

Predicting Customer Satisfaction Based on Service Innovation Mediated by Customer Value: An Empirical Evidence from IELTS Indonesia

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Abstract

In the ever-evolving landscape of language proficiency assessment, the advent of Computer-Based Testing (CBT) within the International English Language Testing System (IELTS) marks a pivotal moment of innovation in the existing service of the organizations. Service innovation plays a crucial role by offering businesses a competitive edge and enhancing customer satisfaction. By introducing new and improved services, companies can differentiate themselves in the market, and meet evolving customer needs. Customer value plays a crucial role in understanding the relationship between service innovation and customer satisfaction. It serves as the bridge that connects the features and benefits of a service innovation with the overall satisfaction experienced by the customers. This study is a survey research on Customer Satisfaction through service innovation, mediated by customer value in IELTS Indonesia. Signaling Theory was chosen to explain this selected phenomenon from the organizational concern. The purpose of this research is to analyze the effect of Service Innovation on Customer Satisfaction mediated by Customer Value. The population in this study was customers of IELTS CBT in Indonesia. Snowball sampling techniques were applied and 150 respondents were included as the sample. Data analysis using SPSS-23 concludes that Service Innovation has a positive and significant effect on Customer Satisfaction and Customer Value. Besides, Customer Value has a positive and significant effect on Customer Satisfaction and Customer Value mediates the effect of Service Innovation on Customer Satisfaction. It also clarifies the application of Signaling theory in organizational contexts.

Keywords: Service Innovation, Customer Satisfaction, Customer Value, CBT.

1.0 Introduction

Computer-Based Testing (CBT) is revolutionizing language proficiency evaluation within IELTS, enhancing flexibility, accessibility, and interactivity, transforming the testing experience for millions globally. Computer-Based Testing (CBT) offers customer satisfaction, but traditional Paper-Based Testing remains preferred. CBT addresses challenges in PBT format while enhancing test security and complexity. However, in developing countries, automated examination infrastructure is outdated and security capacity is limited. (Ilesanmi & Lasisi, 2015). Furthermore, a mixed method study in China reported that users' computer familiarity and mode preference affect their test performance. Students reported dissatisfaction with the CBT system due to the noisy (keyboard typing sound) test environment, difficulties in analyzing reading passages on a computer, and overall lack of information regarding the CBT system and services (Yu & Iwashita, 2021). Contrastingly, this has also been explored in one of Saudi Arabia's prior research among university-level female university students that in the PBT exam, they feel more chances of sentence-level error mistakes than those who took CBT (Ahmed Alwazzan & Suleiman Alyousef, 2019). Several studies recognized constraints of the CBT exam as providing facilities that meet test requirements. Internet network problems, students' intention to use technology, and support from committees and supervisors

(Nartiningrum & Nugroho, 2020). A study conducted among public university students in Malaysia showed that students want to continue the traditional assessment system over the computer-based due to communication issues followed by personal issues and technical issues. (Iskandar et al., 2021).

Researchers are exploring customer acceptance and satisfaction in English proficiency tests, highlighting the mediating role of customer value in service innovation and satisfaction. Service innovation is crucial for competitive edge, customer satisfaction, and revenue growth. It allows organizations to differentiate themselves, address evolving customer needs, and create additional value (Bessant & Davies, 2007). Evaluating customer value is essential in understanding the relationship between service innovation and customer satisfaction (Kandampully, 2002). It connects the features and benefits of a service innovation with the overall customer experience (Zeithml et al., 1988). Customer value reflects the perceived benefits relative to the costs incurred (Kotler, 1998). Therefore, service institutions need to manage their services so that service holders get the most possible benefits from it. Thus, with CBT's popularity, the service provider's role is becoming complex, diversified, and risky in ensuring that the test takers are participating in exams comfortably through the widespread availability of computers and high-speed internet over a large portion of the globe (Isbell & Kremmel, 2020).

This research examines the impact of Customer-Based Technology (CBT) on customer satisfaction in the Indonesian IELTS context, using Signaling theory as a theoretical basis. The theory explains how information is communicated through signals, addressing information asymmetry across economic and social contexts.

2.0 Theoretical Framework and Hypothesis Development

2.1 Signaling Theory (ST)

Signaling Theory (ST) has become a prominent methodology for analyzing innovation and satisfaction, as noted by (Pappu & Quester, 2016). Originating from Spence's (1974) work on signaling equilibria, the theory has developed into a foundational framework for various models and hypotheses. Simultaneous Typecasting (ST) theory clearly explains the relationship between innovativeness and satisfaction, standing out against more complex theories like exchange theory and cues utilization theory (Eisingerich & Rubera, 2010). The core of ST theory, as discussed by Spence (1974, 2002) and Stigler (1961), is the information asymmetry in the marketplace, where consumers lack complete information about new service innovations (Stiglitz, 2000). Firms signal the quality and value of innovations through advertising (Kirmani, 1990), brand name (Erdem & Swait, 1998; Rao et al., 1999), price (Dawar & Sarvary, 1997), and warranty (Boulding & Kirmani, 1993), which consumers use to assess their satisfaction or dissatisfaction.

Marketing studies consider customers as receivers (Basuroy, Desai, & Talukdar, 2006). Besides, strategy researchers have considered customers as existing shareholders, potential investors, or both (Kang, 2008). In contrast, they have also focused broadly on various stakeholders, including consumers (Basdeo et al., 2006).

Management researchers have identified that the effectiveness of signaling depends partly on the attributes of the receivers. For instance, the signaling mechanism will fail if the receivers

do not actively seek the signal or are unaware of what to look for. Hence, the receivers' attention is important to search the environment for signals vigilantly (Gulati & Higgins, 2003).

3.0 Hypothesis Development

3.1 Service Innovation on Customer Satisfaction

Service innovation (SI) focuses on enhancing products and services to meet evolving customer demands, fostering loyalty, and sustaining a competitive edge. Innovation optimizes customer satisfaction and boosts market potential, contributing to increased company profits (Kanwal & Yousaf, 2019). Customer satisfaction measures how well a product, service, or experience meets or exceeds customer expectations. It is a subjective evaluation reflecting the customer's perception of their experience (Zhong & Moon, 2020). Customer perceptions positively relate to service innovation, including novel service ideas and interfaces (Zhou et al., 2015). Service innovation impacts customer satisfaction, brand image, and purchase intention (Van der Have & Rubalcabe, 2016). Therefore, the following hypothesis can be proposed:

H₁: Service innovation has a positive and significant effect on customer satisfaction in the IELTS test operations in Indonesia.

3.2 Service Innovation on Customer Value

The service industry's innovation is driven by understanding and integrating customer perspectives, leading to the creation of customer value (Kandampully, 2002). Innovation spans managerial, communication, service scope, and back-office improvements, involving all aspects of service preparation and delivery (Flint et al., 2002). Service innovation emphasizes customer needs and contexts in developing new services (Alam & Perry, 2002). Customer value is enhanced by adopting a service-oriented approach across business model development (Hakanen & Murtonen, 2015), crucial for gaining a competitive advantage by meeting current and future customer demands (Kandampully & Duddy, 1999). Service innovation shapes customer perceptions of value and benefits received (Tether et al., 2001; Chapman et al., 2002). Hence, the following hypothesis can be developed:

H₂: Service Innovation has a positive and significant effect on Customer Value in the IELTS test operation in Indonesia.

3.3 Customer Value on Customer Satisfaction

Customer value, defined as the difference between a customer's monetary and non-monetary costs and the actual value of a good or service (Tan & Xu, 2015), is crucial for businesses to create a competitive edge. Generating customer value significantly and favorably impacts customer satisfaction, as perceived values positively influence customer satisfaction and pleasure (Ryu et al., 2008). Similarly, (McDougall & Levesque, 2000) highlighted the importance of perceived customer value in influencing customer happiness. Customer satisfaction is impacted by assessed value and anticipated standards. Consequently, we can propose the following hypothesis:

H₃: Customer Value has a positive and significant effect on Customer Satisfaction in the IELTS test operation in Indonesia.

3.4 Mediating Effect of Customer Value on Service Innovation and Customer Satisfaction

Customer expectations for service quality can be met through innovative services, such as new customer service interfaces, advanced functionalities, and technologically enhanced interactions, which promote symbolic value (Luo et al., 2019). Previous research by (Mahmoud et al., 2018) showed that service innovation, customer value, and satisfaction are interrelated, with effective service innovation enhancing customer value. (Flint et al., 2002) recognized that service innovation affects customer satisfaction through customer value. (Mahmoud et al., 2018) also highlighted the mediating role of customer value between service innovation and satisfaction.

Empowering customers is key to satisfaction, as it changes their value perspective through experience and belonging, and encourages new service ideas (Mahr et al., 2014). Customer value significantly influences satisfaction and service innovation (Piligrimiene et al., 2015). (Yuniari et al., 2020) confirmed that customer value mediates the relationship between service innovation and satisfaction, recommending that management develop innovative service strategies to ensure customer value and satisfaction. Thus, we can derive the following hypothesis:

H4: Service Innovation Has a Positive and Significant Effect on Customer Satisfaction Mediated by Customer Value.

4.0 Research Methodology

A structured survey questionnaire was developed for this study which helped the researcher to accumulate responses from the respondents about the research variables more precisely. A formula developed by Cochran (1977) has been used to determine the minimum sample size for this research (Tejada & Punzalan, 2012). The confidence interval to confirm the minimum sample size for this research has been taken at 95% for which the Z score was 1.96. Besides, a 10% margin of error was considered to determine the minimum number of samples because it ensures a reasonable level of accuracy without demanding excessively large sample sizes (James et al., 2015). The “Snowball” sampling technique was used in order to collect responses from the participants. A total number of 150 participants responded in between February 2024-June 2024 from different cities of Indonesia. The measurement scale was taken from previously established and popular scales for service innovation (Mahmoud et al., 2018); customer satisfaction (Mahmoud et al., 2018); and customer value (Dodds et al., 199). The data was analyzed using SPSS version 23 software.

5.0 Results and Data Analysis

5.1 The Effect of Service Innovation and Customer Value on Customer Satisfaction.

Table 1: Regression Model I

| Variable | Coefficient (B) | Std. Error | t | Significant |
|--------------------|-----------------|------------|-------|-------------|
| Constant | 1.489 | 0.684 | 2.176 | 0.031 |
| Service Innovation | 0.185 | 0.019 | 9.526 | 0.000 |
| Customer Value | 0.139 | 0.039 | 3.577 | 0.000 |

a. Dependent Variable: CS'
 Source: Primary Data, 2024

Based on the data highlighted in Table 1, the following results can be derived.

- 1) The Service Innovation variable has a $t_{\text{statistic}}$ value of 9.526 with a significance level of 0.000. The $t_{\text{statistic}}$ value is more than the t_{table} ($9.526 > 1.976$) and the significance level is less than 0.05 (≤ 0.05) indicating that Service Innovation has a significant positive effect on the Customer Satisfaction variable.
- 2) The Customer Value variable has a $t_{\text{statistic}}$ value of 3.577 with a significance level of 0.000. The $t_{\text{statistic}}$ value is more than the t_{table} ($3.577 > 1.976$) and the significance level is less than 0.05 (≤ 0.05) indicating that Customer Value has a significant positive effect on the Customer Satisfaction variable.

5.2 Determination of Coefficient Test of SI and CV on CS

Table 2: Determination Coefficient Test

| R | R Square | Adjusted R Square | Std. Error of The Estimate |
|-------|----------|-------------------|----------------------------|
| 0.795 | 0.632 | 0.627 | 1.26284 |

Source: Primary Data, 2024

Based on the Table 2, the R-value is 0.795 or 79.5%. This means that 0.795 or 79.5% of the ability of service innovation and customer value variables can explain their effect on customer satisfaction, while the remaining 0.205 or 20.5% is explained by other variables outside the model.

5.3 The Effect of Service Innovation on Customer Value

Table 3: Regression Model II

| Variable | Coefficient (B) | Std. Error | t | Significant |
|--------------------|-----------------|------------|-------|-------------|
| Constant | 1.489 | 0.684 | 2.176 | 0.031 |
| Service Innovation | 0.185 | 0.019 | 9.526 | 0.000 |

a. Dependent Variable: CV

Source: Primary Data, 2024

Based on the data highlighted in Table 3, the following results can be derived.

The Service Innovation variable has a $t_{\text{statistic}}$ value of 10.271 with a significance level of 0.000. The $t_{\text{statistic}}$ value is more than the t_{table} ($10.271 > 1.976$) and the significance level is less than 0.05 (≤ 0.05) indicating that service innovation has a significant positive effect on the customer value variable.

5.4 Determination of Coefficient Test of SI on CV

Table 4: Determination Coefficient Test

| R | R Square | Adjusted R Square | Std. Error of The Estimate |
|-------|----------|-------------------|----------------------------|
| 0.645 | 0.416 | 0.412 | 2.66568 |

Source: Primary Data, 2024

Based on Table 4, the R-value is 0.645 or 64.5%. This means that 0.645 or 64.5% of the service innovation variable has the ability to explain its effect on customer value, while the remaining 0.355 or 35.5% is explained by other variables outside the model.

5.5 Sobel Test

The calculation for identifying the effect of mediation can be conducted using the Sobel test. The Sobel test indicated by the coefficient and the standard errors of the coefficients of the regression equation are shown in Tables 5.1 and 5.3.

Following is the formula for calculating the $t_{\text{statistic}}$ to identify the mediating effect of Customer Value on Service Innovation and Customer Satisfaction:

$$t = \frac{ab}{sab} = \frac{(0.322)(0.139)}{0.01269} = \frac{0.044758}{0.01269} = 3.527029 \dots \approx 3.52703$$

Based on the calculations above, the $t_{\text{statistic}}$ value which was obtained at 3.52703 was more than $t_{\text{table}} (>1.97612)$ with a significance level of 0.05 having a sample of 150 respondents. Therefore, it can be concluded that there is a mediating effect of the Service Innovation variable on Customer Satisfaction through Customer Value.

6.0 Discussion

This study examines and certifies the framework with service innovation as independent, customer value as mediating, and customer satisfaction as dependent variables. The study results showed that the Innovation of a Computer-Based Test system impacts Customer Satisfaction, especially among Indonesian test-takers which validates the assumption of H1. Many previous studies conducted in different sectors can be claimed to support these findings, which also showed significant service innovation and a positive impact on customer satisfaction (Rantyanti & Hamil, 2020; Zouari & Abdelhedi, 2021, Ayinaddis, 2023). The study results showed that the Innovation of a Computer-Based Test system impacts Customer Satisfaction, especially among Indonesian test-takers. Many previous studies conducted in different sectors can be claimed to support these findings, which also showed significant service innovation and a positive impact on customer satisfaction (Ayinaddis, 2023). They argued that implementing innovative services drives customer satisfaction.

The result of the H2 showed that Service Innovation has a positive and significant effect on customer value in IELTS test operations in Indonesia. According to (Blut et al., 2015), service innovation aims to gradually improve service delivery processes, existing services, organizational structures, and marketing strategies that create a sense of value for customers. More specifically, customer value will take place if firms modernize or improve their services or lower the perceived expenses of their clients (Wong et al., 2015). A study in the Hotel service industry by (Shan et al., 2016) claimed the same thought explaining that service innovation could aid in fostering customers' cognitive value and helping them perceive value-added integrated service.

Also, the result of this study confirms the H3 assumption that customer value also has a positive and noticeable significant impact on customer satisfaction. (Tan & Xu, 2015) explained that customer value is the difference between how far a customer pays for a good or service and its actual value. Consumers feel satisfied and valued when they receive a product or service effectively. Besides, (Dainiene & Dagiliene, 2015) concluded that a customer's perceived

value and anticipated standards are core factors in defining customer satisfaction. (Wu, 2013) also found a positive correlation between perceived value and customer satisfaction that is similar to the current study results. High-quality service boosts perceived value and increases customer satisfaction. When looking for facts to justify value's beneficial effects on loyalty and satisfaction, very few researchers have examined value as a higher-order construct (Whittaker et al., 2007).

Lastly, H4 of this study showed that customer value mediates the relationship between service innovation and customer satisfaction positively and significantly. Service innovation enables businesses to create value for customers more effectively and directly, positively impacting customer satisfaction through new interactions, self-help processes, and service delivery systems (Ostrom et al., 2010; Rayna & Striukova, 2021). consumer happiness is what a consumer expects from a service provider, (Zouari & Abdelhedi, 2021) and it is strongly correlated with service innovation. The study demonstrates that Service Innovation is a critical factor in predicting customer satisfaction and customer value, and rising service standards in the IELTS Exam process and outcomes would result in higher customer satisfaction.

This study is among the few studies concerning global English proficiency test advancement and IELTS operation innovation. The study is well executed on the operational aspects of the English Language Proficiency testing sector by interacting mechanisms between service innovation, customer value, and customer satisfaction. This study highlights the importance of service innovation and customer value in enhancing customer satisfaction, emphasizing the need for organizations to leverage these dynamic capabilities for improved customer experience.

7.0 Conclusion

In conclusion, the hypotheses tested in the study on the impact of Service Innovation (SI) and Customer Values (CV) on Customer Satisfaction (CS) in the context of the IELTS test operation in Indonesia have been accepted. The findings indicate that SI has a positive and significant effect on CS, as well as on CV. Additionally, CV has a positive and significant effect on CS. Moreover, the study supports the hypothesis that SI influences CS through its mediating effect by CV. These results emphasize the importance of both service innovation and customer value in shaping customer satisfaction within the IELTS test operation in Indonesia. The study examines the English Proficiency Test system and service innovation in education, highlighting customer value and contentment, but has limited generalizability and potential bias issues.

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