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UNIVERSITY–BUSINESS COOPERATION AS A QUALITY SIGNAL

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Abstract – *This study employed signaling theory for building and testing a conceptual model to explore the role of quality signal of unobservable quality products (including university-business cooperation and credibility brand) and their impact on perceived sacrifice for increasing consumer's purchase intention. The study surveyed two independent cases: Tra Vinh Viettel and Tra Vinh University, with 121 telecommunications service customers and 159 senior students interviewed, respectively, then the Smart-PLS software was used for analyzing the data. The research results confirmed these cues to be the quality signals: Credibility brand negatively affects perceived sacrifice in case 1, but for case 2, this has no statistical significance; and university-business cooperation affects perceived sacrifice in both cases positively. The results encourage enterprises and universities to emphasize university-business cooperation and credibility brand appropriately to effectively exploit this quality signal and attract customers to consume more products. The study was carried out in Tra Vinh Province of Vietnam with a non-probability sampling method and only implemented in the cases of Tra Vinh University and Viettel, so the reliability and popularity of the study is limited.*

Keywords: credibility brand, perceived sacrifice, perceived quality, purchase intention, university–business cooperation.

I. INTRODUCTION

Vietnam is in a deep integration process into the world economy, so building a knowledge-based economy is a fundamental concern of economists. Many factors affect a knowledge-based economy, and the connection between the university, the government, and the enterprise is a main driving force, in which universities and businesses cooperation (UBC) is the basis. UBC is increasing in many developed and developing countries, but previous data consistently show that the collaboration is fragmented and uncoordinated, specifically related to educational programs [1]. Although the UBC in Vietnam has been encouraged by both government and universities, enterprises participate in only training and teaching programs. Taking the lead in UBC, Ho Chi Minh City University of Agriculture and Forestry has cooperated with 120 business partners which are three times higher than other universities like Hung Yen University of Technology and Education and Hue University of Agriculture and Forestry, which have 20 to 40 partner enterprises. The remaining universities have a much smaller quantity of less than 10, including Vinh University with only four partner enterprises [2].

Tra Vinh University (TVU), which is guided by the philosophy "for the benefit of students, for community engagement, for learning associated with careers and experiences," [3] proactively builds UBC by implementing the co-op model in nine training majors with more than 1,240 students and 387 businesses involved. Administered by TVU's Teaching and Learning Center, the co-op program ensures that practical research activities at enterprises are carried out every year to ensure that program curricula are updated promptly and are suitable for the needs of industry. However, the level of university-enterprise linkages is desultory due to subjective and objective elements. As for enterprise managers' judgment, UBC's can be too time consuming given their benefits, which dramatically reduces incentives to enter into cooperation with universities. Besides, some enterprises, lacking awareness of the potential benefits of UBC, consider UBC to be burden, entering into cooperative agreements only as a social responsibility. It's a challenging problem

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for both improving teaching-learning quality and expanding enterprises' scope.

UBC activities have been defined as extensions of brand association. Applying signaling theory, Rao et al. [4, 5] assert that brand association with a trustworthy brand is a signal that helps buyers infer quality. Many authors successfully used an associated brand to signal quality for products with unobserved quality [6, 7]. Previous studies on UBC [1, 8, 9] focused on summarizing the results achieved after implementing UBC but have not found studies using UBC as a signal of quality for products that had unobservable quality. This research was conducted to discover if there is a correlation between UBC and quality signal for products. In other words, the research investigated if UBC signals buyers and learners to increase confidence in the quality of teaching and product quality, and if this increased confidence improves purchase intention and product usage of the two parties participating in UBC, thereby promoting greater implementation of UBCs.

To achieve these research goals, the study focused on five main areas of investigation related to UBC and the quality signal of products: i) exploring the role of quality signaling from university and business cooperation; ii) examining the impact of UBC on perceived sacrifice; iii) confirming the impact of credibility brand (CB) on perceived quality (PQ) and perceived sacrifice (PS); iv) investigating the roles of perceived quality and perceived sacrifice related to the purchase intention (PI) of consumers, and v) suggesting management implications for the enterprises and universities.

II. RESEARCH THEORY AND METHODOLOGY

A. Theoretical literature review

The study is carried out basing on a combination of signaling theory, the theory of planned behavior (TPB) and the theory of perception risk (TPR).

Theory of Signaling

Signaling theory comes from information economics, discussing information asymmetry in the market between sellers and buyers due to differences in available information. Buyers often have limited information about the product quality and risk levels associated with products than sellers. The buyers can only evaluate the product quality after use. In the unsymmetrical conditions, buyers tend to rely on signals to find the differences between sellers. In essence, signals are activities introduced by sellers to help buyers distinguish quality between their products and others' products of the same type [10, 11]. Based on the principle of signaling theory, this study suggests that to increase the buyers' belief in product quality and affect purchase decision, sellers should give reliable signals using UBCs that indicate product quality to buyers.

Theory of Perception risk

Bauer [12] stated that perceived risk can negatively affect consumer behavior. Although the components of risk were not well defined in the research, the two main structures of risks, according to Bauer, were uncertainty and adverse consequences. Risk perception is an objective attribute of buying behavior, so businesses must reduce the two structures of risk perception to acceptable levels.

The studies of Zeithaml [13], Dodds et al. [14] and Amiri Aghdaie et al. [15] applied TPR theory when researching purchase intention in different markets. These authors used two aspects of the concept of perceived sacrifice: effort and risk. According to the authors, perceived sacrifice includes risks that the products do not bring expected benefits for buyers and their waste of time and effort in buying. Like risk perception, perceived sacrifice is an objective factor in buyer's decision making and must be reduced to acceptable levels. Applying TPR theory, ours study suggests that when consumers deduce product quality from received signals, they are also skeptical about the unobservable risks that they must trade-off or sacrifice when they use the products. Signals can both increase a product's perceived quality and decrease the consumer's perceived sacrifice.

Theory of Planned behavior

TPB was suggested by Ajzen [16], which was developed from the Theory of Reasoned Action (TRA). TPB determines that attitudes toward behavior (A), subjective norm (SN), and perceived

behavioral control (PBC) shape the intention and behavior of an individual. TPB confirms that when the person believes that their behavior will bring positive results, following the expectations of their acquaintances and their ability, they will tend to make decisions to act. Applying TPB, ours study suggests that when consumers perceive product quality firmly enough and their perception of the level of sacrifice is acceptable, they will intend to buy products.

Literature gap

In previous studies on the application of signaling theory and studies on UBC, the author has not found studies using UBC as a signal of quality for products with unobservable quality.

B. Research concepts

University–business cooperation

UBC is a direct or indirect interaction between universities and enterprises to support each other for mutual benefit. This relationship is reflected in their research and development. UBCs have many benefits: they promote the dynamic movement between lecturers, students, and professional personnel working in enterprises; they allow for easier commercialization of research results; they help develop industry-relevant training programs; they support lifelong learning; and they encourage incipient entrepreneurship and organizational governance [1].

Credibility brand

According to Erdem [17], the Credibility Brand is a brand that can deliver what it promises, its product claims are trustworthy, and over time, buyers' experiences with the brand increases their belief in the brand.

Perceived quality

Perceived quality is defined as the subjective judgment of consumers about a product. A customer's perceived quality is not related to a product's actual quality or characteristics; instead, it is related to the customer's subjective perspective [13, 18].

Perceived sacrifice

To obtain products, consumers must sacrifice purchase costs as they collect and process information to reduce uncertainty, threats or losses [19]. This sacrifice includes not only the price of the product but also the costs of time, searching and psychological impacts, all of which contribute to consumer perception and perceived sacrifice [13].

Purchase intention

According to Baker et al. [20] and Dodds et al. [14], purchase intention is a person's probability and willingness to prioritize product purchases in their purchase considerations.

C. Research hypotheses

Perceived quality and purchase intention

According to Taylor & Baker [21], purchase intention is a linear function of perceived quality and satisfaction. Erdem et al. [17] and Tsiotsou [18] demonstrated that perceived quality has a positive effect to formulate customers' purchase intentions. When the consumer's perceived quality of a product is good, their purchase intention will be formed. The hypothesis is that:

H1: Perceived quality has a positive effect on purchase intention.

Perceived sacrifice and purchase intention

Research by Shiu et al. [22] about the three components of consumer uncertainty stated that uncertain evaluation reduced purchase intention. Similarly, Erdem et al. [17] studied the components of perceived sacrifice, risk perception and costs of information search, which directly affect the purchasing intention. According to Baker et al. [20], effort, time and psychological costs have a direct relationship with purchase intention. When perceived sacrifice increases, a consumer's purchase intention decreases, which is a negative relationship.

H2: Perceived sacrifice has negative effect on the purchase intention.

UBC and perceived quality

Affiliate brands should have different goals to enhance perceived quality and the quality of unobservable quality products, and to diminish customer's disbelief in product quality [4-7]. Within this study, it follows that the reputation and brand quality of both parties signal each other's quality through the implementation of UBC. The hypothesis posed is:

H3a: UBC has a positive effect on the perceived quality of products of both UBC participants

UBC and perceived sacrifice

Product image and brand reputation not only affect reducing risk perception and saving search costs but also have a crucial impact on customers' purchasing decisions. Besides, the brand reputation of the UBC parties significantly increases customer trust in the product as well as makes the customer feel safe when using the products. The hypothesis posed is:

H3b: UBC has a negative effect on perception of sacrifice

Credibility brand with perceived quality

According to Erdem et al [9], the level of brand credibility is the basis for buyers to infer that a product has unobservable quality. The hypothesis posed is:

H4a: The level of credibility of the brand has a positive effect on perceived quality of products of both parties.

Credibility brand with perceived sacrifice

Brand reputation helps buyers feel more secure about the risks when buying and using products [17]. The hypothesis posed is:

H4b: The level of credibility of the brand has a negative effect on perceived sacrifice

Research model

Based on the models of quality signal by Erdem et al. [17] and Erdem & Swait [19] and the market reality in Vietnam, this study proposes a model to study the impact of quality signals on perceived quality and perceived sacrifice with purchase intention of customers (as Figure 1).

D. Research method

Research process

The research process consisted of two steps. First, signal theory was used to develop hypotheses, theoretical models, scales of concepts before conducting qualitative research to explore, adjust and supplement measurement variables for concept scales. And second, quantitative research was carried out to evaluate the scales, hypotheses and theoretical research models.

Research design

We carried out this study in several stages including 1) a pre-study exploratory stage, 2) a quantitative study with Tra Vinh Viettel, 3) a quantitative study with TVU, and 4) statistical analysis to analyze hypothesized relationships. Viettel, one of biggest telecommunications service providers in Vietnam, and Tra Vinh University, a university in the southwest of Vietnam, were chosen to be main research subjects of the study.

1. Pre-study: The face-to-face discussion with group 1, including 6 people, who are managers of Tra Vinh Viettel and TVU; group focused interview with group 2, including 20 people, who are telecommunications service users and high school seniors, to build the concept scales and research model.

2. The first official quantitative study in the case of Tra Vinh Viettel: we interviewed 121 customers (of which: male = 23.1%, female = 76.9%; using Viettel's services 16.5%, Mobiphone 68.6%, Vinaphone 14.9%; age from 18-25, 81.2%, from 26-35, 18.8%). Survey participants were directly surveyed by filling in the questionnaire, then returned to the surveyor. The questionnaire used a seven-point Likert scale for an agreement (level 1-7 corresponds strongly disagree – strongly agree).

3. The second official quantitative study in the case of TVU: we interviewed 159 people (of which: male = 39.5%, female = 60.5%; using Viettel's services= 10.1%, Mobiphone 83%, Vinaphone 6.9%; grade 11 students 20%, grade 12 62%, freshman 18%). According to Hair et al. [23], the number of samples should be at least ten times the maximum number of indices used to measure a single structure. In addition, the pattern must be ten times the maximum number of structural paths and direct at any particular structure in the model. Samples were selected based on these requirements.

4. Statistical first-generation techniques such as linear regression, correlation, and variance analysis could only analyze a complex model piece by piece. Therefore, with the model of this study, partial least squares structural equation modeling (PLS-SEM) with Smart PLS 3 was applied to analyze the relationships in the model, including the reflective model, formative model, and structural model. First of all, the model was designed based on relationship between the indicators and latent variables. Next, the PLS algorithm was used to calculate data and evaluate

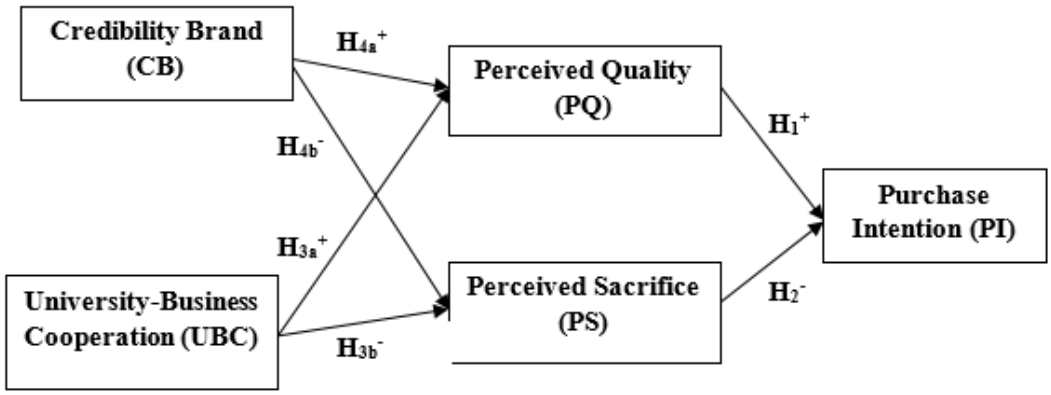

Fig. 1: Suggested research model

the models:

- Convergence value: external loading factor (> 0.7), external loading factor squared (> 0.5), extracted variance (AVE > 0.5). Internal consistency reliability: composite reliability (CR > 0.6), Cronbach's alpha (> 0.6). The discriminant value was determined on the confidence interval with the HTMT (<0.85), which used the reflective model analysis.

- Convergence value: residual analysis (>0.7), evaluation of multicollinearity (VIF<5), external weight, external loading factor, confidence interval Bca, the value were statistically significant (P= 0.05) which used formative model analysis.

- Evaluating the multicollinearity of the relationships (VIF<5), the significance and relevance of the relationships (P<0.05), R2 (0.75 strong, 0.5 moderate, and 0.25 weak), f2 (0.02 small, 0.15 moderate, 0.35 or more strong) that used structural model analysis [23].

III. RESULTS AND DISCUSSION

A. Result of pre-study

Based on the scales of previous studies, we set a draft scale system up with 24 observed variables as shown in Table 1.

We discussed this draft scale system with the two groups. We conducted a one-on-one discussion with group 1, consisting of six people who were managers of business companies and lecturers of the school. The group interview with group 2 included ten students and ten users of telecommunications services in Tra Vinh City to build scales and models. The scales were designed based on previous studies but some adaptations were needed, as the variables PQ5, PS1 PS2, PI2, UBC1 were mismatched for the group of customers using telecommunications services. For the group of students, the variables PS2, UBC1 were not recommended because other variables explain these variables. The remaining variables were sufficient to explain these concepts. The final scales for the two formal studies are shown in Table 2.

B. Results of the study 1

Evaluation of the university-business scale

The evaluation results of external loadings factor, reliability, extracted variance, composite reliability, Cronbach's alpha, and HTMT value of the purchase intention scale showed that the scale met the requirements of convergence value, reliability, composite reliability, internal consistency reliability, and discriminant value. Only observed variable PI3 failed after evaluating three observed variables (PI1, PI4, PI5) of the purchase intention scale.

Evaluation of the perceived quality scale

The results of analyzing the scale demonstrated that they all met the requirements of convergence value, internal consistency reliability, and discriminant value. The perceived quality scale consisted of 4 observed variables (PQ1- PQ4).

Evaluation of the perception sacrifice scale

The results of the perception sacrifice scale evaluation met the requirements of convergent

Table 1: Scales of constructs

Items		Source
University-Business Cooperation: UBC		
UBC1	University and Business collaboration in R&D	Healy et al. [1, p.6]
UBC2	Commercialisation of R&D results	
UBC3	Enterprises create conditions for students and lecturers to approach enterprises	
UBC4	University and Business cooperate curriculum development and delivery	
UBC5	Enterprises that support the spirit and activities of entrepreneurship	
UBC6	Schools and businesses participate in governance	
Credibility Brand: CB		
CB1	This brand delivers what it promises	Erdem et al. [17]
CB2	This brand's product claims are believable	
CB3	This brand has a name you can trust	
CB4	My expences with this brand make me wary of their claims	
Perceived Quality: PQ		
PQ1	X would seem to be good product	Dodds et al. [14]
PQ2	I expect X is of high quality	
PQ3	The workmanship of product would be high	
PQ4	The likelihood that X would be reliable	
PQ5	The likelihood that X is dependable	
Perceived Sacrifice: PS		
PS1	I don't know about X, before buying it	Erdem et al. [17]
PS2	I need lots more information about X before I'd buy it	
PS3	The price of X is too expensive	
PS4	In order to buy X, I have to waste a lot of time	
Purchase Intention: PI		
PI1	I will buy X	Dodds et al. [14], Thielem-ann et al. [24]
PI2	The likelihood of purchasing X is very high	
PI3	The probability that I would consider buying X is very high	
PI4	If bought, I will continue to buy X	
PI5	I will recommend to my relatives to buy X	

Table 2: Scales after qualitative research

Construct	Items	
	Study 1 (Viettel)	**Study 2 (TVU)**
PQ	PQ1, PQ2, PQ3, PQ4	PQ1, PQ2, PQ3, PQ4, PQ5
PS	PS3, PS4, S5	PS1, PS3, PS4, PS5
PI	PI1, PI3, PI4, PI5	PI1, PI2, PI3, PI4, PI5
UBC	UBC2, UBC3, UBC4, UBC5	UBC2, UBC3, UBC4, UBC5
CB	CB1, CB2, CB3	CB1, CB2, CB3

value, internal consistency reliability, and discriminant value. The perception sacrifice scale consisted of 3 observed variables (PS3- PS5), as shown in Table 3.

Evaluation of the university business cooperation scale

The results of the analysis of residuals, external weights, external loading coefficients, t-values, variance inflation factor (VIF) multicollinearity, and university-business and accelerated (BCa) confidence intervals were satisfactory and statistically significant. External weights of two observed variables (UBC3, UBC4) were not statistically significant, but the external loading coefficients were greater than 0.7 and statistically significant, which were accepted. After the evaluation UBC scale included four observed variables (UBC2- UBC5).

Table 3: Evaluation of the formative measurement model

Study	Construct		Convergent Validity			Internal Consistency Reliability		Discriminant Validity	Result
		Items	Outer loading	Indicator Reliability	AVE	CR	α	HTMT	
			> 0,7	>0,5	>0,5	>0,6	>0,6	<0,85	
1	PQ	PQ1	0,784	0,61	0,726	0,913	0,873	0,123-0,827	Yes
		PQ2	0,824	0,68					Yes
		PQ3	0,897	0,80					Yes
		PQ4	0,897	0,81					Yes
	PS	PS3	0,910	0,83	0,838	0,940	0,905	0,123-0,147	Yes
		PS4	0,926	0,84					Yes
		PS5	0,911	0,83					Yes
	PI	PI1	0,900	0,87	0,840	0,940	0,904	0,147-0,827	Yes
		PI4	0,933	0,87					Yes
		PI5	0,916	0,84					Yes
2	PQ	PQ1	0,858	0,74	0,768	0,943	0,924	0,227-0,810	Yes
		PQ2	0,829	0,69					Yes
		PQ3	0,901	0,81					Yes
		PQ4	0,910	0,83					Yes
		PQ5	0,882	0,78					Yes
	PS	PS1	0,778	0,61	0,735	0,917	0,880	0,227-0,255	Yes
		PS3	0,877	0,77					Yes
		PS4	0,884	0,78					Yes
		PS5	0,885	0,78					Yes
	PI	PI1	0,892	0,80	0,802	0,953	0,938	0,255-0,810	Yes
		PI2	0,925	0,86					Yes
		PI3	0,904	0,82					Yes
		PI4	0,895	0,80					Yes
		PI5	0,860	0,74					Yes

Evaluation of credibility brand scale

The results of the analysis of residuals, external weights, external loadings coefficients, t-values, VIF multicollinearity, and BCa confidence intervals satisfied the author's expectation and were statistically significant. Except for the observed variable CB2, external weights and the external loading coefficient of this variable were not statistically significant and was not accepted. The credibility brand scale after the evaluation includes two observed variables (CB1, CB3), as shown in Table 4.

The requirements for structural model testing were ensured by the final outcome of the model evaluation of the result and cause scales.

Evaluation the structural model

The Standardized Root Mean Square Residual (SRMR) index < 0.08, VIF < 5 did not appear multicollinearity, the t, f2 values, the BCa confidence interval were statistically significant, and a structural model was consistent with market data. The adjusted R2 of PI and PQ (0.553 and 0.500) were greater than 0.5, showing that these variables were starkly evident in the model. The adjusted R2 of PS (0.079) was less than 0.5 and was weakly explained in the model, as shown in Table 5.

Hypothesis testing

The study declared UBC had a positive impact on perceived quality with β = 0.324 (p=0.065; 90% confidence level), so hypothesis H3a was supported. Contrary to the hypothesis posed, UBC proved its positive effect on the perception of sacrifice with β = 0.322 (p = 0.011), so hypothesis H3b was not supported, as shown in Table 6.

Credibility brand had a positive impact on perceived quality with an impact level of β=

Table 4: Evaluation of the formative measurement model

Study	Construct	Convergent Validity >0.7	Items	Outer weights (Outer loadings)	t	P	Confidence interval Bca 95%	VIF <5	Result
1	CB	0.908	CB1	0.588 (0.950)	3,875	0.000	0.332-0.936	2.360	Yes
			CB3	0.478 (0.924)	2,944	0.000	0.074-0.720	2.360	Yes
	UBC	0.76	UBC2	0.406 (0.889)	1,939	0.000	-0.086-0.758	2.353	Yes
			UBC3	-0.088*(0.823)	0,270	0.000	-0.859-0.502	3.818	Yes
			UBC4	0.139* (0.830)	0,529	0.000	-0.351-0.691	3.906	Yes
			UBC5	0.624 (0.956)	3,018	0.000	0.227-1.057	4.099	Yes
2	CB	0.729	CB2	0.478 (0.926)	3,332	0.000	0.169-0.738	2.397	Yes
			CB3	0.586 (0.951)	4,198	0.000	0.309-0.862	2.397	Yes
	UBC	0.731	UBC2	0.047* (0.818)	0,245	0.000	-0.343-0.421	2.829	Yes
			UBC3	0.378 (0.918)	1,980	0.000	0.035-0.777	3.621	Yes
			UBC4	0.390 (0.935)	1,857	0.000	-0.007-0.815	4.156	Yes
			UBC5	0.096* (0.894)	0,444	0.000	-0.358-0.494	4.299	Yes
			UBC6	0.195* (0.836)	0,915	0.000	-0.221-0.611	2.503	Yes

Table 5: Evaluation of the structural model fit

		Study 1		Study 2	
		Saturated Model	Estimated Model	Saturated Model	Estimated Model
SRMR		0,058	0,068	0,055	0,060
d_ULS		0,456	0,630	0,689	0,824
d_G		0,298	0,308	0,378	0,392
Chi-Square		202,292	204,857	337,568	342,731
NFI		0,872	0,870	0,888	0,886
R^2 adjusted	PI		0,553		0,585
	PQ		0,500		0,524
	PS		0,079		0,174

0.469 (p=0.007), so hypothesis H4a was supported. Credibility brand negatively affected perception of sacrifice with impact level β= -0.283 (p=0.003), so hypothesis H4b was supported. Perceived quality had a positive impact on purchase intention with an impact level of β= 0.736 (p=0.000), so hypothesis H1 was supported. Perception of sacrifice had a negative impact on purchase intention with an impact level of β=-0.054 (p=0.314 is not statistically significant), so hypothesis H2 was not supported.

C. Results of the study 2

Evaluation of purchase intention scale

The evaluation results of the scale met the requirements of convergence value, reliability, composite reliability, internal consistency reliability, and discriminant value. The scale of purchase intention after evaluation included five observed variables (PI1-PI5).

Evaluation of perceived quality scale

Similar to the results of purchase intention, the evaluation of the perceived quality scale showed that they all met the requirements of convergence value, internal consistency reliability, and discriminant value. The perceived quality scale consisted of 5 observed variables (PQ1- PQ5).

Evaluation of perception sacrifice scale

For the perception sacrifice scale, the calculation of the scale satisfied concerns of convergent value, internal consistency reliability, and discriminant value. The perception sacrifice scale consisted of 4 observed variables (PS1, PS3, PS4, PS5), as shown in table 3.

Evaluation of university business cooperation scale

The results of the analysis of residuals, external weights, external loadings coefficients, t-values, VIF multicollinearity, and BCa confidence intervals were satisfactory and statistically significant. Three observed variables (UBC2, UBC5, UBC6) had external weights that were not statistically significant, but the external loading coefficients were greater than 0.7 and statistically significant, which were accepted. The scale of UBC after the evaluation was including 5 observed variables (UBC2- UBC6).

Evaluation of credibility brand scale

The results of the analysis of residuals, external weights, external loadings coefficients, t-values, VIF multicollinearity, and BCa confidence intervals were satisfactory and statistically significant,

Table 6: Evaluation of the structural model

Study	Hypothesis	β	t	f^2	VIF (<5)	Connfidence interval Bca 95%	P	Result
1	**H_1: PQ-> PI**	0,736	17,938	1,197	1,011	0,643-0,806	0,000	Supported
	H_2: PS-> PI	**-0,054**	**1,007**	**0,007**	**1,011**	**-0,160-0,053**	**0,314**	**Not supported**
	H_{3a}: UBC->PQ	0,324	1,847	0,140	1,498	0,031-0,676	0,065#	Supported
	H_{3b}: UBC->PS	0,322	2,530	0,075	1,498	0,003-0,516	0,011	Change
	H_{4a}: CB->PQ	0,469	2,699	0,293	1,498	0,119-0,764	0,007	Supported
	H_{4b}: CB->PS	-0,283	3,016	0,058	1,498	-0,458- -0,090	0,003	Supported
2	**H_1: PQ-> PI**	0,742	16,268	1,263	1,049	0,641-0,823	0,000	Supported
	H_2: PS-> PI	**0,085**	**1,967**	**0,017**	**1,049**	**-0,001-0,169**	**0,149**	**Not supported**
	H_{3a}: UBC->PQ	0,373	3,274	0,249	1,175	0,152-0,581	0,001	Supported
	H_{3b}: UBC->PS	0,447	5,018	0,206	1,175	0,228-0,592	0,000	Change
	H_{4a}: CB->PQ	0,493	4,850	0,434	1,175	0,298-0,689	0,000	Supported
	H_{4b}: CB->PS	**-0,109**	**1,392**	**0,012**	**1,175**	**-0,254- 0,048**	**0,164**	**Not supported**

except for the observed variable CB1. CB1 had external weights and external loading coefficient that were not statistically significant and was not accepted. The credibility brand scale after the evaluation consists of 2 observed variables (CB2, CB3), as shown in Table 4. The model evaluation of the results and cause scales ensured the requirements for structural model testing.

Evaluation of the structural model

The SRMR index < 0.08, VIF < 5 did not appear multicollinearity, the t, f2 values, the BCa confidence interval were statistically significant, and the structural model was consistent with market data. The adjusted R2 of PI and PQ (0.585 and 0.524) were greater than 0.5, which was well explained in the model. The adjusted R2 of PS (0.174) was less than 0.5 and weakly explained in the model, as shown in Table 6.

Hypothesis testing

UBC had a positive impact on perceived quality with β = 0.373 (p=0.001), so hypothesis H3a was supported. UBC had a positive impact on the perception of sacrifice with β = 0.447 (p = 0.000), contrary to the hypothesis posed, so hypothesis H3b was not supported. Credibility brand had a positive impact on perceived quality with an impact level of β= 0.493 (p=0.000), so hypothesis H4a was supported. Credibility brand negatively affected the perception of sacrifice with impact level β= -0.109 (p=0.164), so hypothesis H4b was not supported. Perceived quality had a positive impact on purchase intention with an impact level of β= 0.742 (p=0.000), so hypothesis H1 was supported. In opposition to Perceived quality, Perception of sacrifice harmed purchase intention with an impact level of β= 0.085 (p=0.194 is not statistically significant), hypothesis H2 was not supported, as shown in Table 5.

Discussion

Hypothesis testing of study 1 had 4 hypotheses that were supported and 2 not supported, while study 2 had 6 proposed hypotheses where 3 were supported and 3 were not supported.

The impact of university-business cooperation

The results confirmed that UBC had a positive impact on perceived quality (βUBCPQ1 = 0.324; βUBCPQ2 = 0.373), and also showed that when higher education institutions cooperated with businesses, buyers' trust towards both enterprises and schools increased, the perception of product quality and teaching quality increased, and the intention to use the products of both parties increased. From the results, the study concludes that UBCs provide noticeable signals that improve buyers' perceptions about the quality of products and services of the parties involved. However, UBC had a positive impact on the perception of sacrifice (βUBCPS1= 0.322; βUBCPS2= 0.447). This result was not consistent with the hypothesis that buyers tend to judge UBC as a crucial factor in increasing costs, selling prices for buyers, and increasing tuition fees for learners.

The impact of credibility brand

Credibility brand had a positive impact on perceived quality (βCBPQ1 = 0.469; βCBPQ2 = 0.493). This shows that when participating parties cooperate with reputable and reliable brands, it will increase the trust of buyers and learners towards businesses and schools, increase the perception of quality, increase the purchase intention for businesses and increase the intention to study at the school. Credibility brand had a negative impact on the perception of sacrifice that was statistically significant for study 1 but not statistically significant for study 2, which showed that for buyers, TVU brand made them feel safe in using the product. The prestige and trustworthiness of the cooperating enterprise were not enough to reassure learners and reduce concerns about losses.

The impact of perceived quality

The results also confirmed that perceived quality had a strong positive influence on purchase intention (βPQPI1 = 0.736; βPQPI2 = 0.742). From this finding, enterprises and universities should increase product quality, such as teaching and learning quality at TVU, to increase consumer intention to use the product.

The impact of perceived sacrifice

Perception of sacrifice has the opposite effect on purchase intention and was not statistically significant. It shows the confusion of buyers and learners about paying high costs due to the cooperation between schools and businesses.

IV. CONCLUSIONS

The results of testing hypotheses and results models, cause models and structural models using PLS-SEM and Bootstrap tools with N= 5000 show that the theoretical model fits the market data. UBC directly and positively affects perceived quality and perception of sacrifice. The findings show that when using this signal as a basis for inferring quality, consumers still feel insecure about the costs incurred in the cooperation process. However, when cooperating with reputable and reliable partners, UBC increases the perception of quality and reduces the perception of sacrifices of customers at the same time. Therefore, this study stated that purchase intention is positively affected by perceived quality but not perceived sacrifice. The impact of perceived sacrifice on purchase intention was not statistically significant in both cases.

The study results added the UBC signal to the set of quality signals for products with unobserved quality and confirmed that UBC conceptual scale had five observed variables.

Businesses and universities need to strengthen cooperation to improve product quality, to increase science and technology content in product production and corporate governance, to update related knowledge, and to improve the quality of teaching and learning. Do so would improve the effectiveness of UBC for participants and increase the contribution of UBCs to the development of Vietnam's economy. Perceived quality is always based on the actual quality of products and only plays a positive role when the actual quality of the product is good. Thus, businesses and schools need to focus on constantly improving the quality of products to create trust with customers and increasingly improve the brand value in the minds of customers, which will ensure the sustainable development of businesses and schools.

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