

Entrepreneurial Competence in Higher Education Faculty: Crafting and Validating a Survey Instrument

Ms. Hina Gul

Ph.D Scholar, Faculty of Education, Fatima Jinnah Women University, Rawalpindi.

Email: hina.gul@fjwu.edu.pk

Dr. Ishrat Siddiqua Lodhi

Associate Professor, Faculty of Education, Fatima Jinnah Women University, Rawalpindi.

Email: ishratsiddiqua@fjwu.edu.pk

Dr. Salma Nazar Khan

Assistant Professor (Adjunct), Faculty of Education, Fatima Jinnah Women University, Rawalpindi.

Email: snkhan@fjwu.edu.pk

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Abstract

The entrepreneurial competencies of Higher Education faculty members are significantly important to fostering innovation, creativity, and entrepreneurial thinking within academic institutions. This study aimed to develop and validate a survey questionnaire designed to assess the entrepreneurial competencies of faculty members at Higher Education Institutions (HEIs), focusing on fostering creativity and innovation in the teaching-learning process. Guided by the Entre Comp framework, the survey explores competencies across three major dimensions—Ideas and Opportunities, Resources, and Into Action—encompassing 15 sub-competencies. A five-point Likert scale was employed to measure these competencies among 385 faculty members from public sector institutions in Rawalpindi/Islamabad. The content validity of the survey was ensured through consultation with 15 specialists across various disciplines and the use of the Item-level Content Validity Index (I-CVI) for systematic refinement. Construct validity was established through Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), with results indicating a strong factorial structure and model fit (KMO = 0.866; CMIN/DF = 1.520; CFI = 0.912; RMSEA = 0.037). The validated tool offers a comprehensive measure of entrepreneurial competencies, enabling targeted professional development for HEI faculty. While the study provides a robust foundation, future research should aim to generalize findings across diverse educational contexts and explore the longitudinal development of these competencies. This study significantly contributes to entrepreneurship education by providing a reliable tool for enhancing the entrepreneurial capacity of educators.

Keywords: Entrepreneurial competencies, Faculty members, Higher Education Institutions.

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Introduction

Higher education institutions (HEIs) are essential in steering growth and economic development. The European Commission (2003) asserts that entrepreneurship is a critical component that supports economic growth, innovation, and progress in all spheres of society in any nation. To succeed in the future, the younger generation is eager to acquire creative skills (World Economic Forum, 2015). The goal of higher education institutions, according to the literature, is to promote socioeconomic growth through entrepreneurship education (Barba-Sanchez & Atienza-Sahuquillo, 2018; O'Connor, 2013), which in turn may become the guiding star in the path to inspire entrepreneurial skills in students (Morris et al., 2013; Peterman & Kennedy, 2003), ultimately leads to the growth of their entrepreneurial intentions (Zhang et al., 2014; Souitaris et al., 2007). Vision 2050 states that skilled, competent, and fully equipped males and females can effectively meet the need for global 21st-century skills. The accomplishment of the transition from a state of surviving to thriving, which is treated as a critical task by Stuetzer, Audretsch, and Potter (2018), is made by entrepreneurship.

Moreover, entrepreneurship and innovation-oriented competencies are the most important competencies that should be acquired via the lifelong learning approach. Universities are places that are considered more responsible for developing entrepreneurial skills among their graduates through entrepreneurship education to enable them to thrive and survive (Obschonka et al., 2016). In Pakistan, only 40% of the country's available human resources are utilized, indicating low economic growth (World Bank report, 2021). They proposed the promotion of young people as confident and influential agents of change by developing their capabilities, which is the foundation for forming such a future. HEC declared that a competence-based curriculum would be implemented at the undergraduate level in Pakistan in 2021. This competency-based curriculum is applied in all undergraduate programs (Khalil, 2020), encompassing four years of bachelor's and professional degrees. However, it is found that higher education institutions are not providing fully support to the teachers to integrate and foster entrepreneurial innovativeness and creativity through their pedagogical practices (European Union, 2011). Therefore, it is required to develop entrepreneurial competencies among higher education faculty to utilize innovative pedagogical practice to promote entrepreneurialism. Furthermore, it is necessary to underscore the entrepreneurial competence of faculty members, whether they are competent and pedagogically well equipped to teach this curriculum or not.

Purpose of the Study

This study aims to develop a survey questionnaire to explore the entrepreneurial competence of higher education institutions' faculty members to increase their students' creativity and innovation in the teaching-learning process. Furthermore, this study adapted the EntreComp framework to design a survey questionnaire to foster entrepreneurial pedagogical practices among faculty members, consequently promoting multidisciplinary collaboration across HEIs.

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Objective

The objectives of this study are as follows:

- To develop a survey questionnaire to explore the entrepreneurial competencies perceived to be necessary to HEIs' faculty in their pedagogical practices.
- To identify opportunities/activities that HEIs provide to faculty to foster their entrepreneurial competence.

Research Questions

The following research questions guided this research:

1. What are the self-reported entrepreneurial competences of HEIs Faculty?

a) How do HEI faculty members perceive the need for entrepreneurial competence to foster entrepreneurial skills among students?

Methods and Materials

Sampling technique and sample size

Public sector faculty members participated in the research as a sample, and the sample was selected through a convenience sampling technique. A self-developed survey questionnaire was employed with 385 participants. More specifically, this study explores the entrepreneurial competencies of faculty members teaching in the higher education institutions of Rawalpindi/Islamabad.

The framework

This study uses the framework to further inform, promote, and inspire the development of entrepreneurial learning on the basis of EntreComp. EntreComp can be used to raise awareness about the importance of entrepreneurial education, appraise and assess entrepreneurship as a competence, establish effective delivery methods, and recognize the progression of entrepreneurial learning. It is more adaptable and flexible to use in different educational contexts. Students should learn to work toward their vision by imagining the future, developing visions to turn ideas into action, and visualizing future scenarios. Individuals should be encouraged to use their imagination and ability to identify opportunities but, at the same time, to recognize needs and challenges in the market.

The researcher found that no standardized research method has been created to assess the entrepreneurial abilities of faculty members at higher education institutions. A review of the literature revealed that many studies were limited to developing a few competencies (a few for teachers and a few for developing entrepreneurial business competencies among students) rather than creating a comprehensive framework for developing entrepreneurial competencies for HEI faculty members. A self-developed survey tool based on the EntreComp framework is used to explore the entrepreneurial competence of the faculty members of higher education institutions.

Description of the Questionnaire:

The framework of Bacigalupo (2016) for EntreComp provided the general guidelines for creating the survey questionnaire. The survey was based on the EntreComp framework's three major and 15 sub competencies. The researcher used prior constructs to create the tool,

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including investigating opportunities and ideas, gathering resources, and putting ideas into practice. The survey items measure each competency level via a five-point Likert scale. 1= Never, 2= Rarely, 3= Sometimes, 4= Often, 5= Always. There was more than enough time for participants to complete the questionnaire. The mean value and standard deviation were used in a descriptive analysis to gather and examine the data. The investigator developed a questionnaire that was easy to comprehend and relevant to education. This article reports the construct validity of the tool through confirmatory factor analysis. All sub competencies used as constructs include different sets of items. Initially, the tool was based on 113 items. After the whole validation process, 58 items were included in total.

Reliability of the Tool

The internal consistency of the instrument was determined using Cronbach Alpha. The dependability of the instrument ensures the authenticity and validity of the data obtained from a certain measuring tool (Cooper & Schindler, 2006). The survey questionnaire's Alpha reliability was assessed to guarantee that the scale was relevant and appropriate for the current investigation. The table below displays the complete scale's dependability.

Table 1.1*Reliability of Survey Questionnaire (Scale)*

Total Items	Cronbach Alpha
90	.956

Conferring to the above result that indicates the excellent reliability of the total scale; this is the test that is used to measure the correlation and covariance between the set of items under each construct of the variable. Furthermore, the acceptable range of Cronbach Alpha is 0.70 to 0.09.

Validity of the survey questionnaire

Content Validity: Fifteen specialists reviewed and validated the survey questionnaire once it was developed and constructed, considering the study's objectives and questions. Nine academic faculty members comprised fifteen specialists; these included three members from the Education department; six from diverse subjects, such as psychology, management sciences, and languages; and three PhD researchers. Specifically, six specialists from different fields attested to the accuracy of the text. According to Polit et al. (2007), content validity is defined in the literature as the intended items' capacity to evaluate particular questionnaire components. In addition, the researcher consulted with three statisticians.

Following consultation, a few items were rearranged in order, and the item-level content validity index (I-CVI) was determined by evaluating the degree of agreement among the six interdisciplinary subject matter experts. The methodological process used to create a scale is the content validity index (CVI). Since the I-CVI information instructs the researcher to modify, delete, or replace the item with a new version, it is essential to the validation process—the research aimed to improve the suitability and relevance of the survey questions for each component. The researcher took six steps to verify the content of an instrument. I started by drafting the content validation form and selecting industry review experts. After

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the validation process, every component of every concept was examined.

CVI (Content Validity Index) is described as a method that is utilized to sum the score of item relevancy gathered from the panel of the experts in the field (McCoach, 2003). Furthermore, Yusoff (2019) suggested that six should be the minimum number of CVI experts. The CVI emphasizes the following criteria: relevant (items are pertinent to the idea being assessed), representative (items are representative of the topic being tested), and clarity (things are easily understood and expressed in plain language). Six experts were asked to score each item against each of the four levels, with one denoting that it was unnecessary, two somewhat relevant, three quite relevant, and four indicating that it was highly appropriate. Moreover, to compute the CVI, the following formula is used: the number of agreements divided by the number of raters.

Construct validity: To produce consistent results, factor analysis is used to verify construct validity in research investigations, build survey questionnaires, and assess construct validity. The investigators utilized both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) to verify the construct validity of the created tool. While CFA establishes a theory or framework for research and supports its fitness and appropriateness, EFA was used to ensure the tool's factorial structure. CFA was used to verify the suggested model (Brown et al., 2010). To create a model that fits the concept, factor analysis helps minimize the more extensive collection of questions in a questionnaire to a smaller or reduced number and to establish the relationship between determining factors and latent variables. The EFA and CFA data were analysed via SPSS (Statistical Package for Social Sciences) and AMOS software.

Organization of the Questionnaire: This research questionnaire is divided into three significant competencies: ideas and opportunities, resources, and ideas into action. Furthermore, these three competencies are subdivided into 15 more competencies. A five-point Likert scale is used to explore self-reported entrepreneurial pedagogical practices, measuring their competencies against the scoring of the Likert scale, including response options such as 1= Never, 2= Rarely, 3= Sometimes, 4= Often, 5= Always. First, construct ideas and opportunities, including five subconstructs, i.e., spotting opportunities, creativity, vision, valuing ideas, and ethical and sustainable thinking. The second construct, Resources, is subdivided into five sub constructs, i.e., self-efficacy, motivation and perseverance, mobilizing resources, and financial and economic literacy. The third construct, Into Action, is subdivided into five sub constructs, i.e., mobilizing others, taking initiative, planning and management, coping with uncertainty, working with others, and learning through experience. All subcompetencies used as constructs include different sets of items. Initially, the tool was based on 113 items. After the whole validation process, 58 items were included in total.

Exploratory Factor Analysis

The following table shows the results of EFA (exploratory factor analysis), which was run after

Pilot testing of the instrument to check the KMO (Kaiser–Meyer–Olkin measure of sampling Adequacy) value of the tool.

*Entrepreneurial Competence in Higher Education Faculty: Crafting and Validating a Survey Instrument***Table 3.4:***KMO and Bartlett's Test*

Kaiser–Meyer–Olkin Measure of Sampling Adequacy	.866
Bartlett's Test of Sphericity Approx. Chi-Square	13011.330
Df	2016
Sig.	.000

The above table illustrates the Kaiser–Meyer–Olkin measure of sampling adequacy (KMO test) results. The KMO value is 0.86, which is excellent. The values between 0.5 and 0.7 are average; values between 0.7 and 0.8 are suitable. However, the range between 0.8 and 0.9 is exceptional (Kaiser, 1974).

Confirmatory Factor Analysis

CFA (confirmatory factor analysis) was subsequently used to fit the model via AMOS software (analysis of moment structures).

Table 3.5:*Results of CFA Model Fit*

Index	CMIN/DF	RMR	IFI	TAG	CFI	RMSEA
Model	1.520	.031	.914	.901	.912	.037
Results						
Sample size (N)= 387						

To assess model fitness, Byrne (2001) employed the comparative fit index (CFI), Tucker–Lewis index (TLI), CMIN/DF, and root mean square error of approximation (RMSEA). A good model fit requires IFI, TLI, and CFI values better than 0.90, a CMIN/DF range of 2--5, an RMR less than 0.05, and RMSEA scores less than 0.08 (Hair et al., 2010; Kline, 2015). Thirty-two elements were removed, with estimations lower than 0.5. The final model currently has 58 components. The results show that the items in each construct fit the model within the specified range.

Discussion

The current study aimed to develop and validate a comprehensive tool to assess the entrepreneurial competencies of faculty members at higher education institutions using the EntreComp framework. This research addresses a significant gap, as previous studies mostly focused on developing competencies of business and engineering students (Kyndt & Baert, 2015) and teachers at primary and secondary level focussing their behaviour (Gonzalez Lopez et al., 2018; Lee et al., 2018; Moreno et al., 2015; Peltonen, 2014). Thus, it is found that literature does not have a validated survey tool that can fully measure the entrepreneurial competencies of the social sciences faculty of HEI.

The EntreComp framework developed by Bacigalupo (2016) provided the roadmap to construct the survey questionnaire. The self-developed survey tool was structured around three significant competencies—Ideas and Opportunities, Resources, and Into Action—with 15 subcompetencies. Each competency was measured on a five-point Likert scale ranging from "never" to "always" (Bacigalupo, 2016). The meticulous survey design aimed to capture

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the multifaceted nature of entrepreneurial competencies.

The interdisciplinary approach was crucial in validating the relevance and clarity of the items. To ensure the survey's content validity, the item-level content validity index (I-CVI) allowed for systematic refinement, ensuring that each item accurately measured the intended competencies. Content validity Index (CVI) is important method to gather the expert opinion regarding the appropriateness, clarity, and relevancy (McCoach, 2003; Polit, Beck, & Owen, 2007; Yusoff, 2019). The collaboration with statisticians further strengthened the content validation process, highlighting the robustness of the survey's design.

The construct validity of the tool was established through a two-step process involving exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). EFA, conducted via SPSS software, confirmed the factorial structure of the tool, indicating that the items were grouped appropriately under the three main competencies and their sub competencies. The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 0.866, indicating an excellent level of adequacy.

Following the EFA, the CFA was performed via AMOS software to validate the proposed model. The CFA results demonstrated a good fit, with a comparative fit index (CFI), Tucker–Lewis index (TLI), and root mean square error of approximation (RMSEA) values within acceptable ranges. The model fit indices—CMIN/DF (1.520), RMR (0.031), IFI (0.914), TLI (0.901), and CFI (0.912)—indicated that the survey items appropriately measured the underlying constructs. Similarly, conferring to Hu and Bentler (1999) the cutoff value of .08 is suitable for SRMR and .06 for RMSEA, .95 for TLI and CFI both for model fit.

Implications

The development of this validated survey tool represents a significant contribution to the field of entrepreneurship education. By providing a reliable and comprehensive measure of entrepreneurial competencies based on EntreComp framework, the tool can facilitate targeted interventions and professional development programs for not only HEI faculty members but also in formal and informal setting. This can enhance the entrepreneurial capacity of educators, ultimately benefiting students and fostering an entrepreneurial culture within academic institutions.

Limitations and Future Research

Despite the rigorous validation process, the study has certain limitations. While adequate, the sample size was limited to specific higher education institutions, which may affect the generalizability of the findings. Future research should validate the tool across diverse educational contexts and geographic regions to enhance its applicability. Additionally, longitudinal studies could provide insights into the development of entrepreneurial competencies over time.

In conclusion, this study successfully developed and validated a survey tool based on the EntreComp framework to assess the entrepreneurial competencies of HEI faculty members. The robust validation process underscores the tool's reliability and potential utility in enhancing entrepreneurship education within higher education.

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Author contributions

The author personally gathered the data, following validation process, data interpretation, and analysis of the data. Author ensured the integrity of the educational research work.

Competing interests

The authors declare no competing interests.

Ethical approval

This article collected data from the human participants; therefore ethical considerations strictly followed and confidentiality was ensured.

Informed consent

Author sought consent letter from the institution and all the participants of the study.