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Linking quality perception to satisfaction in private universities: a mediated marketing model

Sk. Shahabuddin Ahmmed^{a,b} , Md. Sharif Hassan^{c,d} , Mohammad Bin Amin^e ,
Julinawati Binti Suanda^a, Shamsad Ahmed^f and Veronika Fenyves^g 

^aFaculty of Business & Communication, Universiti Malaysia Perlis, Kangar, Malaysia; ^bDepartment of Graphic Design & Multimedia, Shanto-Mariam University of Creative Technology, Dhaka, Bangladesh; ^cSchool of Accounting and Finance, Taylor's University, Subang Jaya, Selangor, Malaysia; ^dDepartment of Business Administration, Daffodil International University, Birulia, Bangladesh; ^eDoctoral School of Management and Business, Faculty of Economics and Business, University of Debrecen, Debrecen, Hungary; ^fDepartment of Business Administration, University of Asia Pacific, Dhaka, Bangladesh; ^gFaculty of Economics and Business, University of Debrecen, Debrecen, Hungary

ABSTRACT

Higher education is developing quite quickly, resulting in intense rivalry between public and private universities. Universities understand that to succeed in the marketplace, they must constantly enhance all aspects of their operations to satisfy their students. So, the study investigated the effect of student services, academic programs, and campus facilities on student satisfaction at private universities in Bangladesh. Moreover, the study also explored the mediating role of institutional brand image on the relationship between academic programs, campus facilities, student services, and student satisfaction. The 350 students who attended Bangladesh's private universities were the subjects of the study. A quantitative research design was adopted by the study, which gathers data through a questionnaire. The SPSS 25 used for descriptive analysis and Structural Equation Modeling (SEM) Smart PLS 4 software has been used to run PLS-SEM to test hypotheses. The analysis revealed that both academic programs and campus facilities significantly and positively influence Institutional Brand Image and Student Satisfaction directly. The Campus Facilities and Academic Program also have significant indirect effects on Student Satisfaction through Institutional Brand Image. The vital role of academic quality and campus facilities in shaping student experiences and institutional reputation has been emphasized by the findings.

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SUBJECTS

Marketing; Marketing Management; Services Marketing

1. Introduction

Student population is expanding globally, and the higher education is becoming increasingly competitive; institutions are giving priority to the pursuit of teaching and learning excellence (Alwi et al., 2019; Azoury et al., 2014). As Higher education plays a crucial role in driving socio-economic and technological progress, making it a fundamental pillar of national development (Demis Alamirew, 2024), institutions strive to provide high-quality services that enhance student satisfaction and overall educational experiences (Chandra et al., 2019; Fuchs et al., 2021).

In Bangladesh, the higher education sector has significantly reshaped the academic environment by expanding access to higher education and fostering innovation through the emergence of private universities. As of 2025, there are 111 private universities in the country (UGC, 2025), contributing to greater educational diversity. Despite these developments, challenges remain in maintaining high service quality and building a sustainable competitive edge. As a result, many institutes are struggling to fulfill the students' expectations. These places of interest highlight the importance of understanding the factors that drive student satisfaction.

CONTACT Md. Sharif Hassan  mdsharifhassan27@gmail.com  School of Accounting and Finance, Taylor's University, Subang Jaya 47500, Selangor, Malaysia; Mohammad Bin Amin  binamindu@gmail.com  Doctoral School of Management and Business, Faculty of Economics and Business, University of Debrecen, Böszörményi út 138, Post Code: 4032, Debrecen, Hungary.

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The well-established theoretical model SERVQUAL by Parasuraman et al. (1985) underpins the assessment of service quality. The model identifies five key factors that are tangibles, reliability, responsiveness, assurance, and empathy that collectively influence customers' perceptions of service quality. The previous evidence reinforces the importance of these SERVQUAL factors. For example, Borishade et al. (2021) found that factors of the SERVQUAL in higher educational institutions influence student satisfaction. In the higher education context of the study, these factors are often reflected through academic programs, campus facilities, and student services. In the current study, these dimensions are contextualized through academic programs, campus facilities, and student services, aligning with prior research (Khan & Hemsley-Brown, 2024; Manzoor et al., 2024).

While prior studies confirm the link between service quality and student satisfaction (Nusraningrum & Endri, 2024; Osman et al., 2024), limited research has investigated how institutional brand image may mediate this relationship particularly within developing economies. A strong institutional brand image shapes students' quality perceptions, enhances satisfaction, and fosters loyalty (Shehzadi et al., 2020). Brand image can increase the perceived value of educational services, thus reinforcing student commitment to the institution (Nguyen et al., 2016). However, its role is often examined as a direct factor rather than a mediator in the service quality–satisfaction relationship.

In emerging markets like Bangladesh, the sociocultural and economic context may influence how students perceive service quality and institutional branding, requiring deeper exploration (Bwachele et al., 2023; Ikram & Kenayathulla, 2023). Addressing these gaps, the present study proposes that institutional brand image mediates the relationship between service quality dimensions and student satisfaction in private universities in Bangladesh. This study also proposes an integrated framework that links three core service quality dimensions: academic programs, campus facilities, and student services, to student satisfaction.

This study advances current literature by demonstrating how quality perceptions translate into satisfaction through the mediating effect of brand image. By situating this model in Bangladesh's private university sector, the research extends the relevance of SERVQUAL and branding frameworks to under-represented developing-country contexts. The findings aim to support academic leaders and policymakers in crafting strategic initiatives focused on service excellence and institutional branding to improve student satisfaction and institutional performance.

To address the research problem, this study seeks to answer the following questions:

1. How do quality dimensions (academic programs, campus facilities, and student services) influence student satisfaction?
2. How do quality dimensions (academic programs, campus facilities, and student services) affect institutional brand image?
3. Does institutional brand image mediate the relationship between quality dimensions (academic programs, campus facilities, student services) and student satisfaction?

2. Literature review and hypotheses development

2.1. Student satisfaction

According to Kotler and Keller (2005), student satisfaction is defined as an individual's assessment of the extent to which their educational expectations are satisfied. Among university students, the retention rate is affected by the considerations of institutional factors (attributed to the level of teaching quality, teaching style, and the facilities of campus) and personal factors (including demographic characteristics and academic performance (Appleton-Knapp & Krentler, 2006). Institutional reputation, faculty quality, and infrastructure are among the significant factors, according to recent studies on their impact on student satisfaction (Wong & Chapman, 2023; Yousaf et al., 2023).

Napitupulu et al. (2018) found a strong positive relation between service quality and satisfaction, with significant contributions of facilities, such as libraries, multimedia centers, and Wi-Fi networks. Likewise,

Rasheed and Rashid (2024) highlight the need for institutional harmonization with student expectations to enhance satisfaction and commitment. Communication, specific academic goals, and feedback are also the greatest factors of satisfaction (Pathmini et al., 2014; Richardson, 2005).

2.2. SERVQUAL

Researchers have used several models and frameworks in higher education literature to increase students' satisfaction. The most well-known and extensively used service quality model, SERVQUAL, has been used worldwide to gauge the satisfaction of students. The SERVQUAL questionnaire was designed, developed, and tested in a business environment by Parasuraman et al. (1985) to assess a company's service quality and customer satisfaction based on five dimensions: (1) tangibles, which comprise equipment, employees appearance, and physical amenities; (2) reliability, which is the capacity to provide the promised service consistently and precisely; (3) responsiveness, or the readiness to help customers as soon as possible; (4) assurance, or the staff's knowledge, politeness, and ability to inspire assurance and confidence; and finally, (5) empathy, which is the attention given to a specific customer, despite being extensively utilized in business. It was criticized in part by several academic researchers who wrote on higher education (Đonlagić & Fazlić, 2015; Kanwar & Sanjeeva, 2022; Saxena et al., 2021).

Although SERVQUAL measures the satisfaction of students from an organizational standpoint, other student elements that affect students' satisfaction include dedication, perception, efficiency, attitudes, and others. The 'Noel-Levitz Student Satisfaction Index' was developed by Noel-Levitz in 1994 to close the gap in higher education. Information on academic experience, social integration, campus life, student assistance resources, and faculty services are all included in this index as stated by Weerasinghe and Fernando (2017) and Martirosyan (2015).

In the context of education, O'Neill and Palmer (2004) defined the quality of service as the difference between the expectations of students and their perceptions of the service they receive. In tertiary-level education, the outcomes of satisfaction differ from profit-driven service sectors. Educational services do not primarily aim for profit. So, traditional consequences of satisfaction, such as repeat business and financial gain, might not be applicable directly to the tertiary-level education sector. Nevertheless, research in higher education indicates that satisfaction leads to outcomes like expressing grievances, loyalty, and favorable recommendations (Paul & Pradhan, 2019).

This study choose academic programs, campus facilities, student services, and institutional brand image as independent variables following the SERVQUAL model, which assesses service quality through reliability, responsiveness, assurance, empathy, and tangibles (Berry, 1988). Academic programs reflect reliability in education delivery, while campus facilities and student services align with tangibles and responsiveness, affecting students' experiences. Institutional brand image influences assurance and expectations, shaping perceived quality and satisfaction (Nguyen & LeBlanc, 2001). These variables comprehensively capture service quality dimensions relevant to private universities, justifying their selection in the study.

2.3. Academic programs

Ornstein and Hunkins (1993) defined the academic program in higher education (HE), it is a set of organized lessons and curricula intended to provide students with specialized knowledge and abilities for the study area they have selected. However, Rosna et al. (2023) argued that the academic programs emphasizing collaborative learning, high-quality instruction, and interaction between students and teachers as variables impacting student achievement were covered. On the other hand, Dill (2007) noted that students' distinctive levels of knowledge, skills, and capacities that they have acquired as a result of taking part in a particular academic program. Furthermore, Giuliana et al. (2012) found that the ability of a teacher plays a vital role in involving students and offering guidance and support. Student satisfaction in higher education is influenced by the quality of academic programs, which suggests that service quality aspects have a beneficial impact on customer satisfaction (MUSTAPHA et al. 2021). Tengteng et al. also found that student satisfaction is strongly influenced by the quality of academic programs. Another

study's results on lecture-based and problem-based learning environments show that students' academic satisfaction is highly influenced by the caliber of instruction and course material (Selam et al., 2022). How academic programs shape the educational experience and satisfaction of students teaching methods, course materials, and faculty support are significant factors for satisfaction (Litasari, 2024; Osman & Saputra, 2019). Furthermore, Selam et al. (2022) accordingly established that constructive teaching and problem-based learning enhanced academic satisfaction considerably. Thus, the following hypotheses are suggested:

H1: Academic programs positively affect student satisfaction.

H1A: Academic programs positively affect institutional brand image.

2.4. Campus facilities

According to Unirank (2024), a higher education institution's campus is the actual location and setting where its administrative, social, and educational activities take place. It includes many facilities, such as academic buildings, classrooms, labs, libraries, living halls, outdoor spaces, and administrative offices, among others. There are differences in the size and structure of campuses; some universities have a single main campus, while others could have several satellite campuses or specialized facilities. Numerous studies have revealed that the quality of campus facilities meaningfully affects the satisfaction of students. Napitupulu et al. (2018), discovered in their research that the quality of campus facilities contributed 57.5% to student satisfaction, representing a strong positive relationship between the two. The design of campus facilities—libraries, laboratories, and social spaces—is fundamental to the student experience. Hanssen and Solvoll (2015), and Napitupulu et al. (2018) demonstrate a high correlation between the satisfaction of campus facilities and satisfaction. However, in a research article on student satisfaction and connection in higher education, it was demonstrated that contentment with 'campus facilities' was much lower than satisfaction with other areas of university life (Chapman & Wong, 2023).

Additionally, a literature review about the satisfaction of students in tertiary-level education described satisfaction as an attitude that comes from assessing the services and educational experience received by students, demonstrating the wide-ranging effects of a variety of elements, such as campus facilities, on the satisfaction of student (Weerasinghe & Fernando, 2017). To improve student satisfaction, these findings highlight universities' need to pay careful attention to campus facilities. Universities may help create a happier and more satisfied learning atmosphere for their students by employing a high emphasis on the excellence of their campus's resources, infrastructure, and support services. The assessment of the literature also highlights the complex relationship between student satisfaction and campus facilities, suggesting that a comprehensive approach is necessary to comprehend and enhance the satisfaction of students in tertiary-level education (Wijesinghe et al., 2023).

A supportive learning environment, equipped with modern technical infrastructure and high-quality physical premises, contributes to improved student performance (Venkateswarlu et al., 2020; Wider et al., 2024). Weerasinghe and Fernando (2017) and Venkateswarlu et al. (2020) also depicted that advanced technology and facilities can improve the learning experience and increase student satisfaction. Martha-Martha and Priyono (2018) conducted a study on private education institutions in Malaysia and found a positive correlation between student satisfaction and tangible aspects, which is one of the qualities of a high-quality service. Research indicates that physical facilities on private campuses influence student satisfaction. These findings illustrate the noteworthy influence of campus facilities on the satisfaction of students in the private universities context. Researchers emphasize the need to provide high-quality campus facilities to increase overall student satisfaction.

H2: Campus facilities positively affect student satisfaction.

H2A: Campus facilities positively affect institutional brand image.

2.5. Student services

Student services are fundamental to supporting academic success and satisfaction. Many researchers consider student service as a nonacademic factor of student satisfaction. Among these are administrative assistance, efficient communication, and the protection of student privacy (Arrivabene et al., 2019; Toring et al., 2023). Student service is an essential factor that fosters overall student satisfaction. Woldetsadik (2016) and Giuliana et al. (2012) found a positive correlation between service quality and satisfaction in private universities. Institutions can build loyalty and satisfaction by aligning services with student needs.

An investigation on how loyalty and student satisfaction in tertiary-level education institutions are affected by service quality was carried out. Student satisfaction was shown to have a substantial correlation with the quality of the service offered by private higher education sectors (Martha-Martha & Priyono, 2018). Another study conducted by the Adama City Administration on a subset of private universities revealed a favorable correlation between the satisfaction of students and the quality of service (Woldetsadik, 2016). The research underscored the significance of comprehending students' contentment to enhance the caliber of services furnished by private universities and colleges (Woldetsadik, 2016).

All of these results point to the importance of quality of service in influencing the satisfaction of students at private universities in the context of Bangladesh. Institutions can build loyalty and satisfaction by aligning services with student needs. They emphasize how crucial it is to offer top-notch student services to raise general student satisfaction and loyalty.

H3: Student services positively affect student satisfaction.

H3A: Student services positively affect institutional brand image.

2.6. Institutional brand image as a mediator

According to Dutta (2012), brand image refers to the general opinion that people have about a brand. Similarly, Keller (1993) described the brand image as the perceptions that consumers have of a brand based on the brand associations that they have in their minds. A brand's meaning increases when it comes from consumer experience or exposure to communications, as brand associations have varying degrees of strength (Aaker, 2009). The more positive the brand image, the more positive the attitude regarding the branded product and its attributes (Aghekyan-Simonian et al., 2012). Brand image assists a consumer in identifying his or her wants and requirements about a brand that separates the brand from competitors (Anwar et al., 2011). Dam and Dam (2021) found that brand image has positively influenced customer satisfaction. The brand image was identified as a precursor to customer satisfaction. Arrivabene et al. (2019) argue that a favorable company image is the primary step to captivating the loyalty of customers. Like the effect of the image of a brand on customer satisfaction, institutional brand image can affect student satisfaction. For example, a study conducted by Chen (2016), discovered that university student satisfaction and brand image influenced word-of-mouth communication by mediating university brand loyalty. Another study found that perceived service quality benefits university brand image, behavioral intent, and brand performance (Sultan & Wong, 2019).

Shehzadi et al. (2020) found that institutional brand image mediates the relationship between service quality dimensions and student satisfaction. The research articles point out how academic programs, student services, campus facilities, and student satisfaction are related, and how institutional brand image plays an intermediary part in this relationship. This has made it possible to look into how institutional brand image functions as a mediator in the environment of Bangladesh's private universities.

H4: Institutional brand image positively affects the satisfaction of students.

H5: Institutional brand image mediates the relationship between academic programs and the satisfaction of students.

H6: Institutional brand image mediates the relationship between campus facilities and the satisfaction of students.

H7: Institutional brand image mediates the relationship between student services and the satisfaction of students.

To address the research questions mentioned in the study, the study suggests the following framework in Figure 1.

3. Methodology

3.1. Research methods and design

The study begins with a research framework drawn from prior research on tertiary education student satisfaction. It uses a quantitative methodology to quantify and examine numerical data about variables affecting student satisfaction. The purpose of the research is to clarify the relationships that these factors have with students' satisfaction and how institutional brand image functions as a mediator. The study adopts an explanatory research design because it aims to clarify and establish causal relationships between variables affecting student satisfaction within the framework drawn from prior research. The design aligns with the study's goal of explaining how specific quality dimensions (academic programs, campus facilities, and student services) interact with institutional brand image to influence student satisfaction. The use of a quantitative methodology further supports this design, as it enables the collection and analysis of numerical data to test hypotheses derived deductively from existing theories. This approach allows the study to systematically explore the mediating role of brand image and provide evidence-based insights into these relationships.

This study collects data in a single round between January 2024 and March 2024 by using a cross-sectional time horizon. With the use of a standardized survey questionnaire, quantitative data is obtained from a representative sample of university-enrolled students. The study employed simple random sampling to ensure that each student in the population has an equal probability of being selected, thereby enhancing the representativeness of the sample. A complete list of enrolled students from the targeted private higher education institutions were used as the sampling frame. Each student was assigned a unique identifier, and a computer-generated random number method was employed to select participants. This method eliminates selection bias and ensures that the sample accurately reflects the broader population. By employing this technique, the study ensures the reliability and generalizability of its findings to the wider student population.

3.2. Data collection and analysis

Students in tertiary education in Bangladesh from ten private universities and backgrounds make up the study participants. They are Shanto-Mariam University of Creative Technology, Daffodil International University, BRAC University, East West University, University of Asia Pacific, Northern University Bangladesh, and Green University of Bangladesh.

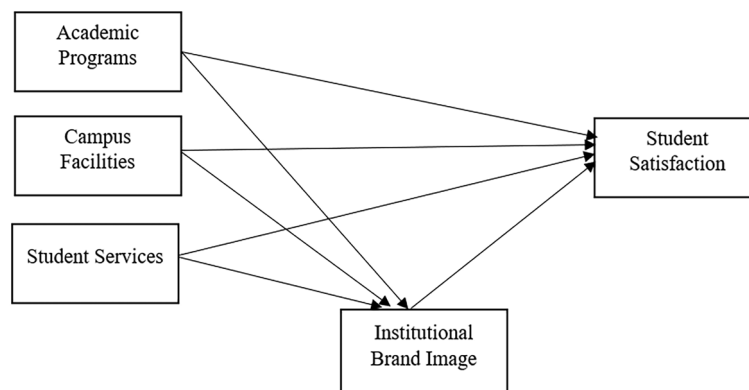


Figure 1. Research framework. Source: Developed by authors

The sample size of the study was determined based on the '10-times rule' guideline for PLS-SEM. According to Wagner and Grimm (2023), the sample size should be at least ten times the number of formative indicators for any single construct, or ten times the highest number of structural paths leading to any one construct in the model. In this study, the most complex construct receives three paths, justifying a minimum sample size of 40. Thus, the final sample of 335 exceeds this threshold and ensures sufficient statistical power. Each construct was measured using multi-item indicators as follows: academic programs (4 items), campus facilities (4 items), student services (5 items), institutional brand image (5 items), and student satisfaction (4 items).

Measurement items were adapted from prior studies for academic programs (Fuchs et al., 2021; Levitz, 2024), campus facilities (Fuchs et al., 2021; Levitz, 2024), student services (Fuchs et al., 2021), institutional brand image (Narteh & Braimah, 2019) and student satisfaction (Elliott & Healy, 2001). Five-point Likert scales with many items were used to identify every component of this study. Participants answer the degree to which they are in agreement or disagreement with each statement on a 5-point scale (1 being 'strongly disagree' and 5 being 'strongly agree'). The study employed known scales from the literature to measure the independent and dependent variables.

Minor modifications were made to the scales to align with the research aims, guaranteeing their validity and reliability (Parasuraman et al., 1991). In addition, to ensure contextual alignment with Bangladeshi private universities, such as replacing general service references with higher education-specific terms. To validate the adapted instrument, expert reviews were conducted with three academics specializing in higher education quality and one industry expert. A pilot study involving 30 students was also conducted to ensure item clarity and content validity. Based on the pilot feedback, minor wording adjustments were made.

The survey was distributed electronically via Google Forms using institutional contact points and student groups. A total of 1,200 students were invited to participate. After eliminating incomplete or invalid responses, 335 valid responses were retained, indicating a response rate of approximately 27.9%. Although the response rate is acceptable for online surveys, non-response bias was considered. To assess this, early and late responses were compared of key variables and no significant differences were found. This suggests limited non-response bias.

Written informed consent was received electronically via the Google form from the study participants. Ethical approval was obtained from the Research Committee of DBA, University of Asia Pacific, with the approval number DBARC/UAP/0026. The study employed partial least square structural equation modeling (PLS-SEM) to analyze the results. PLS-SEM is more suitable than AMOS CB-SEM because the research aims to explore relationships, predict student satisfaction, and assess complex mediation effects rather than strictly confirm an existing theory. Given the potential presence of non-normal data, PLS-SEM efficiently handles such complexities. Structural equation modeling analysis includes both measurement model assessment and structural model assessment. The data in the study were analyzed using SMARTPLS 4.

4. Findings

The survey data was analyzed with SPSS 25 and Smart PLS 4. First, percentage statistics and frequency distributions were primarily employed to understand the sample distribution. Collinearity statistics were utilized to detect multicollinearity within the independent variables. Cronbach's alpha coefficients were also utilized to examine the reliability of the scale items. The latent variables' discriminant and convergent validity were ensured using appropriate statistics. Following that, the assumptions were evaluated using structural equation modeling and the partial least squares approach.

4.1. Initial univariate examination

4.1.1. Analysis of demographics

Table 1 shows the demographic factors, which are gender and current educational level. The results showed that there were more male respondents (59.7%) than female respondents (40.3%). The frequency

and percentage of the current educational level are displayed in the following table. The respondents who were Bachelor 2nd Year had the greatest response rate (33.0%). The respondents at the Masters level had the lowest response rate (1.8%).

4.1.2. Statistical descriptions

The scores for skewness, kurtosis, mean, standard deviation, and skewness were the main tools used to examine all the variables. Prior to the analysis, a composite score was created for every latent variable by averaging the scores on each of the related scale items. For example, all four campus facility items were used to determine a single or average value. Table 2 shows that student satisfaction has the lowest mean score ($M=3.7590$, $SD=0.89111$), whereas Student Services has the highest mean score ($M=3.9684$, $SD=0.73888$). Apart from these two latent variables, other features were obtained with relatively low mean scores.

4.1.3. Common method bias test

The study utilized two distinct methods to evaluate potential common method bias during the Partial Least Squares Structural Equation Modeling (PLS-SEM) verification process. Additionally, it followed Kock's (2015) guidelines for PLS-SEM verification to assess multicollinearity among latent variables. The variation inflation factor (VIF) values, ranging from 2.033 to 3.238 showed in Table 3, remained below the critical threshold of 3.3, indicating acceptable levels. The standard accepted criteria for low multicollinearity is $VIF < 5$ (Hair et al., 2019). A unique marker variable (M1) was identified, demonstrating minimal correlation with the existing latent variables. M1, representing 'Teacher empathy', showed no statistically significant associations (Podsakoff et al., 2024). Based on these findings, common method bias is unlikely to be a concern.

4.2. Measurement model assessment

According to Hair et al. (2019), the measurement model's analysis identifies the correlation between a latent variable and seen or measured variables in a given study. Multiple measuring items with numerical values were gathered from the study participants to evaluate the latent variables. The validity and reliability of the items must, therefore, be established. Using the partial least square structural equation modeling (PLS-SEM) method with SmartPLS version 4.0, the suggested model was evaluated (Ringle et al., 2022).

Table 1. Demographic analysis of respondents.

Categories	Subcategories	Frequency (N)	Percent (%)
Gender	Male	200	59.7
	Female	135	40.3
Total		335	100
Current educational level	Bachelor 1st Year	102	30.4
	Bachelor 2nd Year	112	33.4
	Bachelor 3rd Year	90	26.9
	Bachelor 4th Year	25	7.5
	Masters	6	1.8
Total		335	100

Source: Developed by authors.

Table 2. Descriptive statistical analysis ($n=335$).

Latent variables	Mean	Std. Deviation	Skewness	Std. Error	Kurtosis	Std. Error
Campus facilities	3.8709	0.78268	-1.059	0.133	1.639	0.266
Student services	3.9684	0.73888	-1.528	0.133	3.418	0.266
Academic program	3.8754	0.78864	-0.915	0.133	1.226	0.266
Institutional brand image	3.7904	0.84593	-0.951	0.133	1.193	0.266
Students satisfaction	3.7590	0.89111	-0.840	0.133	0.642	0.266

Source: Results from SmartPLS.

Table 3. VIF values.

Independent variable	VIF
Campus facilities	2.033
Student services	2.296
Academic program	3.238
Institutional brand image	2.648

Source: Results from SmartPLS.

Table 4. Findings of the measurement model analysis.

Latent variables	Items	Factor loadings	Cronbach's alpha	CR (rho_c)	AVE
Academic programs	AP 1	0.802	0.860	0.905	0.705
	AP 2	0.856			
	AP 3	0.877			
	AP 4	0.821			
Institutional brand image	BE 1	0.842	0.872	0.908	0.664
	BE 2	0.861			
	BE 3	0.710			
	BE 4	0.850			
	BE 5	0.801			
Campus facilities	CF 1	0.843	0.808	0.874	0.634
	CF 2	0.803			
	CF 3	0.775			
	CF 4	0.761			
Student services	SS 1	0.712	0.850	0.893	0.626
	SS 2	0.781			
	SS 3	0.831			
	SS 4	0.815			
	SS 5	0.811			
Student satisfaction	S Satisfaction 1	0.841	0.889	0.923	0.750
	S Satisfaction 2	0.898			
	S Satisfaction 3	0.857			
	S Satisfaction 4	0.867			

Source: Results from SmartPLS.

4.2.1. Convergence validity and reliability. Table 4 displays the outcomes from the measurement model analysis. The construction of reliability was determined by looking at Cronbach's Alpha (CA) scores greater than 0.70 and Composite Reliability (CR) values greater than 0.70 (Hair et al., 2019). All of the latent variables' Cronbach's Alpha values and CR values were over 0.70, indicating that the construct reliability has been established. After that, convergent validity is assessed using Factor Loading (FL) values greater than 0.708 and average variance extracted (AVE) values greater than 0.50 (Hair et al., 2019). It is deemed appropriate that the factor loading values were higher than 0.708. AVE is 0.50 or higher, meaning a latent construct accounts for 50% or more of the average variance in the observable variables.

4.2.2. Discriminant validity. Every latent variable is guaranteed to be distinct from the others. Comparing the components' correlation coefficients with the matching square roots of AVE values allowed researchers to examine discriminant validity. According to Fornell and Larcker (1981), the square root of average variance (AVE) must be greater than the correlations for discriminant validity to be sufficient. Table 5 shows that the inter-construct coefficients of correlation (off-diagonal parts) were less than the square root of the average variance for all diagonal elements (bold components).

The Heterotrait-Monotrait Ratio (HTMT) is a PLS-SEM discriminant validity measurement that assesses the real relationships between components (Hair et al., 2019). A value of less than 0.90 for the HTMT indicates the presence of discriminant validity. As Table 6 illustrates, every HTMT value in this study—aside from purpose and perceived usefulness—was less than 0.90. The findings implied that discriminant validity was guaranteed as each latent variable was distinct.

4.2.2. Structural model assessment

After the measurement model's overall validity has been proven, the structural model is evaluated (Hair et al., 2019). The theories are validated through the study of the structural model. Using structural model analysis, the stated hypotheses that demonstrate the importance of the relationships are either accepted or rejected (Byrne, 2013; Schumacker & Lomax, 2004). This investigation estimated the structural model

Table 5. Discriminant validity results using the Fornell–Larcker criterion.

	Academic program	Campus facilities	Institutional brand image	Student satisfaction	Student service
Academic program	0.839				
Campus facilities	0.650	0.796			
Institutional brand image	0.769	0.653	0.815		
Student satisfaction	0.727	0.667	0.767	0.866	
Student service	0.726	0.610	0.625	0.623	0.791

Source: Results from SmartPLS.

Table 6. Discriminant validity results using the Heterotrait–Monotrait ratio (HTMT).

	Academic program	Campus facilities	Institutional brand image	Student satisfaction	Student service
Academic program					
Campus facilities	0.776				
Institutional brand image	0.879	0.773			
Student satisfaction	0.827	0.778	0.867		
Student service	0.850	0.743	0.723	0.714	

Source: Results from SmartPLS.

Table 7. Structural model analysis results.

Hypothesis	Paths	Beta	T statistics	p values	95% CI		Results
					LL	UL	
H1	Academic program → institutional brand image	0.556	9.149	0.000	0.437	0.676	Significant
H1A	Academic program → student satisfaction	0.212	2.619	0.009	0.049	0.362	Significant
H2	Campus facilities → institutional brand image	0.250	4.324	0.000	0.138	0.365	Significant
H2A	Campus facilities → student satisfaction	0.206	4.227	0.000	0.105	0.297	Significant
H3	Student service → institutional brand image	0.069	1.207	0.228	−0.040	0.183	Insignificant
H3A	Student service → student satisfaction	0.083	1.045	0.296	−0.059	0.251	Insignificant
H4	Institutional brand image → student satisfaction	0.418	6.474	0.000	0.285	0.537	Significant

Source: Results from SmartPLS.

using a bootstrapping approach on a subsample of 5000. Below are the relevant p-values, t-statistics, and path coefficients (beta). The result is statistically significant when the p-value is less than 0.05 (Byrne, 2013). Table 7 displays the findings of the structural model analysis.

According to Byrne (2013), NFI should be more than 0.90 and SRMR less than 0.09. The model fit metrics demonstrated that SRMR (0.055) and NFI (0.847) may be obtained by PLS analysis. PLS-SEM, however, does not account for model fit metrics such as χ^2 , GFI, CFI, and RMSEA (Hair et al., 2019).

According to the findings in Table 7 and Figure 2, institutional brand image and student satisfaction were positively and significantly influenced by Campus facilities ($\beta=0.250$, $p=0.000$ and $\beta=0.206$, $p=0.000$), academic programs ($\beta=0.556$, $p=0.000$ and $\beta=0.212$, $p=0.009$). Institutional Brand Image significantly influences Student Satisfaction ($\beta=0.418$, $p=0.000$). On the other hand, student services had no significant effect on Institutional Brand Image and Student Satisfaction as the p value was more than 0.05 (0.228 and 0.296). As a result, hypotheses H1, H1A, H2, H2A, and H4 were validated and the hypothesis H3, and H3A were not validated.

Table 8 presented the mediating or indirect effects of the institutional brand image of the hypothesized relationships between campus facilities, academic programs, and student services, with student satisfaction. The indirect effects of the academic program on student satisfaction through institutional brand image is strongly significant ($\beta=0.233$, $p=0.000$). This emphasizes the key role of academic quality in directly and indirectly nurturing student satisfaction through enhancing the institution's brand image.

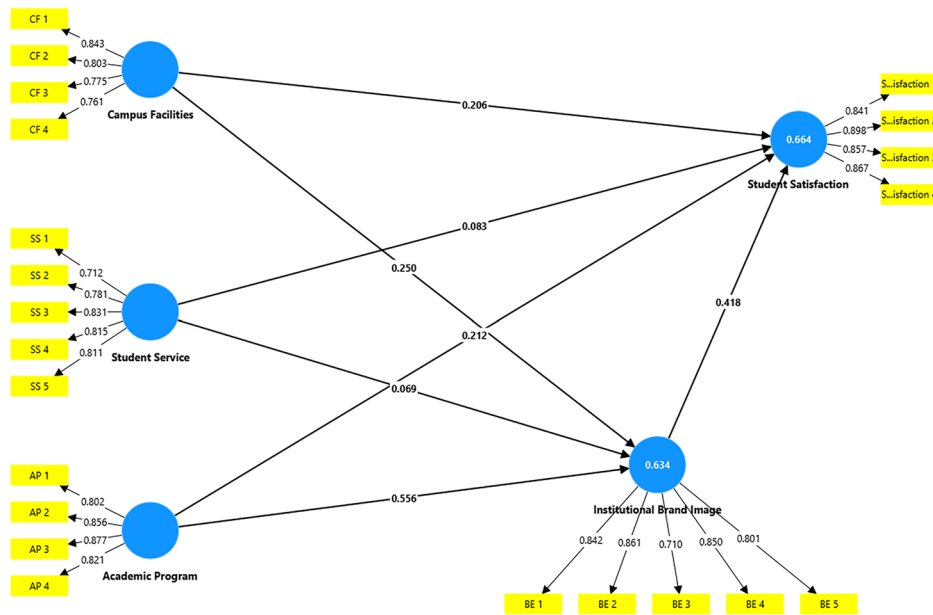


Figure 2. Result of structural model. Source: Results from SmartPLS.

Table 8. Results of structural model analysis (mediating/indirect effects).

Hypothesis	Paths	Beta	T statistics	p values	95% CI		Results
					LL	UL	
H5	Academic Program → Institutional Brand Image → Student Satisfaction	0.233	5.375	0.000	0.154	0.326	Significant
H6	Campus Facilities → Institutional Brand Image → Student Satisfaction	0.104	3.390	0.001	0.053	0.175	Significant
H7	Student Service → Institutional Brand Image → Student Satisfaction	0.029	1.181	0.238	-0.015	0.081	Insignificant

Source: Results from SmartPLS.

However, the indirect relationship between campus facilities and student satisfaction is partly mediated through the institutional brand image ($\beta=0.104, p=0.001$) as the direct relationship between campus facilities and student satisfaction is also significant ($\beta=0.206, p=0.000$). No noteworthy correlation was found between student service and student satisfaction through institutional brand image ($\beta=0.029, p=0.238$). This is consistent with the results from the direct relationship, suggesting that the levels of satisfaction may not be significantly affected by the influence of student services through the brand image.

Thereby, the hypotheses H5 and H6 were significant. H7 was insignificant.

The explanatory power structural model of PLS is determined by the coefficient of determination (R^2), which ranges between 0 and 1 (Hair et al., 2019). An enhanced endogenous component prediction is indicated by a higher R^2 value. According to Hair et al. (2019), R^2 values of 0.75, 0.50, and 0.25 indicate substantial, moderate, and weak, respectively. The higher the value, the better the prediction power. The dependent variable's change percentage that the model could explain was shown by the R^2 values. The analysis revealed that the model could explain around 66.4% of variances in student satisfaction and 63.4% of variances in institutional brand image

When the Q^2 value exceeds 0.00, the route model's predictive accuracy is deemed satisfactory (Hair et al., 2019). The exogenous factors employed in this model had a stronger predictive relevance regarding Institutional Brand Image given that the Q^2 prediction is significantly greater than 0 ($Q^2 = 0.622$) and for Student Satisfaction ($Q^2 = 0.588$).

4.2.3. Discussion

The research objectives were to find out whether the academic programs, campus facilities, and quality of student service influence the satisfaction of students and institutional brand image at the tertiary education level. Another objective was to see the mediation effects of the institutional brand image on the relationship between academic programs and student satisfaction, campus facilities and student satisfaction, and student services and student satisfaction. The results showed that academic programs strongly influence student satisfaction (which is also supported by Bagonza et al., 2023; Masserini et al., 2019; Selam et al., 2022) and institutional brand image. According to a validity study conducted by Huang et al. (2023), the satisfaction of students in academic programs is highly impacted by the quality of instruction, fairness of assessments, and feeling that they are taken care. Another research conducted by Joseph et al. (2012) where the researchers found that academic programs influence institutional brand image. Campus facilities have an impact (though less intensive than academic programs) on student satisfaction and institutional brand image. The results were also reinforced by Hanssen and Solvoll (2015) found that quality of the facilities of the higher education institution influences the students' overall satisfaction. A similar result was also found in an earlier study (Wider et al., 2024). Accordingly, Pedro et al. (2023) found that campus facilities, as part of sustainable development approaches, influence student satisfaction, which positively affects the institutional brand image.

The correlation between student services and student satisfaction of students was found to be insignificant in the study. But many researchers, like, Supriyanto et al. (2025); Bwachele et al. (2023), Masserini et al. (2019); Napitupulu et al. (2018), and Panda et al. (2019), found the strong correlation between students' service quality and students' satisfaction. The reason may be, if services are underutilized, perceived as basic expectations, or inconsistent in quality, they may not influence satisfaction (Ali et al., 2015). Moreover, the study found that the institutional brand image mediates the relationship between academic programs and student satisfaction, and campus facilities and student satisfaction. Soimah et al. (2024) discovered that the institutional brand image mediates the relationship between educational quality, self-ability, and student decisions, influencing student satisfaction when selecting academic programs in higher education. Furthermore, Osman and Saputra (2019) found the full mediating role in the relationship between service quality and student satisfaction in higher education. But the mediation was found to be insignificant for the relationship between student services and student satisfaction. In many studies, it is found that the institutional brand image mediates the relationship between student services and student satisfaction (Dubey & Sahu, 2023; Pinna et al., 2023; Rizard et al., 2022; Sultan & Wong, 2019).

5. Conclusion

This study examined the influence of three critical higher education institutional factors—Academic Programs, Campus Facilities, and Student Services—on Institutional Brand Image and Student Satisfaction. The findings underscore the pivotal role of academic programs quality and campus facilities, both of which exert significant direct and indirect positive effects on student satisfaction directly and also mediated through institutional brand image. These results highlight the necessity for institutions to uphold rigorous academic standards and invest strategically in campus infrastructure to enhance their reputation and provide an improved student experience. Notably, Academic Programs and Campus Facilities emerged as key drivers, substantially enhancing both Institutional Brand Image and Student Satisfaction. Conversely, Student Services demonstrated no significant direct or indirect effect, suggesting their role, while important, may have less influence on overall satisfaction compared to other factors. In conclusion, prioritizing academic excellence and state-of-the-art infrastructure enables universities to elevate their institutional brand and deliver exceptional student experiences. These insights offer a clear pathway for higher education institutions seeking to strengthen their competitive positioning and foster long-term student engagement and satisfaction.

5.1. Theoretical contribution

This study contributes significantly to the literature on private higher education institutes by presenting an integrated framework that connects quality dimensions—academic programs, campus facilities, and

student services to student satisfaction, with institutional brand image playing a mediating role. While previous studies in private higher education institutes have often analyzed these factors independently, this research advances theoretical understanding by emphasizing their interconnectedness and the pivotal role of institutional brand image in enhancing their effects. By framing brand image as a mediator rather than an independent variable, the study shifts the focus toward its transformative potential in amplifying the impact of quality dimensions on student satisfaction.

Moreover, the study fills a critical gap in the context of private higher education institutions in developing economies, which is often underrepresented in existing research. By situating the research in Bangladeshi private universities, it extends the applicability of frameworks commonly developed in public or developed world institutions to private higher education systems in developing countries. This contextualized approach enhances the theoretical understanding of how socio-economic and cultural factors shape the dynamics of quality, brand image, and satisfaction in private institutions, thereby offering a more globally inclusive perspective.

5.2. Managerial implications

The findings offer actionable insights for administrators and policymakers in private higher education institutions, emphasizing strategies that can enhance student satisfaction and institutional competitiveness:

For private institutions, academic programs linked to the 'reliability' and 'assurance' dimensions of SERVQUAL were found to significantly influence student satisfaction and brand image. Institutions should maintain rigorous academic standards, periodically update curricula to match industry trends, and invest in faculty development programs focused on innovative pedagogies. This approach not only improves academic quality but also enhances perceived reliability and competence, which, as supported by our model, contributes to a stronger brand image and higher student satisfaction. Measurable outcomes include improved course evaluation scores, higher retention rates, and enhanced alumni engagement.

Campus facilities, associated with the 'tangibles' dimension of SERVQUAL, were shown to have a significant impact on both institutional brand image and student satisfaction. Institutions should invest in modern, tech-enabled classrooms, comfortable common areas, and up-to-date laboratories and libraries. These visible and functional enhancements strengthen the perception of institutional quality, reinforcing a positive brand image that, as shown in our mediation analysis, further enhances satisfaction. Outcomes can be tracked through student satisfaction surveys, campus visit feedback, and brand perception studies.

The study confirmed that institutional brand image plays a mediating role between service quality dimensions (academic programs and campus facilities) and student satisfaction. Private institutions should therefore invest in strategic branding initiatives that highlight their academic strengths, modern infrastructure, and student success stories. This includes consistent online and offline communication, targeted marketing campaigns, and active engagement with alumni and industry. Improving brand image not only enhances satisfaction but also builds student loyalty and word-of-mouth promotion, both of which are critical for long-term institutional growth.

While academic and physical infrastructure dominate priorities, student services aligned with the 'responsiveness' and 'empathy' dimensions of SERVQUAL also influence satisfaction and brand image. Institutions should improve the availability and responsiveness of services such as career guidance, mental health support, academic advising, and extracurricular programming. The study findings suggest that well-developed student services contribute to a supportive learning environment that fosters emotional connection with the institution, thereby improving brand perception and satisfaction. Measurable indicators may include service utilization rates, satisfaction ratings, and student well-being assessments.

Given the study's focus on Bangladeshi private universities, it is essential that institutions localize their strategies based on cultural, economic, and social factors. This means conducting needs assessments or focus groups to identify what students value most and tailoring academic offerings, facilities, and services accordingly. This context-sensitive approach enhances empathy and assurance core SERVQUAL elements and reinforces institutional brand trust and relevance, particularly in emerging markets. Impact can be assessed through localized satisfaction benchmarks and regional brand equity metrics.

By implementing these recommendations, private higher education institutions can not only enhance student satisfaction but also solidify their market position and drive sustainable growth. A focus on

quality, innovation, and strategic branding will enable them to thrive in an increasingly competitive and dynamic educational landscape.

5.3. Limitations and suggestions for future study

Despite comprehensive insights provided by the study, there are some limitations that should be acknowledged. Data were collected from 463 respondents, and after data cleaning, 335 valid responses were retained. Although this exceeds the minimum threshold suggested by the 10-times rule for PLS-SEM and meets power requirements for structural modeling, it falls slightly below the 384 recommended for large populations (Cohen, 1988). A larger sample size may further enhance the generalizability of the findings. Additionally, the response rate was 27.9%, and although non-response bias was assessed through early-late respondent comparison with no significant differences found, self-selection bias may still be present. This study focused solely on private university students in Bangladesh. While this allows for deeper insights into this specific context, it limits the generalizability of findings to public institutions. Future studies should consider a broader sample that includes public universities to enhance external validity. This study was cross-sectional. The cross-sectional research design captures data at one point that hinders causal inference. If the research design were longitudinal, the study could better reveal the causal relationships and changes over time. Integrating qualitative methods, such as in-depth interviews or focus group discussions could offer deeper insights into student perceptions and satisfaction. Some other potential factors that influence student satisfaction and institutional brand image, such as extra-curricular activities and social integrity on campus, qualifications of the faculty members, and peer interactions were not considered as variables in the analysis. Future research may include those variables that would help to offer more holistic insights of students' satisfaction and institutional brand image.

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Author's contributions

CRedit: **Sk. Shahabuddin Ahmmed**: Conceptualization, Formal analysis, Investigation, Writing – original draft; **Md. Sharif Hassan**: Formal analysis, Methodology, Software, Writing – original draft; **Mohammad Bin Amin**: Data curation, Formal analysis, Project administration; **Julinawati Binti Suanda**: Supervision, Writing – review & editing; **Shamsad Ahmed**: Investigation, Writing – original draft; **Veronika Fenyves**: Funding acquisition, Writing – review & editing.

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About the authors

Sk. Shahabuddin Ahmmed is an Associate Professor in the Department of Graphic Design & Multimedia at Shanto-Mariam University of Creative Technology (SMUCT), Bangladesh. He is currently pursuing his PhD in Marketing at Universiti Malaysia Perlis (UniMAP). His research interests encompass artificial intelligence adoption, branding, marketing communication, and sustainable approaches to education marketing.

Dr. Md. Sharif Hassan is a lecturer at the School of Accounting & Finance, Taylor's University, Malaysia. He is also Visiting researcher at Daffodil International University, Bangladesh. He completed his Ph.d. in Finance from Universiti Malaysia Perlis. His research interest areas include fintech, behavioral finance, technology management, and financial sustainability.

Mohammad Bin Amin is a Doctoral Candidate in the Doctoral School of Management and Business, Faculty of Economics and Business, University of Debrecen, Debrecen, Hungary. Along with his doctoral study, he is working as an Associate Professor of the Department of Business Administration, Bangladesh Army University of Science and Technology, Saidpur, Bangladesh. His areas of research interest include management, human resource management, technology management, technology adaptation, leadership, corporate social responsibility, green management, circular economy, environmental economy, green supply chain management, sustainable performance, knowledge management, and renewable energy management. He can be reached at binamindu@gmail.com; binaminbd@mail-box.unideb.hu.

Dr. Julinawati Binti Suanda is an Associate Professor at the Faculty of Business and Communication, Universiti Malaysia Perlis (UniMAP). She holds a PhD in Health Marketing from the Technological University of the Shannon (TUS), Ireland, as well as a Master of Business Administration and a Bachelor of Public Management from Universiti Utara Malaysia (UUM). Her research interests include Marketing, Social Marketing, Health Marketing, and Health Promotion.

Professor Dr. Shamsad Ahmed received his Ph.D. from the University of Dhaka. He also holds an MBA from the Institute of Business Administration (IBA) at the University of Dhaka and an M. Pharm degree from the same university. His area of expertise lies in marketing. He began his career at a leading cosmetics and toiletries company in Bangladesh. Dr. Ahmed has authored several publications in various research and professional journals. His research interests include Sustainable Consumption, E-Commerce, Mall Management, Event Management, and the Health Care System. Currently, he serves as a professor at the University of Asia Pacific (UAP).

Dr. Veronika Fenyves is a University Professor and Dean of the Faculty of Economics and Business at the University of Debrecen, Hungary. Her research field includes economics, business, management, controlling, ESG, green finance, green technology, technology adaptation, digitalization in finance, technology management, entrepreneurship, and enterprise development. She can be reached at fenyves.veronika@econ.unideb.hu

ORCID

Sk. Shahabuddin Ahmmed  <http://orcid.org/0009-0009-4966-782X>

Md. Sharif Hassan  <http://orcid.org/0000-0001-8418-7578>

Mohammad Bin Amin  <http://orcid.org/0000-0002-9184-4828>

Veronika Fenyves  <http://orcid.org/0000-0002-8737-0666>

Data availability statement

Data is available upon request from the authors. Contact Person: Md. Sharif Hassan (mdsharifhassan27@gmail.com).

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