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## The Effect of Service Innovation on Customer Satisfaction at Balai Besar Tekstil Bandung

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**Abstract:** Service innovation is increasingly important for public technical-service institutions because customers expect services that are fast, accessible, transparent, and easy to use. However, empirical evidence on digital service innovation in textile technical-service institutions remains limited. This study aims to analyze the effect of service innovation on customer satisfaction at Balai Besar Tekstil Bandung. A quantitative descriptive design was applied to 35 customers who used the institution's digital services during November 2025-January 2026. Saturated sampling was used, and data was collected through questionnaires and documentation. Data were analyzed using descriptive statistics, normality and heteroskedasticity tests, simple linear regression, correlation and determination coefficients, and a partial t-test with SPSS 27. The results show that service innovation achieved 78% and customer satisfaction 79%, both in the good category. Service innovation had a positive and significant effect on customer satisfaction, with a regression coefficient of 1.026,  $t = 55.191$ ,  $p < 0.001$ , and  $R^2 = 0.989$ . The study's novelty lies in demonstrating the strong role of digital service innovation in customer satisfaction within a textile technical-service institution.

**Keywords:** Digital Service Innovation, Public Service, Customer Satisfaction, Textile Technical Services.

## INTRODUCTION

Balai Besar Tekstil Bandung is an institution that provides textile-related technical services, including testing, certification, calibration, and technical consultation. These services require accurate processes, rapid completion, understandable procedures, and clear information for customers. In response to the development of technology-based services, the institution has also adopted digital technology and media to facilitate access to information and service utilization.

The development of information technology and digital transformation has changed the delivery of services in both government organizations and service providers. Customers increasingly expect services that are fast, simple, effective, transparent, and accessible according to their needs. This situation encourages organizations to improve service quality through technology utilization and innovation. Service innovation is not limited to the adoption of technology; it also includes the creation of service processes that provide convenience and

added value to users. Consequently, an organization's ability to introduce relevant innovations is an important factor in improving service quality and meeting customer needs.

The success of a service can ultimately be assessed through customer satisfaction after the service has been received. Customer satisfaction reflects the extent to which perceived service performance meets customer expectations. Customers evaluate services on the basis of their overall experience, including process convenience, information clarity, service time, perceived benefits, and service consistency. Therefore, customer satisfaction is an important indicator of whether an organization has successfully met the needs and expectations of its users.

The customers examined in this study were individuals who had used the digital services of Balai Besar Tekstil Bandung, particularly testing, certification, calibration, and technical consultation services. Primary data were obtained from questionnaires distributed to 35 customers during November 2025-January 2026. Secondary data were derived from institutional profiles, organizational structures, standard operating procedures, service reports, customer data, and relevant literature.

The service innovation examined in this study refers specifically to digital service innovation, namely the use of technology in service processes to improve customer convenience. The innovation is directed toward easier access to information, simpler procedures, faster service processes, and improved access to services. The study refers to Rogers' (2003) five characteristics of innovation: relative advantage, compatibility, complexity, trialability, and observability. These characteristics describe the benefits, suitability, ease of use, opportunity for trial, and observable outcomes of an innovation.

Although service innovation has been developed to improve customer convenience, its implementation still needs to be evaluated from the user's perspective. An innovation may provide potential benefits but still deliver limited value if it is difficult to understand or does not match customer needs. Similarly, if procedures remain complex, information is difficult to obtain, or service speed does not meet expectations, the innovation may not provide optimal added value. Accordingly, the issue is not merely whether innovation exists, but how customers perceive its implementation in the service process.

Previous studies have reported positive relationships between service innovation and customer satisfaction. Prakarsa and Hikmah (2022) found that service innovation and service quality influenced public satisfaction in a district government office. Christina and Hartini (2020) identified an effect of service innovation on customer satisfaction in healthcare services. Vanny Agung et al. (2022) reported that service quality and service innovation were associated with customer satisfaction at PT PLN (Persero) Semarang. Barza (2025) and Nur Jalilah et al. (2025) likewise showed that service innovation can improve satisfaction by making services more effective, efficient, accessible, and responsive to user needs.

These studies provide a basis for proposing that service innovation is an important determinant of customer satisfaction. Relative advantage can create greater benefits for users; compatibility can increase acceptance because the service fits customer needs and experience; complexity concerns the extent to which the innovation is easy to understand and use; trialability provides an opportunity to experience the innovation; and observability concerns the extent to which its benefits can be seen and felt. Better perceived characteristics of service innovation are therefore expected to be associated with higher customer satisfaction.

Despite the generally positive findings of previous studies, a research gap remains because most prior research cited in this study was conducted in public administration, healthcare, banking, and general service-company settings. Empirical research on digital service innovation in a technical institution providing textile testing, certification, calibration, and consultation remain limited. The research gap therefore lies in the specific institutional context and service characteristics examined: the effect of digital service innovation on customer satisfaction in a textile technical-service institution.

The state of the art of this study is its application of service-innovation characteristics to the customer experience of digital technical services at Balai Besar Tekstil Bandung. The study provides empirical evidence from 35 digital-service users and evaluates both the perceived condition of service innovation and its statistical effect on customer satisfaction. The objective of the research is to analyze the effect of service innovation on customer satisfaction at Balai Besar Tekstil Bandung. The research hypothesis is that service innovation has a positive and significant effect on customer satisfaction.

## METHODS

This study employed a quantitative descriptive approach to describe the implementation of service innovation, assess the level of customer satisfaction, and test the effect of service innovation on customer satisfaction at Balai Besar Tekstil Bandung. The research object consisted of digital-service customers of the institution.

The study used both primary and secondary data. Primary data was obtained through questionnaires administered to customers who had used the digital services of Balai Besar Tekstil Bandung. Secondary data were obtained from institutional documentation, including the institutional profile, organizational structure, standard operating procedures, service reports, customer data, books, scientific journals, and relevant previous studies.

The accessible population consisted of 35 customers who met the research criteria during November 2025-January 2026. Because all eligible members of the accessible population were included, the study used saturated sampling (Sugiyono, 2021). Respondents were required to have used the digital services of Balai Besar Tekstil Bandung, to have received the institution's services, and to be willing to complete the research questionnaire.

The questionnaire was the main instrument for measuring customer perceptions of service innovation and customer satisfaction. Each statement used a five-point Likert scale: 1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = agree, and 5 = strongly agree. Documentation was used to support the description of the research setting and service process.

The study consisted of Service Innovation (X) as the independent variable and Customer Satisfaction (Y) as the dependent variable. Data was processed using SPSS version 27. The analysis comprised descriptive statistics, classical assumption testing through the Kolmogorov-Smirnov normality test and Glejser heteroskedasticity test, simple linear regression ( $Y = a + bX$ ), correlation and coefficient of determination analysis, and a partial t-test at a significance level of 0.05.

**Table 1. Operationalization of Research Variables**

| Variable                  | Operational Definition                                                                                                                                   | Indicators                                                                                                                                                                                                                                  | Scale        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| Service Innovation (X)    | The level of renewal and development in service processes, systems, technology, and methods intended to improve convenience, speed, and service quality. | Ease of obtaining services; service-process speed; use of technology; ease of access; simplified procedures; information clarity; administrative convenience; fit with customer needs; service-quality improvement; benefits of innovation. | Likert (1-5) |
| Customer Satisfaction (Y) | The level of customer satisfaction after comparing received services with expected needs and expectations.                                               | Conformity with expectations; satisfaction with quality, speed, convenience, information, staff attitude, facilities, and service outcomes; intention to reuse services; willingness to recommend.                                          | Likert (1-5) |

Source: Indicators adapted to the service context of Balai Besar Tekstil Bandung.

## RESULTS AND DISCUSSION

### Descriptive Statistical Analysis

Descriptive statistics were used to provide an overview of Service Innovation (X) and Customer Satisfaction (Y) based on responses from 35 customers. The results are presented in Table 2.

**Table 2. Descriptive Statistics of Research Variables**

| Variable                  | N  | Maximum | Mean  | Std. Deviation | Actual Score | Category |
|---------------------------|----|---------|-------|----------------|--------------|----------|
| Service Innovation (X)    | 35 | 25      | 19.51 | 6.374          | 78%          | Good     |
| Customer Satisfaction (Y) | 35 | 25      | 19.63 | 6.418          | 79%          | Good     |

Source: SPSS 27 output, 2026.

Service Innovation obtained a mean score of 19.51, a standard deviation of 6.374, and an actual-score percentage of 78%, placing it in the good category. Customer Satisfaction obtained a mean score of 19.63, a standard deviation of 6.418, and an actual-score percentage of 79%, also placing it in the good category. These results indicate that respondents generally perceived both the institution's service innovation and their satisfaction with the services positively, although further improvement remains possible.

### Classical Assumption Tests

Classical assumption testing was conducted before simple linear regression. The tests included normality and heteroskedasticity.

**Table 3. Normality Test Results**

| Test                            | Service Innovation (X) | Customer Satisfaction (Y) | Decision |
|---------------------------------|------------------------|---------------------------|----------|
| Kolmogorov-Smirnov Significance | 0.200                  | 0.200                     | Normal   |
| Shapiro-Wilk Significance       | 0.161                  | 0.073                     | Normal   |

Source: SPSS 27 output, 2026.

All reported significance values were greater than 0.05. Therefore, the data met the normality assumption.

**Table 4. Glejser Heteroskedasticity Test**

| Model                  | B      | Std. Error | t      | Sig.  | Decision              |
|------------------------|--------|------------|--------|-------|-----------------------|
| Constant               | -0.230 | 0.265      | -0.867 | 0.392 | -                     |
| Service Innovation (X) | 0.025  | 0.013      | 1.853  | 0.073 | No heteroskedasticity |

Source: SPSS 27 output, 2026.

The Service Innovation variable produced a Glejser significance value of 0.073, which is greater than 0.05. Accordingly, the regression model did not indicate heteroskedasticity and was considered suitable for simple linear regression analysis.

### Simple Linear Regression Analysis

**Table 5. Simple Linear Regression Results**

| Model                  | Unstandardized B | Std. Error | Standardized Beta | t      | Sig.   |
|------------------------|------------------|------------|-------------------|--------|--------|
| Constant               | -0.394           | 0.369      | -                 | -1.067 | 0.294  |
| Service Innovation (X) | 1.026            | 0.019      | 0.995             | 55.191 | <0.001 |

Source: SPSS 27 output, 2026.

The estimated regression equation is  $Y = -0.394 + 1.026X$ . The regression coefficient of 1.026 indicates a positive relationship: a one-unit increase in Service Innovation is associated with a 1.026-unit increase in Customer Satisfaction. The negative constant represents the model

intercept when Service Innovation is zero and should be interpreted within the observed scale of the study.

## Correlation and Coefficient of Determination

**Table 6. Correlation and Coefficient of Determination**

| Model | R     | R Square | Adjusted R Square | Std. Error of Estimate | Durbin-Watson |
|-------|-------|----------|-------------------|------------------------|---------------|
| 1     | 0.995 | 0.989    | 0.989             | 0.398                  | 1.860         |

Source: SPSS 27 output, 2026.

The correlation coefficient (R) of 0.995 indicates a very strong positive relationship between Service Innovation and Customer Satisfaction. The R Square value of 0.989 indicates that 98.9% of the observed variation in Customer Satisfaction was statistically explained by Service Innovation in this sample, while 1.1% was associated with factors outside the model.

## Hypothesis Testing

**Table 7. Hypothesis Test Result**

| Relationship                                | B     | Std. Error | Beta  | t      | Sig.   | Decision  |
|---------------------------------------------|-------|------------|-------|--------|--------|-----------|
| Service Innovation -> Customer Satisfaction | 1.026 | 0.019      | 0.995 | 55.191 | <0.001 | Supported |

Source: SPSS 27 output, 2026.

The partial t-test produced  $t = 55.191$  with  $p < 0.001$ . Because the significance value was below 0.05, the null hypothesis was rejected, and the research hypothesis was supported. Thus, Service Innovation had a positive and statistically significant effect on Customer Satisfaction at Balai Besar Tekstil Bandung.

## Discussion

The findings demonstrate that Service Innovation had a positive and significant effect on Customer Satisfaction at Balai Besar Tekstil Bandung. The regression coefficient of 1.026 and t-value of 55.191 with  $p < 0.001$  support the research hypothesis. The coefficient of determination of 0.989 further indicates that Service Innovation was the dominant explanatory variable for Customer Satisfaction within the observed sample.

This strong relationship can be understood in the context of the institution's technical services. Customers use testing, certification, calibration, and technical consultation services that require accuracy, speed, procedural convenience, and clear information. Innovations that accelerate service processes, simplify procedures, improve digital access, and provide clearer information are therefore likely to be directly perceived as beneficial by customers and to contribute to satisfaction.

The descriptive results reinforce this interpretation. Service Innovation achieved an actual score of 78%, while Customer Satisfaction achieved 79%, with both variables categorized as good. These percentages suggest that the implemented innovations have provided tangible benefits rather than functioning merely as administrative changes. Nevertheless, the scores have not reached the highest category, indicating room for improvement in access convenience, procedural simplification, and consistency across service types.

The findings are consistent with Rogers' (2003) diffusion-of-innovations framework, which identifies relative advantages, compatibility, complexity, trialability, and observability as important characteristics influencing innovation adoption. In the present context, innovations that offer clear advantages, correspond to customer needs, are easy to understand, can be experienced by users, and provide observable benefits are more likely to generate

positive customer evaluations. Digital service innovation therefore contributes to a more effective and efficient service experience.

The findings also support the customer-satisfaction perspective of Kotler and Keller (2016), in which satisfaction is associated with the relationship between expected and perceived performance. When service innovation enables faster, more accurate, more accessible, and more consistent services, customers are more likely to perceive that the benefits received are commensurate with the time and effort invested in obtaining the service. This condition can strengthen satisfaction and encourage future service reuse.

The results are aligned with Prakarsa and Hikmah (2022), who found that service innovation positively affected public satisfaction, and with Christina and Hartini (2020), who identified a positive effect of service innovation in healthcare services. Similar evidence was reported by Vanny Agung et al. (2022), Barza (2025), and Nur Jalilah et al. (2025), who showed that innovation can increase customer satisfaction by making services more effective, efficient, accessible, and responsive to user needs. The consistency of these findings across different service settings suggests that service innovation is an important strategic component of customer-oriented service delivery.

From a practical perspective, Balai Besar Tekstil Bandung should maintain and strengthen digital service innovation through optimized technology-based services, simplified procedures, shorter service times, improved staff competence, and stronger communication with customers. These measures may not only increase short-term satisfaction but also strengthen customer trust in the institution's technical-service quality.

The novelty of this study lies in providing empirical evidence on digital service innovation in a textile technical-service institution, a context that is less frequently represented in the previous studies cited in this manuscript. The very strong relationship observed in this sample suggests that innovation is closely associated with customer evaluation of specialized technical services. At the same time, the high R Square value should be interpreted cautiously because the study involved a small, institution-specific sample and a single predictor.

## CONCLUSIONS AND RECOMMENDATIONS

### Conclusion

Service Innovation at Balai Besar Tekstil Bandung was perceived to be in the good category, with an actual score of 78%, while Customer Satisfaction was also in the good category at 79%. Simple linear regression showed that Service Innovation had a positive and significant effect on Customer Satisfaction, with a regression coefficient of 1.026,  $t = 55.191$ , and  $p < 0.001$ . The R Square value of 0.989 indicates that Service Innovation explained 98.9% of the variation in Customer Satisfaction within the observed sample. These findings answer the research objective by demonstrating that improved access, simplified procedures, technology utilization, service speed, and service consistency are strongly associated with higher customer satisfaction in the context of textile technical services.

### Limitations

This study has several limitations. First, it was conducted only among 35 customers of Balai Besar Tekstil Bandung, so the findings cannot be generalized to other technical-service institutions or regions. Second, the model examined only Service Innovation as a predictor of Customer Satisfaction, although other factors such as service quality, trust, perceived value, staff competence, and digital usability may also influence satisfaction. Third, the cross-sectional questionnaire approach captured customer perceptions during a specific period and did not examine changes in satisfaction over time. The exceptionally high coefficient of determination should therefore be interpreted within the scope and characteristics of this sample.

## Recommendations

Balai Besar Tekstil Bandung is recommended to continue improving service innovation through simpler procedures, optimization of technology-based services, faster service delivery, and clearer and more accessible customer information. Periodic evaluation based on customer feedback is also important so that new service innovations remain aligned with user needs and expectations. Future research should involve larger samples, multiple technical-service institutions, and additional explanatory variables such as service quality, perceived value, trust, or digital-service usability. Longitudinal or mixed-method approaches may also provide a more comprehensive understanding of how service innovation shapes customer satisfaction over time.

## Author Contributions

Rahmad Ramayansyah contributed to research conceptualization, data collection, data analysis, interpretation of results, and preparation of the initial manuscript. Widwi Handari Adji contributed to conceptual guidance, methodological review, interpretation of findings, scholarly revision, and final manuscript review. Both authors have read and approved the final version of the manuscript.

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