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Article

Antecedents to Student Loyalty in Indonesian Higher Education Institutions: The Mediating Role of Technology Innovation

Evi Susilawati

Imamul Khaira

Fakultas Keguruan dan Ilmu Pendidikan, Universitas Islam Sumatera Utara, Medan, Sumatera Utara, Indonesia

Email: evisusilawati@fkip.uisu.ac.id

Management Courses, Universitas Haji, Medan, Sumatera Utara, Indonesia

Email: imamulkhaira@gmail.com

Ikbar Pratama

Faculty of Economics and Business, Universitas Medan Area, Medan, Sumatera Utara, Indonesia

Email: Ikbarpratama@staff.uma.ac.id

Abstract

The aim of this research was to investigate service quality concepts in the higher educational institutions (HEIs) of Indonesia, viz., student quality and student commitment as independent variables, technology innovation as a mediating variable, student satisfaction level as a mediator, and student loyalty as an endogenous construct. The earlier studies found a causal link between these variables; however, this study distinguished itself by making use of Expectation-Disconfirmation theory (EDT) and Social Exchange Theory (SET) for developing a research framework. A total of 310 questionnaires were distributed for data collection, out of which 245 questionnaires were used for the study with the response rate of 79%. The study showed that student commitment and service quality were significantly related to student loyalty, which are perfectly managed by Indonesian education institutions. However, the study recommended that institutions should increase their focus towards these elements to further enhance student loyalty and university performance. The study also concluded that technology innovation greatly explained student's loyalty to HEIs. It is therefore suggested that regulators and university authorities should develop policies related to the technology innovation adoption to enhance student commitment and student loyalty.

Keywords

Student Commitment, service quality, technology innovation, student loyalty, Indonesia

Correspondence to evisusilawati@fkip.uisu.ac.id, Ikbarpratama@staff.uma.ac.id

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Student loyalty has empirically been proven to be important for achieving competitiveness among international HEI's to attract foreign employees. Earlier researches have used different factors for studying and predicting student/customer loyalty, like how well a delivered service conforms with the consumer/students' expectations (Chin et al., 2019), university reputation (Saoud & Sanséau, 2019), student satisfaction (Williams et al., 2019), their confidence or belief in an institution (Patterson, 2016), and dedication (Usman, 2017). According to Snijders and Rikers (2018), in order to investigate the reasons for the reduction in HEIs funding, university image, provision of quality service, and HEI's relationship marketing strategy are considered to be the serious areas of concern for the service providers. In addition to this, relationship marketing and service strategy enable HEIs to promote and enhance their existence at both local and international levels (Rutter et al., 2016). Furthermore, majority of the service suppliers fully understand the important role of service orientation, since service orientation by HEIs results in student loyalty (Xu et al., 2018). Therefore Barani and Menon (2017) stated that because of the significance of service provider, service quality management has become a cornerstone for students and HEIs to ensure a positive outcome.

Fundamentally, the basic aim of any organization is to understand the needs of its consumers and thus attempt to fulfill their needs for the common welfare. Hence, the main aim of higher education institutions (HEIs) that serve a similar purpose is to inspire students, as well as retain and increase student loyalty. However, student satisfaction is not enough because they need to amuse the student, which is also very important. The students are assumed to be the main stakeholder in any organization, and without students, educational institutions cannot be prosperous (Shaaban & Ghoneim, 2017). Usman (2017), in their research, explained that currently, HEIs business has been witnessing rapid growth, which is in line with the trends in other service areas (Kahraman & Koray, 2020).

While drawing attention to international service sector, it is found that the trade-in global service sector accounts for approximately US\$66 billion and signifies about 4% of the exports in total (Usman, 2017). However, globally the business in HEIs is multidimensional. The HEIs mainly focus upon cross-border migration of international students, and it remains the most important aspect of HEIs business around the globe (OECD, 2014). Additionally, the development in international students' migration is steered by demand and supply. On the supply side, international HEIs face the problem of reduction in financial support, which has forced them to offer their programs to international students with no concessions. On the other hand, on the demand side, students' requests are received for more programs and international institutions for acquiring higher qualification because, in their opinion, global education is an asset that distinguishes them and will provide a competitive advantage to them in the employment marketplace. It is also observed that a marketization of HEIs results due to the demand and supply forces. However, it is restricted at both local and international levels since HEIs are attempting to accept foreign students' request to get admission and earn their loyalty (Jupiter et al., 2017; Kocak & Bozkurt Bostanci, 2020).

The current study aimed at analyzing students' loyalty on account of the promotion of student commitment and service quality in the educational sector of Indonesia. The Indonesian economy is the largest in Southeast Asia and is an emerging upper-middle-income country. It is the 15th largest economy in the world as per nominal gross domestic product (GDP) and seventh largest country in terms of GDP (PPP). The Indonesian education system is the fourth largest in the world. According to the statistics of 2018, the literacy rate in Indonesia is 95.66%, 97.33 male literacy rate, and 93.99% female literacy. Primary enrollment is 93.5%, secondary enrollment is 85.9%, and post-secondary enrollment is 36.31%. The education sector of Indonesia has more than 50 million students, 3 million teachers, and 300,000 schools. Education from primary to High school level is compulsory. The education at primary and middle school levels is free while high education is provided at very small fee.

The Indonesian education system has gained the reputation of being the world's fourth-largest education system for its high-quality services to students. The Indonesian educational institutions not only provide

theoretical knowledge to students but also pay heed to the physical and mental fitness of the students and teach them via recreational activities. In most educational institutions, students are found to be committed to the educational institutions and giving preference to educational services. For this reason, the number of higher education institutions in Indonesia has increased. Figure 1 presents the situation graphically.

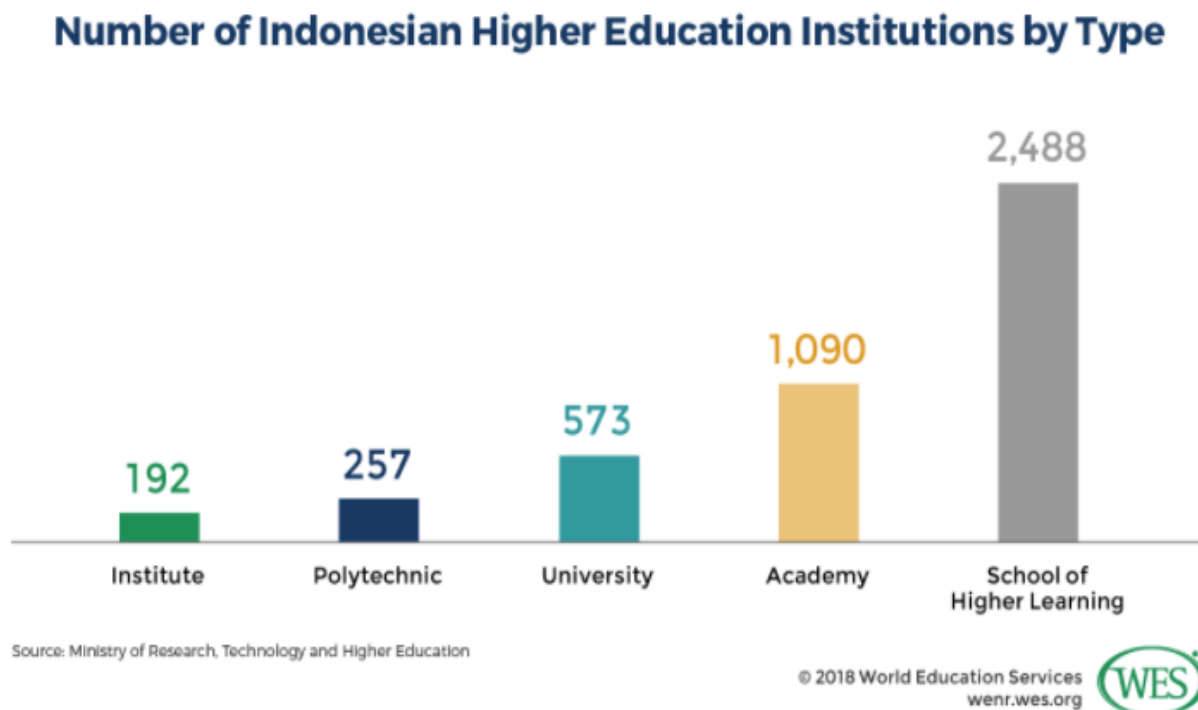


Figure 1: *Number of Higher Education Institutions in Indonesia*

Tan and Gosling (2016) claimed that the international education market has caused numerous HEIs to establish international marketing strategies to improve and attract the enrollment of international students. Recently the marketing of educational services was confined to only the local level (Gómez Soler et al., 2020) whereas, in current years, the HEIs' interest has broadened to international marketing because they are now trying to employ potential global students. This interest has also been adopted at the local level, but in many countries, it is limited to the individual level where the locals are motivated to study in their own countries and also realize the significance of export earnings. According to Spencer and Dauber (2019); (Tomteberget & Larsson, 2020) countries like the UK, the USA, New Zealand, and Australia have implemented both local and international marketing strategies for advertising their education services to attract and maintain student loyalty in their corresponding HEIs, and other countries also imitated this.

Moreover, in terms of students' loyalty and retention, the rendered services or students' experiences in HEIs are deemed as a key component, a majority of the students usually fail during the first year of their course or leave because of dissatisfaction with the service quality by the institution and also due to low rank of HEIs (Pierszalowski et al., 2018). In the meantime, an earlier study has revealed that more than 50% of HEIs students dropped out go the college in their first year (Pidgeon & Pickett, 2017). Therefore, considering HEIs from a business enterprise perspective, the student's satisfaction is very important since it significantly influences university reputation and image, recommendation, student retention, and trust. Thus, the HEIs must take the first year of students as a valuable opportunity to build and maintain student loyalty. Hence, there is a need to understand the relationship between student's perception and HEIs (Cheng, 2020; Matthews & Mokoena, 2020).

In the same way, since the HEI sector has been faced with global competition (Meyer & Hamilton, 2020), student loyalty and retention are currently considered important factors in HEIs (Kaushal & Ali, 2019a). In

addition to this, the demand for HEIs has increased among international students, so HEIs offer online distance learning programs for international students to provide educational services as per their demand. Thus, until recently, the international HEI's have enrolled around 3.6 million foreign students, which shows an 8.6% increase in the previous year's admissions. However, based on the previous tough competition, HEIs have done remarkably well to attract and enhance student loyalty because HEIs focus on both local and global students (Kaushal & Ali, 2019a). One of the highlighted features of service orientation in HEIs is the involvement of their students in the development of services (Cesarec et al., 2020). Hence, the learning process in HEIs consists of information exchange and a relationship between a teacher and a student.

The current research has reported that a student acts as a co-producer and a customer of experience in HEIs (Salunke et al., 2019). Additionally, the experience of a student facilitates HEIs to fully understand the relationship between student and a university, and the reason is that the student act as a key partner of HEIs in terms of service experience and processes (Yulong & Jing, 2020). Due to sheer competition in attracting students, the factors like university image, relationship marketing, and service quality have emerged as the important student loyalty predictors in HEIs (Xu et al., 2018). Moreover, trust and commitment play a significant role in inviting, retaining, and predicting student's loyalty in universities. Similarly, the transactional marketing concept deals with the connection among partners, and the relationship marketing concerns mainly about the creation and retention of student loyalty (Chen, 2016; Lee, 2020).

In this study, the hypothesized research framework shows a significant positive and a direct relationship of university image, relationship marketing, and service quality with student loyalty, which is in line with previous research findings. Some prior research studies have reported that service quality, trust, commitment, and university image result in student loyalty (Akman & Özdemir, 2019; Bernarto & Canoy Jr, 2017; Luo et al., 2019). The past literature also shows empirical evidence about the insignificant and negative relationship between student loyalty, relationship marketing, and service quality in HEIs. However, only satisfaction may not be adequate to provide loyalty to service providers, as a few previous studies have reported some cases where satisfied consumers became disloyal to HEIs or changed the institution/organizations (Wong et al., 2016).

Barton et al. (2017) utilized the social exchange theory (SET) which referred to social and behavioral exchange, and which offered both material and non-material benefits to the involved partners. This theory further explains that individual students can join new organizations with their own willingness while at the same time also keep the existing one thinking that such behavior can itself be redeemed. Such types of associations are characterized by mutual adoption, joint planning, and high cooperation in case of relationship complexity or unforeseen relationships (Huo et al., 2016). Therefore, mutual adoption and cooperation are considered as the characteristics of commitment, trust, service quality, and university reputation, which would likely affect student loyalty through the role of student satisfaction as a mediator. If the service quality provided by HEIs satisfies the student, he/she will suggest this university to other bright students and will choose this institution again in future for further studies (Messina & Zimmerman, 2018).

Integrating Expectation-Disconfirmation theory (EDT) is the most extensively used Technology Acceptance Model (TAM), which identifies the underlying stimulus behind the continuance of student intentions (for example, the purpose of using system) (Susanto et al., 2016). Susanto et al. (2016) explain how and why attitudes and beliefs for using IT have changed with time since more experience is gained by customers/students when they keep on using the target system. Accordingly, the outcome of these two studies in context to EDT explains the satisfaction of Information System (IS) usage, which serves as a powerful predicting variable for loyalty and continuance intention. Additionally, they further discussed role of satisfaction and disconfirmation in changing students' beliefs and attitudes over time. Lee et al. (2016) observed student loyalty as an outcome of satisfaction. When a student is satisfied due to HEIs technological advancement, it would result in a favorable impact on positive disconfirmation and negative disconfirmation when they are not satisfied; in such a scenario, technology innovation will mediate the relationship between student loyalty and satisfaction in HEIs (Compagnucci & Spigarelli, 2020). Nowadays, student loyalty is an

essential element for student success and needs to be investigated frequently. Bhatla (2017) suggested to investigate student loyalty frequently to assess the university performance. Student loyalty is also a significant issue in the universities of Indonesia that requires a deep investigation (Ahmed et al., 2020).

In order to fill these gaps and solve the student loyalty issue, the current study aimed to examine the student's commitment and services quality on the student loyalty and goal of the research also include the investigation of mediating impact of technology innovation among the nexus of students' commitment, services quality and student loyalty. Many researchers and scholars have debated on the issue of student loyalty and examines the elements which contribute to the students' loyalty. The influence of student commitment and service quality on the development of student loyalty have been addressed in past literature separately. A very few studies like Snijders et al. (2020) have dealt with the impact of student commitment and service quality on the development of student loyalty (Birimkulova et al., 2020).

Based on these theoretical explanations and literature review, a few hypotheses needed to be developed for empirical testing and validation of results. This study therefore built seven constructs, viz., university image, service quality, trust, and commitment as exogenous variables, student loyalty as an endogenous construct and added technology innovation as the mediating variable, and student satisfaction as the mediator. The current study is going to be a great contribution to the domain of education development as it not only elaborates the significance of students' loyalty but also explores the impact of students' commitment and quality of services provided by education Institutions on the development of customer loyalty.

Hypothesis Development

Past research studies have inspected the influence of service quality and waiting time on repurchase and satisfaction in fast-food restaurants (Forciniti & Mazzulla, 2016), which provided the opportunity to thoroughly study the nature of relationship between waiting time, student satisfaction, frequency to repurchase, and other factors of service quality in fast-food restaurants (Kozubikova & Kotaskova, 2019). Waiting time and quality features such as seat availability, staff response, ambience, food variation, and quality significantly impact student satisfaction (Isabel et al., 2015). These factors facilitate managers to understand those important factors which determine student satisfaction and student loyalty student satisfaction. Wen (2016) stated that in the service organizations, a hypothesized student loyalty model was examined in professional organizations and found that for professional organizations, the instrument of SERVQUAL and its five quality aspects provide an adequate measuring scale for service quality.

Annamdevula and Bellamkonda (2016) observed that student satisfaction depends upon the provided service and the attained benefits from the services. They argued that positive student satisfaction was considered to be a common means to develop customer/student loyalty in the context of service industry. Therefore, student satisfaction and service quality have apparently been considered as same concepts. However, the difference among student satisfaction and service quality had given rise to a new debate. In a prior study, the link between service quality, motivation to purchase, and satisfaction level of customer has been established and reported a positive impact of service quality on customer satisfaction (Migdadi et al., 2017). Moreover, the study also found the influence of customer satisfaction on the motivation to purchase and thus suggested its linkage to consumer loyalty (Tolusso, 2019). According to Usman (2017), there is a broader scope of customer satisfaction as compared to service quality because customer satisfaction includes various components like price, quality of a product, service quality, personal and environmental factors (Park & Lee, 2021). Hence, it is important to move along quality service through student satisfaction and ultimately reaching student loyalty.

The theoretical framework of the current study was obtained from previous empirical findings and theoretical gaps highlighted in the literature. Two underpinning theories were used to formulate a theoretical framework of this study, which explained the study constructs. This study focused mainly on its theoretical

contribution with the help of supporting empirical evidence concerning Expectation-Disconfirmation theory (EDT) and the Social Exchange Theory (SET) since both these theories act as integrating variables in the linkage among student loyalty and student satisfaction. The mediating variable of technology innovation has been borrowed from Hue (2019), who defined technology innovation as a strategy to improve technology, managerial or strategic ideas, processes, products, or rendered services. Hence, the role of technology innovation was taken as a mediating variable to assess student loyalty and student satisfaction relationship in the HEIs in Indonesia.

There is a general consensus among scholars concerning the important contribution of university image on student loyalty, which has also been documented in previous studies through valid observation and empirical verification (Park & Ghauri, 2015). In another study, Kang and Shin (2016) raised the question of university reputation and institutional image to signify the products and services of an HEI. They tested how relationship offered the initial understanding to the students about HEIs mission, vision, and value, and as a result, reduced uncertainty among students while choosing an HEI institution and helped in making a purchase decision (Khan, 2018). Furthermore, the reputation of a university has also been considered as a benchmark for meeting the expectations of students in terms of quality of graduates, university rank, reputation, and goodwill of product and service quality of HEIs. Plé (2016), for instance, explained that the influence of university image on student experience would positively affect student satisfaction. In the same way, students with a positive opinion about university repute would absolutely evaluate its services and product, based on their opinion. Based on the above research findings, the following hypothesis was proposed:

H1: Student Quality (SQ) has a significant impact on the Student Loyalty (SL).

Yan et al. (2016) suggested that the dimensions of relationship marketing in HEIs play a significant role in establishing an effective marketing strategy to retain and attract student loyalty, particularly in the long run. Rezaei et al. (2016) also empirically examined that commitment positively influenced loyalty. However, the committed students never changed the institution, or if they changed the institution, it only occurred due to the change in the fee or when the institution liked to spend more on students who were less committed towards the institution. Hence, there existed a positive link between student loyalty and commitment. A link between customer loyalty and institutions has also been hypothesized. A few researchers (Haghkhah, 2016; Usman, 2017) have also found the impact of commitment on student loyalty and student retention. In addition, earlier studies have also found a linkage between student loyalty and student commitment in HEIs. Pham et al. (2019) found that student loyalty and student commitment are positively related through perceiving increased service quality in HEIs. Therefore, the second hypothesis of the current study was proposed as:

H2: Student Commitment (SC) has a significant impact on the Student Loyalty (SL).

It has often been seen that after the implementation of technology innovation, HEIs became an entirely new service or switched over to a novel process of delivering services. Such technological innovations in HEIs and their usefulness to the students may significantly contribute to improving perceived value and student satisfaction, thereby resulting in customer loyalty. Previous surveys and observations on students' reaction in response to technological innovation have produced both favorable and opposing outcomes due to which no conclusion can be deduced (Dobbins & Denton, 2017; Khechine & Lakhali, 2018). Hofenk et al. (2019) found positive effects while Liu and Atuahene-Gima (2018) and Srinivasan and Swink (2018) found negative effects. Additionally, Annamdevula and Bellamkonda (2016) found that there was a dearth of studies on student loyalty construct, and studies have emphasized mainly on variables like customer acceptance and satisfaction, which are associated with student loyalty. Therefore, there existed an uncertainty regarding students' response towards new services and products. Moreover, different results have appeared due to the existence of various conceptualizations and definitions due to the variety of industries, multiple size locations, different methodologies, instrument choices, research designs, and statistical tools. Therefore, this study premised that

visible actions must be taken by HEIs to examine how technological innovations helped students know whether institutions cared about them. The following was proposed hypothesis:

H3: Technology Innovation (TIN) has a significant impact on the Student Loyalty (SL).

Through technology innovation, a relationship establishes between student loyalty and student satisfaction in HEIs. A review of the past studies has shown that loyalty comes when the student has a satisfactory experience with the institution. Technology Innovation only enhances customer benefits, and as a result, the satisfaction level and loyalty of a student improve. Hence, student loyalty can only be achieved through student satisfaction when technology innovation plays its role as a mediator in this relationship. Therefore, the following hypothesis was proposed for this study:

H4: Technology Innovation (TIN) mediates the relationship between the Student Quality (SQ) and Student Loyalty (SL).

Technology Innovation could also modify student commitment towards student loyalty. Mixed outcomes were obtained from the literature review, which proposed the need for a potential mediating variable, which must determine the relationship between the dependent variable and the independent variables (Zhang et al., 2019). There is no firm evidence in the previous studies that student loyalty may be guaranteed through student satisfaction. However, it is premise in this study that it completely depends upon the HEIs level of technological innovation. Therefore, in order to strengthen this linkage, further testing was needed since student satisfaction alone cannot ensure student loyalty. To achieve this, the relationship between student and student satisfaction in HEIs must be moderated (Annamdevula & Bellamkonda, 2016). Hence, the hypothesis was built as follows:

H5: Technology Innovation (TIN) mediates the relationship between the Student Commitment (SC) and Student Loyalty (SL).

Method

PLS path modeling was used to analyze the theoretical model in this study. There are different reasons why this technique was known as appropriate for analyzing the data. The main reasons for employing this technique was that compare to the other techniques or software, PLS-SEM provided correct and logical results (Ramayah et al., 2018). Secondly, there was no restriction regarding the normal distribution of data in PLS-SEM. Ong and Puteh (2017) suggested that PLS-SEM was an exceptionally influential technique that tested the multiple relations at the same time in the studies of social and behavioral sciences. This study distributed 310 questionnaires for data collection, out of which 260 questionnaires were received back, 15 were dropped because of some missing information. A total of 245 questionnaires were used for data analysis, with the response rate of 79%. Singh and Prasad (2018) recommended a minimum response rate of 30% in survey-based research, which was adequate for this study.

Results

For hypothesis testing and evaluation of relevance and significance of indicators, the bootstrapping procedure was utilized. Bootstrapping is a resampling procedure that can drive a significant number of subsamples from initial data and evaluate a model for every subsample (Hair et al., 2017). For hypothesis testing of the present study, the structural model (SM) was also used by utilizing the PLS-SEM software. The PLS analysis facilitated the determination of indicators relevance and loadings of specific constructs and assessment of a measurement model. The consistency of the measurement construct was determined by the reliability test, whereas the ability of an instrument to evaluate the construct was examined by the validity test (Hair et al., 2016).

The relation between the latent and observed construct was determined by the outer model. In addition to this, it also estimated convergent and discriminant validity of the instrument, which provides construct validity assessment (Hair et al., 2017). Table 1 and Figure 2 illustrate the measurement model and outer loadings of the constructs of the study.

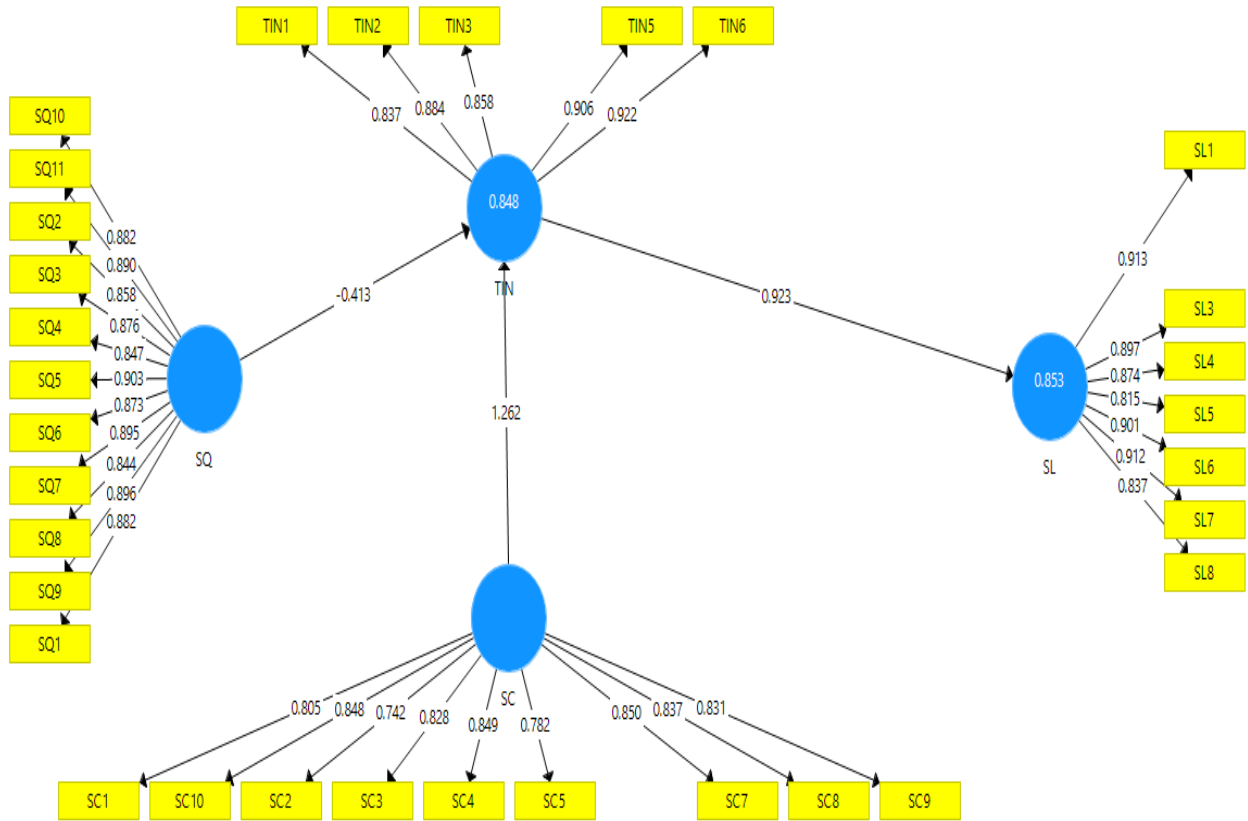


Figure 2: Measurement Model

Table 1: Outer Loadings

	SC	SL	SQ	TIN
SC1	0.805			
SC10	0.848			
SC2	0.742			
SC3	0.828			
SC4	0.849			
SC5	0.782			
SC7	0.850			
SC8	0.837			
SC9	0.831			
SL1		0.913		
SL3		0.897		
SL4		0.874		
SL5		0.815		
SL6		0.901		
SL7		0.912		
SL8		0.837		
SQ10			0.882	

SQ11	0.890	
SQ2	0.858	
SQ3	0.876	
SQ4	0.847	
SQ5	0.903	
SQ6	0.873	
SQ7	0.895	
SQ8	0.844	
SQ9	0.896	
TIN1		0.837
TIN2		0.884
TIN3		0.858
TIN5		0.906
TIN6		0.922
SQ1	0.882	

Note: Student Quality (SQ); Student Commitment (SC); Student Loyalty (SL) and Technology Innovation (TIN)

The individual item reliability was examined with the assessment of outer loadings of constructs as seen in Table 1. In social sciences research, there is a frequent issue of weak outer loadings (Henseler, 2018); hence, items which had low loadings were deleted in order to increase the value of average variance extracted (AVE) and composite reliability (Hair et al., 2016). The convergent validity is the level at which the similar idea of a construct is evaluated by multiple items. This study followed these criteria recommended by Hair et al. (2016), related to AVE, composite reliability (CR), and factor loadings for the establishment of convergent validity.

In the first step for the evaluation of internal consistency reliability of constructs, composite reliability was used (Hair et al., 2016) followed by examining the item loadings for all items. For the multivariate analysis, the acceptable outer loading value must be greater than 0.7 (Hair et al., 2016; Hair et al., 2017; Henseler, 2018). The values of composite reliability in this study were between 0.83 to 0.92, which were greater than the suggested value of 0.7.

Table 2: Reliability

	<i>Cronbach's Alpha</i>	<i>rho_A</i>	<i>CR</i>	<i>(AVE)</i>
SC	0.939	0.946	0.949	0.672
SL	0.951	0.952	0.960	0.773
SQ	0.970	0.971	0.973	0.769
TIN	0.928	0.931	0.946	0.778

The value of AVE showed the total change in indicators because of the latent construct. Table 2 presents the values of AVE which suggests that all values are greater than the suggested value of 0.5 (Hair et al., 2016). The DV was the level at which the items were distinguished among the different variables or with the assessment of correlation, different concepts were evaluated between the overlapped variables.

Table 3: Validity

	<i>SC</i>	<i>SL</i>	<i>SQ</i>	<i>TIN</i>
SC	0.890			
SL	0.886	0.879		
SQ	0.878	0.709	0.877	
TIN	0.700	0.623	0.695	0.882

After estimation of the outer model, the inner model was evaluated in the next step to test the hypotheses

of the study. Table 3 and Figure 3 determine the t-values and path coefficients in PLS.

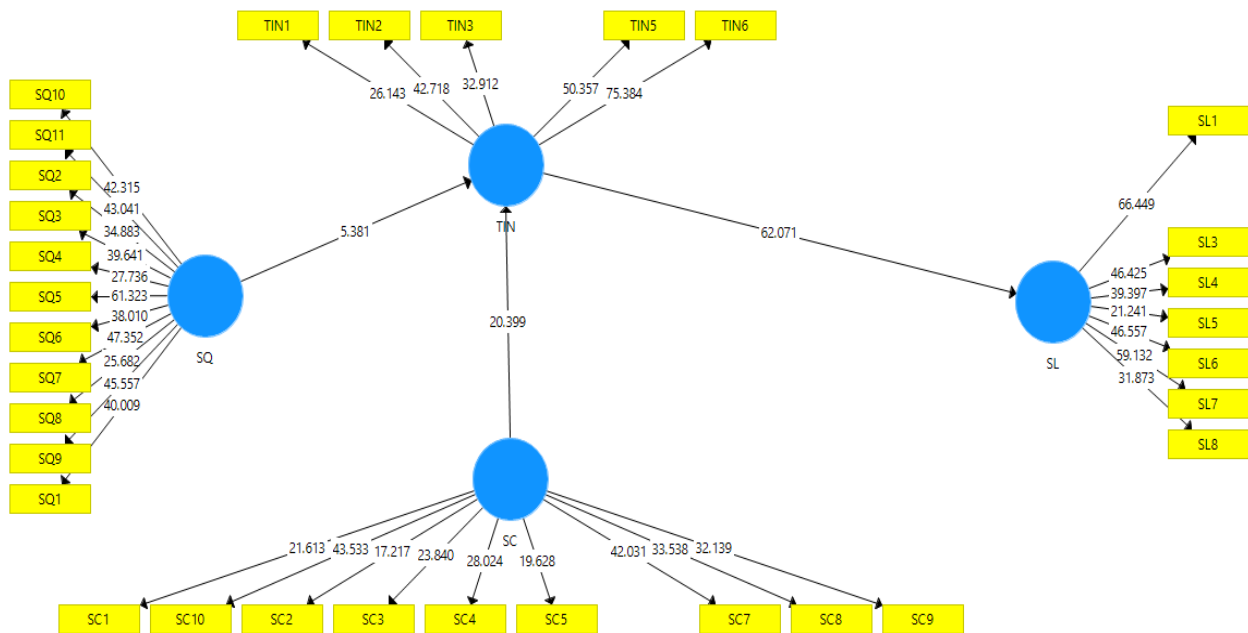


Figure 3: Structural Model

After checking the PLS algorithm, the assumed relations between different constructs were represented by path coefficients, as shown in Figure 3. A total of 500 resamples were taken in the bootstrapping procedure for determining the significance of path coefficients. The p-values, t-values standard errors, and the values of standardized path coefficient are shown in Table 4 and Figure 3.

Table 4: Direct Relationships

	(O)	(M)	(STDEV)	(O/STDEV)	P Values
SC -> SL	1.166	1.152	0.065	18.055	0.000
SC -> TIN	1.262	1.247	0.062	20.399	0.000
SQ -> SL	-0.382	-0.365	0.072	5.292	0.000
SQ -> TIN	-0.413	-0.395	0.077	5.381	0.000
TIN -> SL	0.923	0.923	0.015	62.071	0.000

Consequently, the findings revealed that technology innovation played the role of a mediator between student loyalty and student satisfaction in the HEIs in Indonesia and thus support the Hypotheses of the study.

Technology innovation also acted as a mediating factor because it helped to enhance the students' loyalty, and it helped students by providing access to online material. High technological innovation in HEIs helped in achieving student loyalty as compared to the institution with low technological innovation. Thus, technology innovation facilitated establishing a linkage between student loyalty and student satisfaction and provided a competitive advantage to the HEIs for attracting and retaining more students and building student loyalty. Table 5 presents the mediation relationships.

Table 5: Mediation relationships

	(O)	(M)	(STDEV)	(O/STDEV)	P Values
SC -> TIN -> SL	1.166	1.152	0.065	18.055	0.000
SQ -> TIN -> SL	-0.382	-0.365	0.072	5.292	0.000

The coefficient of determination was represented by R-square (Figure 4), which indicated the difference in the independent variable because of the predictor variable (Hair et al., 2016; Hair et al., 2017; Henseler, 2018). Naala et al. (2017) have recommended the minimum accepted value of R-square to be 0.15.

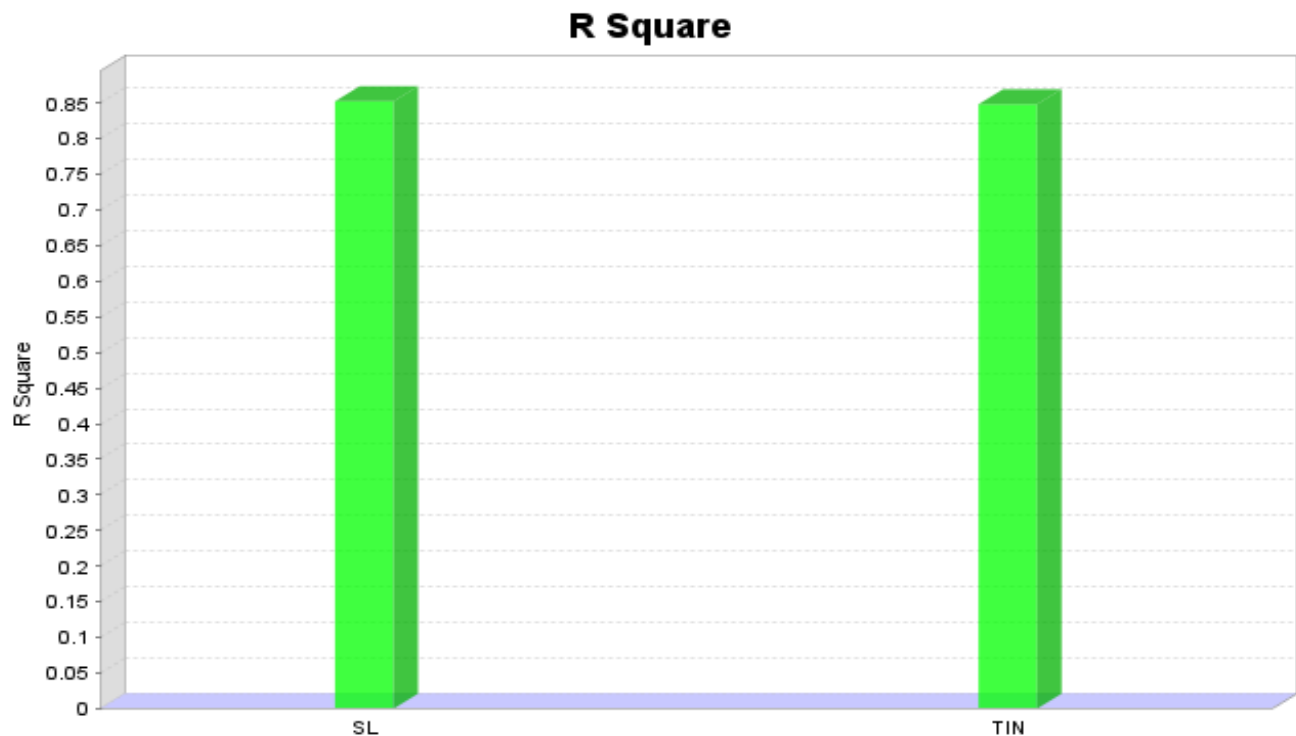


Figure 4: R-Square

Figure 4 shows that a relative effect in the endogenous latent variable due to the exogenous variable could change the R-square, which is known as effect size (Hair et al., 2016). According to the study of Henseler (2018), if the values of R-square are 0.35, 0.15 and 0.02, they have a strong, mediocre, and weak effect respectively.

Discussion

The study results indicated that student commitment had a positive association with student loyalty. These results are in line with the past study of Paul and Pradhan (2019) who stated that when students had a great desire to study, or showed a passion for learning more or to acquire more experience in education, they went through their courses and attended exams wholeheartedly showing a serious attitude. Thus, the commitment of students towards learning and education enhanced students' loyalty. These results are also in line with the previous study of Pham et al. (2019), which elaborates that when the students were committed to the institutional educational institution and the relevant subject, they retain the same institution in search of education. The study results also revealed that the service quality provided to students had a positive association with the development of student loyalty. These results are also in line with the past study of Kaushal and Ali (2019b), who elaborated that the quality of services provided by the educational institution to students like good teaching environment, use of modern technology and internet while teaching, effective syllabi, good quality infrastructure, and arrangement for co-curriculum activities created a bonding between students and the institution, which helped in retaining them.

It was also found out that technology innovation effectively enhanced student satisfaction which resulted

in student loyalty towards HEIs. However, technology innovation was found related to both student satisfaction and student loyalty. This proved that technology innovation in HEIs showed a significant positive relationship with student loyalty and student satisfaction. Therefore, it was concluded technology innovation practices improved student satisfaction and learning experience and added value to students' loyalty, which provided a greater competitive advantage to HEIs over their competitors around the globe. This occurred mainly because students recommended HEIs to others and helped in retaining the existing ones. Students' recommendation clearly indicated a student's positive experience with HEIs. Hence, the higher was the level of student loyalty achieved by HEIs, the more will be the recommendations by students. It was also safe to assume that technology innovation added value to service, which affected the satisfaction level of students and the students' loyalty. When a student was satisfied, it resulted in establishing a solid relationship between HEIs and students; consequently, such students would serve as goodwill ambassadors.

The findings of the current study also hinted those students did not only want to get the best utility through service, but they also wanted to get an uninterrupted provision of innovative technology to compete with the other students of different HEIs. Therefore, through the provision of innovative technology, the service provider could provide benefits to their students for better loyalty. This proved that technology innovation was a significant mediator between student commitment and student loyalty. These results are in line with the past study of [Gholami et al. \(2018\)](#), which showed that when students are committed to the educational institutions, they cooperate with the administrators and teaching staff to adopt innovation in technology. If the innovation-based technology is used in an educational institution to administer the institution, teach students, and to provide co-curricular education, students feel facilitated, get better education, and can develop specific cognitive and physical skills. This motivated student to develop a good image of the institution, retain themselves with the institution, and become a mouthpiece of the institution.

Moreover, the study results also indicated that technology innovation played a mediating role between the service quality and the development of student loyalty. These results are in line with the past study of demonstrated that the intention and ability of the educational institution to provide good quality service according to the requirements of the parents, forced the administration to bring innovation into the technology to provide curricular and co-curricular education.

Conclusion

The current study tested student quality and student commitment as independent variables, technology innovation as a mediating variable, student satisfaction level as a mediator, and student loyalty as an endogenous construct in the context of HEIs in Indonesia. These variables and their associations so far had been neglected in the previous studies and did not draw the attention of researchers. The current research attempted to bridge this gap with technology innovation as a mediator for developing a deeper understanding of student loyalty's influence on the linkage between loyalty among students and student satisfaction in Indonesian HEIs.

The study concluded that student commitment and service quality of the university were the essential elements for student loyalty, which are perfectly managed by Indonesian education institutions. However, the study recommended that institutions should increase their focus towards these elements to further enhance student loyalty and university performance. The study also concluded that technology innovation greatly explained student's loyalty to HEIs. It is therefore suggested that regulators and university authorities should develop policies related to the technology innovation adoption to enhance student commitment and student loyalty.

The current study faced a few limitations which may be addressed to in future studies. First, the study could elaborate the role of only one factor, i.e., student commitment and service quality in developing high student loyalty. Several other factors like traditional elements, financial resources, and assessment procedures, and like may also affect student loyalty, but all these factors could not be taken up in a single study. It is

recommended that future studies should examine some of these factors in the light of student loyalty. Secondly, this study analyzed student loyalty in the Indonesian educational sector, which is an emerging upper-middle-income economy. The findings of this study would not be equally valid and applicable in lower-middle-income countries or developed countries. Future studies may analyze student loyalty in different economies to generalize the findings of the study.

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