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ORIGINAL ARTICLE

# Factors Affecting Vietnamese Higher Education Quality in the Context of Industry 4.0

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**ABSTRACT**
Industry 4.0 has challenged the quality of higher education by demanding more employability besides the academic and vocational skills of undergraduate laborers. Previous studies have addressed this issue unidimensionally. This study explores the measurement model of higher education quality multidimensionally under this circumstance by (1) Confirming the factors to measure higher education quality functionally and technically and (2) Ranking the factors in the quality measurement model. The qualitative Delphi method based on twenty in-depth interviews was conducted to fulfill the study's objectives. The findings show that both the functional and technical dimensions of education quality have been integrated into the Vietnamese Higher Education Institution (HEIs) quality model including: (1) output; (2) critical thinking and problem-solving; (3) organizing and managing ability; (4) adaptability; (5) lifelong learning; (6) teaching process; (7) creativity and innovation; (8) expertise and digitalization; (9) administrative process; (10) learning process; (11) foreign language; and (12) input. The priority of output and learners' competencies over input and education process in the model highlights the need for proper policies to effectively improve Vietnamese HEIs quality.

## 1. INTRODUCTION

Education, in general, and higher education in particular, is crucial for each and every country in the world due to its role in developing human resources, the foundation for the development of a country (Daraio et al., 2011; Swedan et al., 2020). Education is considered the basics of individual knowledge cultivation. Traditional education has been hailed as a highly effective tool for disseminating information in society, meeting the essential needs of daily life, and providing professional knowledge at work. Higher education programs often spend a large portion of time on knowledge enhancement (Prifti et al., 2017; Stefaniak & Carey, 2019). However, along with technology growth and time fluctuation, especially in the boom of Industry 4.0, education needs to change to prepare human resources for the future (Gregorutti, 2007).

Industry 4.0 has been shifting the demand for labor in the market towards emotional intelligence and working skills (Jayashree et al., 2021; Panagiotopoulos & Karanikola, 2017; Ruhela & Riaz, 2019). According to the World Economic Forum, 65 percent of youngsters beginning primary school today will be offered jobs that are currently unavailable (Schwab & Zahidi, 2020; Stromquist, 2019). Therefore, education is required to equip learners with employability beyond academic and vocational skills to allow them to flexibly adapt to future jobs. The research done by Morris et al. (2020) finds that skills are the key to productivity which levers economic growth and sustainable development. Thus, it is the skill, not common education that makes a difference in each nation's wealth.

In the era of online information, each individual needs to prepare themselves with the ability to filter, analyze, and explore information. Besides, an understanding of information technology is essential to prevail in the digital world. Knowledge or a degree is no longer an employer's top priority (Foley et al., 2004; Tomlinson, 2008). Instead, empirical evidence shows that self-management, team working, problem-solving, communication, applied numeracy, information technology, business, and customer awareness which are highly ranked in the labor market are nurtured by emotional intelligence (Kornelakis & Petrakaki, 2020). The evidence suggests that emotional intelligence nurtures competencies. Once the individual has good emotional control, the abilities to learn, collaborate, solve problems, and other abilities develop. McKinsey Global Institute's 2018 report conducted by Manyika and Sneader (2018) reveals that about 15% of the world's workforce, or approximately 400 million workers, will be replaced by robots in the period of 2016-2030. At the same time, the demand for new jobs also increases by a forecast of 21-33% by 2030. In particular, this demand is higher in emerging economies, and Vietnam is not exceptional in this regard.

In general, the major impact of Industry 4.0 on the labor market is automation. This means that from workers to managers, it is necessary to be prepared to work together with artificial intelligence and machines. This is also the basic development that education 4.0 needs to adapt to. In Vietnam, the structural changes in the economy and the impacts of Industry 4.0 create the need to reskill and upskill undergraduate laborers for jobs and the markets of tomorrow (Nghia, 2018). During a period of ten years, from 2010 to 2020, the human capital index for Vietnam increased from 0.66 to 0.69, ranked at the top of low-middle-income countries. With the decrease in government funding and the state incentives for autonomy, the number of higher education providers has grown along with the participation of private universities, both domestically and internationally (Le, 2016). The concept of higher education commercialization also has been introduced with a new view towards learners as customers (Engwall & Lopes, 2020; Holbrook, 2004; Ismail et al., 2015). Naturally, students are treated as clients because they pay for a service. However, the pursuit of education marketing also entails the possibility of corruption in education. Therefore, higher education should be considered a unique service that requires the customers to satisfy certain stringent academic criteria before experiencing the service.

In the current context, the quality of higher education providers is one of the critical factors governing their survival and development (Nguyen et al., 2021). However, quality is a complex concept with multiple dimensions and experiences. It lacks indicators for performance, practice, and monitoring (Cheng & Tam, 1997; Rubio-Alcalá et al., 2019). Quality standards and criteria depend on the views of the diversified stakeholders whether they are involved or not in the education process, who are categorized into two major groups: providers and customers. The solution for quality enhancement is to have a proper measurement, reflecting the overall stakeholders' views (Abdullah, 2005). Responding to this practical concern, this study explores the measurement model of higher education quality multidimensionally in Industry 4.0 by answering the questions: (1) What are the factors affecting higher education quality functionally and technically? (2) How are the factors ranked in the quality measurement model? The measurement approaches of higher education quality based on multiple stakeholders' views with both functional and technical dimensions aim to support the commercialization trend of higher education but not ignore its traditional mission.

## 2. LITERATURE REVIEW

### *2.1. HEIs quality definition*

Quality is a relative concept. The debate is that the education quality of certain HEIs is good from some people's perspectives but not from others', or only some of its components are evaluated as excellent. From different individuals' viewpoints, the concept of quality is different; therefore, its definition needs to be better specified when determining "whose quality?". In each aspect, quality is seen differently. In education, major stakeholders include academics, employers, teaching or non-teaching teams, governments and funding agencies, auditors, assessors, etc., each of whom has their own definitions for the concept of quality (Belash et al., 2015; Cheng & Tam, 1997; Nguyen, 2021; Nikolaidis & Dimitriadis, 2014). Quality, or superiority, was quite popular in the 1980s. Then, the quality was a privilege for the elite. Accordingly, the quality was not evaluated through what was offered but depended on the excellence, and difficulty of assessing higher education. These views imply that quality already exists in universities. It was intended for elites using the logic that the best input gives excellent outputs. Thus, outstanding results depended on the best students and the best HEIs. The two things always get along: the best teachers and facilities attract the

best students and vice versa, good students create an image and reputation for HEIs. Over time, this view has been overshadowed by the appearance of a quality approach based on consistent perfection, encapsulated in the terms "zero defects" and "doing the right things at the starting point" (Crosby, 2005; De Jager & Nieuwenhuis, 2005; Näsman & Nyholm, 2021). This approach emphasizes preventive actions, ensuring that errors do not occur at a prior stage rather than waiting for the final inspection.

This is also the quality culture in which everyone has responsibility for quality, not just quality control people. Each organization is a system of networks, in which each node represents a person or a group with input and output, called a quality interface. Each node is a pooled role of customers, processors, and providers. Therefore, quality is not only associated with customer requirements but also guaranteed during the production process. In a quality culture, product inspection is not important but to make sure that everything is done right in the first place is emphasized. The process leading to a satisfactory output needs to be analyzed to correct the process, ensuring no more errors. The issue of setting, maintaining, and testing the standards is also raised. Therefore, quality is associated with standards compliance, and it is the result of "scientific quality control."

At any given time, there is a standard that a product reaches to be at the threshold of quality. Similarly, standard compliance will be used to evaluate competitive products or services. This leads to the role of external agencies that set standards and evaluate the products (Jackson & Bohrer, 2010). The quality approach to the standards implies that quality will be improved when raising the standards. Setting these standards depends on the goal. Thus, with this approach, quality only makes sense in connection with the goal. This is a fairly common approach in higher education, in which quality is considered sustaining and improving standards. Quality and standards are in close cohesion under the goal orientation (Whitaker & Levy, 2012; Yee et al., 2013). A product is considered to be of quality if it achieves the set goals. Rather than exclusion, this notion implies the inclusion of goal achievement as quality. Although the concept may seem obvious, the "fitness for purpose" concept is easy to deceive others because of at least two problems: (i) whose purpose, and (ii) how to evaluate the fitness. Also, the balance between quality and value is a matter of consideration. The core of the concept of quality measured in money value is a responsibility (Brown et al., 2016). Public services are expected to be responsible for investors and clients.

The quality view in education with this approach has two priorities for screening: (i) customers, and (ii) suppliers. However, the customer is a controversial concept in higher education. Are they service users (learners) or payers (governments, employers, parents, learners)? Are other stakeholders such as faculty included in the customer concept? Are learners clients or output or both? Whether learners are considered direct clients, there is no exception for other indirect customers. In addition, if learners are customers, they are incapable of giving the output requirements (Argent et al., 2020; Harvey, 1995). They often accept what is available to them and may lack knowledge of the offered courses. However, they can be influential in deciding the output once they have joined the system. Therefore, quality may vary to the different options available through the pressure of developing new fields or applying new areas. Thus, student requirements are also determined by providers in the direction of assuming what students need. Unlike industry, both suppliers and customers (faculty and students) in higher education are involved in the education process to make the product which depends on the features of both the producer and consumer. As a result, quality standards are difficult to publish and maintain.

The definition of HEI quality in the sense of meeting customer requirements does not mean that the client is always in the best position to meet the requirements. This concept raises the question of who determines the quality and how it is evaluated. There is also an argument that educational services should go beyond what customers require. However, other research suggests that satisfaction relates to "specific transaction" while quality refers to "global attitude" (Rowley, 1997; Voss et al., 2007). Quality in education should be approached at the functional level. Unlike industries in which the provider does something for a customer, in education, the provider transforms the customer. This process is necessarily negotiated and unique in each case. This leads to the concept of learners' transformation as quality with two key pillars: (i) enhancing and (ii) empowering. To cover this concept, higher education quality should be measured at a technical level. In summary, the definition of education quality is quite diverse. Each focuses on different aspects given their interrelation and non-exclusion in pursuing education quality. The comprehensive definition of higher education quality should be composed of both functional and technical dimensions.

### *2.2. HEIs quality measurement*

Inputs, teaching, learning and administrative processes and outputs are key components of education quality (Rezeanu, 2011; Tsinidou et al., 2010). However, previous research has only focused on one of the three factors (Garira, 2020a, 2020b). With Total Quality Management (TQM), the entire process in higher education is incorporated for quality enhancement. TQM originated in industry, which was cultivating quality culture with the incorporation of all the involved processes in the organization to meet customers' expectations. This approach was applied by Tsinidou et al. (2010) in evaluating higher education quality, beginning with the secondary school leavers through the learning, teaching, and administrative process and graduates' competencies. Secondary school leavers are considered as inputs with a minimum requirement set by authorities, categorized as admission (Fisher & Feldmann, 1984; Fordyce, 1959). There is also a criterion of access exclusivity that distinguishes education from other services. In addition, the creation of quality culture in the classroom is found to be a core TQM application in learning, teaching, and the administrative process characterized by student-centered activities and the knowledge management system. Learners' performance improves with their active participation in effective teaching.

According to Musthafa and Sajila (2014) and Yin et al. (2020), faculty competence can contribute to research activities, which then enriches the teaching content. Teacher expertise impacts the core teaching tasks and promotes the learners' progress. Meanwhile, a positive attitude and motivation, which are the foundation for targeted competencies, are enhanced by the professionalism of the teaching staff (Sarrico & Alves, 2016). In TQM, administrative factors which include education management to faculty competence are among the critical indicators for quality achievement. According to Bouranta (2020), leadership decides the quality by motivating the entire organizational culture. The evidence is that strategic planning and performing, curriculum relevance, and proper resources, inclusive of facilities, financing, and professional staff (Hill et al., 2003; Owlia & Aspinwall, 1996; Sahney et al., 2008; Sahney et al., 2003; Telford & Masson, 2005). The combined factors drive the quality of graduates through a series of indicators, including successful job seeking, job satisfaction, and employers' satisfaction (Abdullah, 2005; Boccuzzo & Gianecchini, 2015; Pan et al., 2018; Pradela, 2015). In brief, the functional dimension of a higher education quality model can be summarized as an administrative process, outputs, teaching process, learning process, and inputs.

In the context of Industry 4.0, diverse skills are almost endless. Therefore, among the three components of competencies, emotional intelligence (EI) has been most emphasized through intelligence, and personality traits cannot be ignored (Freshwater & Stickley, 2004; González-Calvo & Arias-Carballal, 2017). Recent research findings confirm the EI contribution to the largest creation of employability (Goleman, 2012; Panagiotopoulos & Karanikola, 2017; Udayar et al., 2018). The origin of EI can be traced to Darwin's study on the importance of individual emotional expression during natural selection and adaptation changes (Darwin, 2015). It is the ability to feel emotion, recognize it, and name it properly (Boyatzis et al., 2012; Miao et al., 2018). Gardner (2011) proposed the multiple intelligences theory in addition to the concept of IQ. The mental processes with the inclusion of itself and other emotional appraisal, expression, and regulation have got great interest from the research community (Kumar, 2016; Qualter et al., 2012). People with EI know how to express their feelings under the circumstances and control them. Their adaptability allows them to work better. The distinction of the others' emotions is fundamental in person-to-person relationships. Another important feature of EI is the ability to focus emotionally on targeted goals. Goleman (2012) has categorized EI into five dimensions: (1) Self–awareness, which implies that an individual can understand and use emotional knowledge (Bahraminan et al., 2015). Its development requires an adjustment to one's true emotions. An individual can control feelings once they are defined. Self-awareness can be classified into two major sub-groups: emotional perception and self-confidence; (2) Self-regulation refers to the ability to manage and regulate emotions (Kar et al., 2014). Several techniques can alleviate negative emotions such as anger, anxiety, or depression. Self-regulation includes self-control, reliability, compliance, adaptability, and innovation; (3) Motivation demonstrates the use of emotions to facilitate thinking and behavior toward creative decision making. Clear goals and a positive attitude are the catalysts for achievement. With motivation, each individual can adjust negative emotions to get them to become more positive; (4) Empathy is an important factor to be successful in life and career. The more skillful the individual is in identifying others' feelings, or thoughts, the better he has control over his leadership; and (5) Social skills shall promote communication skills, conflict resolution, basic interaction, and team-building skills. Those can be improved with neuroplasticity. Additional empirical studies have confirmed that individuals with increased levels of EI should be a key characteristic of individuals being hired into the position of leaders, managers, and executives in a large corporation. In practice, they are more likely to get along with peers, adapt to changes, be promoted, and

demonstrate success when working with others (Othman et al., 2008; Xu et al., 2020). Therefore, higher education needs to prepare the labor market with competent undergraduates (Lucia & Lepsinger, 1999).

In the context of Vietnam, education has achieved certain achievements, contributing to the improvement of the human development index (HDI) and human capital index (HCI). However, higher education performance is at the bottom of benchmarking list in the four major global rankings, namely the Shanghai Academic Ranking of World Universities, the Times Higher Education World University Rankings, the QS World University Ranking, and the Webometrics rankings (Parajuli et al., 2020). The consequence is significant skills gaps among university graduates relative to labor market needs. Recent research conducted by Le et al. (2020) with the Delphi technique has confirmed the consensus of undergraduates' competency model composed of seven skills: organizing and managing, adaptability, lifelong learning, critical thinking and problem-solving, creativity and innovation, and expertise.

Higher education quality models have been developed and customized to the specific context (Campion et al., 2011). A wide range of literature review suggests several popular techniques applied in quality measurement model development including critical incident interviews (Patterson et al., 2000), which are also known as behavioral event interviews (Spencer & Spencer, 2008). This method contains several advantages such as flexibility and cost-effectiveness though it only focuses on moments assumed critically by researchers or participants. Therefore, information bias/shortage may occur (Allen, 2017). In addition, recollection of incidents consumes a large amount of time (Srivastava & Jaiswal, 2017). According to Goffin et al. (2012) and Napier et al. (2009), the repertory grid technique is another alternative, given its superiority in terms of time consumption and bias elimination. However, unanimity is the challenge under this technique. As a result, modified Delphi is found as a preferable technique (Barber & Tietje, 2004; Vashirawongpinyo & Pianthong, 2015).

## 3. MATERIALS AND METHODS

The qualitative Delphi method was adopted in this study because it can simultaneously explore the factors influencing education quality and confirm the consensus on their rankings in the quality measurement model. It was first introduced by Rand Corporation in 1950 and gradually developed as a tool to achieve unified solutions to complex problems in 1970 to be applied in various fields, and education is not an exception (Dalkey & Helmer, 1963). The philosophy of this method is based on the assumption that the judgment of a panel of experts is more reliable than that of an individual. The outstanding advantage of this method is to avoid direct confrontation between experts (Okoli & Pawlowski, 2004). This technique does not specify the number of experts involved, the number of rounds required or the level of consensus to be reached. In this study, two rounds have been done because it is common for researchers to conduct a minimum of two rounds in order to receive feedback and restructure the questionnaire to get stable results (Mullen, 2003). Skulmoski et al. (2007) argue that an expert panel should have a size of 10-15 people and should apply a purposeful sampling method, for instance, the snowball technique in selecting the expert panel. In this case, twenty experts were selected to provide a sufficient diversity of perspectives. The following four criteria are applied in the panelist selection: (i) knowledge and experience in higher education quality measurement and evaluation; (ii) consent to participate in the interviews; (iii) having time for the interviews; and (iv) having effective communication skills. The first ten experts were approached based on their publication involved in the topic. Then, each of them shall introduce the peer to reach the sample size of 20 experts. The percentages of men and women in the interviews were 55% and 45%, respectively. 55% of the participants were over 50 years old. The majority of experts (70%) had reached the highest level of education (Ph.D.) and have expertise and experience in the fields of human resources recruitment (30%), education quality research (30%), and others (40%).

The two qualitative Delphi rounds have been performed to explore the factors influencing HEIs quality and reach the consensus on their rankings in the quality model despite multiple rounds of the classical Delphi method (Sekayi & Kennedy, 2017). In the first round, brainstorming questions have been raised to each expert to develop a list of factors affecting Vietnamese higher education quality functionally and technically. This was done through a coding process and finally reviewed by the participants in the interviews (Table 1).

*Table 1*

| Factors code | Description |
|---|---|
| Output | Students' performance |

| | |
|---|---|
| Teaching process | Teachers' related factors: research capacity, professional, teaching activities, teaching content, teaching methodology, evaluation, and assessment |
| Learning process | Students' related factors: motivation, attitudes, proactiveness |
| Administrative process | Vocational consultation, extra services, timely response/feedback, industry cooperation, facilities, library |
| Input | Senior secondary school leavers' qualification |
| | Admission |
| Critical thinking and problem-solving | Think multi-dimensionally |
| | Analyze and evaluate |
| | Know how to search or aggregate information systematically |
| | Teamwork |
| Organizing and managing ability | Know the management and organization of work |
| | Apply leadership skills |
| | Cooperate effectively |
| | High discipline spirit |
| Lifelong learning | Constantly learn and update knowledge |
| | Know how to self-study effectively and proactively build the learning goals |
| Adaptability | Know how to work in an interdisciplinary and multicultural environment |
| | Flexibility |
| | Think positively |
| | Apply known knowledge under new circumstances |
| Creativity and Innovation | Dare to explore, discover and test new ideas |
| | Think out of the box |
| Expertise and digitalization | Ready to apply science and technology |
| | Capture and update new knowledge about IT |
| | Apply IT knowledge to solve tasks |
| Foreign language | Basic knowledge |
| | Conversant |
| | Proficient |
| | Fluent |

The results from 1st round have been updated and shared with the panelists to get their qualitative unanimity in the 2nd round (not endorsed, moderately endorsed, strongly endorsed). McKenna (1994) suggested the application of frequency distribution of over 51% in defining the panelists' agreement (strongly endorsed). At the end of the Delphi process, higher education quality measurement factors were finalized (Table 2).

*Table 2. Summary of higher education quality measurement factors at 2nd round*

| Factors | Endorsement of the panelists | | |
|---|---|---|---|
| | Not endorsed | Moderately endorsed | Strongly endorsed |
| Output | 0 | 0 | 20 |
| Critical thinking and problem-solving | 0 | 1 | 19 |
| Organizing and managing ability | 0 | 2 | 18 |
| Adaptability | 1 | 1 | 18 |
| Lifelong learning | | 3 | 17 |
| Teaching process | 1 | 2 | 17 |
| Creativity and Innovation | | 4 | 16 |
| Expertise and digitalization | 1 | 3 | 16 |
| Administrative process | | 5 | 15 |
| Learning process | 1 | 4 | 15 |
| Foreign language | | 6 | 14 |
| Input | 1 | 5 | 14 |

## 4. RESULTS AND DISCUSSION

The Vietnamese Higher Education Institution (HEIs) quality factors identified with the qualitative Delphi method are composed of 12 factors which were presented and ranked in priority order in Table 2. Overall, the model of Vietnamese Higher Education Institution quality reveals the integrated role of both the technical and functional dimensions, confirming that the pursuit of total quality management cannot be ignored in the context of increasing autonomous Vietnamese Higher Education Institutions and serious competition in educational service in Vietnam. The research results confirm the integration of a transformative quality concept into the universal Higher Education Institutions quality model (Teeroovengadum et al., 2016). The findings share the viewpoints of Garira (2020a) on the priority of output quality.

A competent HEIs human resources shall provide a professional team to support program preparation, schedule, extra services, teaching facilities, and equipment, etc. Our finding is consistent with Hanapi, & Nordin, (2014). Moreover, our study implies the strong endorsement of these criteria with a consent rate of 85% in the HEIs quality measurement model. Tsinidou, Gerogiannis & Fitsilis (2010) found that the processes are emphasized with more weight being put on teaching and administrative activities. Our results provide a separate vote on the role of the teaching process (85%) and administrative process (75%) in the HEIs quality measurement. Anyway, both systematically contribute to learning success. Therefore, quality teaching and administrative processes are drivers for education quality.

Input and learning process are factors relating to students. The strong endorsement rates of the two factors are 70% and 75% respectively. Student learning as a potential indicator of HEIs quality was also confirmed in the UK higher education sector (Polkinghorne, Roushan & Taylor, 2017). Their motivation and positive attitudes can lead them to be interested and thorough when studying, which determines their performance and competencies. Self-studying is a learning mode that maximizes the learners' self-awareness in research and knowledge exploration. In addition, a pattern of life-long learning is formed. Input was claimed as less important to others though it still has a role. Quality of input students has been worldwide publicized as an admission condition (Polkinghorne, Roushan &

Taylor, 2017). In Vietnam, senior secondary school leavers need to meet a minimum requirement set by the Ministry of Education and Training to be admitted into a university.

In terms of technical dimension, the factors in the competency model further clarify the order of undergraduate competencies required in the Vietnamese labor market. Critical thinking and problem-solving are among the top skills in the competency model. It is decomposed as the capability to think multi-dimensionally, analyze, interpret, evaluate, summarize, synthesize information, and collaborate in teamwork.

At the level of tertiary education, Vietnam has no quality measurement model (Parajuli et al., 2020). Quality judgment therefore relies on the stakeholder's perspective under a unidimensional approach at either the technical competency model or functional approach/total quality management (Nguyen et al., 2020). Our integrated quality model reflects a general measurement of education quality taking into account the traditional and trending missions of HEIs. The prominent constructs that emerged in each factor are described so that the involved stakeholders can have the guidance for their proper action (Table 1).

In terms of competency, our seven core competencies of critical thinking & problem solving; organizing & managing ability; adaptability; lifelong learning; creativity & innovation; expertise & digitalization; and foreign language cover 25 elements in 5 competency clusters found by (Nguyen et al., 2020) including cognitive competences; management competencies; interpersonal competencies; instrumental competencies and attitudinal competencies. One interesting point is the similarity in importance rate between our results (Table 2) and their findings, for instance: problem-solving (4.26/5); time management (4.01/5); adaptability (4.14/5); continuous learning (4.2/5); creativity (3.76/5); computer skills (4.05/5); foreign language skills (3.89/5).

Relating to the functional approach, the factors in our model are somehow coincident with Grundey (2008) and Johnston (1994). However, the prejudice of "garbage in, garbage out" in conventional entry requirements is challenged in the context of Vietnam (ranked at the bottom of the quality measurement model) and can be explained by the minimum qualification requirement of senior secondary school leavers set by our Ministry of Education and Training. In brief, our integrated measurement model provides a compact tool to assess the Vietnamese HEIs quality for the wide range of stakeholders composed of educational providers, managers, employers, researchers, learners, and their families, categorized as suppliers and customers. The indicative rank of the measurement factors is critical for the involved stakeholders in prioritizing solutions and strategies to boost the training quality given scarce resources.

## 5. CONCLUSION

This study has combined the multiple stakeholders' perspectives in developing the Vietnamese Higher Education Institutions' quality measurement. Both technical and functional approaches are incorporated into the measurement to reflect the unique features of education. The application of the qualitative Delphi method has evidenced the best approach for identifying the measurement in multivariate environments. In Vietnam, the Higher Education Institutions' quality measurement has been poorly explored. With this research, the education values can be found and they have critical implications for Higher Education Institutions' quality assessments in the Vietnam context. Output has been emphasized with full support from the experts. Therefore, the output-based approaches in educational measurement should be boosted. The technical dimension has clarified the output approach when identifying key competencies which HEIs have to equip their students to fulfill the job market demand. Input, as well as teaching and learning processes, are other domains that require improvement. Another unique feature of Vietnamese HEIs quality measurement is the foreign languages criterion. Further strategies on foreign languages should be launched to reach the goal of educational quality. However, the Delphi technique can not reflect the specific influence of the factors in measuring HEIs quality. Moreover, uncertainty, fuzziness, and difficulties in experts' judgment have challenged the decision-making process. Therefore, further research in the future with a deeper investigation of the issue based on fuzzy logic should be implemented.

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