Factors Impacting Co-Creation in Teaching and Learning in Higher Education: The Case of Vietnam National University, Hanoi

International Conference on Emerging Challenges:

Smart Business and Digital Economy

Huong-Linh Le[1*] and Duong Quynh Bui Thi[1]

[1] International School, Vietnam National University, Hanoi, Vietnam

[*]Corresponding author: linhlh@vnuis.edu.vn

Abstract

Research purpose:
This paper is to (1) determine how resources such as Co-production and Value-in-Use influence the cocreation process and (2) figure out the values that lecturers and students can achieve for Co-creation activities at Vietnam National University, Hanoi.

Research motivation:
Higher education co-creation has been extensively researched and developed in recent decades. However, only some studies exist on the Co-creation process in Vietnam's Higher Education Context. Still, there needs to be research focusing on co-creation research in education, significantly higher education, where the rate of interaction and sharing will substantially influence the output of the learning and teaching process.

Research design, approach, and method:
The research use the Co-creation process model developed by Dollinger, Lodge, and Coates (2018); evaluation survey research was conducted at Vietnam National University, Hanoi (VNU), with 209 respondents. The study uses SmartPLS4 software to analyze the Partial Least Squares Structural Equation Modelling (PLS-SEM).

Main findings:
The study found that (1) co-production and value-in-use have a positive effect on the co-creation process, and (2) co-creation activities have a significant effect on the three outcomes presented in the analysis. Nevertheless, there is a distinction between the two samples of lecturer and student.

Practical/managerial implications:
Co-creation activities have the most negligible impact on the benefits of Innovation for both the lecturer and the student. Future studies can evaluate the impact later when implementing consecutive Co-creation activities and thus assess whether it brings innovation.

Keywords: Higher education, Co-creation, Co-production, S-D Logic, Vietnam.

1. INTRODUCTION

Extensive research has delved into Value Co-creation in higher education, encompassing various dimensions. Zarandi, Soares, and Alves (2022) have recently classified these studies into three pivotal themes: (1) Co-creation processes and methodologies in higher education, (2) Student co-creation roles, and (3) Student co-creation behaviors in higher education.

Within these themes, one of the extensively investigated areas is the "Co-creation process and approaches in higher education." This realm often draws upon the Service-dominant logic (SDL) framework that Vargo and Lusch (2004) developed. SDL posits that all exchanges are co-created, emphasizing that value emerges through collaborative efforts

between what an organization provides and the customer consumes (Dollinger, Lodge, & Coates, 2018). For instance, the well-recognized DART (Dialogue, Access, Risk Assessment, Transparency) model, introduced by (Coimbatore K Prahalad & Venkat Ramaswamy, 2004), is a fundamental indicator for co-creation. However, it lacks crucial considerations, such as the role of culture, which is increasingly acknowledged as an essential factor (Cova, Dalli, & Zwick, 2011). Notably, Dollinger et al. (2018) introduced the first conceptual model specifically tailored to value co-creation in higher education. Their approach amalgamates essential components of value co-creation, co-production, and value-in-use, connecting them to anticipated benefits like Knowledge, Equity, Experience, Personalization, and Relationship.

In the context of universities, value co-creation signifies a collaborative endeavor that combines student feedback, opinions, and intellectual resources with institutional assets to generate mutual value (Dollinger et al., 2018). This collaborative process primarily revolves around interactions among students and lecturers. Moreover, value is perceived as a multifaceted and subjective concept, shaped not by the institution but by the students. It emerges from a dynamic interplay between benefits and sacrifices and is inherently temporal, influenced by cognitive and affective factors (Ledden & Kalafatis, 2010).

Despite innovations, Vietnam's higher education system faces quality issues, while co-creation research remains scarce. Emphasizing theoretical knowledge, it struggles to support high-quality learning and research fully. This hampers students' independent thinking and research skills. In a changing landscape, value co-creation gains importance as diverse stakeholders, including students, educators, and institutions, seek to harness its potential.

Considering the limited research in Vietnam, this study endeavors to bridge this critical gap. It seeks to explore co-creation dynamics within the teaching and learning processes at Vietnam National University, Hanoi (VNU). By doing so, it aims to address three fundamental questions:

1. What factors within the VNU context encourage or facilitate co-creation in teaching and learning?

2. How does co-creation manifest within the higher education landscape of Vietnam National University, Hanoi?

3. What are co-creation outcomes in the teaching and learning processes at Vietnam National University, Hanoi?

To achieve the research objectives, the study uses perspectives from SDL theory to establish a theoretical foundation. This research is timely and essential in the context of VNU and Vietnamese higher education, where the landscape is rapidly evolving, and the role of co-creation is yet to be comprehensively explored and understood.

2. LITERATURE REVIEW

2.1 Co-creation conceptual components

Co-creation is a still-evolving concept that requires a broader approach, particularly in novel contexts such as higher education. Determining that co-creation consists of two distinct constructs, co-production (COP) and value-in-use (VIU), was one of the objectives of this study (Ranjan & Read, 2016). Therefore, this part conceptualized co-creation as a third-order construct. In contrast, co-production and value-in-use were conceptualized as second-order constructs, and both second-order structures also contain first-order structures

2.1.1 Co-Production

One aspect of co-creation is co-production, which, as defined by R. F. Lusch and Vargo (2006), is a technique that allows for the integration of consumer resources relatively early in the value chain of production, where customers' knowledge, experiences, and views may influence the creation of the service or product. Thus, co-production is founded on many of the same ideas as co-creation, such as active consumer engagement (Auh, Bell, McLeod, & Shih, 2007) and ongoing discussion that enables cooperation (Grönroos & Voima, 2012; R. F. Lusch, Vargo, & O'brien, 2007). Consumers can be viewed as partly workers or members of the production team in co-production (Lengnick-Hall, 1996; Nuttavuthisit, 2010). Researchers have also proposed that co-production may be further subdivided into three constructs: "knowledge sharing," "equity," and "interaction" (Ranjan & Read, 2016). Thus, the following hypotheses are proposed:

H1: Co-production (CoP) has a positive effect on Co-creation.

To better comprehend this, the next part discusses the underlying co-production structures and their adaptation to the higher education environment.

2.1.1.1. Knowledge sharing

Co-production hinges significantly on knowledge sharing, where lecturers and students combine their expertise to nurture innovative ideas (Ramirez, 1999). Higher education often has a traditional manufacturing mindset, necessitating students to acquire knowledge or power for process transformation (Spohrer & Maglio, 2008). Higher education institutions, typically structured organizations, may lag in adaptability compared to more agile counterparts. However, as the competitive landscape intensifies, integrating user resources could catalyze novel idea generation within schools (Spohrer

& Maglio, 2008). Encouraging students to share their knowledge openly can foster service innovation and mitigate potential future risks (Spohrer & Maglio, 2008).

2.1.1.2. Equity

Co-production relies on knowledge sharing and "Equity," denoting additional access that empowers organization users to contribute knowledge and resources (Gummesson, 2002). Balanced relationships and equal access are paramount for effective co-creation, as emphasized by Fisher and Smith (2011). Value co-creation cannot exhibit other crucial features without equitable access, such as sustained dialogue and interaction between consumers and the organization or shared role responsibility (Coimbatore K Prahalad & Venkat Ramaswamy, 2004). Leavy (2012) notes that transparency in the co-creation process fosters trust and authenticity, underlining the need for organizations to provide resources like platforms and prior production knowledge, enabling consumers to contribute valuable feedback and innovative ideas (Ramaswamy & Ozcan, 2014). In higher education, maintaining a balance in student participation between various groups, including students, lecturers, and student groups, is vital to prevent one entity from dominating the process.

2.1.1.3. Interaction

Crucial for facilitating knowledge sharing and equity within co-production, interactions between consumers and organizations play a pivotal role (Grönroos, 2006; Payne, Storbacka, & Frow, 2008). In higher education, scholars such as Maglio and Spohrer (2008) and Aarikka-Stenroos and Jaakkola (2012) highlight the significance of interaction in the learning and teaching process. Scholars like (Kale, Dyer, & Singh, 2001) and (Vargo, Maglio, & Akaka, 2008) draw parallels between interactions in co-production and alliance-building. Value co-creation encourages ongoing dialogues between organizations and consumers, signifying two fundamental shifts in the traditional producer-consumer relationship. Firstly, consumers can provide feedback throughout the entire value chain, not just at its culmination (Coimbatore Krishna Prahalad & Venkat Ramaswamy, 2004). Secondly, consumers can offer feedback on any element at any time, not confined to specific endeavors or circumstances (Coimbatore Krishna Prahalad & Venkat Ramaswamy, 2004).

2.1.2 Value In Use

Suppose co-production is the process that happens between users and organizations during the creation and delivery of the value offer. In that case, value-in-use is what happens to the value for both users and organizations once they start using the co-produced service or product. The term "value-in-use" (ViU) comes from the term "service-dominant logic" (SD-logic). ViU is an idea first put forward by (Vargo & Lusch, 2004), including Experience, Personalization, and Relationship. It says that all goods and services have value once the consumer gives them worth. SD logic focuses on the intangibles and connections as essential to creating value. It says that organizations no longer provide value (for example, by selling a product) but that both organizations and customers play active parts in their interactions to co-create value (Díaz-Méndez & Gummesson, 2012). Therefore, the following hypotheses are proposed:

H2: Value-in-use (ViU) has a positive effect on Co-creation.

To get a deeper comprehension of this topic, the research presents a discussion of the fundamental Value-in-use structures and their modifications for the setting of higher education.

2.1.2.1. Experience

The first part of ViU is the customer's experience and how it links to what the consumer thinks the product is worth (R. F. Lusch & Vargo, 2006). R. F. Lusch and Vargo (2006) also say that experience is an empathic, emotional, and memorable exchange that has its worth. Experience factor shows actual customer events and makes creating value in a given situation possible. Rageh Ismail, Melewar, Lim, and Woodside (2011) say that optimizing the value of the customer experience requires the customer to be involved in the co-creation process. In higher education literature, Shah, Nair, and Richardson (2016) define the experience as teaching and learning experiences, regardless of the mode of delivery. However, as the market for higher education becomes more competitive, experiences may continue to be an excellent way to determine the service quality and how much they think their education is worth (Shah et al., 2016).

2.1.2.2. Personalization

Ranjan and Read (2016) say that ViU includes how users feel about the value offered and how they can "personalize" it. In co-production, personalization or customer tastes are built in at the beginning of the production process (Grönroos & Voima, 2013; Ramaswamy & Ozcan, 2014). Personalization through ViU would also allow professors and students to combine services, like degrees or classes, that fit their needs or wants in higher education. But the term "co-creation" is better used to describe how professors and students can change the services and experiences of higher education to fit their own needs, such as with flexible education trends like mixed mode delivery courses (Kim & Bonk, 2006) or alternative timetabling options (Burton & Nesbit, 2008).

2.1.2.3. Relationship

The relational construct is the concluding part of ViU. Relations between lecturers and students in higher education reflect social aspects of the experience (Schmitt, 1999; Sheth, Newman, & Gross, 1991) and are a significant source of the co-creation of value at institutions (Dziewanowska, 2017; R. Lusch & Wu, 2012). As value co-creation develops fundamental aspects of relationship formation, such as continuous dialogue and balanced roles (Coimbatore K Prahalad & Venkat Ramaswamy, 2004), it may enhance students' relationships with their lecturers.

2.2 The outcomes of co-creation

This part's objective was to comprehend how higher education co-creates and the outcomes of co-creation. This is crucial in the context of higher education, where services are frequently tailored to the student experience without regard for a larger institutional purpose or objective, or vice versa, where institutional objectives are prioritized over the student experience (Judson & Taylor, 2014; Ng & Forbes, 2009). However, co-creation goes beyond the notion that services must be exclusively for one or another group and instead asserts that experiences and activities can benefit multiple constituents through the co-creation process.

The advantages of student-faculty collaboration in higher education have begun to be investigated (Felten, Cook-Sather, & Bovill, 2014; Matthews, 2017). The majority of this work, however, is conceptualized through the students-as-partners' framework, which is a variation of the topic and lacks the foundational concepts of co-production and ViU. *Innovation*, *knowledge*, and *relational* benefits were analyzed (Reypens, Lievens, & Blazevic, 2016). These broad categories were helpful to apply to higher education because the benefits of co-creation in higher education have not been extensively studied. As a result, too specific parameters could have led to the omission of significant outcomes. It is essential to note that these three advantages frequently overlap and intertwine.

2.2.1. Innovation

The first outcome of co-creation investigated in this study was innovation. Innovation in higher education may pertain to technological and non-technological advancements. As learning technologies and e-learning continue to evolve in higher education, technological innovation through co-creation may be particularly advantageous (Yuan & Powell, 2013). Moreover, through co-creation, students' capacity for innovation may be affected, as student participation in innovative activities frequently influences their autonomy and cognitive development (Martín, Potočnik, & Fras, 2017). Improved learning and teaching practices for students and faculty may result from co-creation in higher education (Harrington, Flint, & Healey, 2014), as well as improved course design and learning resources (Healey, Flint, & Harrington, 2016). Thus, the following hypotheses are proposed:

H3: The Value Co-creation process positively impacts on Innovation of lecturers and students

2.2.2. Knowledge

This research also examined the impact of co-creation on knowledge as a second advantage. This study did not investigate ability in a content-specific manner, such as whether the learner has a better comprehension of a particular learning objective after co-creation. Instead, this study investigated the impact of general knowledge on lecturers and students, such as self-efficacy and perceptions of employability. Communication and leadership are graduate capabilities (Sumsion & Goodfellow, 2004) that students can transfer or utilize in lifelong learning and their careers. Prior research has demonstrated that participants in co-creation frequently report higher self-confidence and the ability to write clearly and effectively, think clearly and effectively, solve complex problems, and comprehend various social contexts (Yi & Gong, 2013). Thus, the following hypotheses are proposed:

H4: The Value Co-creation process positively impacts the Knowledge of lecturers and students.

2.2.3. Relational

The third benefit investigated in this study was relational. Student-faculty interactions have long been recognized as essential for fostering student belongingness, engagement, and learning outcomes (Kuh & Hu, 2001). Studies have shown that the quality of interactions in an authentic or meaningful context is an essential indicator of the efficacy of student-faculty relationships and the frequency of interactions (Cox & Andriot, 2009). Besides, Komarraju, Musulkin, and Bhattacharya (2010) have demonstrated that student-faculty relationships affect how students perceive their entire higher education experience. In addition, co-creation has the potential to positively impact student relationships because it has been demonstrated to foster trust and comprehension among diverse stakeholders (Sheth & Uslay, 2007). Co-creation also promotes collaboration and relational exchanges between producer and consumer categories that were formerly distinct (Yi & Gong, 2013). Thus, the following hypotheses are proposed:

H5: The Value Co-creation process positively impacts the Relationship between lecturers and students.

2.3 Model for Exploring Co-creation in Higher Education

The literature review revealed that co-creation in higher education is underexplored (Elsharnouby, 2016; Fleischman, Raciti, & Lawley, 2015), necessitating a comprehensive model to better grasp its dynamics within this context. When

applied empirically, this model served as a foundation for understanding the complex co-creation process and identifying indicators present in specific research activities, highlighting their correlation with benefits. Amid concerns regarding higher education quality and student involvement (Dollinger et al., 2018), this model sheds light on leveraging co-creation for improved outcomes in institutions, faculty/staff, and students.

The first part of the model assesses indicators of co-creation in higher education by identifying elements in case-study-selected activities. Indicators are crucial for comprehending a phenomenon and establishing benchmarks to differentiate co-creation types (Munda & Nardo, 2005). In this model, indicators are explored through two co-creation constructs: co-production and Value-in-Use (ViU). These constructs, consistent with existing literature (Ranjan & Read, 2016), consist of six first-order constructs. Co-production indicators encompass knowledge sharing, equity, and interaction, while ViU indicators include experience, personalization, and relationship.
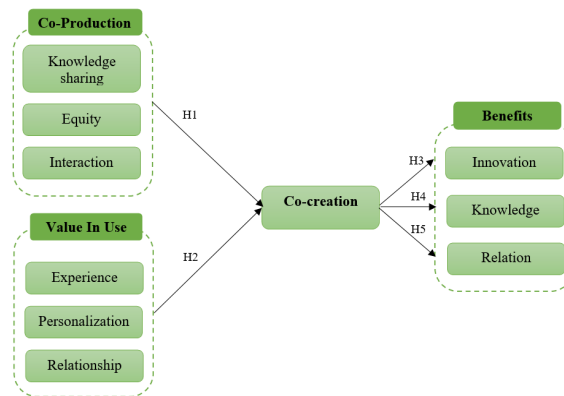

Fig. 1. Final research model

Source: Dollinger et al. (2018)

The first part of the model assesses indicators of co-creation in higher education by identifying elements in case-study-selected activities. Indicators are crucial for comprehending a phenomenon and establishing benchmarks to differentiate co-creation types (Munda & Nardo, 2005). In this model, indicators are explored through two co-creation constructs: co-production and Value-in-Use (ViU). These constructs, consistent with existing literature (Ranjan & Read, 2016), consist of six first-order constructs. Co-production indicators encompass knowledge sharing, equity, and interaction, while ViU indicators include experience, personalization, and relationship.

3. RESEARCH METHODOLOGY

3.1 Designing questionnaire & Pilot test

The research employed a tailored approach to Higher Education in the context of Vietnam National University, combining the Value Co-creation model from Dollinger et al. (2018) with elements from Ranjan and Read's (2016) adaptation of Vargo and Lusch's (2004) service-dominant logic (SDL) approach. This approach measured co-creations value using two dimensions: Co-production (CoP) and Value-in-use (ViU). The questionnaire, structured around nine specific factors, encompassed Co-Production (Knowledge sharing, Equity, Interaction), Value In Use (Experience, Personalization, Relationship), and Outcomes (Innovation, Knowledge, Relation).

The questionnaire comprised three sections: respondent background, resources for co-creation, and outcomes. Careful design ensured clarity and comprehensibility for respondents. The questionnaire was provided in both English and Vietnamese to accommodate diverse subjects. Initially crafted in English, it was then reverse-engineered and translated. A pilot study was conducted over a week, involving students with solid knowledge backgrounds at Vietnam National University. This phase led to removing three irrelevant questions and refining six ambiguous ones, enhancing the questionnaire's quality based on feedback (Harkness, Villar, & Edwards, 2010).

3.2 Sampling and data collection

Vietnam National University, Hanoi, a renowned institution with 40,000+ students, provided an ideal research site for its educational success. To meet the minimum requirement of five observations per item for sample size determination, the study required at least 145 surveys given its nine factors and 29 variables. The study surpassed this requirement with 209 surveys, ensuring robust hypothesis testing. The sample consisted of 220 randomly selected students at Vietnam National University, Hanoi, in May 2023, gathered through a Google Form questionnaire distributed over three weeks. Collaboration with faculty and personal networks ensured randomness. Over 150 responses were collected in the first week, with 220 achieved after two weeks, closing the Google Form link for analysis.

3.3 Measuring

Using a 5-point Likert scale ranging from "(1) strongly disagree" to "(5) strongly agree," to measure each construct for our conceptual research model. The study utilized three constructs, Co-production, Value in use, and outcomes—to measure lecturers' and students' value of co-creation in higher education.

Co-production was adopted and modified based on validated questionnaires created by Ranjan and Read (2016), assessing the degree to which lecturers' and students' knowledge and experience are integrated based on their class participation. There are 11 items to measure three variables, including knowledge sharing, equity, and interaction, each consisting of reflective second-order measurement items.

Value-in-use was adopted and modified from validated questionnaires developed by (Ranjan & Read, 2016), measuring the extent to which lecturers and students utilize the university-provided education platform. There are nine items to measure three variables, including experience, personalization, and relationships; reflective second-order items also measure each variable.

Dollinger et al. (2018) extracted the measurement for the benefits of the Co-creation process. There are nine items to measure three variables, including knowledge, relationships, and innovation, and each consists of reflective measurement items of the second order. In this study, the researcher took measurement items already tested in the service industry (Kacprzak & Dziewanowska, 2019) and changed them to fit the higher education setting.

3.4 Data Analysis Methods

The research employed data analysis tools, such as Microsoft Excel 365, to describe samples, statistical data, and SPSS to collect and cleanse collected data. The author also uses SmartPLS 4 software with particular methods, including factor analysis, reliability analysis, and SEM linear structure modeling. The study utilizes descriptive statistics to examine variables of interest. Analyze these factors and the dependability of the variable scales for the most accurate evaluation of the results. Then, the study evaluated the relationship between six independent variables to two second-order constructs (three independent for each latent variable) and measured the impact of the Co-creation process on the level of the three benefits.

Quantitative research methods are utilized to test the model and hypotheses. Unsatisfactory data lines are initially removed from the collected sample. The research hypothesis is then tested using the structural model. Due to its flexibility in modeling the relationships between independent and dependent variables, linear structural modeling (SEM) has become one of the most widely used research methods in many fields. In the SEM model, two commonly used analytical techniques are CB-SEM (Covariance-based SEM) and PLS-SEM (Partial Least Squares SEM), which are used by the AMOS and SmartPLS software. This study employs the least squares linear structural model PLS-SEM instead of CB-SEM for several reasons (F. Hair Jr, Sarstedt, Hopkins, & G. Kuppelwieser, 2014). (1) Avoiding problems associated with small sample size and non-normally distributed data; (2) Capable of estimating complex research models with numerous intermediate, latent, and observed variables, particularly structural models; and (3) Suitable for predictive works (Henseler, Ringle, & Sinkovics, 2009). In addition, PLS-SEM is considered superior to covariance-based SEM because only respondents participated in Study 1 for Lecturers. Although the sample size is less than 100, PLS-SEM has the advantage of being robust and exhibiting higher statistical power in small samples than in covariance-based SEM.

This study employs PLS-SEM to analyze the impact of CoP and ViU on the Co-creation process through six independent factors and predict the benefits of Co-creation activities for lecturers and students in the context of higher education teaching and learning.

4. DATA PRESENTATION AND RESEARCH FINDINGS

4.1 Data description

The study collected demographic data from 209 respondents. Among them, 126 were female (39.71%), and 83 were male (60.29%). Regarding age, 60.29% were between 18 and 25 years old, 6.70% were between 26 and 30, 17.22% were between 31 and 40, and 3.35% were older than 40. Regarding education level, 66.03% had an undergraduate degree, 6.80% had a bachelor's, 8.61% had a master's, and 18.66% had a Ph.D. or higher. Regarding their role in higher education, 27.27% were lecturers (57 respondents), and 72.73% were students (152 respondents).

Table 1. Descriptive statistics of Respondents

Demographic constructs	Criteria	Size	Percentage (%)
Gender	Male	83	39,71%
	Female	126	60,29%

Age	18 years - 25 years	152	72,73%
	26 years – 30 years	14	6,70%
	31 years – 40 years	36	17,22%
	Above 40 years	7	3,35%
Level of education	Undergraduate	138	66,03%
	Bachelor	14	6,70%
	Masters	18	8,61%
	Ph.D. and above	39	18,66%
The role in higher education	Lecturer	57	27,27%
	Student	152	72,73%

4.2 Data Analysis and Results

We tested our proposed model (see Figure 1) and hypotheses using structural equation modeling (SEM). Using SMART PLS4, we performed the analysis in three steps. First, we used confirmatory factor analysis on the measurement model to ensure the construct validity of the latent variables. Second, we took the SEM approach to test the structural, complex relationships between independent and dependent variables. Finally, we analyzed the effects of exogenous variables on the endogenous variable.

The HTMT, the Fornell and Larcker (1981) criterion, and the correlations between the different categories were used to test the discriminant validity (Dijkstra & Henseler, 2015). In this study, *HTMT ratios* for both samples range from 0.297 to 0.874, which is below the level of 0.9. So, the measuring model has been shown to have discriminant validity. Concerning cross-loading, J. F. Hair Jr, Howard, and Nitzl (2020) said that the loading of each index should be higher than the sum of all its cross-loadings. Each indicator's outer loading on its construct was more significant than 0.5 and more meaningful than all of its cross-loadings on other constructs in this model. As shown in Table 2, *Fornell and Larcker's ratios* range from 0.528 to 0.883 for sample 1 and from 0.570 to 0.898 for sample 2. Also, all of the HTMT values were lower than the baseline value of 0.90, and neither the lower nor the upper confidence interval (CI) had a value of 1. So, this measurement model has been shown to have both convergent and discriminant validity.

Table 2. Discriminant validity—Fornell and Larcker's criterion

Sample 1 -Lecturer				
	Co-creation	Innovation	Knowledge	Relational
Co-creation	**0.829***			
Innovation	0.698	**0.861***		
Knowledge	0.578	0.657	**0.856***	
Relational	0.528	0.639	0.791	**0.883***
Sample 2 – Student				
	Co-creation	Innovation	Knowledge	Relational
Co-creation	**0.859***			
Innovation	0.570	**0.898***		
Knowledge	0.666	0.654	**0.862***	
Relational	0.667	0.624	0.811	**0.867***

Source: The authors' compilation from data analysis

Validating Higher Order Construct

After determining the model's discriminant validity, correlation, reliability, and convergent, we test second-order structures with higher-order reflective models (Ringle, Sarstedt, & Straub, 2012). In this study, two second-order constructs, Co-production and Value, are derived from three lower-order constructs. Outer Weights, Outer Loadings, and

VIF must be determined to establish the higher-order construct validity. All outer weights were significant (J. F. Hair Jr et al., 2020). Moreover, peripheral loadings greater than 0.50 were found for each lower-order construct (Sarstedt, Hair Jr, Cheah, Becker, & Ringle, 2019). All VIF values were less than the recommended value of 5 (J. Hair JR, 2010) when collinearity was checked. Since all criteria are met, the validity of the HOC has been established.

Structural model assessment

After validating the construct measures, the structural model results are evaluated using the procedure suggested by F. Hair Jr et al. (2014), with two evaluation criteria: R^2 value and Q^2 value. R^2 values indicate the model's fitness, with sample 1 explaining 20.3% of Innovation, 37.9% of Knowledge, and 42.4% of Relational (according toHair, Ringle, and Sarstedt (2011), For sample 2, the model explains 21.2% of Innovation, 46.3% of Knowledge, and 43.7% of Relational. Q^2 values, according to Eriksson et al.(2015), which assess predictive relevance, are also examined, indicating that Co-creation, Knowledge, and Relation have predictive solid relevance.

Hypotheses Testing

Evaluation of the hypothesized relationship is the next stage in structural equation modeling to validate the proposed hypotheses. Five hypotheses were tested for each sample based on the level of significance in the path coefficient using the bootstrapping technique (Hair et al., 2011) with 5000 iterations of re-sampling and the number of observations constituting each bootstrap sample. The test revealed that all structural connections between constructs were significant, indicating that the current data supports all of our research hypotheses. Fig. 1, Fig. 2, and Table 3 depict the results of verifying hypotheses.
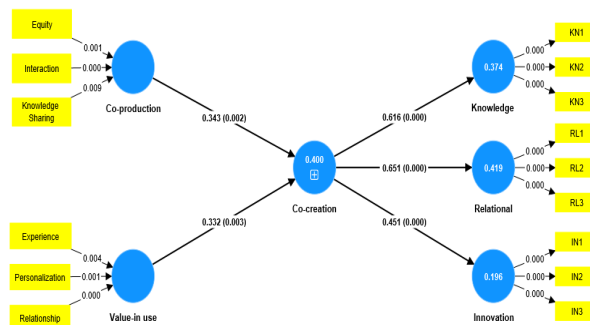

Fig. 2. Structural Model Assessment Results – Lecturer

Source: The authors' compilation from data analysis
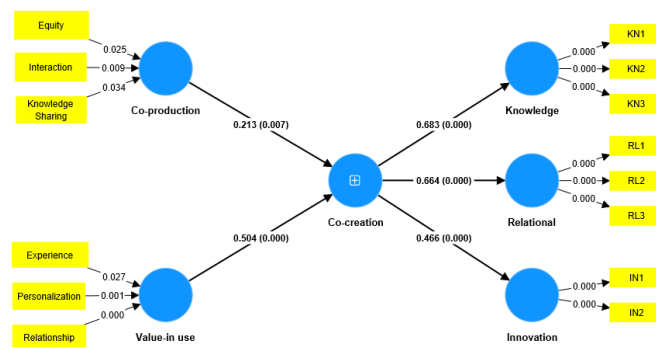

Fig. 3. Structural Model Assessment Results – Student

The study's objectives are to investigate the impact of co-production and value in use on the co-creation process and outcomes, which are knowledge, relation, and innovation for both lecturers and students. Table 3 displays the results of the conducted path analysis. From Table 3, the research results show that all hypotheses are supported. In sample 1 – for the lecturer, the co-production has a positive and significant impact on the Co-creation process (β = 0.343, p < 0.01), Value-in-use (β = 0.332, p < 0.01). In addition, Co-creation was found to be significantly related to three outcomes: Innovation (β = 0.451, p < 0.01), Knowledge (β = 0.616, p < 0.01), and Relational has the highest factors outcomes from the co-creation process for lecturers with β = 0.651, p < 0.01.

Secondly, in sample 2 – for students, the hypothesis testing of five hypothetical regressions (H1 to H5) shows a significance level of p<0.05. Expressly, hypothesis (1) confirms that Co-production has a positive impact on student co-creation activities (β = 0.213, p < 0.01). Similarly, for hypothesis (2), Value-in-use also has a significant positive effect on student co-creation activities (β = 0.504, p < 0.01). The result supports hypothesis (3) (β = 0.466, p < 0.01), showing

that co-creation value positively affects students' Innovation. Moreover, the analysis also supports hypothesis (4) ($\beta = 0.683$, $p < 0.01$), which indicates that Knowledge has the highest positive effect from Co-creation activities for students. Additionally, hypothesis (5) states that there is an effect of co-creation activities on Relational ($\beta = 0.664$, $p < 0.01$); it can be concluded that hypothesis 5 is supported.

Table 3. Path analysis and Hypotheses results

Sample 1 – Lecturer				
Hypothesized paths	**Path coefficients**	**t-value**	**p-value**	**Results**
H1: Co-Production => Co-creation	0.343	3.097	0.002	Supported
H2: Value-in use => Co-creation	0.332	2.983	0.003	Supported
H3: Co-creation => Innovation	0.451	5.742	0.000	Supported
H4: Co-creation => Knowledge	0.616	7.867	0.000	Supported
H5: Co-creation => Relational	**0.651**	11.093	0.000	Supported
Sample 2 – Student				
Hypothesized paths	**Path coefficients**	**t-value**	**p-value**	**Results**
H1: Co-Production => Co-creation	0.213	2.677	0.007	Supported
H2: Value-in use => Co-creation	0.504	6.318	0.000	Supported
H3: Co-creation => Innovation	0.466	6.447	0.000	Supported
H4: Co-creation => Knowledge	**0.683**	11.545	0.000	Supported
H5: Co-creation => Relational	0.664	14.279	0.000	Supported

5. CONCLUSIONS AND IMPLICATIONS

Two studies involving lecturer and student samples identified Co-production and Value-in-use as significant second-order factors, validating a third-order value co-creation model. This model, demonstrating conceptual and empirical reliability, proved applicable in higher education, particularly regarding its positive effects on Co-production influencing Co-creation (H1) and Value-in-use influencing Co-creation (H2). The Co-creation process also positively impacted Knowledge (H3), Relational (H4), and Innovation (H5), albeit with varying degrees of influence across subjects and samples.

Co-production, defined by Ranjan and Read (2016) as the initial co-creation stage, was found to have a positive impact on the Co-creation process for both lecturers and students, with a stronger influence on lecturers ($\beta = 0.343$) than students ($\beta = 0.213$). This dominance by lecturers could potentially lead to a power imbalance, highlighting the need for greater student involvement in course design and delivery.

Value-in-use, established by Vargo and Lusch (2008), significantly impacted the Co-creation process for both groups, benefiting students more in terms of engagement with course content, skill development, and ownership of their education, as pointed out by Agrawal and Rahman (2015) and Doyle, Buckley, and McCarthy (2021).

In examining the influence of Co-creation on Innovation (Hypothesis 3), both lecturers and students experienced a positive effect, albeit with a relatively low impact, possibly due to the substantial time, knowledge, and skill investments required for achieving innovation, as suggested by Kumari, Kwon, Lee, and Choi (2019).

Co-creation's impact on Knowledge (Hypothesis 4) was evident, benefiting both students and lecturers, with students experiencing a more significant advantage ($\beta = 0.683$). Students' fresh perspectives and active involvement in the learning process led to innovative thinking, as noted by Harrington et al. (2014).

Examining the impact of Co-creation on Relational (Hypothesis 6) revealed its positive influence on both lecturers and students. Relational was the most significant benefit of Co-creation activities for both groups, fostering a collaborative learning environment that improved teaching and learning outcomes.

In summary, a quantitative study at Vietnam National University, Hanoi, confirmed the significance of Co-production and Value-in-use in higher education's Co-creation process. Co-creation positively influenced Knowledge, Relational, and Innovation outcomes, albeit with variations across lecturer and student samples. These findings provide valuable guidance for enhancing the educational experience, addressing power imbalances, and promoting collaborative approaches in higher education. Furthermore, Co-creation holds potential benefits for students, instructors, and administrators, contributing to improved educational services and university marketing. Challenges remain in Vietnam's education system, suggesting that further investment in Co-creation-related activities can lead to better teaching and learning outcomes at Vietnam National University, Hanoi.

6. REFERENCES

Aarikka-Stenroos, L., & Jaakkola, E. (2012). Value co-creation in knowledge intensive business services: A dyadic perspective on the joint problem-solving process. *Industrial marketing management, 41*(1), 15-26.

Auh, S., Bell, S. J., McLeod, C. S., & Shih, E. (2007). Co-production and customer loyalty in financial services. *Journal of retailing, 83*(3), 359-370.

Burton, S., & Nesbit, P. (2008). *It's not as bad as they thought: student preferences for teaching format across subjects and over time.* Paper presented at the Quantitative Analysis of Teaching and Learning in Higher Education in Business, Economics and Commerce, Forum.

Cova, B., Dalli, D., & Zwick, D. (2011). Critical perspectives on consumers' role as 'producers': Broadening the debate on value co-creation in marketing processes. *Marketing theory, 11*(3), 231-241.

Cox, M. F., & Andriot, A. (2009). Mentor and undergraduate student comparisons of students' research skills. *Journal of STEM Education: Innovations and Research, 10*(1).

Díaz-Méndez, M., & Gummesson, E. (2012). Value co-creation and university teaching quality: consequences for the European higher education area (EHEA). *Journal of Service Management*.

Dijkstra, T. K., & Henseler, J. (2015). Consistent partial least squares path modeling. *MIS quarterly, 39*(2), 297-316.

Dollinger, M., Lodge, J., & Coates, H. (2018). Co-creation in higher education: Towards a conceptual model. *Journal of marketing for higher education, 28*(2), 210-231.

Dziewanowska, K. (2017). Value types in higher education–students' perspective. *Journal of Higher Education Policy and Management, 39*(3), 235-246.

Elsharnouby, T. H. (2016). Participation behaviour among international students: the role of satisfaction with service augmentation and brand choice attainment. *International Journal of Educational Management*.

F. Hair Jr, J., Sarstedt, M., Hopkins, L., & G. Kuppelwieser, V. (2014). Partial least squares structural equation modeling (PLS-SEM) An emerging tool in business research. *European business review, 26*(2), 106-121.

Felten, P., Cook-Sather, A., & Bovill, C. (2014). *Engaging students as partners in learning and teaching: A guide for faculty*: John Wiley & Sons.

Fisher, D., & Smith, S. (2011). Cocreation is chaotic: What it means for marketing when no one has control. *Marketing theory, 11*(3), 325-350.

Fleischman, D., Raciti, M., & Lawley, M. (2015). Degrees of co-creation: An exploratory study of perceptions of international students' role in community engagement experiences. *Journal of Marketing for Higher Education, 25*(1), 85-103.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of marketing research, 18*(1), 39-50.

Grönroos, C. (2006). Adopting a service logic for marketing. *Marketing theory, 6*(3), 317-333.

Grönroos, C., & Voima, P. (2012). Making sense of value and value co-creation in service logic.

Grönroos, C., & Voima, P. (2013). Critical service logic: making sense of value creation and co-creation. *Journal of the Academy of marketing Science, 41*, 133-150.

Gummesson, E. (2002). Relationship marketing in the new economy. *Journal of relationship marketing, 1*(1), 37-57.

Hair, J. F., Ringle, C. M., & Sarstedt, M. (2011). PLS-SEM: Indeed a silver bullet. *Journal of Marketing theory and Practice, 19*(2), 139-152.

Hair JR, J. (2010). Multvariate data analysis. In.

Hair Jr, J. F., Howard, M. C., & Nitzl, C. (2020). Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *Journal of Business research, 109*, 101-110.

Harrington, K., Flint, A., & Healey, M. (2014). Engagement through partnership: Students as partners in learning and teaching in higher education.

Healey, M., Flint, A., & Harrington, K. (2016). Students as partners: Reflections on a conceptual model. *Teaching and Learning Inquiry, 4*(2), 8-20.

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international

marketing. In *New challenges to international marketing*: Emerald Group Publishing Limited.

Judson, K. M., & Taylor, S. A. (2014). Moving from marketization to marketing of higher education: The co-creation of value in higher education. *Higher education studies, 4*(1), 51-67.

Kacprzak, A., & Dziewanowska, K. (2019). Investigating the influence of consumer socio-demographic characteristics on the preferred type of consumption experience. *Journal of East European Management Studies, 24*(4), 513-544.

Kale, P., Dyer, J., & Singh, H. (2001). Value creation and success in strategic alliances:: alliancing skills and the role of alliance structure and systems. *European Management Journal, 19*(5), 463-471.

Kim, K.-J., & Bonk, C. J. (2006). The future of online teaching and learning in higher education. *Educause quarterly, 29*(4), 22-30.

Komarraju, M., Musulkin, S., & Bhattacharya, G. (2010). Role of student–faculty interactions in developing college students' academic self-concept, motivation, and achievement. *Journal of college student development, 51*(3), 332-342.

Kuh, G. D., & Hu, S. (2001). The effects of student-faculty interaction in the 1990s. *The review of higher education, 24*(3), 309-332.

Ledden, L., & Kalafatis, S. P. (2010). The impact of time on perceptions of educational value. *International Journal of Public Sector Management, 23*(2), 141-157.

Lengnick-Hall, C. A. (1996). Customer contributions to quality: A different view of the customer-oriented firm. *Academy of management review, 21*(3), 791-824.

Lusch, R., & Wu, C. (2012). A service science perspective on higher education linking service productivity theory and higher education reform.

Lusch, R. F., & Vargo, S. L. (2006). Service-dominant logic: reactions, reflections and refinements. *Marketing theory, 6*(3), 281-288.

Lusch, R. F., Vargo, S. L., & O'brien, M. (2007). Competing through service: Insights from service-dominant logic. *Journal of retailing, 83*(1), 5-18.

Maglio, P. P., & Spohrer, J. (2008). Fundamentals of service science. *Journal of the academy of marketing science, 36*, 18-20.

Martín, P., Potočnik, K., & Fras, A. (2017). Determinants of students' innovation in higher education. *Studies in higher education, 42*(7), 1229-1243.

Matthews, K. E. (2017). Five propositions for genuine students as partners practice. *International Journal for Students as Partners, 1*(2).

Nuttavuthisit, K. (2010). If you can't beat them, let them join: The development of strategies to foster consumers' co-creative practices. *Business Horizons, 53*(3), 315-324.

Ng, I. C., & Forbes, J. (2009). Education as service: The understanding of university experience through the service logic. *Journal of Marketing for Higher Education, 19*(1), 38-64.

Payne, A. F., Storbacka, K., & Frow, P. (2008). Managing the co-creation of value. *Journal of the academy of marketing science, 36*, 83-96.

Prahalad, C. K., & Ramaswamy, V. (2004). Co-creation experiences: The next practice in value creation. *Journal of interactive marketing, 18*(3), 5-14.

Prahalad, C. K., & Ramaswamy, V. (2004). *The future of competition: Co-creating unique value with customers*: Harvard Business Press.

Rageh Ismail, A., Melewar, T., Lim, L., & Woodside, A. (2011). Customer experiences with brands: Literature review and research directions. *The marketing review, 11*(3), 205-225.

Ramaswamy, V., & Ozcan, K. (2014). *The co-creation paradigm*: Stanford University Press.

Ramirez, R. (1999). Value co-production: intellectual origins and implications for practice and research. *Strategic management journal, 20*(1), 49-65.

Ranjan, K. R., & Read, S. (2016). Value co-creation: concept and measurement. *Journal of the Academy of marketing Science, 44*, 290-315.

Reypens, C., Lievens, A., & Blazevic, V. (2016). Leveraging value in multi-stakeholder innovation networks: A process framework for value co-creation and capture. *Industrial Marketing Management, 56*, 40-50.

Ringle, C. M., Sarstedt, M., & Straub, D. W. (2012). Editor's comments: a critical look at the use of PLS-SEM in" MIS Quarterly". *MIS quarterly*, iii-xiv.

Sarstedt, M., Hair Jr, J. F., Cheah, J.-H., Becker, J.-M., & Ringle, C. M. (2019). How to specify, estimate, and validate higher-order constructs in PLS-SEM. *Australasian marketing journal, 27*(3), 197-211.

Schmitt, B. (1999). Experiential marketing. *Journal of marketing management, 15*(1-3), 53-67.

Shah, M., Nair, C. S., & Richardson, J. (2016). *Measuring and enhancing the student experience*: Chandos Publishing.

Sheth, J. N., Newman, B. I., & Gross, B. L. (1991). Why we buy what we buy: A theory of consumption values. *Journal of Business research, 22*(2), 159-170.

Sheth, J. N., & Uslay, C. (2007). Implications of the revised definition of marketing: from exchange to value creation. *Journal of Public Policy & Marketing, 26*(2), 302-307.

Spohrer, J., & Maglio, P. P. (2008). The emergence of service science: Toward systematic service innovations to accelerate co-creation of value. *Production and operations management, 17*(3), 238-246.

Sumsion, J., & Goodfellow, J. (2004). Identifying generic skills through curriculum mapping: A critical evaluation. *Higher Education Research & Development, 23*(3), 329-346.

Vargo, S. L., & Lusch, R. F. (2004). Evolving to a new dominant logic for marketing. *Journal of marketing, 68*(1), 1-17.

Vargo, S. L., Maglio, P. P., & Akaka, M. A. (2008). On value and value co-creation: A service systems and service logic perspective. *European Management Journal, 26*(3), 145-152.

Yi, Y., & Gong, T. (2013). Customer value co-creation behavior: Scale development and validation. *Journal of Business research, 66*(9), 1279-1284.

Yuan, L., & Powell, S. (2013). MOOCs and open education: Implications for higher education.

Zarandi, N., Soares, A. M., & Alves, H. (2022). Student roles and behaviors in higher education co-creation–a systematic literature review. *International Journal of Educational Management*(ahead-of-print).