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**FACTORS INFLUENCING STUDENT CITIZENSHIP BEHAVIOR (SCB)
AND LONG – TERM STUDENT RELATIONSHIP ORIENTATION (LRO)
IN VIETNAMESE EDUCATION SECTOR**

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Abstract

Student citizenship behavior (SCB) is regarded as one of the most significant variables influencing student orientation and the development of long-term relationships between students and higher educational institutions (LRO). The literature confirms that the issue of SCB in the higher education sector is a challenge that must be addressed. Hence, this study aims to examine the antecedents and outcome of SCB by applying linear and non-linear relationships based on the partial leastsquares structural equation modeling approach (PLS-SEM) and the artificial neural network model (ANN) through building constructs on the stimulus-organization-response framework (SOR). In addition, data was gathered from 185 students from Ho Chi Minh City's universities and colleges. The study's findings indicate that students' stimuli, such as student satisfaction, trust, and loyalty, have a favorable impact on the expression of their citizenship behaviors, such as advocacy, offering feedback, and helping others. In addition, helping others through SCB has a beneficial influence on LRO for higher educational institutions. Finally, through the ANN model, student trust is the most prominent driver of feedback and advocacy. The results of this research provide important insight into the factors that shape the focus and growth of organizations in Vietnam's education sector through long-term collaborations. In addition, this research sheds new light on the impact that students' actions have on SCB, allowing for the development of concrete recommendations for school administrators concerned with fostering the formation of lasting relationships among their students.

Keywords): long – term student relationship orientation, Vietnam higher-education, student citizenship behavior, SEM-ANN approach

1. Introduction

Higher education is becoming increasingly competitive, both domestically and internationally, in order to recruit and retain students. Consumers in the education sector are now more aware of exactly what they want. Therefore, demand for these services is comparable to demand for commercial firms. Customer service has moved to the center of management operations, and it now serves as the foundation for competitiveness in the higher education industry. Universities and colleges can begin by promoting their offerings in a proactive rather than reactive manner. Additionally, in order to recruit and retain students, they should strive to promote student satisfaction, loyalty, and trust while decreasing student discontent. This can only be accomplished if all services that contribute to "academic life" meet an appropriate standard. It is claimed that in order to solve difficulties such as student retention and participation in higher education, student expectations for quality must be satisfied (Shah et al., 2011).

Numerous countries' educational systems have been the subject of numerous investigations. For instance, Dinh (2021) analyzed the connection between educational service quality and educational outcomes in Vietnam from the perspective of student satisfaction. The purpose of Nguyen and Huynh's (2013) study is to assess service quality in the setting of Vietnamese universities. Furthermore, Nagy & Marzouk (2018) looked at what influences Egyptian college students' civic engagement, and they studied the value of customer service in higher education in Uganda (Wahab, 2016). Students' perspectives as consumers who may participate in many forms of extracurricular activity at school have also been the subject of numerous academic investigations. Several theories and models (SERVQUAL) are used to support and form the basis for the wide range of research themes in the field of education, including but not limited to: customer satisfaction, customer trust, customer citizenship behavior (CCB), total quality management (TQM), customer relationship management (CRM), theory of planned behavior (TPB), etc. From this standpoint, two main issues must be considered. First, theoretically, previous student behavioral outcome studies, such as student satisfaction, loyalty, and trust, have failed to further investigate the nature and antecedents of customer citizenship behavior and then form lasting relationships with higher education institutions. Second, practically, most of the previous studies investigated student behavioral outcomes by conducting linear relationships based on partial least squares structural equation modeling (PLS- SEM). However, the non-linear and non-compensatory relationships of student behavioral outcomes were neglected (Albahri et al., 2022). Therefore, the purpose of this research study is to analyze the connection between student satisfaction, loyalty, and trust and their subsequent participation in forming long-term relationship orientation through student citizenship behavior using the SOR framework. Importantly, this study uses the SOR framework, which is most commonly used to understand behavioral outcomes in many fields but has never been used in a higher education setting. This study also adopted a dual-stage PLS-SEM and artificial neural network (ANN) method to uncover the antecedents of student citizenship behavior and long-term relationship orientation in a higher education setting.

2. Literature Review, Hypotheses development, and Methodology

2.1 The stimulus-organism-response (SOR) framework

The SOR model of psychology uses a three-step process to explain how people act. Perceptions of external or environmental stimuli (S) affect the individual's emotional and cognitive states (O), which in turn drive conscious or unconscious responses (R) (Chan et al., 2017).

In this study, the authors employ the SOR model to provide a concise and organized way of investigating the relationships among the three constructs of student citizenship behavior (advocacy, feedback, and helping) as the organism (O), student satisfaction, student loyalty, and student trust as the stimuli (S), and long-term relationship orientation as the response (R). Therefore, this research makes a contribution by validating a model that widens the SOR paradigm's applicability to provide a theoretical framework for the study of student behavioral outcomes in higher educational settings, within which we investigate the impact of variables that have not been thoroughly investigated before.

2.2 Hypotheses development

2.2.1 Customer Satisfaction (SA) and Customer Citizenship Behavior (CCB)

SA is a psychological and constructive appraisal of the sacrifices people make by paying for services and products compared with the benefits they obtain from the time they buy to the conclusion of the product life cycle or consumption (Chitty et al., 2007). Groth (2005) defines CCB as "voluntary and discretionary customer engagement that is not directly or explicitly prescribed or rewarded but adds to higher quality service and improves service organizations' overall performance." Yi & Gong (2013) and Groth (2005) defined three parts of CCB: feedback (FB) (consumer recommendations to improve service delivery), advocacy (AD) (recommending a company or an individual to others, such as friends or family), and helping (HP) (a readiness to advise or assist

other customers who are in need of assistance).

Psychological, economic, commercial, marketing, housing, and tourism studies use SA constructs (Jiang et al., 2017; J. Kim et al., 2017). SA's impact on CCB has been studied extensively. Bettencourt (1997) and Yi & Gong (2008) found that SA affects CCB. Groth (2005) found a stronger connection between SA and CCB than customer socialization. Anaza (2014) found that online buyers' affective satisfaction affected CCB. Chen et al. (2015) and Ponnusamy et al. (2015) found that e-satisfaction greatly affects e-customer citizenship behavior in virtual communities. The following hypotheses follow:

H1a. SA positively affects advocacy (AD).

H1b. SA positively affects providing feedback (FB).

H1c. SA positively affects helping (HP) other students.

2.2.2 Customer Loyalty (LY) and Customer Citizenship Behavior (CCB)

According to Oliver (1999), LY is the commitment of buyers to purchase certain products, services, and brands of an organization over a continuous length of time, regardless of competitors' new products and advancements, and these consumers are not forced to switch. Additionally, the LY construct has been used in studies in a variety of industries, including omnichannel retail, hospitality, non-tech, banking, etc. According to Nagy and Marzouk (2018) and Macintosh (2002), LY has a substantial and good connection with the citizenship dimensions of assisting other customers and the firm. Ponnusamy et al. (2015b) discovered that LY is the most important predictor of online consumer citizenship activity. However, another line of research revealed that the empirical outcomes were not the same. LY has no influence on helpful citizenship behavior toward other customers and has no effect on helpful citizenship behavior toward the business (Bartikowski and Walsh, 2011). Anaza and Zhao's (2013) findings contradicted Bartikowski and Walsh's (2011) findings that loyalty has a significant influence on customer citizenship behavior, which benefits both the business and other consumers in an online purchasing scenario. Thus, this leads to the following hypothesis:

H2a. LY positively affects AD.

H2b. LY positively affects providing FB.

H2c. LY positively affects HP other students.

2.2.3 Customer Trust (TR) and Customer Citizenship Behavior (CCB)

TR is considered "a party's readiness to be exposed to the acts of another party based on the expectation that the other would execute a certain action significant to the trustor, regardless of the ability to monitor or control that other party" (Mayer et al., 1995). Several studies have shown a positive link between TR and CCB. Empirical results by Wingwon and Montree Piriyaikul (2010) found that TR has a direct and beneficial impact on CCB. Similarly, Zhang et al. (2013) developed a theoretical framework in which community cohesion is a critical antecedent of CCB in a consumer virtual community. Nagy & Marzouk (2018) also discovered that TR had a greater impact on CCB than satisfaction, reputation, and commitment. Similarly, Dirks and Ferrin (2002) found that confidence in leadership had a favorable influence on both employee commitment and OCB in a meta – analysis of research. Barzoki and Rezaei (2017) also found a significant and positive association between organizational trust and OCB. As a result, the third hypothesis of this research is:

H3a. TR positively affects AD.

H3b. TR positively affects providing FB.

H3c. TR positively affects HP other students.

2.2.4 Long – term relationship orientation (LRO) between institutions and the students

LRO has been described as a customer's intention to repurchase a service or product while keeping a long-term connection with a firm (Barry et al., 2008). A buyer in a positive emotional state, according to Ganesan (1994), will have a relationship with the provider, expect a long-term relationship, and want collaboration and transaction enhancement. Moreover, according to previous research, M. Kim et al. (2020) show that CCB in marketing may be used to establish a LRO between a company and its clients. Economic, charitable, and environmental CSR initiatives in the foodservice business improved both corporate image and LRO (Jeon and Yoo, 2015). Besides that, Zahra (2003) also discovered that increased external orientation, decentralization, and a LRO were positively connected with entrepreneurship. Therefore, the following hypothesis was formulated:

H4a. AD positively affects the LRO between institutions and the students.

H4b. Providing FB positively affects the LRO between institutions and the students.

H4c. HP other students positively affects the LRO between institutions and the students.

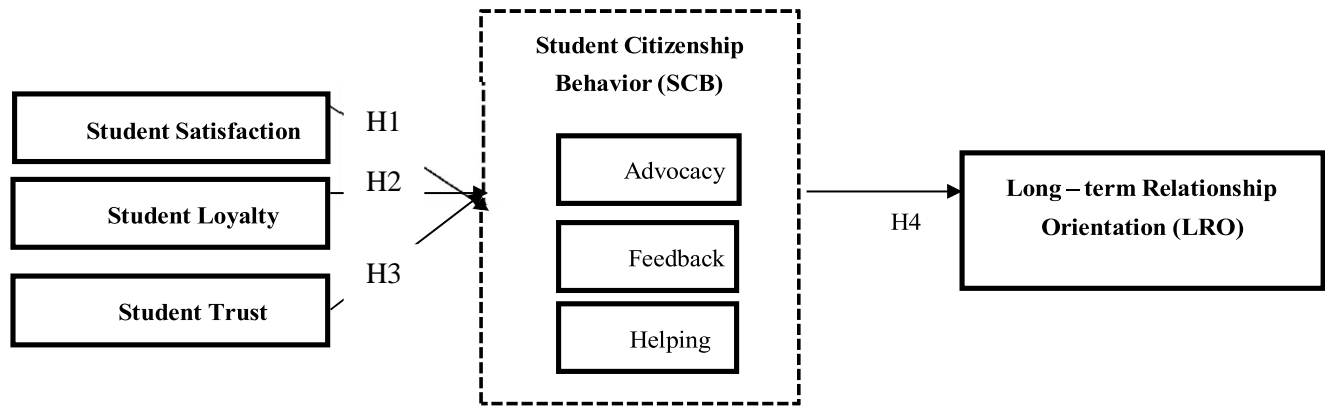


Fig. 1. Conceptual framework

3. Methodology

As of 2022, Vietnam's education business has 2 million students and 242 higher education institutions (Statista, 2022). Ho Chi Minh City has many higher education institutes and students. Students at Ho Chi Minh City's universities and colleges are the target respondents. Judgmental sampling was utilized to ensure that study participants had appropriate knowledge or skills (Etikan, 2016). Google Forms was used to create an online survey. Questionnaire has two parts. First, gender, education, academic level, and study program were examined. Second, theories were tested. Participants were told their identities would not be exposed and their responses would be used for study. Vietnamese questionnaires were distributed. Most respondents finished in 5–10 minutes. For the questionnaire's quality, all questions have to be answered. Using G*Power software (version 3.1), the minimum sample size to obtain 80% statistical power with 7 exogenous constructs and a 0.05 significance level was calculated to be 103. This study used 32 previously studied measurement items. All items were assessed on a seven-point Likert scale, from (1) strongly disagree to (7) strongly agree. Appendix 1 includes questionnaire items and references. Some items failed pilot tests and will be dropped after analysis.

4. Results

4.1 Respondents' demographic

This study's data set comprised 185 replies from students from universities and colleges in Ho Chi Minh City. The characteristics of the participants are depicted in Table 1. The data reveal that the gender ratio of females and males was found to be 61.1% and 38.9%, respectively. Regarding the education level of the respondents, the data suggest that 81.6% have a university education, 17.3% have a college education, and the remaining 1.1% have other education levels. Furthermore, junior students constituted the biggest percentage (69.7%), followed by freshman and sophomore students (10.3%), senior students (9.7%), and no survey participants who graduated. Additionally, when questioned about their study program, 92.4% of respondents were studying a bachelor's degree program, while 7.6% were studying other study programs.

4.2 Measurement Model Assessment

The study model in Fig. 1 was analyzed in SmartPLS 4.0 using PLS-SEM (Hsu & Lin, 2015). Before evaluating inner model (structural) assumptions, validate the outer model (measurement). Examining the measurement model ensures that the measurements employed provide the correct theoretical elements. Validity (convergent and discriminant) and reliability (Cronbach's Alpha and composite reliability) of the measurement model are investigated (Dang et al., 2022; Nguyen & Nguyen, 2021). Table 2 shows that Cronbach's alpha values for internal consistency reliability ranged from 0.724 to 0.859, all above 0.7. The composite reliability (CR) ratings are all above the suggested limit of 0.7. Cronbach's alpha and CR validated internal consistency. Convergent validity evaluates multiple conceptually similar objects. This study examined convergent validity using factor loadings and AVE (J.F. Hair Jr. et al., 2016). Table 2 reveals that all factor loading value

were higher than the prescribed 0.7. $AVE > 0.50$ indicates that items converge to important constructs, validating construct validity (Leong et al., 2011; Nordman & Tolstoy, 2016). Fornell –Lacker criterion was used to evaluate discriminant validity (Table 3). The Fornell–Lacker ratio assumed that AVE’s square root was higher than the correlation values for each research construct pairing (J. Hair et al., 2017). This establishes discriminant validity.

4.3 Structural Model Assessment

Following the confirmation of the measurement model, the structural model is the next phase. This necessitates computing the coefficient of determination (R^2) and path coefficients across 5000 resamples using a bootstrapping approach (Hai et al., 2023; L.-T. Nguyen et al., 2022, 2023; P. Van Nguyen & Nguyen, 2017) From the bootstrapping of the structural model (Fig. 2), the path analysis result (Table 4) demonstrates that seven out of twelve paths are significant. The findings indicated that SA has a negative influence on AD and HP while having a significant positive impact on FB. As a result, H1a and H1c are not supported, but H1b is. Furthermore, LY was found to positively contribute to two sub-dimensions of SCB (AD and FB), and hence hypotheses H2a and H2b are supported. However, the results also revealed that LY has a considerable negative effect on HP, indicating that H2c is not supported. According to Hypothesis 3, TR significantly impacts all three dimensions of SCB. Thus, all the direct impact hypotheses (H3a, H3b, and H3c) were accepted. Finally, whereas AD and FB do not translate into long-term relationship orientation in SCB, HP does. Hence, the hypotheses H4a and H4b are not supported, although H4c is supported.

Table 1 Demographic Characteristics of Respondents.

| | | N (185) | Percentage (%) |
|---------------------------|------------|---------|----------------|
| Gender | | | |
| | Male | 72 | 38.9 |
| | Female | 113 | 61.1 |
| Academic level | | | |
| | University | 151 | 81.6 |
| | College | 32 | 17.3 |
| | Others | 2 | 1.1 |
| Education level | | | |
| | Freshman | 19 | 10.3 |
| | Sophomore | 19 | 10.3 |
| | Junior | 129 | 69.7 |
| | Senior | 18 | 9.7 |
| Programme of study | | | |
| | Bachelors | 171 | 92.4 |
| | Masters | 0 | 0 |
| | Others | 14 | 7.6 |

Table 2 Measurement model results.

| Constructs | Scale Type | Loadings | CR (Rho_A) | CR | Cronbach’s Alpha | AVE |
|------------|------------|----------|------------|-------|------------------|-------|
| SA | Reflective | | 0.807 | 0.871 | 0.803 | 0.629 |
| SA1 | | 0.825 | | | | |
| SA3 | | 0.731 | | | | |
| SA4 | | 0.785 | | | | |
| SA5 | | 0.827 | | | | |
| LY | Reflective | | 0.722 | 0.845 | 0.724 | 0.645 |
| LY1 | | 0.835 | | | | |
| LY2 | | 0.824 | | | | |
| LY3 | | 0.749 | | | | |
| TR | Reflective | | 0.844 | 0.888 | 0.843 | 0.614 |
| TR1 | | 0.795 | | | | |
| TR2 | | 0.792 | | | | |
| TR3 | | 0.805 | | | | |

| Constructs | Scale Type | Loadings | CR (Rho_A) | CR | Cronbach's Alpha | AVE |
|------------|------------|----------|------------|-------|------------------|-------|
| TR4 | | 0.757 | | | | |
| TR5 | | 0.767 | | | | |
| AD | Reflective | | 0.860 | 0.913 | 0.857 | 0.779 |
| AD1 | | 0.836 | | | | |
| AD2 | | 0.900 | | | | |
| AD3 | | 0.909 | | | | |
| FB | Reflective | | 0.803 | 0.870 | 0.801 | 0.625 |
| FB1 | | 0.817 | | | | |
| FB2 | | 0.778 | | | | |
| FB4 | | 0.784 | | | | |
| FB5 | | 0.783 | | | | |
| HP | Reflective | | 0.860 | 0.904 | 0.859 | 0.702 |
| HP1 | | 0.859 | | | | |
| HP2 | | 0.829 | | | | |
| HP3 | | 0.841 | | | | |
| HP4 | | 0.823 | | | | |
| LRO | Reflective | | 0.849 | 0.889 | 0.844 | 0.617 |
| LRO1 | | 0.832 | | | | |
| LRO2 | | 0.802 | | | | |
| LRO3 | | 0.784 | | | | |
| LRO4 | | 0.730 | | | | |
| LRO5 | | 0.776 | | | | |

Note: CR = Composite Reliability, AVE = Average Variance Extracted, SA = student satisfaction, LY = student loyalty, TR = student trust, AD = advocacy, FB = feedback, HP = helping, LRO = long – term relationship orientation.

Table 3. Fornell – Larcker criterion.

| | AD | FB | HP | LRO | LY | SA | TR |
|-----|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| AD | 0.882 | | | | | | |
| FB | 0.629 | 0.791 | | | | | |
| HP | 0.452 | 0.692 | 0.838 | | | | |
| LRO | 0.417 | 0.616 | 0.746 | 0.785 | | | |
| LY | 0.678 | 0.58 | 0.408 | 0.44 | 0.803 | | |
| SA | 0.654 | 0.633 | 0.46 | 0.532 | 0.656 | 0.793 | |
| TR | 0.748 | 0.688 | 0.51 | 0.553 | 0.691 | 0.774 | 0.783 |

Note: AD = advocacy, FB = feedback, HP = helping, LRO = long – term relationship orientation, LY = student loyalty, SA = student satisfaction, TR = student trust.

Table 4 Hypotheses testing results.

| Hypotheses | Path Coefficients | Original Sample (O) | T Statistics (O/STDEV) | P Values | Remarks |
|------------|-------------------|---------------------|--------------------------|--------------|--------------------|
| H1a | SA → AD | 0.102 | 1.343 | 0.179 | <i>Unsupported</i> |
| H1b | SA → FB | 0.205 | 2.132 | 0.033 | Supported |
| H1c | SA → HP | 0.141 | 1.078 | 0.281 | <i>Unsupported</i> |
| H2a | LY → AD | 0.285 | 3.318 | 0.001 | Supported |
| H2b | LY → FB | 0.153 | 2.011 | 0.044 | Supported |
| H2c | LY → HP | 0.074 | 0.619 | 0.536 | <i>Unsupported</i> |
| H3a | TR → AD | 0.472 | 5.414 | 0.000 | Supported |
| H3b | TR → FB | 0.423 | 3.960 | 0.000 | Supported |
| H3c | TR → HP | 0.350 | 2.394 | 0.017 | Supported |
| H4a | AD → LRO | 0.031 | 0.414 | 0.679 | <i>Unsupported</i> |
| H4b | FB → LRO | 0.173 | 1.505 | 0.132 | <i>Unsupported</i> |
| H4c | HP → LRO | 0.612 | 6.483 | 0.000 | Supported |

Note: SA = student satisfaction, LY = student loyalty, TR = student trust, AD = advocacy, FB = feedback, HP = helping, LRO = long – term relationship orientation.

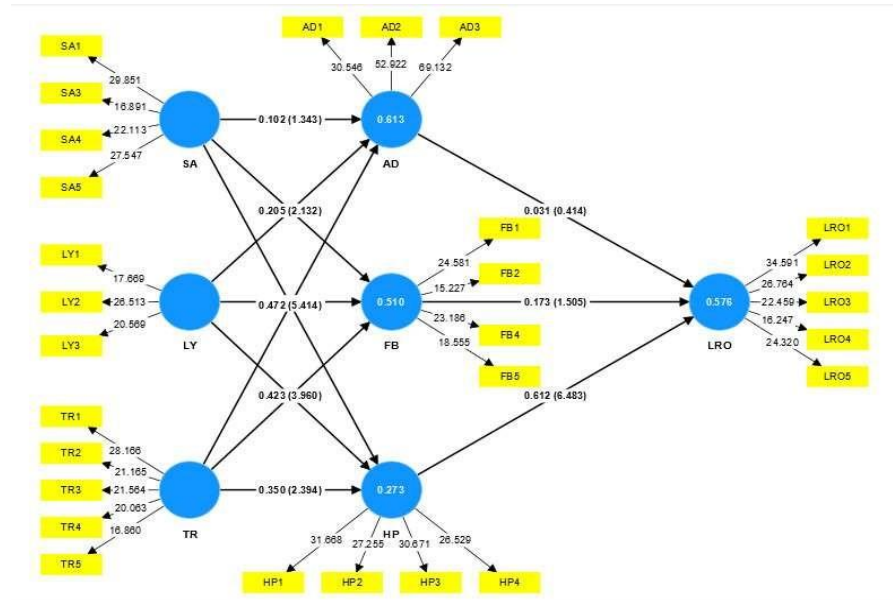


Fig. 2. Structural model hypotheses testing.

4.4 Assessing the predictive relevance

Hair et al. (2014) advised that a structural model has predictive relevance for an endogenous variable, if the Q² value is higher than zero. The Q² values of all endogenous variables are listed in Table 5, together with their R² values. Based upon these Q² values, it is ascertained that the structural model has predictive relevance for all endogenous variables, particularly continuance intention.

Table 5: Q2 predict and R-square

| | Q ² predict | R-square |
|-----|------------------------|----------|
| AD | 0.593 | 0.613 |
| FB | 0.478 | 0.510 |
| HP | 0.219 | 0.273 |
| LRO | 0.289 | 0.576 |

4.5 Importance Performance Map Analysis (IPMA)

IPMA is also known as priority analysis, importance-performance matrix or impact-performance map which extends the results of path coefficient (importance) by integrating the average values of latent construct scores (performance) (Nguyen & Nguyen, 2021). More specifically, it contrasts the unstandardized total effects (importance) in the structural model and the average values of the latent construct scores on a scale ranging from 0 to 100% of performance. IPMA analysis is only performed on endogenous constructs in order to assess and compare the importance and performance of all the relevant exogenous constructs (Ring et al., 2005). In general, constructs with low importance and high performance should be prioritized for improvement followed by high importance and high performance (L. T. Nguyen et al., 2022). Table 6 shows that the mean values of importance and performance are 0.1286 and 74.502% respectively for AD, 0.188 and 74.502% for HP and 0.260 and 74.502% for FB.

Table 6: Importance and performance table for AD, HP, FB

| | AD | | HP | | FB | |
|--------------|--------------|---------------|--------------|---------------|-------------|---------------|
| | Importance | Performance | Importance | Performance | Importance | Performance |
| LY | 0.285 | 72.736 | 0.074 | 72.736 | 0.153 | 72.736 |
| SA | 0.102 | 73.845 | 0.141 | 73.845 | 0.205 | 73.845 |
| TR | 0.472 | 76.924 | 0.35 | 76.924 | 0.423 | 76.924 |
| Means | 0.286 | 74.502 | 0.188 | 74.502 | 0.26 | 74.502 |

4.6 Artificial Neural Network Analysis (ANN model)

An ANN is a modelling technique that attempts to simulate human neural systems and is capable of acquiring knowledge through a learning process (Chong, 2013). Due to its learning ability, ANN could be trained in order to enhance its performance (Wang & Elhag, 2007). As proposed and in agreement with several researchers, this study employs a multi-layer perceptron (MLP) ANN with feed-forward back-propagation (FFBP) algorithm to evaluate the relative importance of exogenous variables towards an endogenous variable (Wang & Elhag, 2007). The ANN models developed are shown in Fig. 3 and Fig. 4.

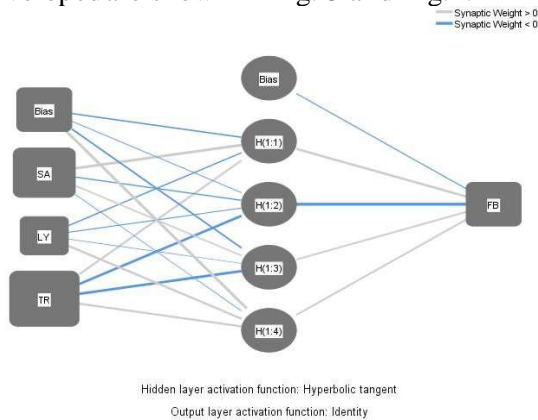
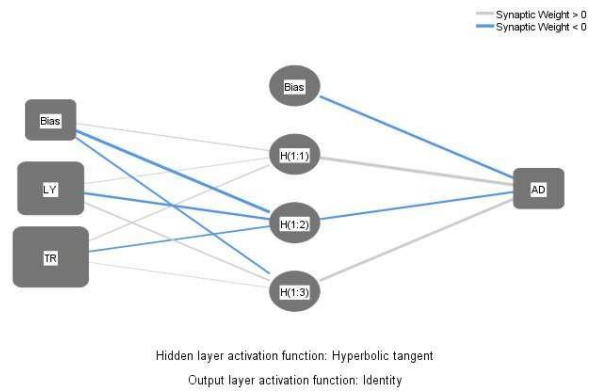
**Figure 3. Model A (SA, LY, TR as input and FB as output)****Figure 4. Model B (LY, TR as input and AD as output)**

Table 8: RMSE result or Model A summary

| Neural network | Training | | | Testing | | | Total |
|----------------|----------|---------|-------|---------|--------|-------|-------|
| | N | SSE | RMSE | N | SSE | RMSE | |
| 1 | 164 | 137.299 | 0.299 | 21 | 19.418 | 0.319 | 185 |
| 2 | 169 | 154.932 | 0.379 | 16 | 13.645 | 0.375 | 185 |
| 3 | 164 | 137.804 | 0.329 | 21 | 17.412 | 0.333 | 185 |
| 4 | 165 | 132.663 | 0.323 | 20 | 20.695 | 0.350 | 185 |
| 5 | 168 | 141.202 | 0.347 | 17 | 14.049 | 0.353 | 185 |
| 6 | 168 | 143.531 | 0.363 | 17 | 16.063 | 0.294 | 185 |
| 7 | 165 | 155.340 | 0.412 | 20 | 16.279 | 0.350 | 185 |
| 8 | 167 | 149.142 | 0.359 | 18 | 17.590 | 0.389 | 185 |
| 9 | 163 | 137.942 | 0.331 | 22 | 13.198 | 0.227 | 185 |
| 10 | 167 | 146.190 | 0.359 | 18 | 12.116 | 0.278 | 185 |
| Mean | | 467.31 | 0.366 | | 52.449 | 0.357 | |
| SD | | 24.585 | 0.030 | | 6.681 | 0.061 | |

Table 9: Sensitivity analysis for Model A

| Neural network | Performance | | |
|--------------------------|-------------|--------|-------|
| | SA | LY | TR |
| 1 | 0.357 | 0.231 | 0.412 |
| 2 | 0.380 | 0.161 | 0.459 |
| 3 | 0.369 | 0.192 | 0.439 |
| 4 | 0.405 | 0.210 | 0.385 |
| 5 | 0.320 | 0.258 | 0.422 |
| 6 | 0.369 | 0.174 | 0.457 |
| 7 | 0.377 | 0.202 | 0.421 |
| 8 | 0.367 | 0.315 | 0.318 |
| 9 | 0.277 | 0.229 | 0.494 |
| 10 | 0.373 | 0.191 | 0.436 |
| Mean Relative Importance | 0.359 | 0.216 | 0.424 |
| Normalized Importance | 74.40% | 26.00% | 100% |

Table 10: RMSE result or Model B summary

| Neural network | Training | | | Testing | | | Total |
|----------------|----------|---------|-------|---------|--------|-------|-------|
| | N | SSE | RMSE | N | SSE | RMSE | |
| 1 | 166 | 189.787 | 0.512 | 19 | 20.124 | 0.316 | 185 |
| 2 | 168 | 195.028 | 0.458 | 17 | 18.783 | 0.471 | 185 |
| 3 | 157 | 149.413 | 0.376 | 28 | 23.295 | 0.357 | 185 |
| 4 | 167 | 202.234 | 0.503 | 18 | 20.363 | 0.500 | 185 |
| 5 | 161 | 173.496 | 0.422 | 24 | 30.653 | 0.542 | 185 |
| 6 | 162 | 158.534 | 0.377 | 23 | 19.244 | 0.304 | 185 |
| 7 | 173 | 202.279 | 0.509 | 12 | 10.053 | 0.250 | 185 |
| 8 | 162 | 172.075 | 0.401 | 23 | 20.632 | 0.435 | 185 |
| 9 | 166 | 169.464 | 0.392 | 19 | 20.427 | 0.368 | 185 |
| 10 | 161 | 157.179 | 0.385 | 24 | 20.256 | 0.333 | 185 |
| Mean | | 467.310 | 0.366 | | 52.449 | 0.357 | |
| SD | | 24.585 | 0.03 | | 6.681 | 0.061 | |

Table 11: Sensitivity analysis for Model B

| Neural network | Performanc | |
|--------------------------|------------|--------|
| | TR | LY |
| 1 | 0.552 | 0.448 |
| 2 | 0.540 | 0.460 |
| 3 | 0.504 | 0.496 |
| 4 | 0.682 | 0.318 |
| 5 | 0.532 | 0.468 |
| 6 | 0.534 | 0.466 |
| 7 | 0.614 | 0.386 |
| 8 | 0.549 | 0.451 |
| 9 | 0.550 | 0.450 |
| 10 | 0.510 | 0.490 |
| Mean Relative Importance | 0.557 | 0.443 |
| Normalized Importance | 100.00% | 81.20% |

The ANN analysis was performed in SPSS 25, with the procedures described and practiced by several past researchers (Albahri et al., 2022; L. T. Nguyen et al., 2022). A ten-fold cross-validation was performed on the dataset to avoid the over-fitting problem (this results in 10 ANNs in an ANN model), with 90% of the data used for training and the remaining 10% used for measuring the predictive accuracy of the trained network (also known as testing) in every ANN. Moreover, the number of hidden neuron(s) was chosen to be automatically generated by the program, and sigmoid was selected as the non-linear activation function for both the hidden and output layers. For the purpose of assessing the predictive accuracy of every ANN in an ANN model, the Mean Square of Error (RMSE) for each of the ANNs in the ANN model was computed. Other than indicating a high level of predictive accuracy, a lower value of RMSE also represents a better fit and forecast of the data. Besides, the relevance of exogenous variables in a particular ANN model was assessed by their number of non-zero synaptic weights associated with hidden neurons.

On the other hand, a sensitivity analysis is employed to rank the predictive power of exogenous variables on an endogenous variable in numerical sequence (L. T. Nguyen et al., 2022). From this particular analysis, the relative importance of every exogenous variable in all ANNs within an ANN model was calculated and subsequently used to compute the normalized relative importance (expressed in percentage) in sensitivity analysis. The strength of influence exerted by exogenous variables was then ranked accordingly to their normalized relative importance. From Table 8, it is noticed that ANN Model A has a low mean RMSE value for both training (0.366) and testing (0.357) data, which exhibits that ANN Model A has a strong degree of predictive accuracy and the data fits the model. The same explanation goes to ANN Model 2 in Table 10. Moreover, during the analysis, all input neurons are connected with at least one hidden neuron in every ANN. These results provide strong support for the predictive relevance of all ANN models. After ascertaining the predictive accuracy and predictive relevance of all four ANN models, a sensitivity analysis was conducted, and the outputs can be found in Table 9. In ANN Model A, TR is the most prominent driver of FB (with 100% normalized relative importance), followed by SA attachment (with 74.40% normalized relative importance) and LY (with 26% normalized relative importance). A similar explanation goes to ANN Model B in Table 11, in which TR is strongly determined by confirmation (100% normalized relative importance), whereas LY (81.20%) is ranked second in terms of their influences over AD.

5. Discussion and Conclusion

5.1 Discussion

Evidently, CCB is not a novel idea in the service sector. But since consumer behavior differs throughout service industries, it's important to study CCB in a variety of settings, especially in the educational services industry. Clients' active participation, especially in the service delivery process, sets educational services apart from other service industries. Therefore, this study's primary objective is to examine the factors that affect CCB and LRO in order to promote the development and expansion of higher education institutions. In particular, this research offers a SOR framework for explaining and exploring the connection between factors like satisfaction, loyalty, and trust, as well as how SCB (i.e., feedback, advocacy, and help) and students' intentions play a role in forming a long-term relationship with the higher education institution. The results have been discussed in greater detail below.

The findings of this study corroborate those of Bettencourt (1997), Chen et al. (2015), Ponnusamy et al. (2015), Yi & Gong (2008), and Anaza (2014). ANN analysis demonstrates that somehow SA is not a significant predictor of SCB, contrary to earlier findings. The satisfaction with core educational services supplied by institutions through skilled teaching personnel and effective programs was found to improve SCB in higher education. Academic and social systems can affect a student's inclination to volunteer in the community. Students are encouraged to offer feedback on issues they learn about. Participation, support, and suggestions for school-organized events and activities enable institutions to absorb and adapt to student requirements. Students can also help by suggesting ideas to improve their school's courses and initiatives. Supervisors need to increase workforce morale and student satisfaction. Managers can better capture students' wants and opinions by creating a website or support app with two-way contact and speedy problem resolution. Administration should poll students on their wishes, needs, and opinions to improve

extracurricular and other school events and to improve instruction quality. This study contradicts previous research by showing that student happiness increases feedback behavior but not advocacy or assistance. Unsatisfied college students may explain this. Even pleased consumers won't wait for poor service. Current students aren't enthusiastic about recruiting friends and relatives. The students are not engaged and helpful because they are not willing to encourage and train their fellow students in the right use of the institution's resources and services, nor are they willing to provide any and all support to those who may need it.

The structural equation model results, on the other hand, demonstrate that loyalty is an essential antecedent for two out of three characteristics of student citizenship behavior in universities. This discovery is consistent with the findings of previous investigations by Anaza & Zhao (2013), Nagy & Marzouk (2018), Ponnusamy et al. (2015b), and others. According to the findings, loyal and dedicated students look forward to maintaining relationships with their institutions throughout their academic careers and even after they graduate. Students who are satisfied with the quality of the teaching and administrative staff, as well as the role their institutions play in providing career opportunities in the market, are more likely to stay with their university for the foreseeable future. Furthermore, students who are loyal to their university or college through voluntary good conduct (advocacy and feedback) give a strategic competitive advantage to the university or college and may promote their school by spreading positive word of mouth about their university or college. Students frequently benefit from long-term partnerships with universities or colleges by pursuing additional courses or furthering their education in the future, as well as continuing to promote their institution in the community. When analyzing the impact of loyalty on students' helpful behavior, the findings are consistent with the viewpoint advanced in the research by Bartikowski and Walsh (2011). The findings demonstrate that the effect occurs solely on students' willingness to assist institutions, not on students' willingness to help others. As a result, loyal students may prefer the random behaviors offered by institutions because they believe such acts will result in future rewards. Students, on the other hand, thought that helping other students resulted in no real incentives or enhancements to the institutions' services for them.

This study confirmed previous research showing trust had a favorable effect on SCB. Multiple studies, including those by Wingwon and Montree Piriyakul (2010), Zhang et al. (2013), Nagy and Marzouk (2018), Dirks and Ferrin (2002), and Barzoki and Rezaei (2017), have found an association between trust and CCB. Surprisingly, trust is the best predictor of SCB, according to ANN studies. Students are more likely to have faith in institutions that demonstrate accountability, transparency, clarity, and rapid problem resolution. That could lead to an increase in students' faith, satisfaction, and good will with respect to the school. If schools can ensure their students receive an excellent, reliable, and secure education, the student-school relationship will flourish. The value of the school's offerings far exceeds the costs incurred by its students. Management should strengthen instructional strategies, lecturer quality, facilities, assessment methods for teaching and learning, and the overall learning atmosphere to win back the confidence of the student body. Managers need to be explicit about agreements and possibilities. Students will have faith in an institution's abilities and merits. Taking into account students' academic and social environments when making educational decisions, responding promptly to student complaints and problems, and providing students with access to relevant information all contribute to the long-term sustainability of students' meaningful relationships with the university or college.

Lastly, when looking at the correlation between SCB and LRO, we see that one facet of SCB, helpful behavior, positively affects LRO between students and their school. The results of this study are different from those of studies done by Ganesan (1994), M. Kim et al. (2020), Jeon & Yoo (2015), and Zahra (2003). Since the participants and the subject matter are different, a number of factors come into play when determining this difference. It has been demonstrated that the three CCB components have varying effects on how students feel about their institutions over the long run. The study did not find a correlation between providing feedback, advocating for others, and learning to reflect on one's own performance (LRO), in contrast to the correlation seen between aiding other students and LRO. Giving feedback and advocating for the utilization of a product or service does not have the same impact as supporting other students in picking educational services or training facilities. This research thinks this is because students feel more comfortable being critical or complimentary about items and services when providing feedback

and advocating for them. Given the potential for randomness in comments and suggestions, their motivations can be hard to ascertain. In addition, the study's results can be used to further examine factors that affect maintaining positive connections with students, which is helpful for educational institutions. Winning CCB requires universities and institutions to adopt a relationship approach, particularly one that encourages students to become their advocates. Schools are constantly on the lookout for methods to enhance LRO by encouraging constructive student interactions and responsible citizenship. Enhancing the quality of educational services has a huge effect on SCB, shifting the focus to creating a reliable, trustworthy, and mutually beneficial partnership. Students may have a psychological predisposition to prefer schools through feedback and advocacy efforts if schools are completely attentive to their needs and offer students a particular amount of enjoyment. In the long run, these methods can enhance LRO between students and schools by strengthening the CCB.

6. Conclusion

This study uses the SOR paradigm to evaluate how satisfaction, loyalty, and trust affect SCB and LRO. Understanding SCB influences future student-institution interactions. According to this study, student trust has the most impact on SCB in institutions, despite a strong relationship between the three components. Each criterion enhances SCB in some ways. In a similar vein, student orientation and long-term student-institution connections may benefit from SCB (helpful conduct). The study model of influencing variables based on SCB predicts LRO with 57.6% accuracy. This research suggests college and university administrations should regard students as assets and reward them for campus accomplishments. Universities and colleges in Vietnam must enhance student pleasure, loyalty, and trust in their services to boost learning outcomes, expand enrollment, and solidify lifetime student connections.

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