectiveness has yet to reach an optimal level, leading to ongoing complaints from applicants regarding the speed and transparency of the approval process.

To address various challenges in the management of Andalalin at BPTJ, service innovation and Customer Relationship Management (CRM) are crucial factors in enhancing applicant satisfaction. Service innovation, such as the digitalization of approval processes and the development of more transparent systems, can improve efficiency and reduce administrative barriers. Meanwhile, CRM plays a role in establishing more effective communication between BPTJ and applicants, ensuring that their needs are better met. Service quality, as an intervening variable, also plays a significant role in bridging the relationship between innovation and CRM with customer satisfaction, where improvements in service quality directly contribute to increased satisfaction among Andalalin applicants.

Several previous studies support this relationship. (Vu & Khanh, 2021) developed the SERVQUAL concept, stating

that gaps in service quality have a direct impact on customer satisfaction. Another study by (Hussain Shah et al., 2023) found that effective CRM enhances customer loyalty through improved satisfaction, mediated by service quality. Additionally, research by (Chen & Popovich, 2003) emphasized that technology-based CRM, when integrated with service innovation, can improve operational efficiency and strengthen customer trust in the provided services.

Based on the above discussion, this study aims to analyze the influence of service innovation and Customer Relationship Management (CRM) on service quality in the Andalalin approval process at BPTJ, with service quality as an intervening variable. Given the important role of service quality in increasing applicant satisfaction, this research also seeks to determine the extent to which service innovation and CRM implementation can enhance the effectiveness and efficiency of Andalalin services.

Furthermore, this study will explore the causal relationship between service innovation and CRM with applicant satisfaction, both directly and through improved service quality as an intervening variable. Thus, the findings of this research are expected to provide policy recommendations for BPTJ in optimizing digital service strategies and improving the CRM system to enhance transparency, efficiency, and the quality of interactions with Andalalin applicants. Additionally, this study contributes to academic insights regarding the role of service innovation and CRM in the transportation sector, particularly in the context of licensing and traffic regulations.

II. LITERATURE REVIEW

➤ Service Innovation

Service innovation refers to the development and application of new or improved services to enhance customer experience, increase efficiency, and meet evolving user needs. According to (Ziemnowicz, 2020), innovation in services includes new processes, technological advancements, and novel business models that improve service delivery. In the context of BPTJ, service innovation can manifest through digitalization of application processes, automation of service procedures, and implementation of smart transportation solutions. By adopting innovative approaches, BPTJ can streamline Andalalin application processing, reduce waiting times, and improve overall service efficiency.

Service innovation in public transportation regulatory bodies, such as BPTJ, is essential to improving accessibility and responsiveness. Innovations like online application systems, integrated service platforms, and data-driven decision-making help enhance the overall user experience. Previous studies suggest that service innovation positively impacts service quality by improving reliability, efficiency, and customer-centricity (Hu et al., 2009).

➤ Costumer Relationship Management (CRM)

Customer Relationship Management (CRM) is a strategic approach that organizations use to manage customer

interactions and relationships effectively. It combines technology, processes, and human resources to analyze customer needs, improve service responsiveness, and foster long-term engagement (Shiferaw & Birbirsa, 2025). At BPTJ, CRM is critical in managing interactions with Andalalin applicants by ensuring timely communication, providing relevant information, and addressing concerns efficiently. CRM strategies, such as automated feedback systems, complaint resolution mechanisms, and personalized services, help in enhancing the overall customer experience.

➤ *Service Quality*

Service quality is a critical determinant of customer satisfaction and loyalty. (Parasuraman et al., 1988) introduced the SERVQUAL model, which identifies five dimensions of service quality :

- Reliability – The ability to perform the promised service dependably and accurately.
- Responsiveness – The willingness to help customers and provide prompt service.
- Assurance – The knowledge and courtesy of employees and their ability to inspire trust and confidence.
- Empathy – The provision of caring and individualized attention to customers.
- Tangibles – The appearance of physical facilities, equipment, personnel, and communication materials.

Service quality serves as an intervening variable between service innovation, CRM, and customer satisfaction. High-quality services ensure that innovations and customer relationship management efforts translate into meaningful improvements in the applicant experience. For example, an efficient Andalalin application system (service innovation) and responsive customer support (CRM) will only lead to satisfaction if the perceived service quality meets or exceeds customer expectations.

➤ *Costumer Satisfaction*

Customer satisfaction is the extent to which a service meets or exceeds customer expectations. It is a key performance indicator in service organizations and is influenced by factors such as service quality, innovation, and relationship management (O. D. Safi & S. Alagha, 2020). For BPTJ, the satisfaction of Andalalin applicants depends on the efficiency of the application process, the responsiveness of service personnel, and the reliability of the provided information. When customers perceive high service quality and effective CRM practices, they are more likely to express positive satisfaction, leading to increased trust in the institution.

III. HYPOTHESIS DEVELOPMENT

➤ *In this Study, Several Hypotheses are used to Achieve the Research Goals, Including:*

- *H1 : Service Innovation and Service Quality*
  Service innovation is expected to influence service quality in the Andalalin approval process at BPTJ, where the use of technology and digital systems can improve efficiency and service transparency.

- *H2 : Customer Relationship Management and Service Quality*
  Customer Relationship Management (CRM) is expected to influence service quality, as effective communication between BPTJ and applicants can accelerate the process and enhance service information clarity.

- *H3 : Service Innovation and Applicant Satisfaction*
  Service innovation is expected to influence applicant satisfaction, as faster, more modern, and transparent services can enhance the user experience and satisfaction.

- *H4 : Costumer Relationship Management and Applicant Satisfaction*
  Customer Relationship Management (CRM) is expected to influence applicant satisfaction, as responsive interactions and personalized services can create a stronger relationship between applicants and service providers.

- *H5 : Service Quality and Applicant Satisfaction*
  Service quality is expected to influence applicant satisfaction, where reliable, responsive, and expectation-aligned services will enhance user satisfaction levels.

- *H6 : Service Innovation and Applicant Satisfaction with Service Quality as Mediation.*
  Service innovation mediated by service quality is expected to influence applicant satisfaction, as innovation improvements accompanied by service quality enhancements will provide a better experience for applicants.

- *H7 : Costumer Relationship Management and Applicant Satisfaction with Service Quality as Mediation.*
  Customer Relationship Management (CRM) mediated by service quality is expected to influence applicant satisfaction, as effective CRM can improve service quality, ultimately enhancing Andalalin applicants' satisfaction.
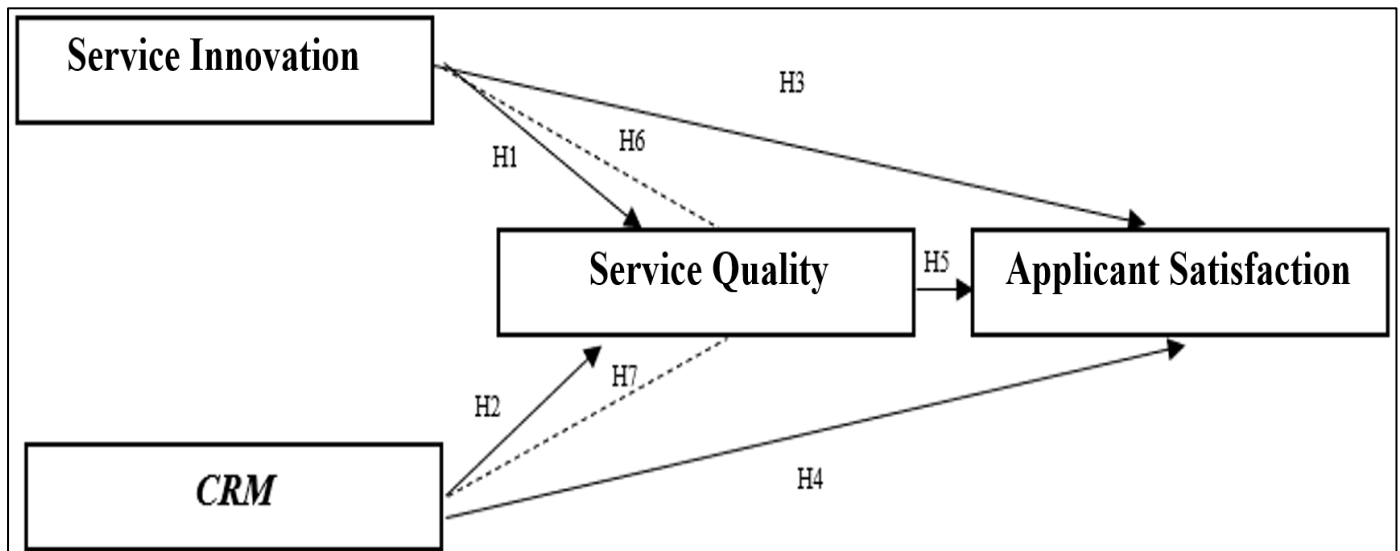
Fig 1 Conceptual Framework

IV. MATERIAL AND METHODS

This prospective comparative study was carried out on applicants of the Jabodetabek Transportation Management Agency (BPTJ) at Jl. Merdeka Barat No.8, Gambir, Central Jakarta, from March 2024 to December 2024. A total of 294 applicants who submitted Andalalin requests between 2017 and June 2024 were included in this study.

- **Study Design:** This study employs a quantitative descriptive research design using a survey-based approach to analyze the influence of service innovation and Customer Relationship Management (CRM) on the satisfaction of Andalalin applicants at BPTJ, with service quality as an intervening variable.
- **Study Location**: The research is conducted at the Jabodetabek Transportation Management Agency (BPTJ), located at Jl. Merdeka Barat No.8, Gambir, Central Jakarta.
- **Study Duration:** The study is conducted over 10 months, from March 2024.
- **Sample size:** 294 applicants.
- **Sample size calculation:** opulation: The study population includes all Andalalin applicants at BPTJ from 2017 to June 2024, totaling 294 applicants. Sample Selection: The sample size is 294 respondents, determined based on the total population approach. Sampling Technique: The study employs non-probability sampling using the saturated sampling method (census), where all members of the population are included as research subjects.
- **Subjects & selection method**: Respondents in this study are Andalalin applicants who have submitted their applications at BPTJ from 2017 to June 2024. The study utilizes questionnaires to gather data on the applicant's perception of service innovation, CRM, service quality, and satisfaction levels.

➢ *Inclusion Criteria:*

- Applicants who have submitted an Andalalin request at BPTJ between 2017 and June 2024.

- Applicants who have completed all required documents for the Andalalin approval process.
- Applicants who have experienced the Andalalin approval process at BPTJ.
- Applicants who are willing to participate in the research and complete the survey.

➢ *Exclusion Criteria:*

- Applicants who have withdrawn their Andalalin application before approval.
- Applicants who have incomplete or missing data.
- Applicants who do not respond to the survey within the designated timeframe.

➢ *Data Collection Methods :*

- Primary Data Collection: Collected through questionnaires, both manual and online (Google Forms).
- Secondary Data Collection: Obtained from BPTJ reports, regulatory documents, and previous research.

➢ *Procedure Methodology*

After obtaining informed consent, the survey is conducted using a structured questionnaire covering demographic characteristics, service innovation, CRM implementation, service quality, and satisfaction levels. The collected data is then processed and analyzed to evaluate the relationships between variables.

➢ *Statistical Analysis*

The data is analyzed using Structural Equation Modeling (SEM) with the Partial Least Squares (PLS) approach. The analysis follows these steps :

- *Outer Model Evaluation:*

✓ Indicator reliability (outer loading should be ≥ 0.5–0.7 for exploratory research).

- ✓ Discriminant validity (cross-loading should be higher for its latent variable).
- ✓ Internal consistency (composite reliability ≥ 0.6 for exploratory research).
- ✓ Convergent validity (Average Variance Extracted (AVE) should be > 0.5).

- *Inner Model Evaluation:*

- ✓ Coefficient of Determination (R^2): Values ≥ 0.75 indicate a strong model.
- ✓ Path Coefficient Significance: Using t-tests and p-values ($p < 0.05$).

- *Hypothesis Testing:*

- ✓ T-test ($t > 1.96$) and p-value analysis.

V. RESULT

➢ Convergent Validity Test

To measure the feasibility of a research object (instrument), a validity test is required. Validity testing or convergent validity is conducted using the outer loading value. The following are the results of the validity test for each variable:

Table 1 Validity Convergent.

Variable	Indicator	Outer Loading	Description
Service Innovation	X1.1	0.688	Valid
	X1.2	0.718	Valid
	X1.3	0.740	Valid
	X1.4	0.729	Valid
	X1.5	0.765	Valid
	X1.6	0.836	Valid
	X1.7	0.710	Valid
	X1.8	0.778	Valid
	X1.9	0.654	Valid
	X1.10	0.784	Valid
CRM	X2.1	0.645	Valid
	X2.2	0.684	Valid
	X2.3	0.803	Valid
	X2.4	0.795	Valid
	X2.5	0.765	Valid
	X2.6	0.789	Valid
	X2.7	0.837	Valid
	X2.8	0.799	Valid
Service Quality	Y1.1	0.682	Valid
	Y1.2	0.750	Valid
	Y1.3	0.720	Valid
	Y1.4	0.752	Valid
	Y1.5	0.694	Valid
	Y1.6	0.774	Valid
	Y1.7	0.713	Valid
	Y1.8	0.811	Valid
Costumer Satisfaction	Z1.1	0.760	Valid
	Z1.2	0.712	Valid
	Z1.3	0.860	Valid
	Z1.4	0.808	Valid
	Z1.5	0.803	Valid
	Z1.6	0.768	Valid
	Z1.7	0.643	Valid
	Z1.8	0.742	Valid

➢ Discriminant Validity Evaluation

After conducting validity testing using the outer loading values, discriminant validity testing is then performed using the average variance extracted (AVE) values.

Table 2 Discriminant Validity Test Result

Variabel	Average Variance Extracted (AVE)
CRM	0.588
Service Innovation	0.550
Costumer Satisfaction	0.584
Service Quality	0.545

The value observed based on the table above in this test is the average variance extracted (AVE) value, where for all variables, the estimated result is greater than 0.50, indicating that it is valid.

➤ *Reliability Test*

Reliability testing is conducted to determine whether the variables used in this study are reliable or not. The reliability test utilizes Cronbach's Alpha and composite reliability values.

Table 3 Reliability Test Result

Variabel	Cronbach's Alpha	Composite Reliability	Rule of Thumb	Evaluasi Model
CRM	0.899	0.919		Reliabel
Inovasi Pelayanan	0.908	0.924	> 0.70	Reliabel
Kepuasan Pemohon	0.897	0.918		Reliabel
Kualitas Pelayanan	0.880	0.905		Reliabel

Based on the table above, it can be seen that the constructs for all variables have met the reliability criteria of > 0.70. This indicates that the Cronbach's Alpha and Composite Reliability values obtained from the estimation using SmartPLS are reliable, as recommended, and the study can proceed to the testing phase.

➤ *Structural Model Test (Inner Model) use R-Square*

The inner model or structural model testing is conducted to examine the relationships between constructs, the significance values, and the R-square of the research model.

Table 4 R-Square

Variable	R Square	Q Square
Service Quality (Y)	0,724	0,385
Costumer Satisfaction (Z)	0,807	0,464

The analysis results indicate that the R Square value for Service Quality (Y) is 0.724 (72.4%), meaning that Service Innovation (X1) and Customer Relationship Management (X2) substantially explain 72.4% of the Service Quality (Y) variable, while the remaining percentage is influenced by other factors. Meanwhile, the R Square value for Applicant Satisfaction (Z) is 0.807 (80.7%), indicating that Service Innovation (X1), Customer Relationship Management (X2), and Service Quality (Y) together explain 80.7% of the Applicant Satisfaction (Z) variable. Additionally, the Q Square value for Service Quality (Y) and Applicant Satisfaction (Z) is greater than 0.1, confirming that this research model has good predictive relevance.

➤ *Hypotesis Result*

The significance of a relationship can be assessed by examining the path coefficient and T-statistic values, which

are obtained through the bootstrapping method. The path coefficient indicates the strength and direction of the relationship between the hypothesized variables. A positive path coefficient (> 0) suggests a direct positive influence between two variables, while a negative path coefficient (< 0) indicates a negative influence. The T-statistic value, generated through bootstrapping, is used to determine whether a relationship is statistically significant. A result is considered significant if the T-statistic exceeds 1.96 (at a 5% significance level) or 1.64 (at a 10% significance level). This study applies a 5% significance level, meaning a hypothesis is accepted if the T-statistic is greater than 1.96 and the P-value is less than 0.05. The following section presents the path coefficient and T-statistic values used to test the hypotheses in this research.

Table 5 Path Coefficient & T Statistic

Variable Relationship	Original Sample	Sample Mean	Standard Deviation	T Statistics	P Values
SI -> SQ	0.381	0.380	0.069	5.539	0.000
CRM -> SQ	0.495	0.498	0.070	7.029	0.000
SI -> CS	0.275	0.276	0.068	4.018	0.000
CRM -> CS	0.220	0.220	0.069	3.198	0.001
SQ -> CS	0.454	0.453	0.046	9.967	0.000
SI -> SQ -> CS	0.173	0.172	0.035	4.943	0.000
CRM -> SQ -> CS	0.224	0.226	0.040	5.546	0.000

➢ *Description :*

- SI : Service Innovation

- CRM: Costumer Relationship Management
- SQ : Service Quality
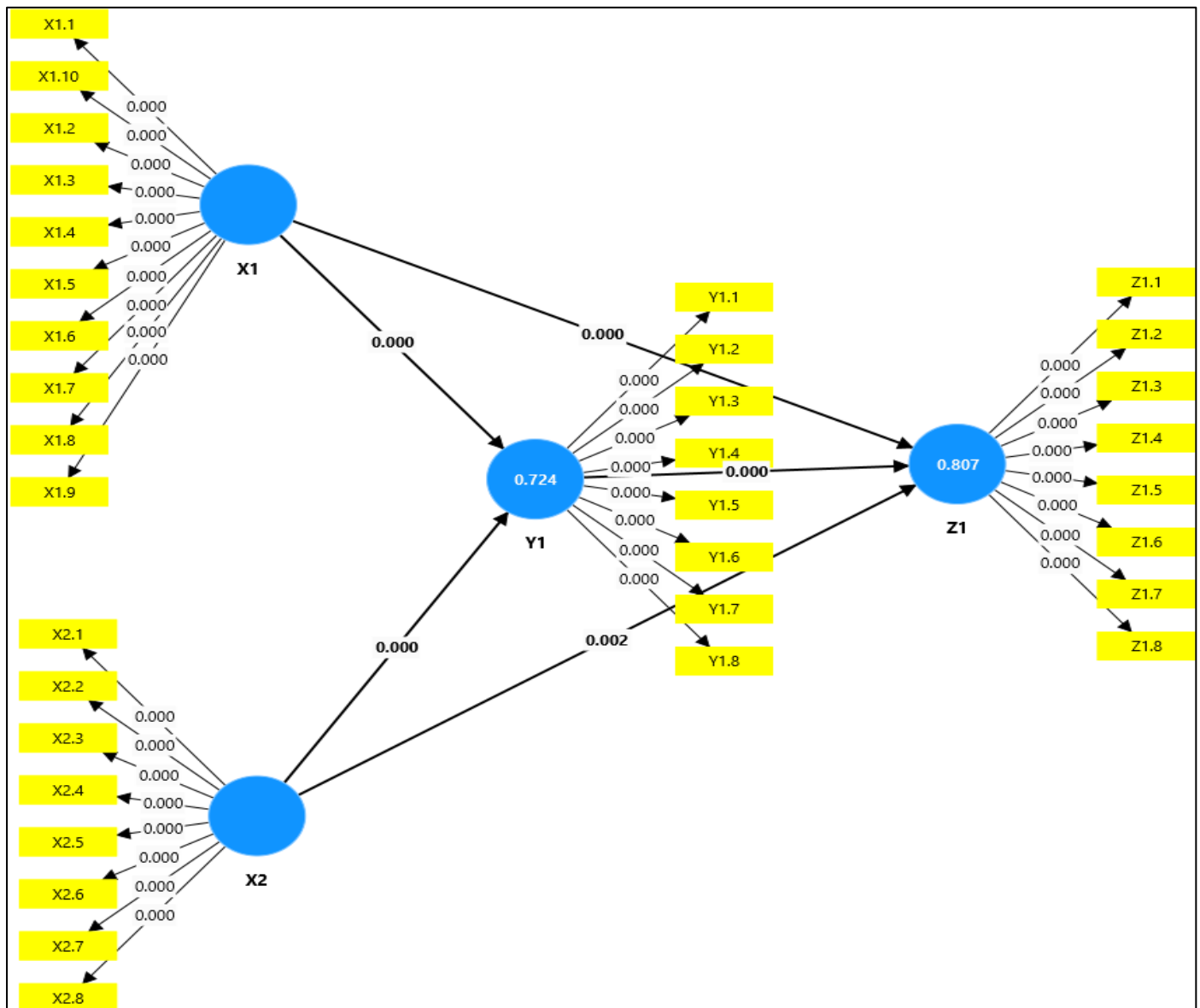- CS : Costumer Satisfaction

Fig 2 Path Diagram of P Value

Bootstrap Testing is used to minimize issues related to data non-normality in research. The results of the bootstrap testing evaluation from PLS analysis are as follows:

➢ *H1: Service Innovation Influences Service Quality in the Andalalin Approval Process at BPTJ.*

The results of Hypothesis 1 testing indicate that the effect of the service innovation variable on service quality has an estimated value of 0.381 (positive) and a p-value of 0.000, which is less than 0.05. Therefore, it can be concluded that service innovation has a positive influence on service quality by 0.381. This confirms that service innovation has a positive and significant impact on service quality in the Andalalin process at BPTJ, meaning Hypothesis 1 is supported (accepted).

➢ *H2: Customer Relationship Management (CRM) Influences Service Quality in the Andalalin Approval Process at BPTJ.*

The results of hypothesis testing for Hypothesis 2 indicate that the effect of the Customer Relationship Management variable on service quality has an estimated value of 0.495 (positive) and a p-value of 0.000, which is less than 0.05. Therefore, it can be concluded that Customer Relationship Management has a positive and significant influence on service quality in the Andalalin approval process at BPTJ, meaning that Hypothesis 2 is supported (accepted).

➢ *H3: Service Innovation Influences Applicant Satisfaction in the Andalalin Approval Process at BPTJ.*

The results of hypothesis testing for Hypothesis 3 show that the influence of the service innovation variable on applicant satisfaction has an estimated value of 0.275

(positive) and a p-value of 0.000, which is less than 0.05. Therefore, it can be concluded that service innovation has a positive and significant effect on applicant satisfaction in the Andalalin process at BPTJ, meaning that Hypothesis 3 is supported (accepted).

➢ *H4: Customer Relationship Management (CRM) Influences Applicant Satisfaction in the Andalalin Approval Process at BPTJ.*

The results of hypothesis 4 testing indicate that the influence of the customer relationship management variable on applicant satisfaction shows an estimated value of 0.220 (positive) and a p-value of 0.001, which is less than 0.05. Therefore, it can be concluded that customer relationship management has a positive and significant effect on applicant satisfaction in the Andalalin process at BPTJ, meaning that hypothesis 4 is supported (hypothesis 4 is accepted).

➢ *H5: Service Quality Influences Applicant Satisfaction in the Andalalin Approval Process at BPTJ.*

The results of hypothesis 5 testing indicate that the influence of the service quality variable on applicant satisfaction shows an estimated value of 0.454 (positive) and a p-value of 0.000, which is less than 0.05. Therefore, it can be concluded that service quality has a positive and significant effect on applicant satisfaction in the Andalalin process at BPTJ, meaning that hypothesis 5 is supported (hypothesis 5 is accepted).

➢ *H6: Service Innovation, Mediated by Service Quality, has an Impact on Applicant Satisfaction in the Andalalin Approval Process at BPTJ.*

The mediation test results indicate that service innovation on applicant satisfaction through service quality as a mediating variable shows an estimated value of 0.173 (positive) and a p-value of 0.000, which is less than 0.05. Therefore, it can be concluded that service innovation mediated by service quality has an influence on the satisfaction of BPTJ applicants.

➢ *H7: Customer Relationship Management (CRM), Mediated by Service Quality, has an Impact on Applicant Satisfaction in the Andalalin Approval Process at BPTJ.*

The mediation test results indicate that customer relationship management (CRM), mediated by service quality, has an effect on applicant satisfaction, with an estimated value of 0.224 (positive) and a p-value of 0.000, which is less than 0.05. Therefore, it can be concluded that CRM, when mediated by service quality, significantly influences the satisfaction of BPTJ applicants.

VI. DISCUSSION

➢ *The Influence of Service Innovation on Service Quality*

The study confirms that service innovation significantly enhances service quality in the Andalalin process at BPTJ. The implementation of information technology, such as mobile applications and Geographic Information Systems (GIS), has improved efficiency and transparency, aligning with the SERVQUAL model (Parasuraman et al., 1988). Additionally, this finding is consistent with Minister of

Transportation Regulation No. PM 17 of 2021, which mandates an integrated electronic licensing system. However, while the use of Google Mail for document submission is considered effective, some applicants suggest further digitalization through a dedicated web-based application to optimize service delivery.

➢ *The Influence of CRM on Service Quality*

The study reveals that Customer Relationship Management (CRM) significantly impacts service quality, particularly through loyalty programs and complaint management systems. This supports (Payne & Frow, 2005), who emphasize CRM's role in strengthening customer engagement and improving service quality. Although BPTJ currently manages applicant interactions via telephone, email, and in-person meetings, respondents recommend developing an e-CRM system to facilitate seamless communication and align with regulatory requirements for electronic licensing.

➢ *The Influence of Service Innovation on Costumer Satisfaction*

Service innovation not only improves service quality but also directly enhances applicant satisfaction. Applicants appreciate faster processes, better information access, and innovative service features (Cabral & Coelho Marques, 2020). This aligns with Minister of Transportation Regulation No. PM 17 of 2021, which mandates a three-day approval timeframe for Andalalin applications. While the current system using Google Mail is still acceptable, continuous improvements in service innovation are necessary to maintain applicant satisfaction.

➢ *The Influence of CRM on Costumer Satisfaction*

CRM efforts at BPTJ, including prompt responses to complaints, personalized service, and improved applicant engagement, significantly contribute to higher satisfaction levels. This supports (Nilashi et al., 2023), who states that CRM enhances satisfaction by fostering strong customer relationships and achieving competitive advantage. However, while the current complaint-handling approach through WhatsApp is deemed effective, transitioning to a web-based CRM application would further enhance service accessibility.

➢ *The Influence of Service Quality on Costumer Satisfaction*

Consistent with (Tjiptono, 2023), the study confirms that service quality is a key determinant of applicant satisfaction. Improvements in processing speed, staff responsiveness, and accuracy of information have significantly enhanced the overall applicant experience. This aligns with the conformance quality concept, which measures how well a service meets predefined standards.

➢ *The Influence of Service Innovation on Costumer Satisfaction through Service Quality as a Mediating Variable*

The mediation analysis indicates that service quality mediates the relationship between service innovation and applicant satisfaction. This means that technological advancements in service delivery contribute to applicant satisfaction only when they also enhance service quality. This

aligns with the SERVQUAL model, which highlights tangibility, responsiveness, assurance, and empathy as key factors linking service innovation to satisfaction (Vu & Khanh, 2021)

> *The Influence of CRM on Costumer Satisfaction through Service Quality as a Mediating Variable*

Similarly, the study confirms that service quality mediates the effect of CRM on applicant satisfaction. Effective CRM not only directly enhances satisfaction but also indirectly improves it by strengthening service quality. This finding is consistent with the Minister of Transportation Regulation No. PM 17 of 2021, which streamlines the Andalalin evaluation process and reduces bureaucratic barriers, leading to an increase in application volume from 2020 to 2021. While current CRM efforts at BPTJ are beneficial, transitioning to a more structured, web-based CRM system would further optimize service performance.

VII. CONCLUSION

This study confirms that service innovation and Customer Relationship Management (CRM) play a crucial role in improving service quality and applicant satisfaction in the Andalalin approval process at BPTJ. The implementation of technological advancements, such as mobile applications and Geographic Information Systems (GIS), has significantly enhanced service efficiency and transparency, aligning with the SERVQUAL model and regulatory requirements. However, while the current use of Google Mail for document submission is considered effective, further digitalization through a dedicated web-based application is recommended to optimize service quality and streamline the approval process.

Additionally, the study highlights that CRM significantly influences service quality, particularly through loyalty programs and effective complaint management systems. By fostering strong applicant relationships, CRM enhances communication and service responsiveness, which ultimately contributes to higher service quality. While BPTJ currently manages interactions through telephone, email, and in-person meetings, respondents suggest transitioning to a more structured e-CRM system to improve accessibility and ensure seamless communication between applicants and service providers.

Furthermore, findings indicate that service innovation and CRM not only enhance service quality but also directly impact applicant satisfaction. Applicants highly value faster processing times, better access to information, and personalized service features, which align with regulatory mandates for efficient electronic licensing. Moreover, mediation analysis confirms that service quality serves as a key intermediary, meaning that technological and relationship management improvements are most effective when they also enhance overall service quality.

Based on these findings, BPTJ should continue improving its digital services by adopting a fully integrated online application system and enhancing its CRM strategies.

Implementing a web-based service platform and automated complaint-handling system would further strengthen service quality and applicant satisfaction. Future research could explore long-term impacts of digital transformation in public service sectors, ensuring that ongoing innovations align with evolving user needs and regulatory standards.

REFERENCES

[1]. Cabral, A. M., & Coelho Marques, J. P. (2020). the Influence of Service Innovation in Customer Satisfaction: Case Study of Hotel Industry. Proceedings of the International Conference of Applied Business and Management (Icabm2020), June, 316–327.

[2]. Chen, I. J., & Popovich, K. (2003). Understanding customer relationship management (CRM). Business Process Management Journal, 9(5), 672–688. https://doi.org/10.1108/14637150310496758

[3]. Dündar, H., Ömürgönülşen, M., & Soysal, M. (2021). A review on sustainable urban vehicle routing. Journal of Cleaner Production. https://www.sciencedirect.com/science/article/pii/S0959652620354901

[4]. Hu, H.-H. (Sunny), Kandampully, J., & Juwaheer, T. D. (2009). Relationships and impacts of service quality, perceived value, customer satisfaction, and image: an empirical study. The Service Industries Journal, 29(2), 111–125. https://doi.org/10.1080/02642060802292932

[5]. Hussain Shah, N., Khalid, W., Ahmad, A., Ghaffar, A., Muhammad, T., Khan, I., & Pakhtunkhwa, K. (2023). The Effect of Customer Relationship Management on Customer Retention: The Mediating Role of Customer Satisfaction and Effective Commitment.

[6]. Hardjono, B., & San, L. P. (2017). Customer Relationship Management Implementation and its Implication to Customer Loyalty in Hospitality Industry. Jurnal Dinamika Manajemen, 8(1), 92–107. https://doi.org/10.15294/jdm.v8i1.10414

[7]. Imasari, K., & Nursalin, K. K. (2011). Customer Relationship Management Terhadap Loyalitas Pelanggan Pada PT BCA Tbk Influence of Customer Relationship Management Toward Customer Loyalty on PT. BCA Tbk Kartika. Fokus Ekonomi (FE), 10(3), 183–192.

[8]. Iriandini, A. (2015). PENGARUH CUSTOMER RELATIONSHIP MANAGEMENT (CRM) TERHADAP KEPUASAN PELANGGAN DAN LOYALITAS PELANGGAN (Survey pada Pelanggan PT. Gemilang Libra Logistics, Kota Surabaya). Jurnal Administrasi Bisnis S1 Universitas Brawijaya, 23(2), 85998.

[9]. Kanaidi & Kurniawan, A. (2011). Analisis Customer Relationship Management(CRM) pada SBU ADMAIL.

[10]. Kasmir. (2017). No Title. In Customer Service Excellent. Raja Grafindo Persada.

[11]. Kementrian Perhubungan Indonesia. (2021). Peraturan Menteri Perhubungan Republik Indonesia

Nomor PM 17 Tahun 2021 Tentang Penyelenggaraan Analisis Dampak Lalu Lintas. In Peraturan Menteri.

[12]. Kosasi, S. (2018). Perancangan Sistem Electronic Customer Relationship Management Untuk Mempertahankan Loyalitas Pelanggan. Jurnal Sistem Informasi Dan Teknologi Informasi, 4(2), 92–102.

[13]. Kotler dan Keller. (2009). Manajemen Pemasaran Jilid 1 (Edisi Ke13). Erlangga.

[14]. Kotler, P. and K. L. K. (2009). Manajemen Pemasaran, Edisi 13. Erlangga.

[15]. Kotler, P. dan K. L. K. (2016). Marketing Manajemen (Edisi ke15). Edision Pearson Education Inc.

[16]. Nilashi, M., Abumalloh, R. A., Ahmadi, H., Samad, S., Alrizq, M., Abosaq, H., & Alghamdi, A. (2023). The nexus between quality of customer relationship management systems and customers' satisfaction: Evidence from online customers' reviews. Heliyon, 9(11), e21828. https://doi.org/10.1016/j.heliyon.2023.e21828

[17]. O. D. Safi, D. F., & S. Alagha, D. M. (2020). The Relationship Between Service Quality And Customer Satisfaction. International Journal of Scientific and Research Publications (IJSRP), 10(8), 767–787. https://doi.org/10.29322/IJSRP.10.08.2020.p10497

[18]. Parasuraman, A. P., Zeithaml, V., & Berry, L. (1988). SERVQUAL: A multiple- Item Scale for measuring consumer perceptions of service quality. Journal of Retailing.

[19]. Payne, A., & Frow, P. (2005). A Strategic Framework for Customer Relationship Management. Journal of Marketing, 69(4), 167–176. https://doi.org/10.1509/jmkg.2005.69.4.167

[20]. Shiferaw, R. M., & Birbirsa, Z. A. (2025). Digital technology and human resource practices: A systematic literature review. Heliyon, 11(2), e41946. https://doi.org/10.1016/j.heliyon.2025.e41946

[21]. Tjiptono, F. (2023). Service , Quality & Satisfaction. January 2016.

[22]. Vu, T., & Khanh, N. (2021). Service Quality And Its Impact On Customer Satisfaction (Issue November). https://doi.org/http://dx.doi.org/10.6084/m9.figshare.17089454

[23]. Ziemnowicz, C. (2020). Joseph A. Schumpeter and Innovation BT - Encyclopedia of Creativity, Invention, Innovation and Entrepreneurship (E. G. Carayannis (ed.); pp. 1517–1522). Springer International Publishing. https://doi.org/10.1007/978-3-319-15347-6_476