

**MEDIATING ROLE OF PERCEIVED VALUE ON THE RELATIONSHIP
BETWEEN SERVICE INNOVATION AND STUDENTS' SATISFACTION AMONG
PRIVATE UNIVERSITIES IN NIGER STATE, NIGERIA**

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Abstract

The paper explores the mediating effect of perceived value on the relationship between Service Innovation and Student Satisfaction among private universities in Niger State, Nigeria. The research work used a survey research design with a quantitative approach. Data were collected from a population of 2,075 students across three private universities in Nigeria. A sample size of 402 students were used and determined using the Taro Yamane formula and selected through cluster sampling. Data were administered using a structured questionnaire and analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM) at a 5% level of significance. The findings indicate that a new Service Concept did not directly influence Student satisfaction, while perceived value is significant. New Service Processes significantly influenced both perceived value and directly impacted Student satisfaction. Most importantly, perceived value was found to have a significant positive direct effect on Student satisfaction and played a significant mediating role in the relationships between both New Service Concepts (Indirect Effect) and New Service Processes (Indirect Effect) and Student satisfaction. The study concludes that private universities in Niger State can leverage service innovations, particularly those that foster efficiencies, to enhance their attractiveness and ultimately boost student satisfaction. The study has implications for captains of industry to devise the most effective and efficient means of managing students during training that has perceived value, while policymakers should be dynamic and proactive in responding to the universities.

Keywords: Concept, Innovation, perceive value, process, Services, Student Satisfaction

1.1 Introduction

Satisfaction of students is paramount to the survival and sustainability of higher institutions particularly the private universities in Niger State Nigeria, they must do everything possible within their disposal to satisfy students to avoid decline in enrolment, recent reports indicate significant decline in student's enrolment across private universities in Nigeria, with some experiencing 32% decline between 2018 to 2024 (Association of African Universities 2024). For private universities in Niger State, Nigeria, satisfying, attracting and retaining students is paramount for their continued operation, growth, and ability to fulfil their academic missions. Student Satisfaction can have far-reaching implications, impacting financial stability, resource allocation, program viability, and ultimately, the long-term strategic direction of these institutions. Understanding the factors that drive or hinder student satisfaction is, therefore a fundamental concern for university administrators and policymakers alike. In the dynamic higher education sector of Nigeria, where both public and private institutions vie for a limited pool of qualified applicants, the ability to consistently satisfy, attract and maintain student numbers is a testament to an institution's strategic agility and market responsiveness. This is further complicated by a lack of students' satisfaction, rising tuition costs and evolving perceptions of the value of traditional four-year degrees (College Board, 2023).

Service innovation, broadly defined as the development and implementation of new or significantly improved services, plays a pivotal role in shaping an organisation's competitive advantage. In the context of higher education, service innovation encompasses a wide range of initiatives aimed at enhancing the student experience, from novel pedagogical approaches to improved administrative processes and enhanced support services. This holistic view of innovation recognizes that the "service" offered by a university extends beyond classroom instruction to encompass every interaction a student has with the institution throughout their academic journey (Awuku et al., 2023).

One critical dimension of service innovation is the introduction of new service concepts. These refer to fundamentally new offerings or unique ways of structuring existing services that address previously unmet needs or create new value propositions for students. The second aspect of service innovation involves the optimization of new service processes. This dimension focuses on improving the efficiency, effectiveness, and user-friendliness of the delivery mechanisms for educational and administrative services, such as streamlined admission procedures, online registration systems, digital learning management platforms, and enhanced student support services.

1.2 Statement of the Problem

The burgeoning private university sector in Nigeria, including those in Niger State, faces a complex array of challenges, with student satisfaction emerging as a particularly pressing concern. Despite the growing demand for higher education in the country, many private

universities struggle to satisfy, attract and retain a sufficient number of students (Association of African Universities, 2023; Idowu, 2022). This satisfaction directly impacts their financial sustainability, operational capacity, and ability to fulfil their mandate of contributing to human capital development.

A significant aspect of this problem lies in the competitive landscape. Private universities contend not only with each other but also with more established public universities, which often benefit from government subsidies and lower tuition fees, making them more attractive to a larger segment of the population (Taiwo, 2006). Furthermore, while private universities are recognized for their potential to offer flexible and market-driven programs, many still grapple with effectively communicating their unique value propositions and distinguishing themselves in a crowded market (Onyemaechi, 2021). The challenge is not merely about satisfying and attracting students, but about aligning with the university's academic profile and contribute to its long-term viability.

The role of service innovation in addressing this satisfaction challenge, while intuitively important, has not been fully explored within the specific context of private universities in Niger State. While general literature supports the idea that innovative service offerings can enhance institutional attractiveness (Awuku et al., 2023), there is a gap in understanding how specific dimensions of service innovation, such as the introduction of new service concepts and new service processes, directly translate into increased students' satisfaction, for these particular institutions. Many private universities may invest in new programs or improved facilities, but without a clear understanding of their impact on student choice and retention, these efforts may not yield optimal results (Essien et al., 2023).

Similarly, the strategic adoption of perceived value is often considered a critical lever in competitive markets like Nigeria's higher education sector. However, the precise mediating role of such a strategy in the relationship between service innovation and student satisfaction in private universities in Niger State remains under-examined. While evidence suggests that satisfaction can drive enrolment (Tooley & Dixon, 2020), many studies emphasize the importance of service innovation for organizational products, services, and profitability (Boroujerdi et al., 2019; Vikram, 2023). However, most of this research fails to specifically look at how service innovation affects student satisfaction in private universities. Although existing literature suggests a positive link between service innovation and student satisfaction (Maria et al;2024, Oluwumi et al;2017, Maryam et al;2023; and Anita et al., 2023), no known studies have investigated the mediating role of perceived value in this relationship, particularly within private universities in Nigeria, especially in Niger State. Additionally, much of the research by management scholars on innovation has focused on product-based companies rather than service-oriented ones (Vikram, 2023). This current study aims to bridge this gap by examining the interplay between service innovation, perceived value and student satisfaction in private universities in Niger State.

1.3 Objectives of the Study

The main objective of this study is to analyse the mediating role of perceived value between service innovation and students' satisfaction in Private Universities in Niger State, Nigeria. The specific objectives are:

- i. To find out the influence of new service concepts on students' satisfaction in Private Universities in Niger State, Nigeria
- ii. To examine the influence of new service processes on students' satisfaction in Private Universities in Niger State, Nigeria
- iii. To determine the extent to which perceived value mediates the relationship between new service concepts and students' satisfaction in Private Universities in Niger State, Nigeria
- iv. To determine the extent to which perceived value mediates the relationship between new service processes and students' satisfaction in Private Universities in Niger State, Nigeria

2.1 Literature Review

2.1. 1 Student satisfaction

Student satisfaction relates to how well students feel about their educational experiences, services, and support from the institution. Academic quality, the setting for teaching and learning, student services, on-campus amenities, extracurricular activities, and social integration are just a few of the aspects it covers. Student contentment about the services of a particular university is an essential outcome that has a consequential impact on students' drive and success in school (Abu et al 2024). According to numerous academics, student satisfaction is the best indicator of an institution's total level of service quality (Getahun D. (2024): Abu et al (2024), & Shahrukh et al (2023). It is the core basis of competitive advantage, and it has become the core competitive feature for universities.

2.2 Concept of Service Innovation

The contemporary understanding of service innovation is multifaceted, typically encompassing the introduction of new or significantly improved services, service delivery methods, or service concepts that generate value for both the service provider and the customer. Gustafsson et al. (2020) define it as an initiative involving "the introduction of a new service or process offering that aims to add value to customers, consumers, and other stakeholders." Similarly, Poi & Azuma (2022) characterize it as "an introduction of new service or the creation and implementation of a new service," emphasizing the act of bringing something novel into practice.

While these definitions collectively provide a comprehensive view, a common criticism is their inherent breadth, which can lead to ambiguity and challenges in measurement. Many definitions tend to overlap with concepts like "new service development" or "service design," making it difficult to delineate clear boundaries for service innovation itself (Poi & Azuma, 2022; "Service Innovation: A New Conceptualization and Path Forward"). There's also a tendency for some

definitions to focus inward, viewing innovation primarily as something new to the firm, rather than explicitly emphasizing its impact on customer value or financial performance. This lack of precise conceptualization can hinder the systematic analysis and management of service innovation, particularly in diverse contexts.

For this study, service innovation refers to the introduction of fundamentally novel educational offerings, academic programs, or student support services that address previously unmet needs or create distinct value propositions for prospective and current students. New service processes refer to the significant improvement of this study. Service innovation will be operationally defined as the implementation of new service concepts and new service processes within private universities. New service concepts, redesign of internal university operations and delivery mechanisms, such as streamlined admission procedures, advanced online learning platforms, or enhanced digital student support systems, aimed at improving efficiency, accessibility, and the overall student experience.

2.2.1 Dimensions of the Concept of Service Innovation

According to Awuku et al. (2023), service innovation can be proxied using service concept innovation, service process innovation, and service new technologies. However, this study adopts only service concept innovation and service process innovation as proxies for service innovation. This decision is justified on both theoretical and contextual grounds. Theoretically, service concept and process innovations capture the core dimensions through which organizations transform both what they offer and how they deliver it - aligning directly with the objectives of this study. Contextually, the study focuses on institutions where technological advancement is often integrated within service processes, making it methodologically sound to treat new technologies as embedded within process innovation (Adewale & Onuka, 2022). Moreover, limiting the proxies to two enhances the clarity, manageability, and focus of the research without significantly compromising the comprehensiveness of the service innovation construct. This approach allows for deeper analysis while ensuring the study remains grounded in the operational realities of the target institutions.

Service Concept Innovation focuses on the development or significant improvement of the core idea behind a service. This includes the creation of new offerings, the redesign of existing services, or the bundling of services in ways that create new value for customers. In the context of educational institutions or public service environments, this could mean designing new program structures, developing personalized learning services, or introducing student-centred innovations that were not previously available (Olaleye et al., 2023; UNESCO, 2021).

Service Process Innovation, on the other hand, concerns how services are rendered to users - focusing on operational processes, technology usage, and interaction methods. This dimension (World Bank, 2022). In educational service delivery, for example, this may include innovations like online enrolment systems, mobile-based student services, automated help desks, or virtual learning environments. Adewale and Onuka (2022) argue that innovating service delivery not

only enhances the user experience but also reduces operational costs and administrative bottlenecks. As a study objective, this dimension explores the extent to which institutions adopt modern methods and tools to enhance service efficiency, accessibility, and responsiveness.

2.3 Perceived value

This is a customer's personal assessment of a product or service's benefits versus its cost and how well it meets their needs and expectations, particularly when compared to competitors. (Yum & Kim 2024) Perceived value is a customer's perception of a product or service's merit or desirability to them, especially in comparison to a competitor's product.

In this context, perceived value is the student's perception and assessment of the services of a particular university. Customer (Student) perceived value is the customer's perception of the value that the company (University) must consider, the value in developing products and services so that it is in line with what the customer expects. (Made & Kastawan 2020). Service quality and value for consumers can provide trust to consumers, this states that the development of trust, especially confidence, should be a fundamental component of marketing strategies that are intended to lead to the creation of a true customer relationship Perceived value is measured by the price that the public is willing to pay for a good or service, this subjective evaluation influences purchasing decision, customer satisfaction and brand loyalty, with factors like, price, quality, marketing and playing significant roles in shaping a customer's perception of value. (Bernadeth 2024)

2.4 Empirical Review

María, Pablo, Elena & Eloy (2024) in their study, students' satisfaction: Examining capacity development and environmental factors in higher education institutions Identify that the success of universities is heavily dependent upon the efficient management of the learning environment. The students, who are the principal customers of these institutions, are the guarantors of their survival. In this context, students' satisfaction with their education experience is fundamental to achieving success and maintaining competitiveness, universities must identify the key aspects that are important to their students. In the literature, the importance of generic or transversal competence/capacity development is highlighted as a motivational factor.

Dao and Yang (2014) explored the impact of service innovation on student retention, with student satisfaction serving as a mediating factor. Using a sample of 400 students in Vietnam, they empirically tested the relationships among the variables through a conceptual model, employing confirmatory factor analysis (CFA) and structural equation modelling (SEM) for data analysis. The results showed that two dimensions of service innovation, interactive innovation and supportive innovation, significantly influenced student satisfaction, which in turn positively affected student retention. Although the study offered meaningful contributions to understanding how service innovation can enhance student loyalty, it had a key methodological shortcoming: the absence of multicollinearity testing. This limitation potentially affects the strength and general applicability of the results.

Awuku et al. (2023) carried out a quantitative study to examine variations in innovation practices within the telecommunications sector, customers' perceptions of these service innovations, and how such practices affect mobile subscriber loyalty in Ghana. The study involved 250 active subscribers from major mobile telecom companies and utilized descriptive and regression analyses to fulfill its objectives. Results indicated that service innovation practices have a significant effect on customer loyalty, with innovative service concepts, service processes, and new technologies identified as key drivers, among which new technologies exerted the greatest influence. However, the study had limitations, including the absence of multicollinearity testing and the lack of reliability and validity assessments, which may impact the reliability of the findings.

Tayyba, Awan, Kamran, and Shahzad (2021) investigated the customer retention process in the service industry by examining customer value creation, emphasizing the role of service innovation and the moderating effect of customer participation. The researchers collected 548 responses through an online survey at one point in time and analysed the data using structural equation modelling with Smart PLS3. Their findings indicated that service innovation significantly influences customer retention through the customer value creation process, and this relationship is strengthened by customer participation. However, the study's scope was limited by its cross-sectional design and focus on a single service industry, highlighting the need for further research in other sectors like banking, hospitality, and travel to enhance generalizability. Moreover, the absence of multicollinearity testing may affect the validity of the results.

From the forgoing some of these studies were limited by methodological gaps, that is absence of multicollinearity tests, reliability and validity assessment and scope gap in the work of Tayyba. et al (2021). Which this study intends to fill.

2.5 Theoretical Framework

This study is underpinned by a synthesis of three key theoretical frameworks: The Resource-Based View (RBV), Diffusion of Innovation Theory (DOI), and Equity Theory (EQ), specifically focusing on clients or customers' perception and satisfaction. These theories collectively provide a robust lens through which to examine the mediating role of perceived value between service innovation and student satisfaction in private universities in Niger State, Nigeria.

Firstly, the Resource-Based View (RBV) of the firm (Barney, 1991) posits that a firm's sustained competitive advantage stems from its unique, valuable, rare, inimitable, and non-substitutable (VRIO) internal resources and capabilities. In the context of private universities, these resources can include highly skilled faculty, unique academic programs, strong institutional reputation, advanced technological infrastructure, and efficient operational processes. Service innovation, encompassing new service concepts and new service processes, can be viewed as the development and leveraging of these internal resources and capabilities. For instance, developing a highly sought-after, interdisciplinary program (new service concept) requires specific academic

expertise and curricular design capabilities, which are internal resources. Similarly, implementing a seamless online admission system (new service process) relies on robust IT infrastructure and skilled administrative personnel. The RBV suggests that universities able to effectively develop and deploy such innovative services, which are difficult for competitors to replicate, will gain a competitive edge in satisfying and attracting students, which is linked to objectives one and two, the influence of service concept and processes on students' satisfaction.

Secondly, Diffusion of Innovation Theory (DOI), popularized by Rogers (1962), explains how new ideas, practices, or products spread through a social system over time. In the higher education sector, service innovations, such as new academic programs or modernized administrative processes, are innovations that private universities introduce. The adoption of these innovations is crucial for students' satisfaction. DOI highlights factors influencing the rate of adoption, including the perceived relative advantage, compatibility, complexity, trainability, and observability of the innovation. For instance, a new service concept like a blended learning program will likely see higher adoption if it offers clear advantages (flexibility), is compatible with students' lifestyles, is easy to understand, can be tried out (e.g., through a pilot), and its benefits are observable (e.g., success stories). Therefore, the theory helps explain how new service concepts and processes, if effectively communicated and perceived as beneficial, can lead to increased student satisfaction. This theory is also linked to the first and second objectives, service concept and process.

Thirdly, Equity Theory, developed by Adams (1963) as cited by Abu et al (2024). It argues that client satisfaction is guaranteed when a particular group feels that some of the outcomes of an operation were achieved with inputs like cost, time, and energy, the Equity Theory has garnered widespread recognition for its ability to shed light on consumer satisfaction and behaviour, it is the ideal theory for the discipline of marketing since it helps shed light on issues related to consumer happiness and discontent, this theory is linked to third and fourth objectives.

3.0 Methodology

Methodology has to do with research design, population of the study, sample and sampling technique, research instrument, method of data collection and analysis.

3.1 Research Design, Population, Sample and Sampling Technique

This study employs a survey research design with a quantitative approach to examine the mediating role of perceived value between service innovation and student satisfaction in private universities in Niger State. This design is ideal for collecting and analysing numerical data from a large number of respondents, enabling the testing of hypotheses and the objective measurement of phenomena. The population for this study includes all 2,075 students across the three private universities in Niger State as of December 2024: Edu Soko University (472 students), El-Amin International University (102 students), and New Gate University (1,501 students). Private universities were selected due to their reliance on students for survival and providing a distinct

context compared to government-funded institutions. A sample size of 335 students was determined using the Taro Yamane (1967) formula, which was then increased to 402 to account for a 20% non-response rate. This sample will be proportionally distributed among the universities (Edu Soko: 91, El-Amin: 20, New Gate: 291). A cluster sampling technique was used to select participants from each university, leveraging the natural grouping of students within their respective institutions.

3.2 Data Collection Instrument and Measurement of Variables

Data was collected using a structured questionnaire as the primary research instrument. This questionnaire will be divided into two sections. Section A gathered demographic information such as age, gender, and level of education, providing crucial insights into the characteristics of the student population. Section B focused on measuring the study's key variables using a five-point Likert scale. The independent variable, service innovation, was measured through two proxies: new service concepts and new service processes, each comprising five scale items adapted from established works by Awuku *et al.* (2023), Nguyen, Ho, and Ngo (2024), and Poi and Azuma (2022). The mediating variable, perceived value, was assessed using a five-item scale adapted from the same sources. Finally, the dependent variable, student satisfaction, was measured using a five-item scale adapted from Dao and Yang (2014) and Tayyba, Awan, Kamran, and Shahzad (2021). This systematic approach ensures robust data collection and measurement for subsequent quantitative analysis.

3.3 Method of Data Analysis

The collected data were analysed using Partial Least Squares Structural Equation Model (PLS-SEM), specifically through a variance-based approach. PLS-SEM is highly suitable for the study due to its ability to handle complex models, its focus on prediction, and its robust performance even with non-normal data distributions (Hair et al., 2017). The analysis was done in two main stages: first, evaluating the measurement model (outer model) to ensure the reliability and validity of the constructs (service innovation proxies, perceived value, and student satisfaction) by examining indicators like composite reliability, convergent validity (Average Variance Extracted - AVE), and discriminant validity (e.g., HTMT ratio). Second, the structural model (inner model) was evaluated to assess the hypothesized relationships between these latent constructs, including direct and mediating effects. The statistical software SmartPLS was employed for all PLS-SEM analyses.

All hypotheses were tested at 5% level of significance ($p < 0.05$). Hypothesis testing in PLS-SEM was conducted using bootstrapping, a non-parametric resampling procedure that generates standard errors and t-values for the path coefficients (Hair et al., 2017). The significance of both direct and indirect effects was determined by comparing their p-values against the 0.05 threshold. If a p-value is less than 0.05, the corresponding hypothesis be supported. For mediation analysis, the significance of the indirect effect (the product of the path from the

independent variable to the mediator and from the mediator to the dependent variable) was key. If the indirect effect is significant, further examination of the direct effect will clarify whether the mediation is full or partial.

The regression model for this study is adapted from the works of Awuku *et al.*, (2023), in which the independent variable is innovation practices and students' satisfaction, the dependent variable, and Perceived value the mediating variable and presented below: $SS = \beta_0 + \beta_1 NSC + \beta_2 NSP + \beta_3 PV + \beta_3 PV^* + \beta_1 NSC^* + \beta_2 NSP + e$
Where:

SS = Students' Satisfaction:

$\beta_1 NSC$ = New Service Concept coefficients;

$\beta_2 NSP$ = New Service Process coefficients;

$\beta_3 PV$ = Perceived value coefficients;

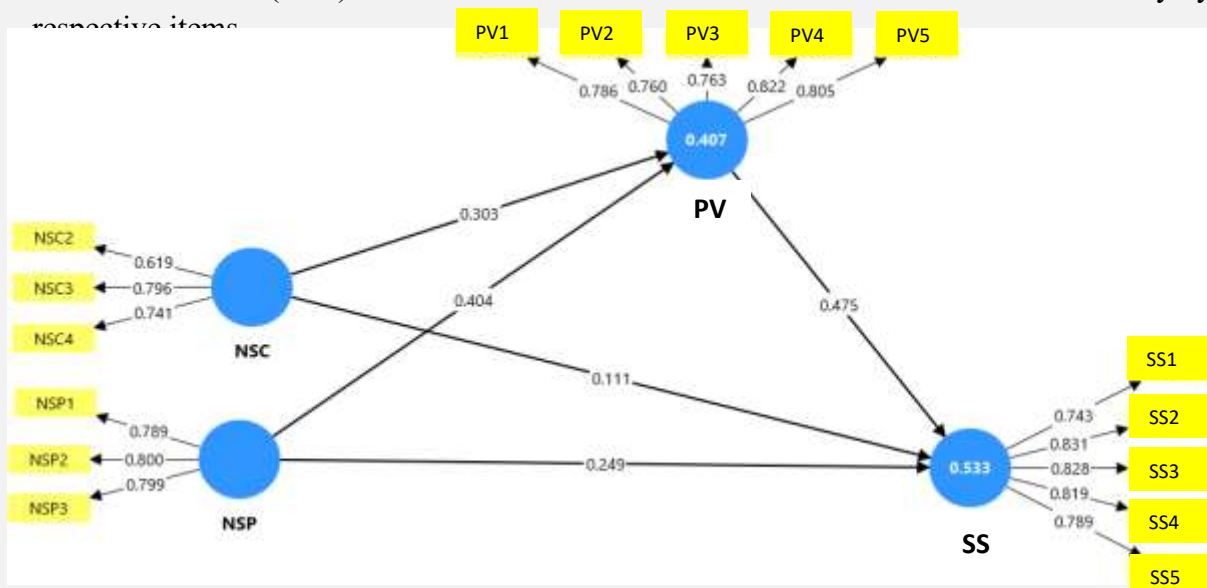
e - error term.

4.0 Result

The results of the findings are presented below;

Measurement (Outer) Model

Before conducting the evaluation of the study's structural model, the measurement model (also known as the outer model in PLS-SEM) was assessed to confirm the reliability and validity of the constructs and their respective indicators (Hair et al., 2017). The study includes three constructs: Service Innovation (SI), Perceived Value (PV), and Student Satisfaction (SS). As depicted in Figure 1 (the provided SmartPLS diagram), Service Innovation is treated as a higher-order construct measured by two first-order constructs: New Service Concepts (NSC) and New Service Processes (NSP). Perceived value and Student Satisfaction are measured directly by their respective items.



The assessment of the measurement model involved examining the factor loadings of all indicators. A factor loading represents the strength of the relationship between an indicator and its underlying construct. The results revealed that while most factor loadings met the commonly accepted threshold of 0.50 (or ideally 0.70) for reflective indicators in PLS-SEM (Hair et al., 2017), several items were below this threshold. Consequently, the following items were deleted from the model to improve the constructs' reliability and validity: NSC1, NSC5, NSP4, and NSP5. Figure 1, the provided SmartPLS path diagram, illustrates the retained scale items and their loadings, reflecting this refinement to the measurement model. Subsequent analyses of composite reliability and Average Variance Extracted (AVE) would further confirm the internal consistency and convergent validity of the remaining constructs.

Model Fit Indices

After running the CFA, the study checked how the model fit the data. Table 1 shows the indices used to assess the study model fit.

Table 4.1 Indices for assessing study model fit

1	Saturated model	Estimated model
SRMR	0.067	0.067
d_UIS	0.602	0.602
d_G	0.221	0.221
Chi-square	492.299	492.299
NFI	0.818	0.818

Source: Field survey, 2025.

Based on the provided indices, the model demonstrates a good fit based on the SRMR (0.067), which is often considered the most reliable global fit index in PLS-SEM (Hair et al., 2017). The NFI (0.818) also indicates an acceptable fit. While the chi-square value is high, this is common in PLS-SEM and does not necessarily indicate a poor fit when other indices are favorable. The d_UIS and d_G values require comparison with bootstrapped critical values for a definitive assessment, which are not available in this table. However, the strong performance of SRMR and acceptable NFI generally supports the overall fit of the model to the data.

Reliability and Convergent Validity Test

The first measurement test evaluation carried out is the reliability and convergent validity test. For a construct to be considered reliable, the values of the construct's Cronbach's alpha (CA) and composite reliability (CR) should be $> .7$. The study used the Fornell and Larcker criterion to conduct a convergent validity test. For any construct to be considered to have achieved

convergent validity, the construct factor loading and Average Variance Extracted (AVE) should be $> .50$, and the CR value should be $> .70$ (Fornell & Larcker, 1981).

Table 4, 2 Reliability and Convergent Validity Test

	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
PV	0.847	0.891	0.620
NSC	0.538	0.764	0.522
NSP	0.711	0.838	0.634
SS	0.862	0.900	0.644

Source: Field survey 2025.

Table 2 presents the results for reliability and convergent validity, crucial evaluations for the measurement model in PLS-SEM. For a construct to be considered reliable and valid, Cronbach's Alpha (CA) and Composite Reliability (CR) should ideally exceed 0.70, and the Average Variance Extracted (AVE) should be greater than 0.50 (Fornell & Larcker, 1981; Hair et al., 2017). All constructs—Perceived value (PV), New Service Processes (NSP), and Student Satisfaction (SS)—demonstrated strong reliability, with CA values of 0.847, 0.711, and 0.862, respectively, and CR values of 0.891, 0.838, and 0.900, all well above the 0.70 threshold. Similarly, all these constructs exhibited good convergent validity, with AVE values of 0.620, 0.634, and 0.644, respectively, all exceeding the 0.50 criterion. While New Service Concepts (NSC) had a Cronbach's Alpha of 0.538 (below 0.70), its Composite Reliability of 0.764 and AVE of 0.522 were acceptable, as CR is considered a more robust measure of internal consistency in PLS-SEM, and an AVE above 0.50 confirms adequate convergent validity (Hair et al., 2017). Overall, the measurement model demonstrates acceptable to good reliability and convergent validity across all constructs, confirming that the indicators effectively measure their intended latent variables.

Discriminant Validity: Fornelli and Larcker Criteria

The Fornell and Larcker criteria require that the square root of the Average Variance Extracted (AVE) for each construct must be greater than its correlations with any other construct in the model. This ensures that the constructs share more variance with their own indicators than with other constructs, thus confirming discriminant validity. The results presented in Table 3 demonstrate that all study constructs meet this requirement, as the square roots of the AVE values for each construct are indeed greater than the corresponding inter-construct correlations. This indicates that each construct is distinct from the others, fulfilling the Fornell and Larcker criteria for discriminant validity and reinforcing the robustness of the measurement model.

Table 4.3 Fornell and Larcker Criterion

	PV	NSC	NSP	SS
PV	0.787			
NSC	0.554	0.723		
NSP	0.592	0.621	0.796	
SS	0.684	0.529	0.599	0.803

Source: Field survey 2025.

Table 3 presents the results of the Fornell and Larcker criterion, which is a key test for discriminant validity. This criterion assesses whether each construct is truly distinct from other constructs in the model by requiring that the square root of a construct's Average Variance Extracted (AVE) be greater than its correlation with any other construct (Fornell & Larcker, 1981; Hair et al., 2017). The diagonal values in the table represent the square roots of the AVEs for each construct (PV: 0.787, NSC: 0.723, NSP: 0.796, SS: 0.803). As demonstrated, the square root of the AVE for each construct is consistently higher than all its correlations with other constructs in the corresponding column and row. For instance, for PV (0.787), it is greater than its correlations with NSC (0.554), NSP (0.592), and SS (0.684). Similarly, for NSC (0.723), it is greater than its correlations with PV (0.554), NSP (0.621), and SS (0.529), and so forth for NSP and SS. This consistent pattern across all constructs confirms that each construct shares more variance with its own indicators than with other constructs, thereby establishing robust discriminant validity for the measurement model.

Evaluation Of Structural (Inner) Model

Collinearity Problem

After conducting several tests on the measurement model, the researcher proceeded to the first step of the structural model analysis. To ensure that the regression results were unbiased, we examined the potential issue of collinearity among the constructs. This was done using the Variance Inflation Factor (VIF), where a VIF value greater than 5 would indicate problematic collinearity. However, as shown in Table 5, all construct items had VIF values ranging between 1.268 and 1.791, which are well below the threshold of 5. These results confirm that collinearity is not a concern in our study, allowing us to proceed confidently with the regression analysis in the structural model.

Table 4.4 **Collinearity Test**

	VIF
PV -> SS	1.687
NSC -> PV	1.628
NSC -> SS	1.783
NSP -> PV	1.628
NSP -> SS	1.904

Source: Field survey 2025.

Following the evaluation of the measurement model, the initial step in assessing the structural model involved checking for potential collinearity among the constructs. Collinearity, which can bias regression results, is identified using the Variance Inflation Factor (VIF), with values exceeding 5 typically indicating a problematic level (Hair et al., 2017). As presented in Table 4, the VIF values for all direct relationships between the constructs PV-> SS (1.687), NSC -> LCS (1.628), NSC -> SS (1.783), NSP -> PV (1.628), and NSP -> SS (1.904) range between 1.628 and 1.904. These values are all well below the critical threshold of 5, confirming that collinearity is not a concern within this study's model. This favourable outcome ensures that the regression

analysis can be conducted confidently, as the independent variables are sufficiently distinct in their predictive contributions.

Coefficient of determination R^2

The R-square (R^2) value indicates the extent to which the exogenous variables influence the endogenous variable in a model. It essentially measures the proportion of variance in the endogenous variable that is predictable from the exogenous variables. The interpretation of the R^2 value relies on specific cutoff thresholds, which serve as a rule of thumb. According to Chen, as cited in Fauzi (2022), an R^2 value of 0.19 is considered weak, 0.33 is considered moderate, and 0.67 is considered strong. These thresholds help in assessing the strength of the relationship between the constructs within the model, providing insight into how well the exogenous variables explain the variance in the endogenous construct. A higher R^2 value signifies a greater explanatory power of the exogenous variables on the endogenous variable, indicating a more robust model.

Table 4. 5 **R-square value**

	R-square	R-square adjusted
PV	0.407	0.404
SS	0.533	0.529

Source: Field survey 2025.

Table 5 presents the R-squared (R^2) values, which indicate the proportion of variance in the endogenous (dependent) variables that is explained by the exogenous (independent) variables in the model, thus measuring the model's explanatory power. According to Chen (as cited in Fauzi, 2022), an R^2 value of 0.19 is considered weak, 0.33 moderate, and 0.67 strong. For Perceived value (PV), the R^2 value is 0.407, indicating that 40.7% of its variance is explained by the combined effect of New Service Concepts and New Service Processes. This falls into the moderate to strong range, suggesting that service innovation is a significant predictor of low-cost strategy. For Student Satisfaction (SS), the R^2 value is 0.533, meaning that 53.3% of its variance is explained by New Service Concepts, New Service Processes, and Perceived value. This also signifies a moderate to strong explanatory power, suggesting that the model provides a substantial explanation for variations in student satisfaction. The R-squared adjusted values are very close to the R-squared values, which further confirms the robustness of the model. These results collectively indicate that the exogenous constructs in the model have considerable predictive relevance for the endogenous constructs.

Effect size f-square analysis

The effect size is a statistical procedure that assesses the significance of one or more exogenous constructs on an endogenous construct by recalculating the R^2 value. It quantifies the magnitude of the relationship between the latent variables, offering insights into how much an independent variable contributes to explaining the variance in a dependent variable. By doing so, the effect size helps determine the practical importance of the exogenous constructs in influencing the

endogenous construct. This procedure is crucial for understanding not just whether relationships exist, but how substantial those relationships are, thereby providing a more nuanced view of the dynamics within the model.

Table4. 6 **Effect size f^2**

	f-square
PV -> SS	0.287
NSC -> PV	0.095
NSC -> SS	0.015
NSP -> PV	0.169
NSP -> SS	0.070

Source: Field survey 2025.

Table 7 presents the f-square (f^2) effect sizes, which quantify the practical significance of each exogenous construct's contribution to an endogenous construct, beyond just statistical significance. These values are interpreted using Cohen's (1988) guidelines, where f^2 values of 0.02, 0.15, and 0.35 are considered small, medium, and large effects, respectively (Hair et al., 2017). The relationship from Perceived Value (PV) to Student Satisfaction (SS) shows an f^2 of 0.287, indicating a medium to large effect size, highlighting that PV makes a substantial practical contribution to explaining the variance in student satisfaction. For New Service Concepts (NSC) to PV, the f^2 is 0.095, representing a small to medium effect, suggesting a noticeable but not large contribution. The effect of NSC on SS is 0.015, which is a very small effect, indicating a negligible unique contribution after accounting for other variables. Conversely, New Service Processes (NSP) to PV has an f^2 of 0.169, signifying a medium effect, demonstrating a practically meaningful contribution. Lastly, NSP to SS shows an f^2 of 0.070, which is a small effect, suggesting a minor direct contribution. Overall, while all effects are positive, the most practically significant relationships are PV's influence on SS and NSP's influence on PV.

Predictive relevance Q^2 analysis

Table4. 7 **LV Prediction summary**

	Q^2predict	RMSE	MAE
PV	0.393	0.785	0.561
SS	0.386	0.789	0.567

Source: Field survey 2025.

Table 7 presents the LV Prediction summary, which includes the Q^2 predict statistic, a key measure of the model's predictive relevance (Hair et al., 2017). Q^2 predict values greater than 0 indicate that the model has predictive relevance for the endogenous construct in question. For Perceived value (PV), the Q^2 predict value is 0.393, which is well above zero, indicating that the model has significant predictive relevance for PV. Similarly, for Student Satisfaction (SS), the Q^2 predict value is 0.386, also well above zero, confirming the model's strong predictive relevance for student satisfaction. The Root Mean Square Error (RMSE) and Mean Absolute

Error (MAE) values (PV: RMSE=0.785, MAE=0.561; SS: RMSE=0.789, MAE=0.567) provide additional insights into the accuracy of the predictions, with lower values generally indicating better predictive accuracy. The consistently positive and substantial Q²predict values for both endogenous constructs signify that the model is not only statistically robust but also has a strong out-of-sample predictive capability for Perceived value and Student Satisfaction.

Bootstrapping Procedure:

To test the study hypotheses, a bootstrapping procedure with 5000 resamples was employed, providing a robust method for estimating the precision of the path coefficients. Table 9 presents the results of the bootstrapping analysis, which are used to evaluate the significance of the hypothesized relationships. According to the decision rule, a variable is considered to have a significant effect if the t-statistic value is greater than 1.96 and the p-value is less than 0.05. These thresholds indicate that the effect is statistically significant at the 5% level, meaning that there is a high likelihood that the observed effects are not due to random chance. This approach ensures the reliability of the results and supports the validity of the hypotheses tested in the study.

Test of Hypothesis (Direct Effect)

Table4. 8 Path coefficient estimates (Direct Effect)

	Co-efficient	Standard Error (SE)	T statistics	P values
PV-> SS	0.475	0.070	6.786	0.000
NSC -> PV	0.303	0.072	4.192	0.000
NSC -> SS	0.111	0.066	1.690	0.091
NSP -> PV	0.404	0.069	5.832	0.000
NSP -> SS	0.249	0.073	3.421	0.001

Source: Field survey 2025.

Table 8 presents the direct path coefficients, standard errors, T-statistics, and P-values, which are critical for testing the study's hypotheses at a 5% level of significance ($p < 0.05$). These results shed light on the direct relationships between the constructs in the model, providing insights into the individual effects of service innovation proxies and perceived value on student satisfaction within private universities in Niger State.

The relationship between Perceived Value (PV) and Student Satisfaction (SS) shows a significant positive direct effect (Coefficient = 0.475, P-value = 0.000). This strong and statistically significant finding indicates that private universities that successfully implement a perceived value are considerably more effective in satisfying and attracting students. This outcome is fundamental to the study's overall objective, as it confirms that the mediating variable itself has a substantial and direct impact on the dependent variable, forming a crucial link in the hypothesized mediation chain.

Regarding the influence of New Service Concepts (NSC) on Perceived value (PV), the results reveal a significant positive direct effect (Coefficient = 0.303, P-value = 0.000). This finding suggests that the introduction of novel service concepts within private universities contributes significantly to their ability to develop and maintain a perceived value operational framework. This direct link is a vital component of how service innovation, specifically through new concepts, might contribute to the university's perceived value, which then could influence students' satisfaction.

Conversely, the direct relationship between New Service Concepts (NSC) and Student Satisfaction (SS) shows a positive coefficient (0.111) but is not statistically significant (P-value = 0.091, which is greater than 0.05). This implies that, directly, New Service Concepts do not have a statistically significant influence on student satisfaction in private universities in Niger State, thereby not supporting the study's first specific objective. This suggests that students may not be directly satisfied by the presence of new service concepts without other facilitating factors.

The path from New Service Processes (NSP) to Perceived value (PV) demonstrates a significant positive direct effect (Coefficient = 0.404, P-value = 0.000). This strong statistical evidence indicates that improvements and streamlining of service delivery processes within private universities are highly effective in supporting and enabling the implementation of perceived value. This underscores the practical importance of operational efficiency in achieving perceived value advantages, which then can be passed on to students.

Finally, the relationship between New Service Processes (NSP) and Student Satisfaction (SS) reveals a significant positive direct effect (Coefficient = 0.249, P-value = 0.001). This finding strongly supports the study's second specific objective, confirming that private universities that enhance their service delivery processes are more successful in directly satisfying students. This highlights the direct impact of improved operational services on student satisfaction.

Test of Hypothesis (Indirect Effect)

Table 4. 9 Path Coefficient (Indirect Effect)

	Co-efficient	Standard Error (SE)	T statistics	P values
NSC -> PV -> SS	0.144	0.045	3.220	0.001
NSP -> PV -> SS	0.192	0.043	4.450	0.000

Source: Field survey 2025.

Table 9 presents the indirect path coefficients, standard errors, T-statistics, and P-values, which are crucial for evaluating the mediating role of Perceived value (PV) as hypothesized in the study. These results assess whether Service Innovation (through its proxies: New Service Concepts - NSC, and New Service Processes - NSP) influences Student Satisfaction (SS) through the Perceived value among private universities in Niger State. All tests are conducted at a 5% level of significance ($p < 0.05$).

The indirect effect from New Service Concepts (NSC) to Student Satisfaction (SS) through Perceived value (PV) (NSC → PV → SS) shows a significant positive coefficient of 0.144 with a P-value of 0.001. This finding is statistically significant and directly supports the study's third specific objective: "To determine the extent to which perceived value mediates the relationship between new service concepts and students' satisfaction in Private Universities in Niger State." It indicates that while New Service Concepts did not show a significant direct effect on Student Satisfaction (as per Table 8), they do significantly influence satisfaction indirectly by contributing to the adoption of perceived value, which then positively impacts student satisfaction. This demonstrates that perceived value acts as a significant mediator in this relationship.

Similarly, the indirect effect from New Service Processes (NSP) to Student Satisfaction (SS) through Perceived value (PV) (NSP → PV → SS) also presents a significant positive coefficient of 0.192 with a P-value of 0.000. This result is highly statistically significant and supports the study's fourth specific objective: "To determine the extent to which perceived value mediates the relationship between new service processes and students' satisfaction in Private Universities in Niger State." This indicates that New Service Processes significantly contribute to Student satisfaction not only directly (as shown in Table 8) but also indirectly by fostering a perceived value, which in turn boosts satisfaction. This further solidifies the role of perceived value as a mediator in translating process-oriented service innovations into tangible satisfaction gains.

Discussion of Findings

The first research hypothesis states that New Service Concepts have no significant influence on students' satisfaction in Private Universities in Niger State. The findings confirm that New Service Concepts have no significant influence on students' satisfaction in Private Universities in Niger State offers a critical insight when compared to the broader expectations found in the literature concerning service innovation and organizational outcomes. While several studies, such as those by Poi & Azuma (2022), Hannah et al. (2022), and Vikram (2023), have highlighted the general significance of service innovation for product, services, and profitability across various organizations, their focus is often on overall innovation benefits rather than the nuanced direct impact of specific innovation types (like new service concepts) on a particular outcome like student satisfaction.

Existing literature does suggest a positive relationship between service innovation and student attraction, as implied by the general benefits of innovation. For instance, the works of Dao and Yang (2014) and Tayyba et al. (2021), while focusing on customer loyalty and satisfaction respectively, imply that successful service innovations should ultimately contribute to attracting and retaining customers. However, this study's specific finding regarding the direct non-significance of new service concepts on satisfaction in this context suggests a divergence. It indicates that merely introducing novel service concepts, without considering other influencing factors, may not be enough to directly drive student satisfaction. This could be due to various

reasons, such as a lack of awareness or perceived value by prospective students, or perhaps other factors in the Niger State private university market. These findings, therefore, point towards the idea that the impact of new service concepts on satisfaction might be more complex or indirect, aligning with the study's primary objective of exploring the mediating role of perceived value. The emphasis in the broader literature on the significance of service innovation is thus seen here to potentially operate through more intricate pathways rather than a simple direct link when it comes to satisfying students via new concepts.

The second research hypothesis states that New Service Processes have no significant influence on students' satisfaction in Private Universities in Niger State. The findings revealed that New Service Processes has positive and significant influence on students' satisfaction in Private Universities in Niger State. The finding that New Service Processes have a positive and significant influence on student satisfaction in private universities in Niger State offers a clear and positive alignment with existing literature on the benefits of service innovation. This result directly contrasts with the second research hypothesis, indicating that improvements in the methods and procedures of service delivery are indeed effective in satisfying students at private universities in this region.

This outcome supports the general notion, highlighted by studies such as those by Poi & Azuma. (2022), Hannah et al. (2022), and Vikram (2023), that service innovation significantly impacts organizational services and, by extension, profitability and customer attraction. More specifically, the positive influence of New Service Processes aligns with the underlying principles seen in the work of Dao and Yang (2014) and Tayyba et al. (2021). Although their studies focus on customer loyalty and satisfaction, streamlined and efficient service processes are foundational to achieving these outcomes. For instance, processes related to application, admission, registration, and student support that are intuitive, quick, and reliable (i.e., new or improved processes) are likely to enhance a prospective student's experience and perception of the university's efficiency and responsiveness. This positive perception can directly translate into a higher likelihood of satisfaction. Therefore, unlike new service concepts, improvements in the how of service delivery appear to have a more tangible and direct impact on student decision-making in the context of private universities in Niger State, aligning with the broader understanding that operational excellence and efficient service delivery are key competitive advantages in the service sector.

The third research hypothesis states that perceived value does not mediate the relationship between new service concepts and students' satisfaction in Private Universities in Niger State. The findings revealed that perceived value mediates the relationship between new service concepts and students' satisfaction in Private Universities in Niger State. The finding that perceived value mediates the relationship between new service concepts and student satisfaction in private universities in Niger State directly contradicts the third research hypothesis. This is a significant result that offers a crucial nuance to the understanding of how service innovation,

particularly through the introduction of new concepts, actually influences student satisfaction in this specific context.

Existing literature, such as that by Poi & Azuma. (2022), Hannah et al. (2022), and Vikram (2023) broadly emphasizes the significance of service innovation for organizational success and profitability. While these studies do not explicitly address the mediating role of perceived value, their general assertion that service innovation contributes to competitive advantage and, by extension, customer acquisition, is indirectly supported by this finding. If new service concepts (a form of service innovation) contribute to perceived value and then satisfy students, it still aligns with the broad positive impact of innovation. More directly, the finding aligns with the general principle that perceived value can be a powerful driver of customer satisfaction and attraction, especially in competitive markets (Adams 1963), as discussed in the theoretical framework.

The absence of a significant direct effect of new service concepts on satisfaction (as previously discussed), coupled with this significant indirect effect, implies that the true value of introducing new service concepts in these private universities might not be in their inherent novelty alone for students. Instead, their effectiveness in satisfying students is realized by enabling the university to offer a more competitive service. For instance, new service concepts that are designed with efficiency in mind, or that leverage technology to reduce delivery costs, would empower the university to offer more attractive services; this mediating pathway becomes critically important. Therefore, these finding highlights that for private universities in Niger State, the strategic implementation of new service concepts should be intrinsically linked with value goals to maximise their impact on student satisfaction, a relationship that was not explicitly examined in the studies by Dao and Yang (2014) or Tayyba et al. (2021) in their focus on direct effects or customer satisfaction.

The fourth research hypothesis states that perceived value does not mediate the relationship between new service processes and students' satisfaction in Private Universities in Niger State. The findings revealed that perceived value mediates the relationship between new service processes and students' satisfaction in Private Universities in Niger State. The finding that perceived value mediates the relationship between new service processes and student satisfaction in private universities in Niger State directly refutes the fourth research hypothesis. This result is particularly significant, as it clarifies a critical mechanism through which innovations in service delivery processes contribute to student satisfaction.

This outcome supports the broader understanding from the literature, as seen in studies by Poi Azuma. (2022), Hannah et al. (2022), and Vikram (2023), which generally advocate for the positive impact of service innovation on organizational performance and competitiveness. While these studies do not specifically detail the mediation of perceived value, their emphasis on efficient and innovative service delivery implicitly links to the ability to manage costs effectively. The direct significant influence of New Service Processes on Student satisfaction (as

previously discussed) indicates that students appreciate improved operational services. However, this finding further reveals a powerful indirect pathway: that these improved processes also enable the university to adopt or maintain a more competitive strategy.

In a market context, such as that of private universities in Niger State, where satisfaction is a crucial factor for prospective students (Anita et al. 2022), this mediation is highly practical. New service processes that streamline administrative tasks, optimize resource utilization, or enhance educational delivery efficiency (e.g., through value) can directly lead to students' satisfaction. Therefore, the mediating role of perceived value means that the positive impact of efficient new service processes on student satisfaction is amplified through the services they help create. This provides a more comprehensive understanding than studies solely focused on direct effects or customer satisfaction (e.g., Dao & Yang, 2014; Tayyba et al., 2021), by revealing how process-oriented service innovation translates into satisfaction gains via a value advantage.

Conclusion

Based on the findings, the study concludes that perceived value significantly mediates the relationship between Service Innovation and Student satisfaction among private universities in Niger State. While New Service Concepts did not exhibit a direct statistically significant impact on student satisfaction, their contribution to a perceived value, which in turn strongly influences satisfaction, highlights a crucial indirect pathway. Furthermore, New Service Processes significantly contribute to both perceived value and directly to Student Satisfaction, reinforcing their dual role in satisfying students.

Recommendations

Based on the findings regarding the mediating role of perceived value on the relationship between service innovation and student satisfaction among private universities in Niger State, here are some recommendations for five critical stakeholders:

For Private University Management in Niger State, the findings strongly suggest a strategic imperative to embed service innovation within their core operations, not just as a means to directly satisfy students, but critically as a pathway to achieve and sustain perceived value. Management should prioritize investments in enhancing New Service Processes (e.g., streamlined admissions, efficient student support, and effective online learning platforms) as these not only directly attract students but also significantly contribute to satisfaction. While developing New Service Concepts (e.g., unique programs, innovative learning models) is valuable for differentiation, management should focus on how these concepts can be delivered efficiently to contribute to perceived value structure, recognizing their indirect impact on satisfaction through this mediator. This holistic approach will allow them to remain competitive, which is a major factor in attracting students in Nigeria's current economic climate.

Furthermore, Policymakers and Regulatory Bodies (e.g., NUC) should recognize the critical role private universities play in expanding access to higher education and consider policies that

facilitate their ability to innovate and operate efficiently. This could include providing incentives for service innovation that leads to value creation, or revisiting regulatory frameworks that might inadvertently increase operational efficiencies for private institutions. For Prospective Students and Parents, the findings highlight that, beyond academic reputation, considering a private university's ability to offer quality education at a relatively satisfactory level, enabled by efficient service innovation, is a key determinant of value. They should actively inquire about the university's service delivery processes and transparent structures, recognizing that a well-created value can provide a quality educational experience without prohibitive expenses. Lastly, for Funding Bodies and Investors, the study underscores that supporting private universities in their efforts to innovate services can be a sustainable investment strategy, as this approach directly correlates with increased student satisfaction and, by extension, enrolment and retention. They should consider funding projects or initiatives that specifically aim to improve service processes and introduce value service concepts, thereby contributing to the long-term growth and accessibility of private higher education in the region.

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