



Research article

Constructing the scale to measure entrepreneurial traits by using the modified delphi method

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ABSTRACT

Higher entrepreneurial traits significantly increase the likelihood of graduate students venturing into entrepreneurship. This study intended to develop a scale for assessing the entrepreneurial traits of graduate students, recognizing a gap in existing literature and measurement tools predominantly developed for countries with conducive entrepreneurial climates. Aligned with Ajzen's theory of planned behavior, the study employed a modified Delphi method, including prototype development, two Delphi surveys, and subsequent statistical analyses. The robustness of the final items and scale in effectively capturing the entrepreneurial traits of graduate students is supported by descriptive statistical analyses ($SD \leq 1.5$, Interquartile Range ≤ 1 , and Level of Agreement $\geq 70\%$), content validity analysis (I-CVI ≥ 0.8 , S-CVI/Ave = 0.92; S-CVI/UA = 0.4), and Kendall's Coefficient of Concordance analysis ($X^2(37, N = 30) = 700.504$, $W = 0.631$, $p < 0.01$). Ultimately, the scale comprises 38 items organized into three overarching thematic areas: life philosophy, creating and utilizing mindset, and supportive and motivating environment. Consistent with existing literature, entrepreneurial traits are intricately linked to individuals' life perspectives, often characterized by a desire for self-autonomy. Additionally, the ability to create or leverage available resources and the presence of a conducive external environment emerge as pivotal dimensions in entrepreneurial traits. Notably, the study highlights the critical influence of a country's environment and policies, mainly through university courses and short-term programs, in shaping the development of entrepreneurial traits.

1. Introduction

Entrepreneurship is pursuing innovation, primarily emphasizing modifying or creating ideas and products [1]. When intentions materialize into tangible actions, the state can be termed entrepreneurial. The primary descriptors of entrepreneurial traits are intentions and behaviors. However, to be precisely characterized as entrepreneurial, these traits should contribute to economic mobility [2]. In alignment with Ajzen's theory of planned behavior [3], it becomes evident that the higher the entrepreneurial traits, the greater the likelihood of transitioning into an entrepreneurial role. How to measure a person's entrepreneurial traits is the central question that this paper answers. Hence, measuring an individual's entrepreneurial traits was explored and validated—the paper attempted to provide insights into the scale with different dimensions and items to measure entrepreneurial traits. This paper theorized entrepreneurial traits based on experts' opinions, consensus, statistical rigor, and existing theory and literature. This theorization is vital in entrepreneurship literature [4], providing a way to measure entrepreneurial traits.

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1.1. Background and rationale of the study

Measuring entrepreneurial traits is crucial for predicting the likelihood of individuals choosing entrepreneurship as a career. Among the entrepreneurial traits, innovation is pivotal, as it requires translating abstract mere conceptualizations into concrete actions for entrepreneurship [5]. Although innovation is often presented as the most critical component in many entrepreneurial literature [5, 6], an excessive focus on mere innovation may overshadow other essential entrepreneurial attributes, like resourcefulness, resilience, market understanding [7–9], and exposure [10], distorting the measurement of entrepreneurial aspirations. The contrary arguments are focused on market and economic mobility and argue that the true significance of entrepreneurship lies in economic mobility and its impact on the market [2].

Presenting entrepreneurs as visionaries and people capable of perceiving situations differently [6] raises questions about the universality of entrepreneurial traits. Although distinct modes of thinking contribute to entrepreneurial success, not all individuals possess these characteristics [9], nullifying universal ways of describing entrepreneurs. This leads to a question: Can entrepreneurial traits be accurately measured and standardized across diverse populations with varying backgrounds?

Describing beyond mere innovation, the entrepreneurial landscape is also shaped by broader behavioral and economic factors [7, 9]. From an economic perspective, entrepreneurship enhances economic mobility and drives innovation-led growth [2]. However, critics argue that this perspective overlooks systemic barriers that hinder entrepreneurial activity [11], particularly in marginalized communities or regions with limited resources and support networks.

Additionally, the utilization of resources and opportunities depends on various socio-economic factors, such as age, gender, ethnicity, and education [2]. While these factors influence entrepreneurial outcomes, oversimplifying the complexity of the interplay between individual attributes and external circumstances is challenging [12]. This raises concerns about the validity of existing entrepreneurial measurement scales, which may fail to capture the nuances of entrepreneurial behavior in diverse contexts.

Despite the importance of entrepreneurial traits, the existing literature on measurement scales has limitations. Many studies focusing on entrepreneurial traits of management graduate students and other aspiring entrepreneurs have potentially overlooked a broader spectrum of entrepreneurial experiences and perspectives inherited by various socio-demographic diversities [13]. This raises questions about the generalizability and applicability of existing measurement frameworks, particularly in regions with unique socio-economic contexts like Nepal [10,14].

The lack of a supportive system often undermines individuals' entrepreneurial aspirations, highlighting the disconnect between personal willingness and systemic support, which is valid for the Nepali context [14]. This prompts concerns about the effectiveness of interventions that foster entrepreneurship without addressing systemic barriers. In this background, the Nepali context presents a unique challenge, as the desire and systemic support do not align due to a less supportive system [15] [16]. have highlighted the Nepali situation and emphasized that structural constraints such as talent and capital market segmentation hinder entrepreneurial activity. Thus, because of the uniqueness of the context, there is a greater need for customized measurement scales.

Despite the essentiality of measuring entrepreneurial traits, critically examining the methodologies and frameworks for their refinement is crucial. By acknowledging the complexities, coverage, and universality of constructs of existing measurement scales [15, 16], the development of more specific, validated, and contextually relevant approaches to understand and foster the measure of entrepreneurial traits was recognized. This required a rigorous effort to develop customized measurement tools that capture the context-specific and complex nature of entrepreneurship that could serve to understand systemic barriers that hinder the entrepreneurial traits of an individual in diverse socio-economic contexts.

1.2. Purpose and research question

This study aimed to fill this entrepreneurial trait measurement gap by developing and validating items and a scale from scratch using the modified Delphi method. Thus, this study answered the research question: "What scale best describes the entrepreneurial traits of graduating management students?" Through this study, we aimed to contribute to refining entrepreneurial measurement tools contextualized to the Nepali or similar context and advance our understanding of entrepreneurship and its associated components to foster entrepreneurship within the region.

1.3. Literature review

Many attributes are linked to an individual's entrepreneurial traits, encompassing personal eagerness and structural-level support. Individuals possessing higher entrepreneurial traits exhibit control over internal and external environments, demonstrate risk tolerance, and have a higher desire to achieve their goals [17,18]. Similarly, structural attributes such as organizational structure, physical facilities, processes and procedures, control and monitoring systems, financial systems, human resource status, and country information systems are equally pivotal for entrepreneurs to initiate and sustain their activities [18]. The interplay between personal willingness and structural support is crucial in enhancing entrepreneurial behavior, as the likelihood of someone becoming an entrepreneur is higher when they have higher entrepreneurial traits [19]. However, the central question remains: How do we measure entrepreneurial traits among graduate students?

Various areas and attributes have been identified for assessing entrepreneurial traits, including self-efficacy, independence, innovativeness, control over internal and external environments, willingness to achieve, positivity toward the future, stress tolerance, and risk-taking [20]. [21] proposed a comprehensive model that considers knowledge, internal and external motivation, personal capacity at different phases, personal characteristics, and thinking style as central themes in scanning entrepreneurial characters and

traits [22]. developed the widely recognized Entrepreneurial Intention Questionnaire (EIQ), incorporating significant areas like personal attitude, subjective norms, and perceived behavioral control. However, it is noteworthy that the EIQ was primarily validated in university students from highly entrepreneurial countries such as Spain and Taiwan.

In the Nepali context, efforts have been made to develop items for measuring entrepreneurial attributes [23]. tested the validity of items related to entrepreneurial behavior against previously established criteria, finding associations between entrepreneurial intention and self-efficacy, role models, and experience. Similarly [13], used risk tolerance and self-efficacy as predefined criteria to gauge entrepreneurial intention. Although the tested criteria were primarily significant predictors, a mismatch between the research findings and entrepreneurial challenges is visible. Given the complexities stemming from bureaucratic processes and the diverse societal composition in Nepal, entrepreneurs face challenges in the startup, smooth operation, and retention of entrepreneurial activities [13,24]. This complexity highlights the need for context-specific items that could serve as a scale to measure entrepreneurial traits in countries like Nepal.

The sociocultural setting of a nation significantly influences entrepreneurial attributes, and Nepali entrepreneurship predominantly relies on family legacy over other personal and structural attributes [24]. Most literature focused on developing items to measure entrepreneurial traits, intentions, or attitudes has primarily concentrated on personal willingness or environmental support. Table 1 provides an overview of major thematic areas that describe entrepreneurial traits in various contexts.

To address the research gap of the limited entrepreneurial traits measurement scale, this study examined the dimensions and areas that shape students' attitudes towards entrepreneurship and their perceived behavioral control over entrepreneurial activities. In doing so, this study drew insights from various sources. For instance, research on students from different disciplines in Saudi Arabia [34] highlighted traits such as conscientiousness and emotional stability that might be relevant to Nepali students. Similarly, insights from engineering undergraduate students in India [25] emphasized that ambiguity tolerance, risk-taking, and social networks could inform the study's framework.

Moreover, this study gained understanding from the studies, which explored the attitudes towards innovation and risk-taking among hotel managers in Spain [26], entrepreneurial passion and self-efficacy among university students in China [27], and institutional factors affecting informal enterprises in Nigeria [28]. Additionally, insights from graduate students in Turkey [18], masters level management students in Nepal [17], Small and Medium Enterprises (SMEs) in India [29], faculties of universities in Spain [30], students of business management in Pakistan [31], and people from business databases in Czechia, Hungary, and Serbia [32]. A comprehensive understanding of the factors driving entrepreneurial activities in Nepal was extended by synthesizing findings from diverse contexts and incorporating Nepal-specific factors, such as cultural norms and institutional frameworks. This holistic approach could nurture entrepreneurship and foster economic growth in the country by adequately measuring the entrepreneurial traits among the graduating students.

Although many scales are available locally and globally, employing a non-contextual tool to measure the entrepreneurial attributes of graduating students might be inappropriate. Thus, it was evident that existing instruments borrowed from different populations and contexts required a reevaluation to address the complicated sociocultural setting of a country like Nepal. Despite the studies conducted in Nepal highlighting raised entrepreneurial traits among graduate students, the discrepancy is visible when observing the lower level of entrepreneurial activities in recent years [35,36]. Nepal's lower rank in the "Doing Business Index" (94 out of 190 countries) suggests weaker entrepreneurial activity and the environment [32]. Hence, there appeared to be a distinct mismatch between existing tools and

Table 1
Major thematic areas of entrepreneurship measurement scales.

Scholar/s	Sample	Traits
[23] [25]	Students from various disciplines, Saudi-Arabia Engineering undergraduate students, India	Conscientiousness, emotional stability, openness to experience, extraversion, and agreeableness Characteristics: Ambiguity tolerance, locus of control, planning, risk-taking, self-sufficient, social network
[16]	Sector not specified, Nepal	Attitude: Achievement, innovation, self-esteem, and personal control Personal Attitude, Perceived Behavioral Control, Subjective Norms, Structural Support, and Entrepreneurship Education
[26]	Hotel managers, Spain	Innovation, proactiveness, and risk-taking
[27]	University students, China	Entrepreneurial passion, entrepreneurial education, role models, entrepreneurial self-efficacy
[28]	Informal enterprises, Nigeria	Institutional factors: political, cognitive, cultural, and corruption Individual factors: innovativeness, proactiveness, and risk-taking
[18]	Graduate students, Turkey	Internal locus of control, risk tolerance, need for achievement, and entrepreneurial alertness
[22]	University students, Spain and Taiwan	Attitude towards startup, subjective norm, perceived behavioral control
[17]	Masters level management students from a university, Nepal	Agreeableness, conscientiousness, extraversion, emotional stability, openness, and social support
[29]	SME, India	Risk-taking, innovative, creative, acceptance to change, Farsighted, planned, competitive, decisive, leading from the front
[30]	Faculties of universities, Spain	Perceived desirability and perceived feasibility
[31]	Students of business management, Pakistan	Extraversion, openness, neuroticism, conscientiousness, agreeable
[32]	People from business databases from Czechia, Hungary, and Serbia	Independence, education, internal local of control, risk-taking, creativity, need for achievement, confidence
[33]	Undergraduate students, Iran	Open-mindedness, need for achievement, pragmatism, ambiguity tolerance, long-term vision, challenge and risk-taking, internal locus of control

the accurate measurement of entrepreneurial traits. This gap demanded an appropriate tool for more precisely articulating students' entrepreneurial traits.

This study aimed to bridge this gap by offering a ready-to-use scale for measuring the entrepreneurial traits of Nepali management graduating students (MBS and MBA), irrespective of their sex, age, or ethnic identity developed from scratch. In doing so, it sought to make a significant contribution to the educational industry by enabling the assessment of student traits and facilitating necessary interventions, whether in the form of curriculum adjustments or extracurricular activities. These interventions ultimately aimed to support students in making informed career choices, particularly in pursuing entrepreneurship.

1.4. Research methods

The study employed a modified Delphi method to develop, validate, and finalize the scale. Delphi studies are recognized as essential tools for comprehending trends and establishing standards [31]. The modified Delphi method offers several advantages, particularly in providing a platform for experts to freely express their ideas while ensuring anonymity [37,38]. This process enables the collection of diverse, first-hand ideas and effectively explores priorities [37]. Moreover, the Delphi method can validate scales yet to be explored [38].

The primary objective of the Delphi method in this study was to attain a consensus among the expert panels, maintaining the anonymity of responses and incorporating statistical backstopping from successive rounds of efforts [39]. The Delphi method helped obtain information in a structured form, ensuring the efficiency of the entire process [40]. The modified Delphi approach, in particular, stood out as a cost-effective method for acquiring an in-depth understanding of the issue at hand [38] because of its flexibility regarding consultations and surveys. The study meticulously followed four significant steps, as outlined in Fig. 1.

The commencing sections explain the process, the methods employed, and the findings from each step individually.

1.4.1. Prototype tool development

While developing the prototype tool, experts were consulted following a comprehensive literature review. The primary rationale for opting for the modified Delphi method was to leverage the insights gained during the prototype development stage. The online survey was conducted using the Kobo Humanitarian Platform (kobo.humanitarianresponse.info), aiding real-time access to study experts' opinions and minimizing human error [40]. The developed survey link was emailed to experts to obtain independent expert judgments. Expert input at this stage was anticipated to refine the prototype tool's domains and items, enhancing the scale's content validity for measuring entrepreneurial traits. Scholars have employed various criteria, including self-efficacy, alertness [17], proactive personality [41], control over internal and external environments, desire to achieve, and risk tolerance [42], to assess entrepreneurial traits. While the Entrepreneurial Intention Questionnaire (EIQ) developed by [22] is widely used to measure entrepreneurial intention among graduating students, a specific and validated measurement tool gap was realized to understand students' entrepreneurial traits in the Nepali context. To understand the peculiarities of the context, experts were selected to dig out the major themes and operationalize those themes.

The selection of the experts in the prototype development phase was judgmental as the literature on the Delphi process lacked consensus on the number of experts or participants [43]. This study selected five experts based on their commitment and expertise, ensuring a comprehensive exploration of entrepreneurial attributes in the Nepali context. Experts were asked an open-ended question: "What are the entrepreneurship traits of management graduate students?" Responses were coded and thematized, and a follow-up member check was conducted to ensure accurate representation and recording of expert voices, ensuring the study's trustworthiness [44]. Three major thematic areas emerged from the initial expert consultation: life philosophy, creating and utilizing mindset, and supportive and motivating environments (see Fig. 2). These thematic areas served as guidelines for the second round of expert consultation and the development of the prototype scale.

A second round of inquiry with the experts was conducted, building upon the key themes generated from the initial consultation. In the second round, experts were asked the following questions: "What are the additional attributes under a) life philosophy, b) creating and utilizing mindset, and c) supportive and motivating environments that can measure the entrepreneurial traits of management graduating students?" All five experts responded, with the structures varying from bullet points to lengthy paragraphs. Once again, the answers were systematically coded and thematized. Based on these responses, a draft item set (items count = 74) was formulated. Additionally, a review of existing literature, particularly in the Nepali context, was undertaken, contributing to constructing a prototype scale.

The final prototype scale comprised 74 items distributed across three domains: life philosophy, creating and utilizing mindset, and supportive and motivating environments. These domains were derived from the insights extracted through expert consultations and literature review, providing a comprehensive framework for measuring entrepreneurial traits among management graduating students.

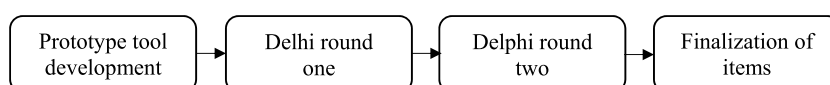


Fig. 1. Steps followed to develop the scale.

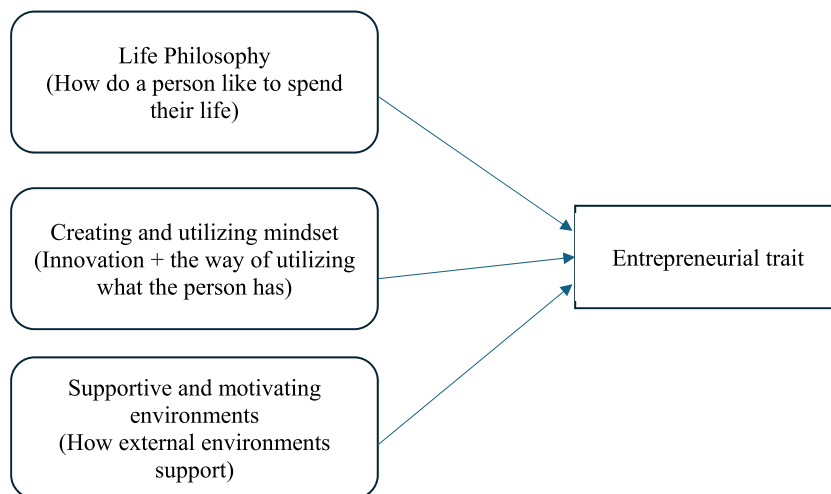


Fig. 2. Major thematic areas from the first round of the expert consultation.

1.4.2. Sample size (expert selection) for the delphi surveys

A set of criteria was established to select the experts for the study, encompassing not only entrepreneurs but also university professors engaged in teaching entrepreneurship development, master's level graduate students, and researchers and trainers involved in entrepreneurship development training and capacity development events. Thus, the purposive sampling method [45] was employed to select participants as experts. This method aimed to bring a consensus of expertise from diverse fields and constructs [40]. Additional criteria such as expertise, heterogeneity in socio-demographic characteristics (please refer to Table 2), and access were also considered in participant selection to ensure diversity [40].

For participant heterogeneity, experts from expansive areas were chosen based on their experience and expertise. The Delphi process's central focus on minimizing bias highlights the importance of panel size [46]. A diverse sample size ensured multiple perspectives and ideas from individuals of different strata and groups [47]. Consequently, a disproportionate stratified sampling technique was applied to understand expert opinions and perspectives regarding entrepreneurial traits [47]. The study population constituted four distinct strata—university professors, graduate students, entrepreneurs, and researchers and trainers.

Table 2
Socio-demographic characteristics of experts.

Characteristics	Attributes	Round one Delphi (N = 30)		Round two Delphi (N = 30)	
		n	%	n	%
Expertise area	Graduate students	14	46.7%	14	46.7%
	Entrepreneur	8	26.7%	8	26.7%
	University lecturer	4	13.3%	4	13.3%
	Researcher/trainer	4	13.3%	4	13.3%
Gender	Male	20	66.7%	20	66.7%
	Female	10	33.3%	10	33.3%
Age group	Up to 25 years	13	43.3%	13	43.3%
	26–35	5	16.7%	5	16.7%
	36–45	7	23.3%	7	23.3%
	45–60	2	6.7%	2	6.7%
	60 or above	3	10.0%	3	10.0%
Education Level	Up to Grade 12	3	10.0%	3	10.0%
	Bachelor	18	60.0%	18	60.0%
	Masters	4	13.3%	4	13.3%
	MPhil/PhD	5	16.7%	5	16.7%
Resident by province	Bagmati Province	11	36.7%	11	36.7%
	Gandaki Province	6	20.0%	6	20.0%
	Lumbini Province	6	20.0%	6	20.0%
	Karnali Province	3	10.0%	3	10.0%
	Sudur Paschim Province	4	13.3%	4	13.3%

Note. N = total number of experts, n = number of experts within a group, % = percentage of experts.

While there is no consensus on the ideal sample size for the Delphi process, many studies suggest that more than ten participants would be sufficient [45,48,49]. Some researchers propose a sample size of thirty as adequate for generating a valid tool [37,50]. Larger sample sizes may not necessarily enhance the study's value, as the primary objective of the Delphi process is to gather expert opinions and judgments rather than generalize results for the larger population [49]. Accordingly, the study selected thirty participants from diverse backgrounds as the sample, ensuring an appropriate size for analysis and maintaining methodological rigor.

The scale development process extends approximately six months, starting in March 2022 and concluding in September 2022. The items were finalized for further use after two rounds of online Delphi surveys.

1.4.3. Socio-demographic characteristics of the experts

In the first round, invitations were sent to 35 experts to participate upon their preliminary agreement to participate in the process. Following three subsequent follow-up rounds, 30 experts responded to the prototype items, resulting in five experts being considered dropouts. However, all thirty experts responded to the second round after a series of follow-ups. The socio-demographic characteristics of the experts are presented in Table 2.

The study participants exhibited diversity in expertise, gender, age group, and education level. Given the study's focus on understanding the entrepreneurial traits of graduate students, these students were also considered experts in the process. Most participants attained a bachelor's degree or higher, with three entrepreneurs concluding their education after high school (grade 12). The majority of participants were below 25 years old, but to incorporate a range of expertise and experiences, 10% of participants were above the age of 60. These aged participants included university lecturers (professors) and researchers. Thus, the study ensured a diverse selection of participants, bringing together multiple dimensions for a comprehensive understanding.

1.4.4. Delphi surveys and scale validation criteria

Two survey rounds were undertaken with the same participants for tool validation. In the initial round, the study participants ($N = 35$) were provided with a tool comprising 74 rating items. They were asked to rate the degree of agreement with each item, assessing its capacity to describe the entrepreneurial traits of graduate students. The study employed a five-point rating scale, ranging from "strongly disagree (=1)" to "strongly agree (=5)," as this scale was deemed effective in understanding the experts' views toward each item's ability to depict the extent of entrepreneurial traits among graduate students.

A two-week timeframe was allocated to experts for form completion, aligning with the typical duration for a round in the Delphi process [51]. Real-time data entry and count monitoring were maintained, and follow-up measures, including emails and telephone calls, were implemented to ensure timely responses. After two weeks, 30 responses were received from the 35 experts. Statistical analysis based on three criteria—interquartile range, median value, and level of agreement was used to make item retention and reduction decisions. In the second round, 50 items were retained after data analysis. These 50 items were then sent to participants who responded in the first round, requesting a response within two weeks.

In the second round, emails and telephone calls were used as the follow-up strategy, ensuring that all 30 responses were received on time. The responses were subjected to the same statistical criteria as in the first phase, and the final items were determined. Two survey rounds are considered sufficient in the Delphi process [52–54]. So, the survey was concluded after two rounds. Both rounds of surveys were conducted online, and the data were imported into the SPSS software (version 27) for analysis.

The primary criteria for item selection were consensus among the experts [55], focusing on the interquartile range, standard deviation, and the level of agreement among the experts. The Interquartile Range was considered adequate for identifying data outliers [53], with responses showing more than a 1.5 interquartile range for a five-point scale considered outlier observations. The median value was crucial as a central tendency measure for Likert-type data. A median value of 4 or more on the five-point Likert scale was considered a basis for retaining items, indicating agreement among the majority [54].

This study adopted a benchmark of 70 percent or above average consensus among the experts, an interquartile range of 1 or less, and a standard deviation of 1.5 or less for item retention. Additionally, the Kendall coefficient of concordance was calculated to ensure significant consensus among the experts at the 5% level.

Content validity, reflecting the items' ability to describe the constructs as intended, was addressed through the Content Validity Index (CVI). Items with a CVI of more than 0.8 were considered good representatives of the construct. Both the Item-Content Validity Index (I-CVI) and overall Scale-Content Validity Index (S-CVI), including S-CVI Universal Agreement (S-CVI/UA) and S-CVI Average (S-CVI/Ave), were calculated. The cutoff values for I-CVI, S-CVI/UA, and S-CVI/Ave were set at 0.78, 0.8, and 0.9, respectively, ensuring the scale's content validity.

2. Results

The two rounds of Delphi surveys were conducted. The survey results from the first round indicated a decrease in items from 74 to 50. Subsequently, the second round further supported a reduction in the items, resulting in a final count of 38. The statistical measures applied to the remaining 38 items indicated a higher level of Content Validity, affirming the scale's suitability for measuring the entrepreneurial traits of management graduate students. The detailed results of each round of the Delphi survey are presented below.

2.1. Round one delphi

As previously discussed, 74 items were presented to the experts to assess each item's relevance in defining graduate students' entrepreneurial traits. The responses were coded, and a descriptive statistical analysis was conducted. The results revealed that out of

the initial 74 items, only 50 met the predetermined criteria: interquartile range ≤ 1 , level of agreement $\geq 70\%$, and standard deviation ≤ 1.5 . Items failing to meet these criteria were omitted for the subsequent phase of the Delphi process. The decision to retain or discard items was based on considerations of standard deviation, interquartile range, and the level of agreement. Descriptive statistics and the decisions regarding item retention are detailed in [Annex 1](#). From the analysis, 50 out of the initial 74 items were retained for the second round of the Delphi process.

The assessment of the Content Validity of the items involved calculating the Item-Content Validity Index (I-CVI), Scale-Content Validity Index/Average (S-CVI/Ave), and Scale-Content Validity Index/Universal Agreement (S-CVI/UA). The content validity indices for all 74 items are presented in [Annex 2](#). The analysis indicated that the average System Level Content Validity Index (S-CVI/Ave) was 0.79, slightly below the predefined value of 0.8. Among the 74 items, only 50 individual items met the criteria for the Individual Content Validity Index (ICVI ≥ 0.78). As anticipated, the System Level Content Validity Index Universal Agreement was notably lower (S-CVI/UA = 0.013) compared to the set value of 0.8.

In addition to calculating CVIs, Kendall's Concordance A test was conducted to evaluate the level of agreement among the raters and determine the significance of the coefficient value. The findings of these results are presented in [Table 3](#).

The primary purpose of calculating Kendall's *W* coefficient was to measure the degree of agreement among the judges. [Table 3](#) showed a significant but lower level of consensus among the experts for the overall items with $X^2(73, N = 30) = 178.01, W = 0.081, p < 0.01$.

The results provided a clear direction for the second round of the Delphi process. Building on the statistical evidence, which included descriptive statistical values, Content Validity Indices (CVIs), and Kendall's *W* coefficient, the second round of the Delphi process was initiated. Study participants were contacted again, and the purpose of the second round of Delphi was clarified to them.

2.2. Round two delphi

The fifty items retained from the initial round of the Delphi process were transformed into itemized scale items spanning from "strongly disagree (=1)" to "strongly agree (=5)" for the second round of Delphi. The objective was to assess how each item behaves to describe the entrepreneurial traits of graduating students. A new Kobo-based online survey link was generated for this round, and it was sent to all 30 participants who had responded in the first round. Participants who did not respond in the first round were considered dropouts for the second round of Delphi. All participants were requested to respond to the form within a two-week timeframe. Notably, most respondents responded to the survey form within the first week. An email and telephone follow-up were conducted for those who had not responded after one week. On the 13th day, a final telephone follow-up was carried out. After these follow-ups, all 30 participants responded. The received data were coded in SPSS and analyzed using the same criteria applied in the first round of Delphi. A descriptive analysis of the second round of Delphi is presented in [Annex 3](#). The results indicate that out of the 50 items, only 38 were retained, which adhered to the criteria of SD ≤ 1.5 , average agreement for each item $\geq 70\%$, and Interquartile Range ≤ 1 .

Additionally, to evaluate the content validity of items from the second round of Delphi, the Content Validity Index (CVI) was calculated in terms of Item-Content Validity Index (I-CVI) as well as Scale-Content Validity Index (S-CVI, including S-CVI/Ave and S-CVI/UA). The content validity analysis for each item and the overall scale is presented in [Annex 4](#). In this round, 12 out of 50 items had I-CVI values less than 0.78. The S-CVI/Ave value was 0.81. Notably, the S-CVI/UA value showed a substantial increase compared to the first round, with a value of 0.28, indicating improved content validity for individual items and the overall scale. Furthermore, the Kendall *W* Coefficient analysis was conducted to assess the level of agreement among the experts, and the test results are presented in [Table 4](#).

As of the first round of Delphi, Kendall's *W* coefficient was calculated to assess the agreement among the experts. The results indicated a significant and moderate agreement among the experts, with $X^2(49, N = 30) = 776.356, W = 0.528, p < 0.01$. The agreement level increased substantially from the first to the second round, suggesting a more uniform agreement among the experts for the scale. However, based on the Level of Agreement for each item and I-CVI values, some items needed to be deleted for finalization.

2.3. Finalization of tools and scale

The second round of Delphi supported refining items for the scale, resulting in a significant increase in the Level of Agreement.

Table 3
Kendall's test of concordance (round one Delphi).

<i>N</i>	30
<i>W</i>	0.081
<i>X</i> ²	178.012**
<i>df</i>	73
<i>p</i>	<0.01

***p* < 0.01, *N* = number of experts, *W* = Kendall's *W* coefficient of concordance, *X*² = Chi-square coefficients, *df* = degree of freedom.

Table 4
Kendall's test of concordance (round two Delphi).

<i>N</i>	30
<i>W</i>	0.528
<i>X</i> ²	776.356**
<i>df</i>	49
<i>p</i>	<0.01

***p* < 0.01, *N* = number of experts, *W*= Kendall's *W* coefficient of concordance, *X*² = Chi-square coefficients, *df* = degree of freedom.

Consequently, only the retained items from the second round were considered for the final scale. By keeping only 38 items from the second round of Delphi, the statistical tests, including descriptive analysis and Kendall's *W* Coefficient, were calculated one more time.

All 38 items showed *SD* > 1.25; the minimum average agreement was 88% (see Annex 5). Of the 38 items, 14 achieved Universal Agreement, i.e., S-CVI/UA was 100%. Further, the Content Validity Index of the 38 items in terms of the I-CVI and S-CVI values is presented in Annex 6. Similarly, the minimum I-CVI was 0.8 (>0.78), indicating a sufficiently high Individual Item-level Content Validity Index. Additionally, the average System Level Content Validity Index (S-CVI/Ave) was 0.92 (>0.9), surpassing the set benchmark level. Lastly, the S-CVI/UA was 0.4. Although typically a 0.9 value for the S-CVI/UA is expected for universal agreement, it is acknowledged that obtaining 0.9 is challenging with a more significant number of experts (e.g., 30). Thus, the 0.4 value still supports a decent level of Universal Agreement. Similarly, the Kendall's Coefficient of Concordance (Kendall's *W* Coefficient) test was conducted to ensure the level of consensus among experts was not due to chance. The test result is presented in Table 5.

Table 5 showed a higher agreement level among the experts, and the level of agreement was significant, too, with *X*² (37, *N* = 30) = 700.504, *W* = 0.631, *p* < 0.01. There was a substantial change in Kendall's *W* value from the first round compared to the final retained items. As most of the item parameters met the criteria after the second round of the modified Delphi, the Delphi survey was concluded at this point. Thus, through two rounds of modified Delphi surveys and retaining only the items that fulfilled the statistical criteria, a scale with 38 items was constructed.

2.4. Process summary

Initially, an in-depth literature review was undertaken to investigate the existence of instruments for assessing the entrepreneurial traits of graduate students in Nepal. The review indicated a lack of context-specific tools to measure the entrepreneurial traits of graduating students in Nepal. Following this, five experts based on criteria to include diversity and expertise were selected and engaged in email discussions with them to comprehend the significant themes associated with entrepreneurial traits. In the second stage, experts were consulted and involved in individual discussions to outline sub-themes and items for each theme. Based on insights from these two rounds of individual expert consultations, a prototype tool comprising 74 items was developed.

A diverse group of experts (*N* = 35) from various fields, chosen for their voluntary participation, were then invited to rate the relevancy and appropriateness of each item to describe the construct of entrepreneurial traits in graduate students using a Kobo-based online tool. After receiving 30 responses within the stipulated timeframe, the collected data underwent statistical analyses. Subsequently, 50 items were retained based on the established criteria for the second round of the Delphi process. The experts rejudged these retained items for the second round, and the responses were subjected to further statistical analysis. After the second round, 38 items met the criteria for retention, resulting in the development of a scale comprising 38 items. The detailed process is illustrated in Annex 8.

3. Findings and discussion

The study innovatively engaged experts in multiple rounds and developed a tool to assess the entrepreneurial traits of graduating management students (MBS and MBA). This scale, comprising 38 items, focused on three key domains: "Life Philosophy", "Creating and Utilizing Mindset", and "Supportive and Motivating Environment". Notably, these domains aligned closely with Ajzen's theory of

Table 5
Kendall's test of concordance (final scale).

<i>N</i>	30
<i>W</i>	0.631
<i>X</i> ²	700.504**
<i>df</i>	37
<i>p</i>	<0.01

***p* < 0.01, *N* = number of experts, *W*= Kendall's *W* coefficient of concordance, *X*² = Chi-square coefficients, *df* = degree of freedom.

planned behavior, encompassing attitude, social norms, and behavior control [3]. By incorporating these thematic areas, the study uniquely assessed the entrepreneurial traits of graduating students, highlighting the pivotal role of their attitude towards life, the mindset of creating and utilizing, and the influence of external environmental factors.

Within the framework of Ajzen's theory, the study's primary objective was to develop a scale for measuring entrepreneurial traits. This process involved an extensive literature review, two rounds of expert opinions synthesis, and two validation-modified Delphi surveys. Notably, this methodological approach represents an innovative contribution to the field, mainly by utilizing a multi-method strategy for tool development [56]. The study dealt with significant constructs for measuring entrepreneurship, highlighting how individuals see life, use resources, and navigate societal norms and values for entrepreneurial aspirations.

It emphasized the influence of subjective norms, such as environmental motivations, and behavioral control, such as creating and utilizing mindset or entrepreneurial life philosophies, on entrepreneurial behaviors. It highlighted the importance of societal influence in career choices and the individual's beliefs, in line with the previous study results [57]. Further, the study identified several factors contributing to entrepreneurship ideation, including education, motivation, market availability, and personal imagination, which align with other study findings [58].

Unique from other studies and tools, this suggested that individuals with distinct life philosophies, characterized by innovation and a willingness to invest and compete, demonstrate potential as entrepreneurs, similar to the previous study findings [58]. Moreover, entrepreneurial traits, according to this study's findings, were evident in those who exhibited creativity by creating or utilizing new products or ideas and in their ability to optimize available resources for personal or societal benefit, aligning with previous study findings [19].

Finally, the study also revealed the influence of social pressure and norms on entrepreneurial aspiration, emphasizing the role of personal life philosophy in shaping these intentions [59]. Ultimately, aspiring entrepreneurs were aligned at navigating complex situations and leveraging environments to maximize benefits, demonstrating their problem-solving abilities [60]. Overall, the significant findings of this study, represented through the constructed scale, contributed to a deeper understanding of entrepreneurial traits and behaviors, which would be mainly beneficial to assess the entrepreneurial traits of the management graduating students.

3.1. Life philosophy and entrepreneurial traits

The entrepreneurial trait of "Life Philosophy" plays a pivotal role in shaping individuals' aspirations in their personal and professional arenas. Described by fourteen items, this trait focused on details of individuals' outlooks, aspirations, and strategies for exploring the multiplexity of life and achieving their objectives. These items covered various vital components such as attitudes towards investment, dedication to hard work, autonomy in decision-making, the quest for recognition, resilience, belief in healthy competition, and managing stress for entrepreneurial aspiration.

Contrary to the perspective of a wide range of arguments that external forces predominantly shape personal decision-making [61], this study's findings align with the emphasis that the intense effect of an individual's life philosophy is a fundamental entrepreneurial trait. This emphasis extends particularly to psychological characteristics and the pursuit of personal goals [62]. Prior studies consistently highlight the relationships between an individual's life philosophy and entrepreneurial decisions, emphasizing the significance of decision-making power and its implications on overall life satisfaction [63].

However, contrasting opinions posit that entrepreneurial decisions are steered by situational factors in many cases [64]. Nonetheless, this study's findings align with the other study findings that many entrepreneurs feel fulfillment from the autonomy provided by their entrepreneurship [65] despite the attraction of stability offered by conventional employment. Moreover, this study's findings highlight that the personal quest for fame and recognition is linked with an individual's life philosophy [66]. The satisfaction gained from the name and fame contributes to societal value [67]. Life philosophy connects closely with adopting a self-directed boss mindset, which fosters innovation and enables individuals to leverage their ideas for success.

Though some may opt for alternative career paths such as ease of regular job and lower level of risk as their life philosophy [68], the self-directed approach typically resonates with enhanced life satisfaction and the epitome of entrepreneurial traits [69]. On the other hand, it is essential to acknowledge the limitations of the practical implementation of innovative ideas, as evidenced by the notable rate of startup failures [70]. Nevertheless, individuals' alignment with a self-directed boss tends to fulfill their ambitious goals and tend toward greater satisfaction from their entrepreneurial journey [63].

In conclusion, as a significant finding in this study, the entrepreneurial trait of life philosophy emerges as a crucial thematic domain within entrepreneurial aspirations. It influences various aspects of entrepreneurial behavior and success, serving as a guiding framework that shapes individuals' perceptions, decisions, and actions. Ultimately, it significantly contributes to their entrepreneurial endeavors and overall satisfaction.

3.2. Creating and utilizing mindset and entrepreneurial traits

Fifteen items were employed to explain the "Creating and Utilizing Mindset" entrepreneurial characteristic. Key components within this thematic domain encompassed the utilization of familial assets, the facilitation of job creation and employment opportunities for others, and the enhancement of accessibility to services and providers. Despite prevailing research indicating that familial legacy does not typically foster entrepreneurship [71], this study's findings, particularly pertinent to the Nepali context, found the significant influence of family legacy and cultural background on entrepreneurial aspirations [72]. Notably, the emphasis was on the role of family support in this regard. This trait also involved skillfully managing challenging situations, diverging from conventional approaches, and adapting products and services to meet market demand.

Conversely, while profit is conventionally regarded as the primary driver of entrepreneurial orientation [73], this study highlights the philanthropic mindset and support for others, which are prevalent traits within the Nepali context. A central focus within this theme was optimizing time and resources to maximize profit—an integral aspect of entrepreneurial endeavors, combined with consideration for social development beyond mere personal gain, reflecting Nepal's distinctiveness [74].

Moreover, the study highlighted the imperative of effectively leveraging available resources as a critical concern in entrepreneurship. Scholars have explained the creation and utilization of mindset, emphasizing the significance of perceiving situations through a different lens [59], a pivotal attribute in entrepreneurship. Nevertheless, contrasting viewpoints prioritize innovation more than utilizing available resources within the entrepreneurial discourse [75], thus emphasizing mere creation rather than utilization. Additionally, alongside creation, the emphasis on a utilization mindset and the continuation of existing trades are recognized as integral facets of entrepreneurship [76], particularly in contexts where familial legacy holds influence, as observed in larger corporate entities in Nepal [77].

Hence, the study findings reinforce the assertion that entrepreneurs can identify potential solutions and implement them to enhance their entrepreneurial endeavors [78]. These findings align with the findings that resource utilization is a noteworthy characteristic of entrepreneurs, representing the maximization of available resources in diverse ways for entrepreneurial success [11]. Despite studies in varying contexts that have predominantly focused on ideation rather than financial resources [79], the study's findings resonate with the Nepali context, where financial resources have emerged as pivotal contributors to the initiation and sustenance of entrepreneurial ventures [80].

Numerous innovative ideas fail to materialize into ventures due to insufficient financial resources. Thus, the findings echo the Nepali context, where parental properties are regarded as significant assets and collateral for financial institutions to finance entrepreneurship [81], which might not be the default properties for second-generation individuals in many instances. Thus, utilizing these resources within the Nepali context holds unique significance for entrepreneurial traits.

Consequently, the availability of resources and the ability to conceive innovative ways to leverage them significantly contribute to the inception of startups [82]. The confidence derived from existing parental properties and assets drives innovation in the Nepali context. It plays a significant role in enhancing the mindset of creating and utilizing to foster innovation and entrepreneurship [83]. Innovation, far from being spontaneous, demands rigorous planning and sustained effort, consistently generating positive outcomes for entrepreneurship [84].

Hence, cultivating and utilizing a mindset toward innovation represents pivotal traits within entrepreneurship. Continuous development and the positive impact of innovation are essential components, necessitating an exploration of alternative methods to maximize yields from available resources from a multifaceted perspective.

3.3. Supportive and motivating environment and entrepreneurial traits

In the Nepali context, the structure and system support for entrepreneurial aspirations are crucial components that significantly influence the entrepreneurial landscape. Ten items were employed to explain entrepreneurial traits within the "Supportive and Motivating Environment" theme, primarily focusing on systemic support. Supportive structures and systems, encompassing elements such as family support, national policies, economic frameworks, and financial assistance, were the significant attributes covered under this thematic area, which are highly important for entrepreneurial development in Nepal [80]. Family support emerges as a substantial factor contributing to the inclination towards entrepreneurship despite the limited prevalence of second-generation family entrepreneurship [61]. Familial encouragement plays a pivotal role in shaping entrepreneurial aspirations [85], providing individuals with the necessary confidence, resources, and emotional backing to embark on entrepreneurial ventures.

Moreover, traits like rational decision-making, risk assessment, and a commitment to success are highlighted as fundamental in entrepreneurial pursuits [86]. While personal attributes play a role in shaping entrepreneurial mindsets, the study emphasizes the substantial influence of external support in cultivating these traits [87]. External factors, including family support and societal encouragement, actively contribute to molding individuals into successful entrepreneurs, underscoring the importance of a supportive environment.

In entrepreneurial discourse, the external environment emerges as a critical determinant of entrepreneurial engagement [88]. National policies favoring entrepreneurship are recognized as catalysts for stimulating startup initiatives and fostering economic development [89]. However, effective implementation of these policies is more crucial than their mere formulation, especially in Nepal, where gaps between policy formulation and execution persist [90]. While some argue for the importance of personal will and risk-taking in driving entrepreneurship, the study suggests that external support systems often influence these personal attributes [88]. This infers an interconnected relationship between individual motivations and external factors in entrepreneurial decision-making.

Moreover, institutional support, such as financial institutions, is indispensable for creating a conducive entrepreneurial environment [91]. The availability of resources, access to markets, regulatory frameworks, and alignment with personal missions are critical elements influenced by the external environment [92]. Stable policies and practices are emphasized as essential for fostering entrepreneurship, highlighting the significance of a supportive external environment [89].

In conclusion, the study findings highlight the importance of the external environment and support in fostering entrepreneurial aspirations in Nepal. While personal attributes and motivations are influential, external factors such as family support, national policies, and institutional frameworks shape entrepreneurial traits and enhance motivation [88]. This emphasizes the necessity of creating conducive conditions and robust support systems to nurture entrepreneurship and drive economic growth in Nepal.

4. Conclusion and implications

The study has constructed a tool to assess the entrepreneurial traits of management graduating students, outlining three key domains: Life Philosophy, Creating and Utilizing Mindset, and Supportive and Motivating Environment, comprising 38 items using the modified Delphi method. These domains unveiled the connections between personal philosophies, resource utilization, and external influences on entrepreneurial traits. Employing qualitative and quantitative, the study used extensive literature reviews, expert opinions, and Delphi surveys to develop a scale for measuring entrepreneurial traits. Consensus plays a vital role in creating a new scale and is a significant characteristic within the Delphi process. The Modified Delphi method offers ample opportunities for scale development, particularly in digging out localized ideas and construction. The Delphi method enhances agreement among experts and is instrumental in eliminating redundant and irrelevant by ensuring content validity for each item and the scale. The study identified key factors supporting entrepreneurship imagination, such as education, motivation, and market availability. Aligned with Ajzen's theory of planned behavior, these domains summarize essential aspects of attitude, social norms, and behavior control. The entrepreneurial traits of graduating students are tied to their life philosophies and approaches to shaping their futures. The study's findings significantly contribute to understanding the dynamics shaping entrepreneurial attitudes, behaviors, and the intricate interaction between individual beliefs, societal expectations, and external support systems. The study's implications are given below.

4.1. Theoretical implications

This study makes a significant contribution by advancing the development of a scale designed to assess the entrepreneurial traits of graduating management students. The findings of this study play a crucial role in addressing existing knowledge gaps within the local context and specific circumstances. Notably, the results provide substantial support for Ajzen's theory of planned behavior, wherein entrepreneurial traits are shown to be closely tied to personal willingness and structural support. Integrating Ajzen's Theory of Planned Behavior with a focus on entrepreneurial traits among Nepali graduating students offers significant theoretical insights into the dynamics of entrepreneurship within this context. The study deepens understanding of the psychological mechanisms driving entrepreneurial intentions and behaviors by digging out the roles of attitudes, subjective norms, and perceived behavioral control.

Identifying three thematic areas—life philosophy, creating and utilizing mindset, and supportive external environment—provides a structured framework for comprehensively examining the multifaceted nature of entrepreneurial traits among Nepali students, shaping the personal willingness for entrepreneurship. Thus, personal willingness is shaped by one's perception of life, an innovative and creative mindset, and the utilization of external and internal environmental factors. Such insights are particularly crucial in entrepreneurship, given its heightened significance for the social and economic development of countries like Nepal.

Using the Modified Delphi study method, this study has developed and thoroughly tested the scale's validity. This makes the scale useful for academic studies and real-world applications, including business and industry. Additionally, the research explored how contextual and cultural factors influence people's attitudes and actions toward entrepreneurship. This emphasizes the importance of considering specific local and cultural contexts when studying entrepreneurship and designing interventions to support it.

4.2. Practical implications

The practical implications of this study extend to various stakeholders, offering valuable insights for educational institutions, policymakers, and businesses. One's academic journey is almost completed after the graduate study (MBS and MBA). Subsequently, individuals transition into the workforce after a few months or a year. This workforce's assessment of entrepreneurial traits is instrumental, and such measurements serve as valuable tools for comprehending students' inclinations toward entrepreneurship. Notably, universities can play a pivotal role in influencing graduating students towards entrepreneurial pursuits, thereby contributing to the advancement of this sector. Recognizing education as a critical intervention, universities hold the potential to mold students for entrepreneurial careers [93,94] regardless of their gender [95] and other socio-demographic attributes. Understanding the entrepreneurial traits of graduating students can support curriculum development and teaching-learning strategies in universities and colleges. Integrating elements that foster entrepreneurial mindsets and support enabling environments, such as internships, learning experiences, and mentor-mentee programs, can equip students for entrepreneurial pursuits emphasizing innovation and entrepreneurial behavior. Moreover, career counseling services can support students interested in entrepreneurship, providing them with guidance to explore the entrepreneurial landscape effectively.

The insights gained from such assessments can benefit providers of short-term training programs. Equipped with a deep understanding of the entrepreneurial traits exhibited by individuals, these providers can design and implement targeted interventions. These interventions, though short-term, can effectively enhance entrepreneurial activities. This tool is also helpful for entrepreneurs to understand their traits and can demand interventions from the university or the training agencies. As entrepreneurs may not prefer regular courses, simulation-based teaching would be precious for them [96].

Policymakers can use the insights regarding curriculum, short-term training, and mentorship to develop policies that encourage Nepal's people to start their own ventures. They can make policies to support aspiring entrepreneurs by offering financial benefits to startups, infrastructural support that helps entrepreneurial activities, and improving education to impart people the skills they need to be entrepreneurs. These policies can help boost the economy, create jobs, and encourage innovations.

Businesses and industries can also benefit from understanding what makes someone entrepreneurial when hiring new employees. If they can find creative people willing to take risks and good at solving problems, they can use those skills to progress their companies further. This measurement scale can serve to assess the persons while hiring. Additionally, businesses and industry can work with

universities and policymakers to support programs that help aspirants learn how to start businesses and engage in entrepreneurial activities. This collaboration could include mentorship programs, internships, and opportunities for funding for aspirant entrepreneurs. Overall, this study's findings suggest that it is crucial to recognize entrepreneurial traits among the ready-to-go workforce, particularly university-graduating students, that would ultimately help the county grow economically and socially.

4.3. Limitations and ideas for future research

After conducting a thorough literature review, primary online available, the study employed a modified Delphi method. Unable to access the print articles was one of the study's limitations, potentially missing the local background and context. Surveys were administered online to maintain the anonymity of Delphi participants, although it is acknowledged that conducting face-to-face sessions could offer additional opportunities. While exploring the constructs and scale with a larger sample would provide more valuable insights, it is essential to note the limitation in the study's sample size. Expanding the sample size and diversifying the participant pool could improve the study's external validity.

While the focus was on Nepali students, further research is needed to investigate cross-cultural variations in entrepreneurial traits and the applicability of the developed scale in diverse cultural contexts. Longitudinal studies could offer insights into how entrepreneurial traits evolve and their impact on actual entrepreneurial behavior post-graduation. Additionally, while qualitative followed by quantitative methods were employed for measurement in this study, future research could complement these findings with post-qualitative approaches to gain deeper insights into students' perceptions and aspirations related to entrepreneurship.

This investigation utilized Ajzen's theory of planned behavior as a framework. Still, there is room for further refinement by integrating alternative entrepreneurship theories such as opportunity-based theory [97] and the need for achievement theory [98]. The study explored essential thematic areas and formulated a scale comprising items derived from literature synthesis, expert consultations, and Delphi surveys. However, it is crucial to note that measuring the strength of each theme and item was beyond the scope of this Delphi study, presenting a limitation.

Further refinement and scale validation can enhance the capture of entrepreneurial traits more accurately. Forthcoming research could also investigate the effectiveness of interventions such as university curriculum or short-term courses and the policy supports in fostering entrepreneurial traits among Nepali students and promoting entrepreneurial behavior.

Addressing these limitations can enrich the understanding of entrepreneurial traits among graduating students. Similarly, exploring future research avenues can enhance knowledge of entrepreneurial traits within the Nepali context and inform the development of effective strategies for promoting entrepreneurship and fostering economic growth. It is recommended that future researchers conduct a comprehensive examination of the robustness inherent in each theme and item to facilitate the development of a more refined scale with enhanced efficacy in discerning the entrepreneurial traits of graduating students.

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CRediT authorship contribution statement

Sagar Mani Neupane: Writing – original draft, Validation, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Prakash C. Bhattarai:** Writing – review & editing, Supervision, Methodology, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Annex 1 Descriptive statistics and item retention decision: Round one Delphi

Number	Item	Descriptive values	Retention
1	lp1	SD = 1.2, Agreement = 73%, Inter-quartile Range = 0	Yes

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Number	Item	Descriptive values	Retention
2	lp2	SD = 0.9, Agreement = 74%, Inter-quartile Range = 0	Yes
3	lp3	SD = 1.2, Agreement = 68%, Inter-quartile Range = 0	No
4	lp4	SD = 1.1, Agreement = 78%, Inter-quartile Range = 0	Yes
5	lp5	SD = 1.2, Agreement = 72%, Inter-quartile Range = 0	Yes
6	lp6	SD = 1, Agreement = 77%, Inter-quartile Range = 0	Yes
7	lp7	SD = 1.3, Agreement = 73%, Inter-quartile Range = 0.8	Yes
8	lp8	SD = 1.1, Agreement = 81%, Inter-quartile Range = 1	Yes
9	lp9	SD = 1.1, Agreement = 77%, Inter-quartile Range = 1	Yes
10	lp10	SD = 1.2, Agreement = 74%, Inter-quartile Range = 0.8	Yes
11	lp11	SD = 1.2, Agreement = 61%, Inter-quartile Range = 2	No
12	lp12	SD = 1.2, Agreement = 72%, Inter-quartile Range = 2	No
13	lp13	SD = 1, Agreement = 79%, Inter-quartile Range = 1	Yes
14	lp14	SD = 1.4, Agreement = 71%, Inter-quartile Range = 2.3	No
15	lp15	SD = 1.3, Agreement = 73%, Inter-quartile Range = 0.8	Yes
16	lp16	SD = 0.9, Agreement = 83%, Inter-quartile Range = 1	Yes
17	lp17	SD = 1.2, Agreement = 78%, Inter-quartile Range = 1	Yes
18	lp18	SD = 1.2, Agreement = 79%, Inter-quartile Range = 1	Yes
19	lp19	SD = 1.1, Agreement = 67%, Inter-quartile Range = 2	No
20	lp20	SD = 0.9, Agreement = 83%, Inter-quartile Range = 1	Yes
21	lp21	SD = 1.2, Agreement = 70%, Inter-quartile Range = 2	No
22	lp22	SD = 1.2, Agreement = 68%, Inter-quartile Range = 2	No
23	lp23	SD = 1.2, Agreement = 69%, Inter-quartile Range = 2	No
24	lp24	SD = 0.7, Agreement = 81%, Inter-quartile Range = 0	Yes
25	cu1	SD = 1.3, Agreement = 75%, Inter-quartile Range = 1	Yes
26	cu2	SD = 1.2, Agreement = 76%, Inter-quartile Range = 1	Yes
27	cu3	SD = 1.1, Agreement = 77%, Inter-quartile Range = 0.3	Yes
28	cu4	SD = 0.4, Agreement = 84%, Inter-quartile Range = 0	Yes
29	cu5	SD = 0.9, Agreement = 85%, Inter-quartile Range = 1	Yes
30	cu6	SD = 1.1, Agreement = 76%, Inter-quartile Range = 0	Yes
31	cu7	SD = 1.2, Agreement = 69%, Inter-quartile Range = 0.5	No
32	cu8	SD = 1.2, Agreement = 69%, Inter-quartile Range = 0.5	No
33	cu9	SD = 1.3, Agreement = 71%, Inter-quartile Range = 0.5	Yes
34	cu10	SD = 1.3, Agreement = 77%, Inter-quartile Range = 1	Yes
35	cu11	SD = 0.9, Agreement = 80%, Inter-quartile Range = 1	Yes
36	cu12	SD = 0.6, Agreement = 85%, Inter-quartile Range = 1	Yes
37	cu13	SD = 1.5, Agreement = 58%, Inter-quartile Range = 2.2	No
38	cu14	SD = 1.2, Agreement = 69%, Inter-quartile Range = 0.5	No
39	cu15	SD = 1.3, Agreement = 72%, Inter-quartile Range = 0.5	Yes
40	cu16	SD = 1.3, Agreement = 71%, Inter-quartile Range = 0.5	Yes
41	cu17	SD = 1.4, Agreement = 61%, Inter-quartile Range = 2	No
42	cu18	SD = 1.1, Agreement = 77%, Inter-quartile Range = 0.3	Yes
43	cu19	SD = 1.2, Agreement = 78%, Inter-quartile Range = 1	Yes
44	cu20	SD = 1.1, Agreement = 76%, Inter-quartile Range = 0	Yes
45	env1	SD = 1.1, Agreement = 77%, Inter-quartile Range = 0.3	Yes
46	env2	SD = 1.5, Agreement = 67%, Inter-quartile Range = 3	No
47	env3	SD = 1.5, Agreement = 58%, Inter-quartile Range = 2.2	No
48	env4	SD = 1.1, Agreement = 77%, Inter-quartile Range = 0.3	Yes
49	env5	SD = 1.2, Agreement = 78%, Inter-quartile Range = 1	Yes
50	env6	SD = 1.1, Agreement = 77%, Inter-quartile Range = 1	Yes
51	env7	SD = 1.5, Agreement = 67%, Inter-quartile Range = 3	No
52	env8	SD = 1.1, Agreement = 77%, Inter-quartile Range = 1	Yes
53	env9	SD = 1, Agreement = 69%, Inter-quartile Range = 0.5	No
54	env10	SD = 1.5, Agreement = 67%, Inter-quartile Range = 2.3	No
55	env11	SD = 1.2, Agreement = 75%, Inter-quartile Range = 0.3	Yes
56	env12	SD = 1.5, Agreement = 64%, Inter-quartile Range = 2.3	No
57	env13	SD = 1.3, Agreement = 73%, Inter-quartile Range = 0.8	Yes
58	env14	SD = 1.5, Agreement = 67%, Inter-quartile Range = 3	No
59	env15	SD = 0.8, Agreement = 85%, Inter-quartile Range = 1	Yes
60	env16	SD = 1.1, Agreement = 76%, Inter-quartile Range = 0	Yes
61	env17	SD = 1.5, Agreement = 63%, Inter-quartile Range = 2	No
62	env18	SD = 1.2, Agreement = 73%, Inter-quartile Range = 0	Yes
63	env19	SD = 1.1, Agreement = 71%, Inter-quartile Range = 0.5	Yes
64	env20	SD = 1, Agreement = 73%, Inter-quartile Range = 0	Yes
65	env21	SD = 1, Agreement = 74%, Inter-quartile Range = 0	Yes
66	env22	SD = 1.1, Agreement = 71%, Inter-quartile Range = 0	Yes
67	env23	SD = 1.2, Agreement = 72%, Inter-quartile Range = 2	No
68	env24	SD = 1, Agreement = 73%, Inter-quartile Range = 0	Yes
69	env25	SD = 1.4, Agreement = 63%, Inter-quartile Range = 2	No
70	env26	SD = 1.1, Agreement = 77%, Inter-quartile Range = 0.3	Yes
71	env27	SD = 1, Agreement = 74%, Inter-quartile Range = 0	Yes

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Number	Item	Descriptive values	Retention
72	env28	SD = 0.7, Agreement = 87%, Inter-quartile Range = 1	Yes
73	env29	SD = 1.1, Agreement = 76%, Inter-quartile Range = 0	Yes
74	env30	SD = 1.4, Agreement = 66%, Inter-quartile Range = 2	No

Annex 2 Content validity index analysis (Delphi-1)

Item	I-CVI	Item	I-CVI	Item	I-CVI	Item	I-CVI	Item	I-CVI
lp1	0.83	lp17	0.83	cu9	0.77	env5	0.83	env21	0.83
lp2	0.9	lp18	0.87	cu10	0.83	env6	0.8	env22	0.8
lp3	0.8	lp19	0.73	cu11	0.87	env7	0.63	env23	0.73
lp4	0.9	lp20	0.93	cu12	0.97	env8	0.83	env24	0.83
lp5	0.83	lp21	0.73	cu13	0.97	env9	0.77	env25	0.57
lp6	0.9	lp22	0.67	cu14	0.77	env10	0.63	env26	0.83
lp7	0.77	lp23	0.73	cu15	0.77	env11	0.8	env27	0.83
lp8	0.9	lp24	0.97	cu16	0.77	env12	0.57	env28	0.97
lp9	0.8	cu1	0.8	cu17	0.57	env13	0.77	env29	0.83
lp10	0.77	cu2	0.8	cu18	0.83	env14	0.63	env30	0.67
lp11	0.57	cu3	0.87	cu19	0.83	env15	0.93		
lp12	0.73	cu4	1	cu20	0.83	env16	0.83		
lp13	0.83	cu5	0.93	env1	0.83	env17	0.57		
lp14	0.73	cu6	0.83	env2	0.63	env18	0.8		
lp15	0.77	cu7	0.77	env3	0.5	env19	0.77		
lp16	0.9	cu8	0.77	env4	0.83	env20	0.83		

S-CVI/Ave = 0.79; S-CVI/UA = 0.013.

Annex 3. Descriptive statistics of round two Delphi

Number	Item	Descriptive Values	Retention
1	lp1	SD = 0, Agreement = 100%, Interquartile Range = 0	Yes
2	lp2	SD = 1.14, Agreement = 90%, Interquartile Range = 0	Yes
3	lp4	SD = 0, Agreement = 100%, Interquartile Range = 0	Yes
4	lp5	SD = 0.51, Agreement = 77%, Interquartile Range = 0	Yes
5	lp6	SD = 0.76, Agreement = 96%, Interquartile Range = 0	Yes
6	lp7	SD = 1.14, Agreement = 90%, Interquartile Range = 0	Yes
7	lp8	SD = 1.2, Agreement = 69%, Interquartile Range = 2	No
8	lp9	SD = 0, Agreement = 100%, Interquartile Range = 0	Yes
9	lp10	SD = 1.07, Agreement = 91%, Interquartile Range = 0	Yes
10	lp13	SD = 0.81, Agreement = 72%, Interquartile Range = 0	Yes
11	lp15	SD = 1.22, Agreement = 88%, Interquartile Range = 0	Yes
12	lp16	SD = 1.27, Agreement = 64%, Interquartile Range = 2	No
13	lp17	SD = 0, Agreement = 100%, Interquartile Range = 0	Yes
14	lp18	SD = 1.38, Agreement = 68%, Interquartile Range = 3	No
15	lp20	SD = 0.69, Agreement = 75%, Interquartile Range = 0	Yes
16	lp24	SD = 0, Agreement = 100%, Interquartile Range = 0	Yes
17	cu1	SD = 1.04, Agreement = 92%, Interquartile Range = 0	Yes
18	cu2	SD = 0.69, Agreement = 75%, Interquartile Range = 0	Yes
19	cu3	SD = 1.04, Agreement = 92%, Interquartile Range = 0	Yes
20	cu4	SD = 0, Agreement = 100%, Interquartile Range = 0	Yes
21	cu5	SD = 0.61, Agreement = 76%, Interquartile Range = 0	Yes
22	cu6	SD = 0, Agreement = 100%, Interquartile Range = 0	Yes
23	cu9	SD = 0, Agreement = 100%, Interquartile Range = 0	Yes
24	cu10	SD = 0, Agreement = 100%, Interquartile Range = 0	Yes
25	cu11	SD = 1.14, Agreement = 90%, Interquartile Range = 0	Yes
26	cu12	SD = 0.92, Agreement = 94%, Interquartile Range = 0	Yes
27	cu15	SD = 1.07, Agreement = 92%, Interquartile Range = 0	Yes
28	cu16	SD = 0, Agreement = 100%, Interquartile Range = 0	Yes
29	cu18	SD = 1.38, Agreement = 89%, Interquartile Range = 0	Yes
30	cu19	SD = 1.14, Agreement = 70%, Interquartile Range = 0	Yes
31	cu20	SD = 1.04, Agreement = 72%, Interquartile Range = 0	Yes
32	env1	SD = 1.32, Agreement = 67%, Interquartile Range = 2.25	No
33	env4	SD = 0, Agreement = 80%, Interquartile Range = 0	Yes
34	env5	SD = 1.33, Agreement = 63%, Interquartile Range = 2	No
35	env6	SD = 0, Agreement = 100%, Interquartile Range = 0	Yes

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Number	Item	Descriptive Values	Retention
36	env8	SD = 1.17, Agreement = 91%, Interquartile Range = 0	Yes
37	env11	SD = 0.35, Agreement = 97%, Interquartile Range = 0	Yes
38	env13	SD = 0.63, Agreement = 90%, Interquartile Range = 1	Yes
39	env15	SD = 1.22, Agreement = 68%, Interquartile Range = 3	No
40	env16	SD = 1.4, Agreement = 88%, Interquartile Range = 0	Yes
41	env18	SD = 1.37, Agreement = 64%, Interquartile Range = 3	No
42	env19	SD = 0, Agreement = 100%, Interquartile Range = 0	Yes
43	env20	SD = 1.22, Agreement = 92%, Interquartile Range = 0	Yes
44	env21	SD = 1.26, Agreement = 65%, Interquartile Range = 2	No
45	env22	SD = 1.03, Agreement = 67%, Interquartile Range = 1.25	No
46	env24	SD = 1.01, Agreement = 95%, Interquartile Range = 0	Yes
47	env26	SD = 1.2, Agreement = 69%, Interquartile Range = 2.25	No
48	env27	SD = 1.28, Agreement = 65%, Interquartile Range = 2.25	No
49	env28	SD = 1.04, Agreement = 92%, Interquartile Range = 0	Yes
50	env29	SD = 1.43, Agreement = 65%, Interquartile Range = 3	No

Annex 4. Content validity index analysis (Delphi-II)

Item	I-CVI	Item	I-CVI	Item	I-CVI	Item	I-CVI	Item	I-CVI
lp1	1.0	lp15	0.8	cu5	0.9	cu20	0.9	env18	0.4
lp2	0.8	lp16	0.5	cu6	1.0	env1	0.5	env19	1.0
lp4	1.0	lp17	1.0	cu9	1.0	env4	1.0	env20	0.9
lp5	0.9	lp18	0.5	cu10	1.0	env5	0.4	env21	0.5
lp6	0.9	lp20	0.9	cu11	0.8	env6	1.0	env22	0.4
lp7	0.8	lp24	1.0	cu12	0.9	env8	0.9	env24	0.9
lp8	0.4	cu1	0.9	cu15	0.9	env11	1.0	env26	0.5
lp9	1.0	cu2	0.9	cu16	1.0	env13	0.9	env27	0.4
lp10	0.8	cu3	0.9	cu18	0.9	env15	0.4	env28	0.9
lp13	0.8	cu4	1.0	cu19	0.8	env16	0.8	env29	0.4

S-CVI/Ave = 0.81; S-CVI/UA = 0.28.

Annex 5. Descriptive statistics of the final items

Number	Item	Descriptive values
1	lp1	SD = 0, Agreement = 100%, Interquartile Range = 0
2	lp2	SD = 1.14, Agreement = 90%, Interquartile Range = 0
3	lp3	SD = 0, Agreement = 100%, Interquartile Range = 0
4	lp4	SD = 0.51, Agreement = 97%, Interquartile Range = 0
5	lp6	SD = 0.76, Agreement = 96%, Interquartile Range = 0
6	lp7	SD = 1.14, Agreement = 90%, Interquartile Range = 0
7	lp9	SD = 0, Agreement = 100%, Interquartile Range = 0
8	lp10	SD = 1.07, Agreement = 91%, Interquartile Range = 0
9	lp11	SD = 0.81, Agreement = 90%, Interquartile Range = 0
10	lp12	SD = 1.22, Agreement = 88%, Interquartile Range = 0
11	lp17	SD = 0, Agreement = 100%, Interquartile Range = 0
12	lp22	SD = 0.69, Agreement = 93%, Interquartile Range = 0
13	lp23	SD = 0, Agreement = 100%, Interquartile Range = 0
14	cu1	SD = 1.04, Agreement = 92%, Interquartile Range = 0
15	cu2	SD = 0.69, Agreement = 93%, Interquartile Range = 0
16	cu4	SD = 1.04, Agreement = 92%, Interquartile Range = 0
17	cu6	SD = 0, Agreement = 100%, Interquartile Range = 0
18	cu7	SD = 0.61, Agreement = 95%, Interquartile Range = 0
19	cu8	SD = 0, Agreement = 100%, Interquartile Range = 0
20	cu9	SD = 0, Agreement = 100%, Interquartile Range = 0
21	cu11	SD = 0, Agreement = 100%, Interquartile Range = 0
22	cu12	SD = 1.14, Agreement = 90%, Interquartile Range = 0
23	cu13	SD = 0.92, Agreement = 94%, Interquartile Range = 0
24	cu15	SD = 1.07, Agreement = 92%, Interquartile Range = 0
25	cu17	SD = 0, Agreement = 100%, Interquartile Range = 0
26	cu18	SD = 1.38, Agreement = 89%, Interquartile Range = 0
27	cu19	SD = 1.14, Agreement = 88%, Interquartile Range = 0
28	cu20	SD = 1.04, Agreement = 90%, Interquartile Range = 0
29	en4	SD = 0, Agreement = 100%, Interquartile Range = 0

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Number	Item	Descriptive values
30	en6	SD = 0, Agreement = 100%, Interquartile Range = 0
31	en7	SD = 1.17, Agreement = 91%, Interquartile Range = 0
32	en8	SD = 0.35, Agreement = 97%, Interquartile Range = 0
33	en12	SD = 0.63, Agreement = 90%, Interquartile Range = 1
34	en16	SD = 1.38, Agreement = 89%, Interquartile Range = 0
35	en19	SD = 0, Agreement = 100%, Interquartile Range = 0
36	en20	SD = 1.22, Agreement = 92%, Interquartile Range = 0
37	en24	SD = 1.01, Agreement = 95%, Interquartile Range = 0
38	env28	SD = 1.04, Agreement = 92%, Interquartile Range = 0

Annex 6. Content validity index analysis (final items and scale)

Item	I-CVI	Item	I-CVI	Item	I-CVI	Item	I-CVI	Item	I-CVI
lp1	1.0	lp13	0.8	cu4	1.0	cu16	1.0	en13	0.93
lp2	0.8	lp15	0.8	cu5	0.9	cu18	0.9	en16	0.87
lp4	1.0	lp17	1.0	cu6	1.0	cu19	0.8	en19	1.00
lp5	0.9	lp20	0.9	cu9	1.0	cu20	0.9	en20	0.90
lp6	0.9	lp24	1.0	cu10	1.0	en4	1.0	en24	0.93
lp7	0.8	cu1	0.9	cu11	0.8	en6	1.0	env28	0.93
lp9	1.0	cu2	0.9	cu12	0.9	en8	0.9		
lp10	0.8	cu3	0.9	cu15	0.9	en11	1.0		

S-CVI/Ave = 0.92; S-CVI/UA = 0.4.

Annex 7. Final items and scale

Thematic area	Items
Life Philosophy	<p>lp1- Tomorrow's return is based on today's investment.</p> <p>lp2- Personal achievement is related to financial investment.</p> <p>lp3- Personal achievement is related to time investment.</p> <p>lp4- The hard work that I do today determines my future.</p> <p>lp6- I want to make my own decision.</p> <p>lp7- I want to gain fame with my work.</p> <p>lp9- I am resilient enough to redo the same work even if I bear the loss in my business.</p> <p>lp10- I am resilient enough to redo the same work even if my experienced workers leave me.</p> <p>lp11- I enjoy competition.</p> <p>lp12- Competition drives me forward.</p> <p>lp17- Competition makes me more mature.</p> <p>lp22- I can manage my stress easily.</p> <p>lp23- Stress also creates opportunities.</p>
Creating and Utilizing Mindset	<p>cu1- I can utilize the existing parental property to generate more income.</p> <p>cu2- I can use the parental property differently than what is being used now.</p> <p>cu4- I want to support my country's development process by creating jobs.</p> <p>cu6- If I create employment, my respect will increase.</p> <p>cu7- I want to make my services or products accessible to more people.</p> <p>cu8- I want to make my services or products easily accessible to many people.</p> <p>cu9- I can easily handle difficult situations.</p> <p>cu11- My thinking is different from others.</p> <p>cu12- I can do things differently than others.</p> <p>cu13- The revisions on the services or products are always forward-looking.</p> <p>cu15- Tomorrow may not have the same working environment as now.</p> <p>cu17- These days are the most important times to invest and work.</p> <p>cu18- I know what makes a profit or a loss.</p> <p>cu19- I know the sustainable and long-term influential sectors for investment.</p> <p>cu20- Mostly, I think about ways to earn more profit.</p>
Supportive and motivating environment	<p>en4- My family supports me in my business.</p> <p>en6- The country's economic policies are in favor of businesspeople.</p> <p>en7- Financial institutions in my country easily support me in doing entrepreneurial work.</p> <p>en8- Even if there is a loss, I can easily get additional financial support from financial institutions.</p> <p>en12- My country's current policies and regulations are supportive of entrepreneurs.</p> <p>en16- I want to introduce myself as someone heading toward success.</p> <p>en19- I work for success by using my abilities and skills.</p> <p>en20- Mostly, I make decisions irrespective of my emotions.</p> <p>en24- Before I do something, I keep informed related to it.</p> <p>env28- I do not hesitate to compromise if it benefits me.</p>

Annex 8. Summary of the scale development process

Process	Description
Prototype tool development	1. Literature Review and Gap Identification 2. Expert Selection (N = 5) 3. Online expert consultation (round 1) to identify the theme 4. Coding, thematizing, and analysis of data to generate the themes (three broader themes were developed) and member checked for confirmation 5. Online expert consultations (round 2) to identify the sub-themes and items 6. Coding, thematizing, and analysis to generate the items 7. Use a five-point rating scale and develop the prototype tool
Expert selection for the Delphi survey	8. Identification of experts and asked for volunteer participation (N = 35) (Graduate students: 15, Entrepreneurs: 10, University lecturers: 5, Researchers/Trainers: 5)
Modified Delphi Round 1	9. Delphi round 1: Developed online Survey (with 74 items) and sent to 35 experts (provided two weeks to respond) 10. Followed up by email and telephone 11. Data collected, analyzed, and items reduced to 50 (data received from 30 experts)
Modified Delphi Round 2	12. Second round of Delphi: Developed online Survey (with 50 items) and sent to 30 experts who responded in round one (provided two weeks to respond) 13. Followed up by email and telephone 14. Data collected, analyzed, and items reduced to 38 (data received from all 30 respondents during the second round)
Finalization of tools and Scale	15. The final tool is developed by ensuring the Level of consensus and content validity

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2024.e28410>.

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