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Drivers of sustainable entrepreneurship education: An analytic hierarchy process

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Abstract: This research aims to explore the drivers of sustainable entrepreneurship (SE) education for university lecturers and their hierarchy of prioritization. An Analytic Hierarchy Process (AHP) method was applied to analyze data collected from nine entrepreneurship-education experts based in eight universities in Vietnam. The results show that there are several identified key drivers, ranked based on descending prioritization, namely: encouraging youth, social problems, talent shortage, and connection with practitioners. Several sub-factors may also be ranked as having relative importance to SE, with the top five being "encourage students to engage in social enterprises", "venture creation is our responsibility", "students age group drives the educators' interest", "students engage in heated discussions", and "failure of the established institutions". This could be the first endeavor to assess and rank the drivers of SE education, thereby offering some meaningful contributions to both academia and practice.

Keywords: Entrepreneurship, sustainable entrepreneurship, entrepreneurship education.

1. Introduction

For many years, entrepreneurship has been considered one of the many solutions for employment as well as social and environmental issues (Muñoz, 2018). Realizing this, some researchers have recently acknowledged the relationship between traditional entrepreneurship, society, and the environment, and hence have developed a new type of entrepreneurship called "sustainable entrepreneurship" (SE) (Cohen & Winn, 2007). In the last decade, SE has gradually received more attention, partly because entrepreneurs and start-ups were the main actors in the rise in prominence of clean and green production (Fichter & Tiemann, 2020). SE plays a crucial role in achieving the United Nations Sustainable Development Goals (SDGs), such as innovation and infrastructure, responsible production and

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consumption, health and well-being, and climate adaptation; therefore, it requires the involvement of stakeholders, including educators (Apostolopoulos et al., 2018).

SE is an area of research that is still in its nascent stage (Arru, 2020). Some studies have focused on different subjects within the SE domain. However, the literature provides very little insight into the motivations for educators to teach SE. So far, the majority of the studies are mainly focused on the impacts of SE intention (Fichter & Tiemann, 2020; Romero-Colmenares & Reyes-Rodríguez, 2022; Thelken & de Jong, 2020; Vuorio et al., 2018). On the other hand, some studies investigated SE's impacts on finance, the environment, and society (Criado-Gomis et al., 2018), the details of SE's processes (Johnson & Schaltegger, 2020), principles of behaviours in SE (Arru, 2020), and drivers of SE (Thelken & de Jong, 2020). These studies within the literature have mainly applied quantitative methods and techniques such as structural equation modeling (SEM) and regression. It seems that there have been no works utilizing the Analytic Hierarchy Process (AHP) method.

Academic institutions and lecturers play a decisive role in SE training (Dentchev et al., 2018). They help improve the self-efficacy of young entrepreneurs (Hockerts, 2015) and support enterprises and start-ups that are established for social purposes (Kummitha & Majumdar, 2015). In some studies, the adoption of SE may be sped up through various educational aspects such as fostering factors that influence the university's support for SE (Fichter & Tiemann, 2020), designing a sustainability-driven entrepreneurship curriculum (Cincera et al., 2018), and cultivating academic training (Miller et al., 2012). However, the literature provides very little knowledge of the factors that drive lecturers to teach SE (Fichter & Tiemann, 2020). According to Neck & Corbett (2018), SE-related studies from the perspective of trainers has been relatively silent. The research on this subject is extremely important, as pre-SE training provides the necessary capacity – not only for sustainable entrepreneurs but also their employees and society (Starkey et al., 2009). Moreover, this subject should be given more attention, especially in developing countries like Vietnam, as there are urgent calls for studying SE in the context of emerging environmental contexts (Romero-Colmenares & Reyes-Rodríguez, 2022). This importance is further compounded by the fact that Vietnam's entrepreneurship education system is still in its early stages (Pham et al., 2021).

On the other hand, it has been argued recently that the higher education systems in many countries have not contributed to the greater global sustainability agenda. This is because most of them have neither thoughtfully provided learners with the opportunity to acquire knowledge of and adopt sustainable practices, nor promoted sustainable lifestyles (Tilbury, 2011). Some advocates of global sustainability are of the opinion that higher education institutions have not adequately provided forums or avenues for comments, discussions, and actions on the topic of sustainability. This has prevented students from contributing to the adoption of sustainable practices in life, work, and business (Wals & Jickling, 2002). In the field of management, some researchers have even pointed out that business schools are significantly contributing to an unsustainable and unequal way of life (Fotaki & Prasad, 2015), due to their preoccupation with the market and school ranking (Gioia & Corley, 2002). Therefore, it is imperative for researchers to raise awareness and motivation among university lecturers to advocate SE education.

To fill the above research gaps, the authors have applied the AHP method in this study to answer the following questions:

Q1: What drivers speed up SE education adoption among university lecturers?

Q2: What is the relative importance of such drivers?

The remaining sections of the study are organized as follows: Section two introduces the theoretical background. Section three presents the research methodology. Section four details the research results. Section five reports the discussions and implications. Section six concludes.

2. Literature

2.1. Sustainable entrepreneurship and the role of education

In general, SE may be defined from two different perspectives: an entrepreneurship

process or sustainable management (Terán-Yépez et al., 2020). Through the entrepreneurship process approach, Belz & Binder (2017) define SE as the realization and utilization of business opportunities to create future products with economic, environmental, and social interests. Through the sustainable management approach, Shepherd & Patzelt (2011) define SE as "focused on the preservation of nature, life support, and community in pursuit of perceived opportunities to create future products, processes, and services for profit, where profit is broadly construed to include economic and non-economic gains to individuals, the economy, and society" (page. 142). Similar to this approach, Urbaniec (2018) considers SE as a new business practice that brings about new opportunities for the creation of enterprises that are trying to solve ecological and social issues.

Many researchers believe that building a sustainable future is connected closely to the role of education. This role is currently globally recognized, as evident from the formation of the United Nations Decade for Education for Sustainable Development (UNECE, 2012). Higher education institutions are deemed as the main agents in the conversion to a sustainable society – through their various functions, such as education, scientific research, and community service (Haertle et al., 2017). One of the main objectives of sustainable integration in higher education is to provide future graduates with knowledge and skills to face great challenges faced by the global society and build a sustainable future (Décamps et al., 2017). Calls for a sustainable approach to lectures and lessons in universities have remarkably increased in the last few years (Kolb et al., 2017). Some training strategies have been applied in business schools in response to these calls (Storey et al., 2017), especially involving the SE teaching strategy.

Universities and lecturers play an important role in linking entrepreneurial training and sustainable development, by providing training to entrepreneurs who contribute to sustainable development (Kummitha & Kummitha, 2021). They equip entrepreneurs with behaviour and skills that allow them to capture business opportunities, create social demand, initiate sustainable enterprises, and ensure sustainability in business affairs (Diepolder et al., 2021). Some universities in the world have developed dedicated SE programs, consisting of training and research (Décamps et al., 2017). In most cases, lecturers integrate business-related subjects with entrepreneurial training to build SE education modules (Gast et al., 2017). Business universities participate in the provision of SE education to encourage their students to engage in sustainable enterprises in order to deal with worsening social issues (Kummitha & Kummitha, 2021). SE education helps passionate people gain the necessary capacities and skills to found sustainable enterprises (Warwick et al., 2017), increase confidence and behaviour towards entrepreneurship (Vuorio et al., 2018), and build new connections (Chandra, 2017).

2.2. Drivers of sustainable entrepreneurship education

In recent years, it seems that there is a lack of studies that investigate the drivers for universities or lecturers to adopt SE education, except for a few isolated researches. For example, Kummitha (2017) finds that the key drivers promoting SE teaching is the urge to solve social and environmental issues. Décamps et al. (2017), on the other hand, discover that solving social or ecological issues is the key objective that promotes academic institutions to engage in SE teaching. Long et al. (2019), Vuorio et al. (2018), Cincera et al. (2018), and Miller et al. (2012) discover that cooperation and facilitation among students in creating ventures promotes the introduction of SE courses among universities and lecturers. Through the platform, members may also engage themselves with social issues, which would help increase their sense of compassion (Miller et al., 2012), altruism (Vuorio et al., 2018), and sympathy (Cincera et al., 2018), as well as motivate the initiation of sustainable enterprises (Long et al., 2019). In addition, Chandra (2016) points out that another driving factor of SE teaching is the internal structures built by universities to facilitate students' interest in SE practices. Nevertheless, most structures neither directly found drivers as their research objectives, nor brought out a general model of drivers for universities or SE lecturers.

The research by Kummitha & Kummitha (2021), while intended to explore the drivers of

SE, was only focused on the context of business schools. Through interviews with SE program educators, the researchers found four key drivers of SE education, namely: the existence of social problems, talent shortage, encouraging youth to engage in sustainability, and connection with practitioners. According to Kummitha & Kummitha (2021), 'social problems' is a dimension developed from themes such as growing social problems, addressing social problems, and institutional support. This dimension relates to specific issues such as increasing disparities, institutional failures, a strong push for personal authority, a visible and expanding social enterprise sector, and rethinking the role of educational institutions. Talent shortage pertains to topics like venture creation responsibilities, neglect of job creation needs in the industry, and ignorance of the shortage among educators. Encouraging youth involvement in sustainability involves motivating students to engage in social causes, teachers being motivated by their students' age range, and students engaging in lively discussions on social enterprise. Connecting with practitioners involves establishing strategic alliances to provide resources, enabling student collaboration with practitioners, and fostering connections that inspire students. However, the research mainly focuses on three specific types of training: initiating, ensuring, and integrating. This work aims to carry out deeper research on a set of drivers that Kummitha & Kummitha (2021) and the literature have pointed out, while also ranking their importance to gain a more extensive understanding of this subject.

3. Methodology

3.1. Analytic hierarchy process (AHP)

According to Chen (2006), AHP is one of the most reliable and sound decision-making tools. Using the AHP method, different items will be compared on a pairwise basis. After that, the results from the pairwise comparison will be further analyzed to rank the relative importance of each factor and sub-factor. Lee (2014) believes that results from the AHP method has valuable implications as inconsistency checking is required by design. Therefore, AHP is an appropriate method to answer this study's research questions. The minimal AHP sample size normally varies from 9 to 15 participants, while it may vary based on the complexity of the problem being addressed, survey participant homogeneity, and participant rating accuracy (Saaty, 1996, 2008).

3.2. Development of hierarchy structure on drivers of SE education

The hierarchy structure used in this research comprises three levels (see Table 3). The second and third levels within the structure include factors and sub-factors (items) inherited from the research by Kummitha & Kummitha (2021). The factors and sub-factors were translated into Vietnamese and modified to fit the Vietnamese background. The questionnaire was then sent to three experts with more than five years of experience in teaching entrepreneurship. Next, these three experts were also asked to participate in a pilot test. The final questionnaire includes 16 items that were grouped into four factors: social problems, encouraging youth, talent shortage, and connect with practitioners.

A combined offline and online survey (via the Google Forms platform) was conducted in August 2022, in Vietnam. There were nine experts involved in this study, all of whom are lecturers with at least five years of expertise and teaching experience in SE at eight universities in Vietnam. Eight experts responded online and one expert provided direct responses. Table 1 displays the characteristics of the experts.

3.3. Prioritization procedure

Table 1. Characteristics of participants

Characteristics	**Frequency**	**%**
Gender		
Male	6	66.7%
Female	3	33.3%
Academic title		
PhD	5	55.6%
MA	4	44.4%
Age		
22-30	1	11.1%
31-40	6	66.7%
41-50	2	22.2%

Source: Authors.

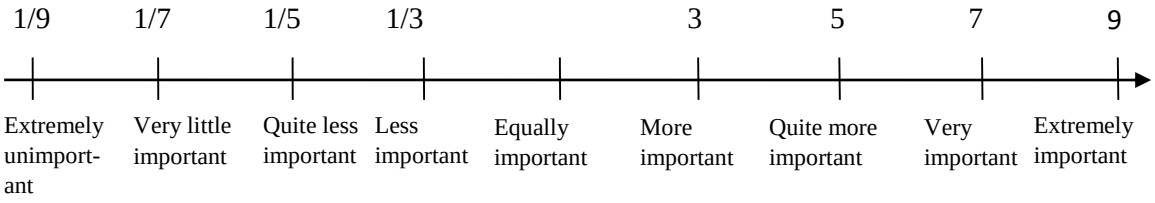
The questionnaire includes two sections. The first section collects preliminary information from the experts. The second section asks experts to compare the relative importance of four factors and 16 sub-factors, that represent factors driving the motivation to deliver SE education.

According to Saaty and Kearns (1985), in the AHP technique, experts need to compare pairs of indicators (factors and sub-factors) and then synthesize them into a matrix of n rows and n columns (n is the number of indicators). The aij element represents the importance of the i row indicators compared to the j column indicators.

$$A = (a_{ij})_{n\times n} = \begin{bmatrix} 1 & a_{12} & \dots & a_{1n} \\ a_{21} & 1 & \dots & a_{2n} \\ \vdots & \vdots & \vdots & \vdots \\ a_{n1} & a_{n2} & \dots & 1 \end{bmatrix}$$

The relative importance of indicator *i* compared to *j* is calculated by the ratio *k* (*k* ranges from 1 to 9), the opposite of the indicator *j* relative to *i* is 1/k. Therefore $a_{ij} > 0$, $a_{ij} = 1/a_{ji}$, $a_{ii} = 1$.

Table 2: The relative importance scale



Accordingly, each expert is required to compare two factors or items by the hierarchy 1-3-5-7-9 or the intermediate values 2-4-6-8 (Saaty & Kearns, 1985). For example, if factors A and B have the same importance, the respondent is asked to choose number 1. If A is more important than B, the respondent is asked to choose from 2 to 9 points (based on the relative importance of A over B), and vice versa (see Table 2).

3.4. Data synthesis

Microsoft Excel is used to estimate the local weight, global weight, and consistency ratios (CR) of the collected data. According to (Saaty, 1990), CR is calculated according to the following formula:

$W_i^s = \sum_{j=1}^{m} w_{ij}^s * w_j^a$

i=1,. . . n

w_{ij}^s : Weight of option i corresponds to the criterion j

w_j^a : Weight of indicator j

n: Number of options; m: number of criteria

Then, the relative importance of each factor and sub-factors (options and indicators) is integrated. The local weight shows the relative importance of one item (sub-factors) on its factor or the importance of one factor on SE education. The global weight indicates the relative importance of one item in SE education. All weights were calculated as per Saaty (1990)'s suggestion.

4. Results

Table 3 details the relative weights and ranking of motivational factors of SE education. The results show that the most important factor is encouraging youth, followed by social problems, talent shortage, and connect with the practitioners, in descending order. The consistency test reveals that the answers are generally consistent, with CR = 0.076.

Table 3: Ranking of the drivers of SE education

Factors	Weights	Ranking
Social problems	0.297	2
Talent shortage	0.216	3
Encouraging youth	0.303	1
Connect with the practitioners	0.184	4
Consistency ratio	0.076	

Table 4 shows the relative importance of items and their respective ranking in the whole model. The evaluations are consistent, with CR

values in each factor ranging from 0.079–0.085. The results indicate that all 16 drivers have obtained consensus among the experts. Among them, the drivers with the highest consensus primarily belong to the factors "Encouraging youth," "Social problems," and "Talent shortage". Specifically, the five biggest driving sub-factors for SE lecturers are: "encourage students to engage in social enterprises", "venture creation is our responsibility", "students age group drives the educators' interest", "students engage in heated discussions", and "failure of the established institutions" respectively. The five least important items are "students pitch in the events to get resources", "a mix of classroom and practice-based learning helps", "create strategic partnerships to provide resources", "connect with practitioners inspire students", and "students are encouraged to work with practitioners". All of these sub-factors belong to the factor "connect with the practitioners".

Figure 1 illustrates more visibly the global weights of different items affecting the motivation of lecturers when training SE.

Table 4: Final weights and rank of items

Factor	Local weights	CR	Items	Items	Local weights	Global weight	Ranking
Social problems (F1)	0.297	0.079	Raising inequalities	F1.1	0.230	0.068	7
			Failure of the established institutions	F1.2	0.239	0.071	5
			Strong thrust in the power of individuals	F1.3	0.235	0.070	6
			A visible and growing social entrepreneurship industry	F1.4	0.175	0.052	10
			Redefine the role played by academic institutions	F1.5	0.154	0.046	11
Talent shortage (F2)	0.216	0.085	Venture creation is our responsibility	F2.1	0.468	0.101	2
			No concern for employment generation in the industry	F2.2	0.257	0.055	9
			Educators are not aware about the latent shortage	F2.3	0.276	0.060	8
Encouraging youth (F3)	0.303	0.085	Encourage students to engage in social enterprises	F3.1	0.411	0.125	1
			Students age group drives the educators interest	F3.2	0.323	0.098	3
			Students engage in heated discussions	F3.3	0.265	0.080	4
Connect with the practitioners (F4)	0.184	0.010	Create strategic partnerships to provide resources	F4.1	0.192	0.035	14
			Students pitch in the events to get resources	F4.2	0.183	0.034	16
			Students are encouraged to work with practitioners	F4.3	0.216	0.040	12
			A mix of classroom and practice based learning helps	F4.4	0.188	0.035	15
			Connect with practitioners inspire students	F4.5	0.201	0.037	13

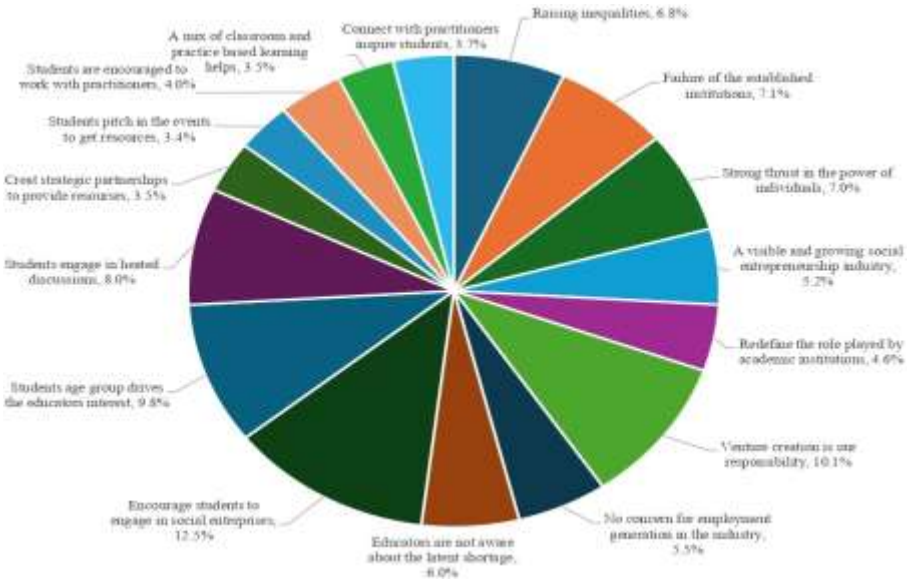


Figure 1. The relative importance of drivers of SE education
Source: Authors.

5. Discussion and implications

5.1. Discussion

This research contributes to the literature on entrepreneurship (particularly on SE) in two significant ways. Firstly, to the best of the author's knowledge, this research is the first ever that involves a ranking of the relative importance of driving factors and sub-factors of SE education. Two factors that are considered the most important by experts are 'encouraging youth' and 'social problems'. This result is largely consistent with the findings by Kummitha and Kummitha (2021). Via multiple interviews with Indian educators, Kummitha and Kummitha (2021) prove that the desire to encourage students to initiate sustainable enterprises, and solve social or environmental issues are a factor that drives business schools to offer SE education. Several other studies also show that by undergoing SE teaching and practice, students are faced with severe social or environmental issues, thereby increasing their sense of altruism and confidence (Vuorio et al., 2018), compassion (Miller et al., 2012), and sympathy (Cincera et al., 2018). These acquired sentiments may prompt the students to initiate sustainable enterprises of their own (Long et al., 2019). Furthermore, the result of this research is consistent with the recent hike in environmental threats (Shi et al., 2022).

The second important factor is talent shortage. This finding is supported by several previous studies. Aslan et al. (2023) demonstrate that skill education, context-specific training, management systems, and the shortage of a green workforce hinder the attainment of SE capabilities in developing countries. Kummitha & Kummitha (2021) finds that recruitment and retention of qualified managers and employees are the significant issues faced by sustainable enterprises today. Keizer et al. (2016), on the other hand, proclaim that one of the main differences between sustainable enterprises and their commercial counterparts is the complication of manager-talent attraction. Thompson & Eijkemans (2018) remark that some SE ventures fail to attract managerial experts. Meanwhile, the staff is considered a competitive advantage to achieve high SE efficacy (Kucharčíková et al., 2018).

The third important factor is 'connect with the practitioners'. The literature suggests that studies on this factor are still burgeoning. However, the result of this research is supported by the discovery by Kummitha & Kummitha (2021), where they discovered that SE educators in India are driven by their development of an internal ecosystem that promotes students' SE. Kummitha & Kummitha (2021) also show that there is the lack of a platform and mechanism that allow students to develop their SE ideas and

practices. To remedy this, students should be recommended to implement their pilot ventures to gain actual knowledge in the SE courses. In other words, universities, lecturers, and students should combine both SE practice and theory from the very beginning of the course. This research's findings suggest that factors such as 'encouraging students to work with practitioners', 'connecting with practitioners to inspire students', and 'creating strategic partnerships to provide resource' are less important than other factors, in the context of Vietnam.

Secondly, this research contributes to the literature on SE education, an area of study that is relatively new. Although education plays an important role in SE as shown by the literature, research on the drivers of SE education seems to be lacking. There is evidence to suggest that education and training are core, indispensable components of sustainable entrepreneurial ecosystems (Elnadi & Gheith, 2021). A truly effective entrepreneurial ecosystem must fulfill functions such as education and training, knowledge development and dissemination, providing R&D, orientation, startup experimentation, and nurturing activities (Markard & Truffer, 2008). The Global Entrepreneurship Monitor (GEM) has also identified education as one of the nine pillars of entrepreneurial ecosystems. In Vietnam, Nguyen (2020) has shown that education significantly influences the awareness and entrepreneurial decisions of young entrepreneurs and suggests that to ensure successful entrepreneurial support, there is a need to enhance education and implement strategies to improve the entrepreneurial ecosystem. To effectively achieve the Sustainable Development Goals, researchers and countries should focus more on faculty, students, and universities, which train human resources for the future. Particularly, creating motivation and an environment for lecturers to teach about SE plays a key role. If the economy and businesses are not led by entrepreneurs who are equipped with knowledge, skills, and attitudes about SE, other efforts such as changing consumers' perception of green products, practicing sustainable management, and building an entrepreneurial ecosystem… may be less effective. This is especially pronounced in the context of developing countries, where environmental and social issues are on the rise (Romero-Colmenares & Reyes-Rodríguez, 2022).

In summary, this research has outlined the drivers of SE education, which involve 16 key sub-factors and four main factors. Moreover, this research has highlighted the role of some crucial factors which have not been emphasized and explained in previous studies.

5.2. Implications

This research may provide several practical implications for lecturers, university administrators, and policy-makers, especially in developing countries.

Firstly, university administrators and policymakers may further understand the importance of SE education in the modern-day context. This issue has neither been extensively discussed nor significantly paid attention to by researchers. To ensure sustainable development, it is necessary to pay more attention to root solutions that promote lecturers and universities to train in SE. Universities that do not offer courses in economics or business may also be advised to include topics on SE in their subjects.

Secondly, the results of this research may help university administrators to acknowledge and prioritize the SE education drivers, translating them into proper administration policies. Accordingly, this may raise awareness among lecturers on the importance of the SE education drivers, namely: encouraging youth, social problems, talent shortage, and connecting with the practitioners. If lecturers strive to inspire and encourage students to study and practice SE, recognize the necessity of emerging environmental and social issues, and acknowledge the shortage of persons who are capable of dealing with such issues, they are more motivated to teach SE. In the context of developing countries like Vietnam, universities may be even more resource-constrained. Therefore, this work can provide implications for university administrators about resource allocation priorities.

Thirdly, universities should build a convenient environment for SE teaching that connects students with sustainable development practitioners. Universities may create strategic partnerships to provide resources, connect with practitioners, and inspire students. This is because the drivers involve not only lecturers but

also practitioners with concrete, practical experiences. This becomes even more significant in developing countries as it seems that there is still more social interest in traditional entrepreneurship than in SE education and practice.

6. Conclusions

A survey of the literature on SE suggests that there are calls for SE research to be conducted beyond the framework of developed countries. Moreover, the literature provides very little understanding of SE education. Therefore, this research aims to discover which drivers promote university lecturers to provide training in SE and their level of importance. The results prove that the main factors (in descending priority) are encouraging youth, social problems, talent shortage, and connection with practitioners. Furthermore, sub-factors are also ranked as to their relative importance.

This research has meaningful contributions to science. It constitutes the first effort to assess and rank the drivers of SE education using the AHP technique. This research provides a further understanding of SE education – which is currently quite limited – and possibly encourages subsequent studies to broaden this subject. The result of the research may bring meaningful implications to policymakers, university lecturers, and administrators who are interested in sustainable development. This is because the authors have pointed out the factors to be emphasized and their prioritization in the construction of a driving environment for SE lecturers.

However, this research has some limitations. Firstly, the AHP method employed does not require the involvement of many expert participants and requires consistency of responses. This study had a sample size of only nine experts with a minimum of five years of teaching experience in SE, among whom there is one individual aged 22-30. Although the study ensured the necessary sample size for the AHP method, it would be beneficial to utilize other parametric and non-parametric methods with a larger sample size. With more experienced experts, the results may carry greater significance. In addition, this research may provide a deeper understanding and explanations should it be combined with the Delhi method with semi-structured questions. Secondly, theories of motivation creation such as the expectancy theory and the theory of planning behaviour should also be leveraged to investigate other drivers, including intermediate factors between motivation and behaviour. The drivers of SE education in this research are only based on the research by Kummitha & Kummitha (2021), while many internal and external drivers have yet to be considered. Thirdly, this research was conducted in the context of Vietnam. Therefore, it is likely that different results will be produced when the research is conducted in the context of other countries and regions. This is especially pronounced in developing countries, where the social and environmental issues are far more challenging, or the demand for labour force for sustainable development is higher. For that reason, future studies will be more meaningful if the scope of the research is broadened to include comparisons of the differences between countries and regions.

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