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## The Role of Higher Education Institutions in Promoting Innovativeness and Passion towards Entrepreneurship among Students – A Meta-Analytic Review

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# The Role of Higher Education Institutions in Promoting Innovativeness and Passion towards Entrepreneurship among Students – A Meta-Analytic Review

## Abstract

With the growing importance of entrepreneurship education, entrepreneurship programs established within higher education institutions are thriving hard to achieve entrepreneurship educational outcomes in recent years. Several studies reported the role of higher education institutions in promoting entrepreneurship education and enhancing students' skill sets in various ways. To extend this knowledge, this paper aims to analyse the role of higher education institutions in promoting innovativeness and passion among students pursuing entrepreneurship education. A meta-analytic review is conducted by combining the results from empirical analysis of 24 related studies. The influence of higher education institutions on entrepreneurship educational outcomes and individual transformations is examined and their relationships are exposed. The results of the review show that various components of higher education institutions are positively related to individual transformations ( $r_c=0.579$ ) and entrepreneurship educational outcomes ( $r_c=0.331$ ). It is also found that the passion ( $r_c = 0.31$ ) and innovativeness ( $r_c = 0.2771$ ) are positively correlated with entrepreneurship educational outcome. Moreover, institutional environment has a greater impact on passion ( $r_c = 0.531$ ). Thus, the results indicate that higher education institutions play an important role in promoting passion and innovativeness among students.

## Practitioner Notes

1. Higher Education Institutions plays a significant role in promoting entrepreneurial education.
2. Various components of Higher Education Institutions that influence entrepreneurship education outcomes and individual determinants are identified and analyzed.
3. From the analysis, it is evident that passion has a strong influence on entrepreneurial intention and entrepreneurial orientation.
4. Passion creates a strong difference among individuals pursuing entrepreneurship education in various ways in risk-taking and problem-solving skills.
5. Instead of transferring theoretical knowledge, Higher Education Institutions must provide innovative ways and opportunities to develop various proficient skills such as problem-solving, innovativeness, decision-making, competencies, creativity and leadership for their students.

## Keywords

Higher education institutions, Passion, Innovativeness, Entrepreneurship educational outcomes, individual transformations

## Introduction

The view of entrepreneurship education (EE) perceived by society has changed and shifted apparently in the last few years due to the evolution of new pedagogies and diverse teaching practices (Ratten & Usmanij, 2021). EE is characterised by collaborative learning that is associated with business and community initiatives (Boon et al., 2013). It helps the students prepare themselves for uncertain paths due to the ever-changing global economy. It enhances various life skills such as problem-solving, risk-taking, and creativity among students and makes them achieve in their careers (Hasan et al., 2017). As the value of EE is increasing day by day, higher education institutions (HEIs) and universities are exploring the possibilities of adding new programs by updating entrepreneurship courses. Moreover, HEIs are making a move that not only enhances the quality of education but also students' branding.

As the primary focus of EE is to develop the abilities of the student to cope with the real world, HEIs are responsible for inculcating a wide range of skills among students related to leadership, teamwork, and creativity, as well as promoting entrepreneurial intention (EI) and entrepreneurial attitude (EA) through seamless motivation and support. This can only be achieved by practising experience-based learning instead of normal classroom-based learning. The dynamic teaching-learning process involving industrial collaboration, guest lectures from successful entrepreneurs, case studies, and entrepreneurial activities must be part of their daily learning process (Lynch et al., 2021).

Several studies indicate that HEIs and their initiatives play a crucial role in creating awareness of entrepreneurship, promoting entrepreneurship learning, and enhancing entrepreneurial willingness (Lepik & Urmanavičienė, 2022; Jeyalakshmi & Meenakumari, 2015). Numerous institutional factors affect one or more of the EE outcomes, including EI, spirit, entrepreneurial self-efficiency (ES), EA, and entrepreneurial behaviour (EB) (Farsi et al., 2014). Some of these institutional factors include rules, structure and governance, entrepreneurship or business programs conducted, university-industry collaboration, governmental policies, academic reward system, lecturers and their attitudes towards entrepreneurship, education/research structure of the university and the institutional environment. Apart from educational outcomes, HEIs also tend to create individual differences among students by transforming their thoughts into entrepreneurship oriented. Individual differences or transformations include skills such as risk-taking, entrepreneurial orientation (EO), innovativeness, problem-solving, learning passion, proactive personality and perseverance, leadership experience, exposure to entrepreneurial role models, and so on. Moreover, these differences also influence the outcomes of EE (Newman et al., 2019). The relationship between the HEI components, indices of individual transformation, and EE outcomes is presented in Figure 1.

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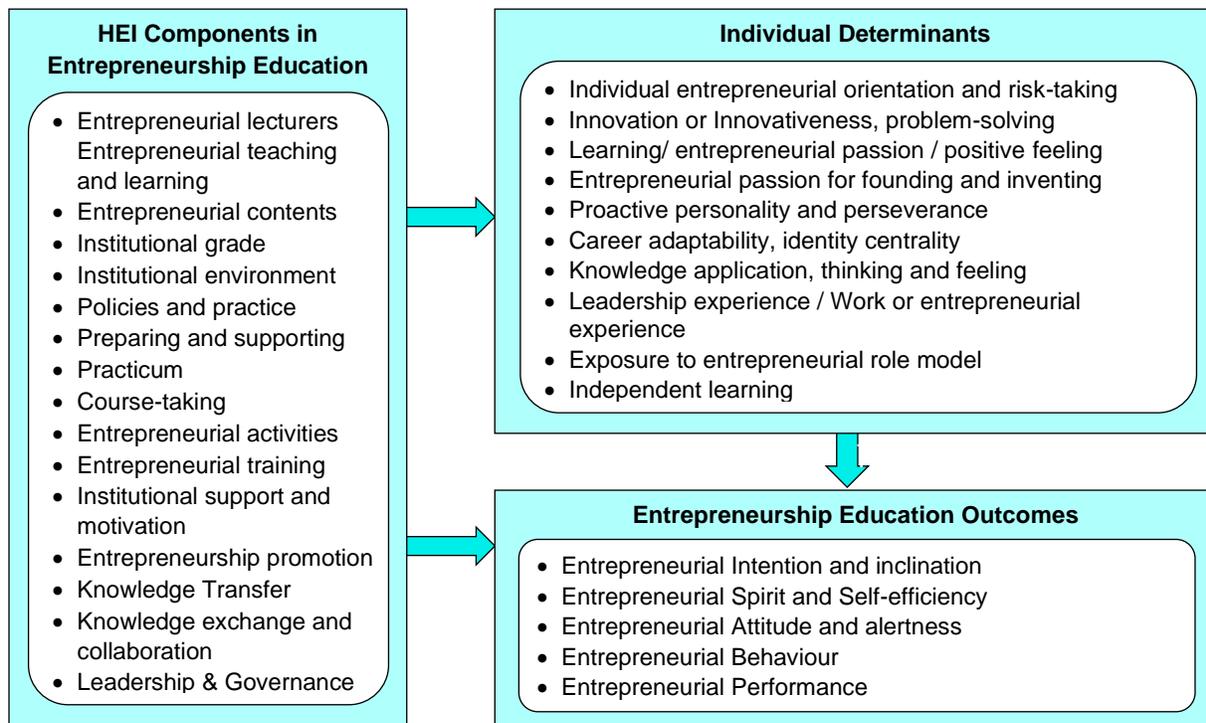
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Several studies were reported on EE and its outcomes, such as EI, EA, and EB. However, there is still a lack of research on the influence of HEI components on EE outcomes and their impact on instilling individual differences like passion and innovativeness among students. As a result, given the significant role that HEIs play in today's EE, this review evaluates HEIs' role in fostering passion and innovation among students, as well as the changes it makes to EE outcomes. Initially, the impact of HEI components on individual determinants and EE outcomes is analysed. Then the impact of passion and innovativeness on EE outcomes and other individual determinants is analysed individually. The framework of the proposed theoretical model is presented in Figure 2. Here, the lines indicate the correlation between the variables.

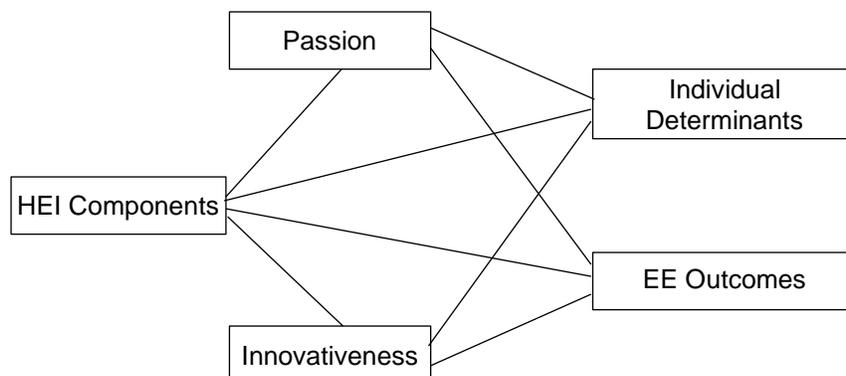
**Figure 1**

*Relationship between HEI Components, Individual Determinants and EE Outcomes*  
(Source: Authors)



**Figure 2**

*Proposed Theoretical Framework (Source: Authors)*



Thus, the primary objective of the proposed research is to analyse the impact of HEI in achieving EE outcomes while promoting individual differences like passion and innovativeness among students through a meta-analytic literature review. Moreover, the study also assesses the role of passion and innovativeness in achieving EE outcomes. Thus, the following are the contributions of this literature review.

1. Various components of HEIs are identified and the factors of EE outcomes and individual determinants that are influenced by the HEIs are identified.
2. The impact of passion and innovativeness in the EE among HEI students is analysed.
3. The suggestions to enhance the effectiveness of EE in the HEI and the outline for future studies are discussed.

The paper is structured as follows: The literature section analyses the studies related to the proposed work. The method section discusses the meta-analysis phases such as study selection, synthesis analysis and statistical interpretation. The results section explores the detailed results obtained from the various meta-analyses performed. The discussion section confers the interpretation of results along with the policy, theoretical and practical implications and study limitations. Finally, the conclusion section concludes the research with future research directions.

## Literature

According to studies, the indirect simulation effect of EE on economic development is astonishing (Gelaidan & Abdullateef, 2017). In this context, several HEIs are gradually providing EE for students by institutionalising entrepreneurship programs and courses to instil entrepreneurial spirit and passion, increase EI and awareness (Nabi et al., 2016; Mei et al., 2020) and transform prospects in entrepreneurial events through their commitments (Hahn et al., 2019). According to a study conducted by Rodrigues et al. (2021), entrepreneurs with a great sense of EA and EI are essential for economic growth. HEIs are directly involved in developing entrepreneurship, and so EE must trigger the students towards effective EB, EA, and EI (Al moosa & Porkodi, 2014; Fernández-Pérez et al., 2019). Nicolaidis (2011) revealed the multiple roles played by HEI, such

as being supportive, analytic, catalytic, reflective, environmental awareness, promoting entrepreneurship, and guiding individuals incredibly.

Boldureanu et al. (2020) insisted that the learning process must focus on developing entrepreneurial skills and use successful entrepreneurial role models to improve EE outcomes. According to Moreno et al. (2019), developing competencies, a significant role for HEIs, was also found to be an influencing factor for job creation. A study by Iwu et al. (2021) reported that apart from curriculum, competent lecturers, and effective teaching and learning processes, motivation and support given by the course instructors are also important to kindle EA among students. Asamoah (2014) listed out strategies such as offering entrepreneurial training and practicum, knowledge exchange, and collaboration with industries at the HEIs to provide institutional support and motivation and ensure entrepreneurship promotion for students.

In general, the factors influenced by the HEIs in promoting EE are educational outcomes and individual determinants. The primary factors of EE outcomes considered in the existing studies are EI (Manik et al., 2021) and inclination (Horng et al., 2020), entrepreneurial spirit and ES (Liu et al., 2019), EA (Majeed et al., 2021) and alertness (Li et al., 2020) and EB (Valencia-Arias et al., 2022). Several studies reported that the individual determinants are also significant for achieving EE outcomes, which are influenced by the HEI components. Gafar et al. (2015) insisted that HEIs develop essential skills for EI, such as problem-solving, communication, creative and innovative skills, leadership, and perseverance. Alves et al. (2019) reported that though age, gender, and family income could not be influenced by HEIs, other factors such as the mentors, institutional environment, knowledge collaboration with industries, and quality EE at HEIs help to ignite the entrepreneurial spirit and EI among students.

Hamilton and Mostert (2019) claimed that though personal barriers are considered to be the most significant factor hindering entrepreneurial activity at an institutional level, individual differences are the primary factor invoking EI. However, these personality traits are developed during the learning process (Remeikiene et al., 2013; Wei et al., 2019). Among various individual traits, Porkodi and Rajesh (2014) emphasised that passion is considered to be first step towards EI and identified as a significant variable in the entrepreneurship process. According to Kaoropthai (2022), passion creates interest and seeks opportunities to learn, enhance, and innovate students' knowledge, making it essential for learning. Moreover, passion is positively correlated with innovation. Passion for learning EE and innovativeness depend on the various HEI components discussed. Thus, though several personality traits influence the EE outcome, the more common traits such as passion and innovativeness are considered in this study.

Moreover, the review studies on EE in higher education performed earlier (Nabi et al., 2017; Othman & Othman, 2019) and assessing the impact of HEIs (Wong & Chan, 2021) are systematic. The other meta-analysis performed focused mainly on EI (Schlaegel & Koenig, 2014; Zhang et al., 2022) and the effectiveness of EE (Martínez-Gregorio et al., 2021). None of the studies assess the HEIs' role or its impact on creating individual differences. Thus, the proposed research attempts to address the existing research gap by examining HEIs' role in developing individual characteristics like passion and innovativeness.

## Method

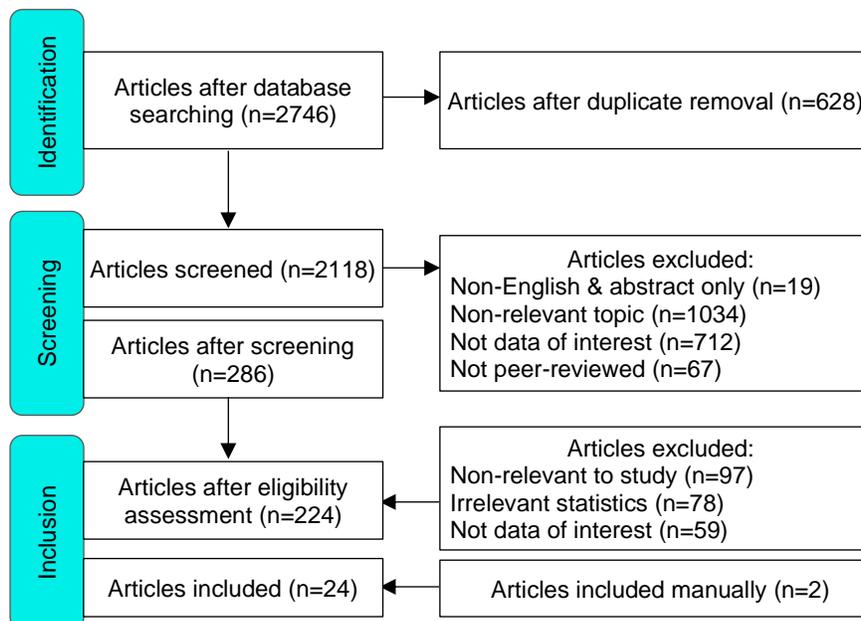
This literature review uses meta-analysis that aggregates data from several studies using statistical analysis (Glass, 1976). Various factors and different variations of specific factors identified in individual-related studies are used to conduct the review.

### Study Selection

To conduct the review, keywords are identified for locating relevant articles and appropriate studies. The structured approach has been followed to perform a search in which it uses various combinations of keywords such as 'higher education institution', 'entrepreneurial education', 'passion', 'innovation', 'entrepreneurial intention', 'entrepreneurial attitude' or their synonyms and other forms (university, innovativeness, learning passion, entrepreneurship course, spirit). The keywords are searched in the title, keywords, and abstract parts of the articles. The keywords are searched against various electronic databases, including Scopus and Google Scholar. The initial search ended with 2746 results. PRISMA criteria were used to evaluate the publications in the proposed research (Page et al., 2021). The initial screening is carried out by removing irrelevant and duplicate documents. During the initial screening, irrelevant and duplicate documents are removed, and the 22 articles that meet the inclusion criteria are chosen for the meta-analysis. The articles that focus on EE in HEIs report statistical analysis with a relevant population and adequate documentation and report that at least one of the factors of EE in HEIs correlates with the factors of the theory of planned behaviour (EA, EB, EI, ES) is included. The study includes 24 articles after including two more articles by manually analysing the reference lists of the selected publications. Figure 3 summarises the study selection process.

**Figure 3.**

*Overview of the Study Selection Process (Source: Authors)*

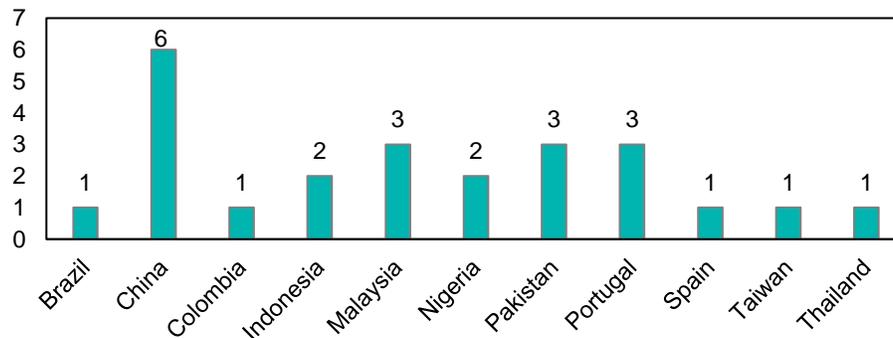


## Synthesis Analysis

Research on EE and HEIs has become increasingly popular due to technological development and post-pandemic changes in the education system. The selected articles were published in the last five years, between 2018 and 2020, showing exponential growth. The research on the selected articles was conducted in various countries, including China, Malaysia, Pakistan, Portugal, Indonesia, and Nigeria. The statistics on the country in which the research was conducted are shown in Figure 4. Moreover, from the word count analysis of the keywords specified in the selected articles, it is found that EI, EE, EB, EA, and institutional environment have a higher frequency than others. The distribution of the top ten keywords is presented in Figure 5.

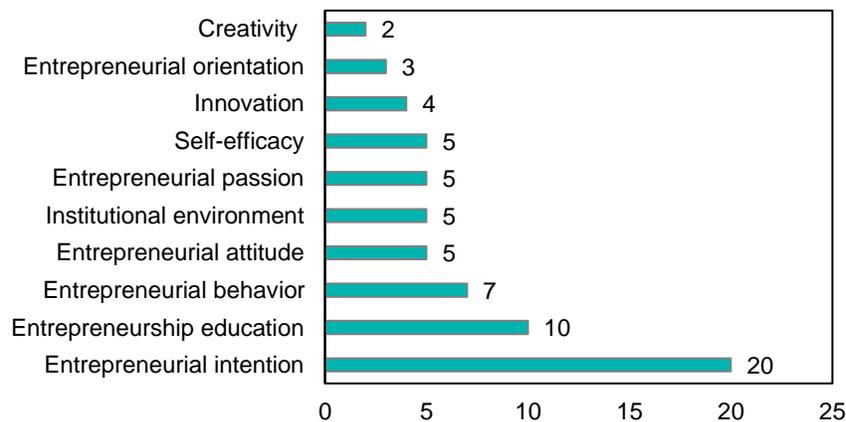
**Figure 4.**

*Distribution of the Country (Source: Authors)*



**Figure 5**

*Top ten Keywords from the Selected Articles (Source: Authors)*



The word count analysis on the titles of selected articles indicates that the terms entrepreneurial, education, intention, passion, entrepreneurship, role, and students are more frequently used. Figure 6 shows the word cloud representing the word distribution of title words. The information about the selected articles is tabulated in Table 1.



**Table 1**

*Summary of Articles Selected for Meta-Analysis*

<b>Author(s) &amp; Year</b>	<b>Focus</b>	<b>Approach</b>	<b>#Sample</b>	<b>Country</b>
Hornng et al. (2020)	Outcomes of EE	Integrated Mediation-Moderation	446	Taiwan
Manik et al. (2021)	Effect of EO on the EI	Regression Analysis and t-test	200	Indonesia
Anjum et al. (2018)	Impact of EE on the EI	Partial Least Square	556	Malaysia
Anjum et al. (2019)	Role of EA in the development of students' EI	Partial Least Squares Structural Equation Modelling (PLS-SEM)	350	Malaysia
Majeed et al. (2021)	Role of passion in EA and EI	PLS-SEM technique	240	Pakistan
Liu et al. (2019)	Effects of EE and self-efficacy	Exploratory Factor Analysis	327	China
Li et al. (2020)	Role of passion in EI	PLS-SEM technique	346	China
Huang et al. (2021)	Role of entrepreneurship policy and practice on EI	SEM technique	384	China
Zhou et al. (2022)	Impact of the entrepreneurial institutional environment on EO	Cognitive Appraisal Theory of Emotion	197	China
Murad et al. (2021)	Impact of creativity on EI	SEM technique	390	Pakistan
Otache (2019)	Role of entrepreneurial lecturers in EE and EI	PLS-SEM technique	256	Nigeria
Wathanakom et al. (2020)	Relationship between innovativeness and EI	Confirmatory Analysis and Multiple Regression	330	Thailand
Mónico et al. (2021)	Students' perception of the EE level in HEI	Exploratory and Confirmatory Factor Analysis	966	Portugal
Mei et al. (2020)	Influences of EE on student EI	Multiple Regressions	599	China
Valencia-Arias et al. (2022)	Influential factors in the EI	Theory of Planned Behaviour; Business Event Model	178	Colombia
Astuty et al. (2022)	Student entrepreneurship activities through the university entrepreneurship ecosystem	Structural Equation Model	456	Indonesia
Hameed et al. (2021)	Role of EE in environmental sustainability	Covariance-based Structural Equation Modelling	420	Pakistan
Liao et al. (2022)	Individual psychological capital and role conflict	Correlation Analysis; Structural Equation Models	525	China
Sancho et al. (2022)	Role of training on the link between EI and EB	PLS technique	212	Spain
Iizuka et al. (2022)	Influence of the college environment and entrepreneurial characteristics	PLS-SEM technique	384	Brazil
Song et al. (2021)	Effect of EE towards an EI	Partial Least Squares	429	Malaysia
Ramalho et al. (2022)	Effect of ES in entrepreneurship in higher education	SEM technique	176	Portugal

Lopes et al. (2022)	Factors influencing the EI of students at HEI	Theory of Planned Behaviour	594	Portugal
Okolie et al. (2021)	Entrepreneurial competencies and compulsory participation in EE	Confirmatory Factor Analysis	1191	Nigeria

## Results

Details of the factors and their relationships analysed in the meta-analysis process based on the objective of the research study are reported below.

### Impact of HEI Components in EE

Ten different studies reported the statistical correlations between various HEI components and different EE outcomes. The HEI components used for the analysis include entrepreneurial lecturers (Otache, 2019), entrepreneurial teaching and learning (Ramalho et al., 2022), learning process (Sancho et al., 2022), grade (Liu et al., 2019), entrepreneurial/institutional environment (Zhou et al., 2022; Iizuka et al., 2022), policies and practice followed in the institutions (Huang et al., 2021), preparing and supporting entrepreneurs (Mónico et al., 2021), practicum and course-taking (Mei et al., 2020), entrepreneurial activity (Astuty et al., 2022), entrepreneurial support and motivation (Hameed et al., 2021). For performing the meta-analysis, a *metafor* package from R programming software has been used. Meta-analytic results of a weighted estimate of correlation coefficients using a REM between HEI components and different EE outcomes as well as individual determinants are presented in Table 2. The aggregated meta correlation results for distinct entries of different factors in Table 2 indicate that the HEI components stimulate more difference among individual students ( $r_c=0.579$ ) than on EE outcomes ( $r_c=0.331$ ).

This study follows the interpretation of correlation values as given by Hopkins (2000) and Corder and Foreman (2011) (Gogan et al., 2016). The correlation value of 0.5 was considered strong on different scales. Accordingly, this interpretation has been utilised in this study to magnify the difference since the majority of the calculated correlation values lie between 0.3 and 0.7.

**Table 2**

*Factors Influenced by HEI Components (Authors' Calculations)*

Factors	K	N	$r_c$	95% CI
<b>Individual Determinants</b> ( $r_c=0.5789$ ; 95% CI, 0.41, 0.74)				
Learning Passion/Intense Positive Feeling	5	2038	0.3837	0.229 and 0.538
Knowledge Application	5	2730	0.7616	0.650 and 0.872
Leadership and Governance	5	2668	0.7339	0.554 and 0.914
Entrepreneurial Orientation	3	1109	0.4331	0.239 and 0.628
<b>Entrepreneurship Educational Outcomes</b> ( $r_c=0.3307$ ; 95% CI, 0.13, 0.53)				
Entrepreneurship Education	7	3775	0.4614	0.208 and 0.715
Entrepreneurial Intention	13	6314	0.2984	0.169 and 0.428
Entrepreneurial Attitude	3	1095	0.4015	0.160 and 0.643
Entrepreneurial Behaviour	3	1260	0.2131	0.014 and 0.413
Self-efficiency	4	1063	0.2725	0.102 and 0.443

Note. K=#study effects, N=Total sample size,  $r_c$ =weighted estimate of correlation coefficients using REM

Thus, the more detailed insight shows that the HEI components such as contents, teaching and learning, preparing and supporting entrepreneurs have a very strong association with applying knowledge ( $r_c=0.762$ ) and developing leadership and governance ( $r_c=0.734$ ) among students, which creates a noticeable difference among individuals. These HEI components also have a moderate impact on EE outcomes ( $r_c=0.461$ ). For meta-analyses with correlations, the fixed and random effects estimates are calculated, and inverse-variance weighting is used to pool the results. A meta-analysis of the correlation between HEI components and knowledge application is presented in Table 3, and the corresponding forest plot is shown in Figure 7.

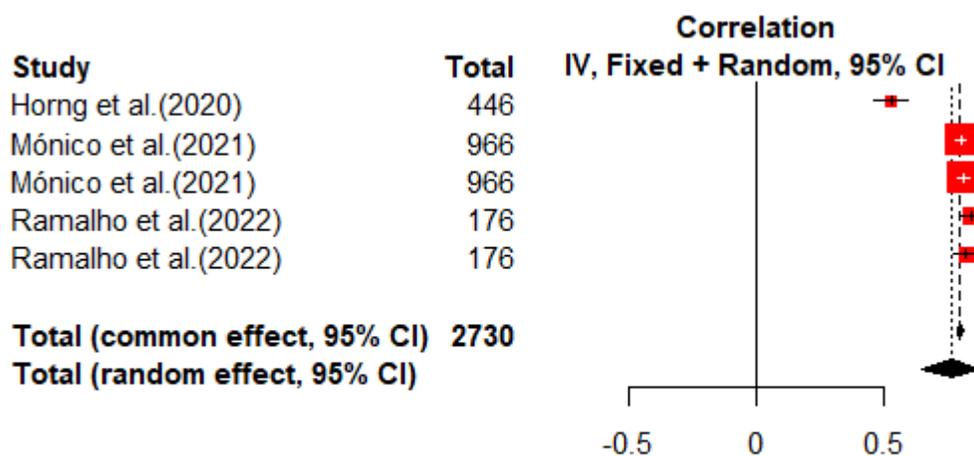
**Table 3**

*Meta-Analysis of Correlation between HEI Components and Knowledge Application (Authors' Calculations)*

Study	Factors	Total	Weight (common)	Weight (random)	Correlation IV, Fixed +Random, 95% CI
Horng et al. (2020)	Entrepreneurial Contents	446	4.2%	19.2%	0.53 [0.46; 0.59]
Mónico et al. (2021)	Teaching and Learning	966	37.0%	20.5%	0.80 [0.78; 0.82]
Mónico et al. (2021)	Supporting Entrepreneurs	966	40.6%	20.5%	0.81 [0.79; 0.83]
Ramalho et al. (2022)	Teaching and Learning	176	10.0%	20.0%	0.84 [0.80; 0.88]
Ramalho et al. (2022)	Supporting Entrepreneurs	176	8.1%	19.9%	0.82 [0.77; 0.87]
<i>Total (common effect, 95% CI)</i>		2730	100%	-	0.80 [0.78; 0.81]
<i>Total (random effect, 95% CI)</i>		-	-	100%	0.76 [0.65; 0.87]

**Figure 7**

*Correlation between HEI Components and Knowledge Application (Source: Authors)*



Heterogeneity:  $\tau^2 = 0.0156$ ;  $\chi^2 = 68.20$ ,  $df = 4$  ( $P < 0.01$ );  $I^2 = 94\%$

On the other hand, HEI components such as institutional environment and entrepreneurial activities moderately influence EO ( $r_c=0.433$ ) and learning passion/intense positive feeling

( $r_c=0.384$ ). A meta-analysis of the correlation between HEI components and passion (0.38) is presented in Table 4, and the corresponding forest plot is shown in Figure 8. Also, grades, policies and practices followed by the institutions have a significant and moderate relationship with the EA (0.4015). Moreover, it is found that the association between HEI components and EI (0.30) is moderately greater than the association between HEI components with EB (0.21) and ES (0.27). A meta-analysis of the correlation between HEI components and EI is presented in Table 5, and the corresponding forest plot is shown in Figure 9.

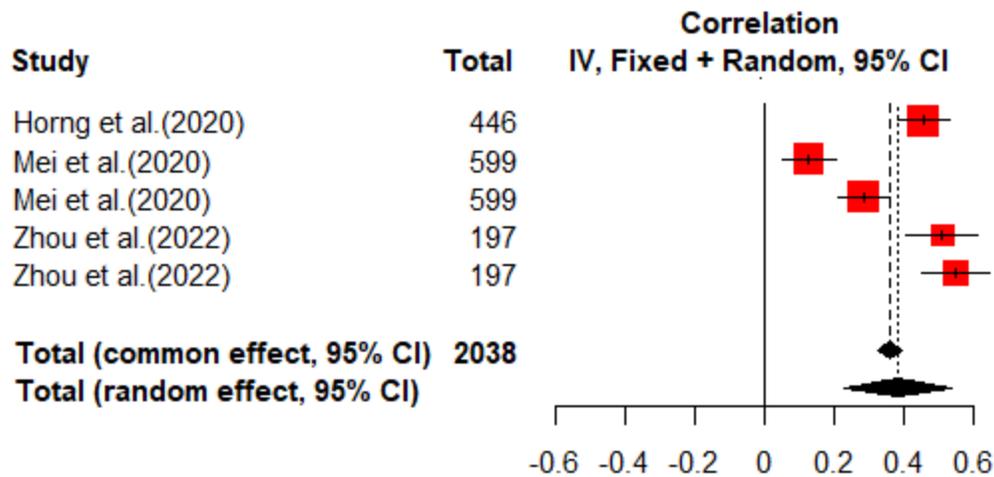
**Table 4**

*Meta-Analysis of Correlation between HEI Components and Passion (Authors' Calculations)*

Study	Factors	Total	Weight (common)	Weight (random)	Correlation IV, Fixed +Random, 95% CI
Hornig et al. (2020)	Entrepreneurial Contents	446	25.4%	20.3%	0.46 [0.38; 0.53]
Mei et al. (2020)	Practicum	599	22.1%	20.2%	0.13 [0.05; 0.21]
Mei et al. (2020)	Course-Taking	599	25.3%	20.3%	0.28 [0.21; 0.36]
Zhou et al. (2022)	Institutional environment	197	12.8%	19.5%	0.51 [0.41; 0.61]
Zhou et al. (2022)	Identity centrality	197	14.4%	19.7%	0.55 [0.45; 0.65]
<i>Total (common effect, 95% CI)</i>		2038	100%	-	0.36 [0.32; 0.40]
<i>Total (random effect, 95% CI)</i>		-	-	100%	0.38 [0.23; 0.54]

**Figure 8**

*Correlation between HEI Components and Passion (Source: Authors)*



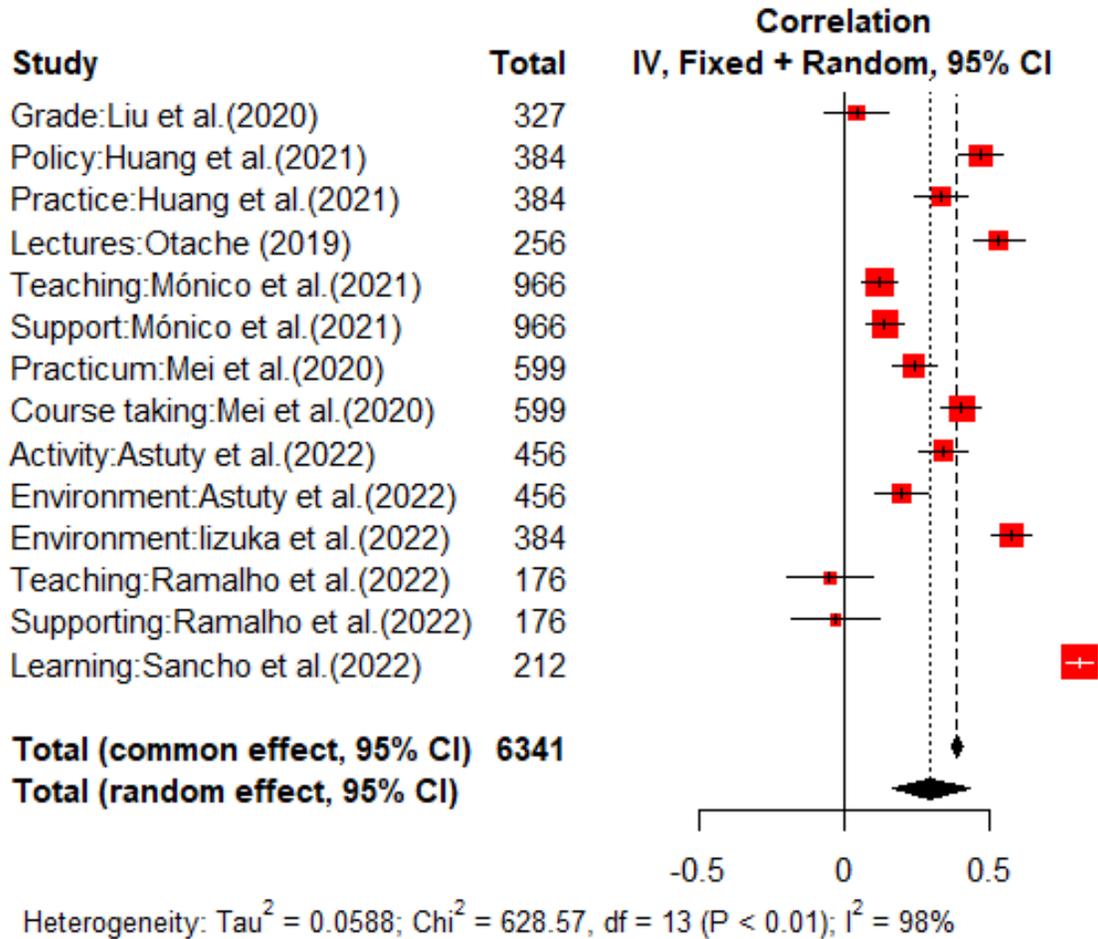
Heterogeneity:  $\tau^2 = 0.0291$ ;  $\chi^2 = 66.49$ ,  $df = 4$  ( $P < 0.01$ );  $I^2 = 94\%$

**Table 5***Meta-Analysis of Correlation between HEI Components and EI (Authors' Calculations)*

<b>Study</b>	<b>Factors</b>	<b>Total</b>	<b>Weight (common)</b>	<b>Weight (random)</b>	<b>Correlation IV, Fixed +Random, 95% CI</b>
Liu et al. (2020)	Grade	327	3.4%	7.0%	0.04 [-0.07; 0.15]
Huang et al. (2021)	Entrepreneurship Policy	384	6.6%	7.2%	0.47 [0.39; 0.55]
Huang et al. (2021)	Entrepreneurship Practice	384	5.1%	7.2%	0.33 [0.25; 0.42]
Otache (2019)	Entrepreneurial Lecturers	256	5.2%	7.2%	0.53 [0.44; 0.62]
Mónico et al. (2021)	Teaching and Learning	966	10.5%	7.3%	0.12 [0.06; 0.18]
Mónico et al. (2021)	Supporting Entrepreneurs	966	10.6%	7.3%	0.14 [0.08; 0.20]
Mei et al. (2020)	Practicum	599	7.1%	7.2%	0.24 [0.16; 0.32]
Mei et al. (2020)	Course-Taking	599	9.0%	7.3%	0.40 [0.34; 0.47]
Astuty et al. (2022)	Entrepreneurial Activity	456	6.1%	7.2%	0.34 [0.26; 0.42]
Astuty et al. (2022)	Institutional Environment	456	5.2%	7.2%	0.20 [0.11; 0.29]
Iizuka et al. (2022)	Institutional Environment	384	8.9%	7.3%	0.57 [0.51; 0.64]
Ramalho et al. (2022)	Teaching	176	1.9%	6.7%	-0.05 [-0.20; 0.10]
Ramalho et al. (2022)	Supporting Entrepreneurs	176	1.8%	6.7%	-0.03 [-0.18; 0.12]
Sancho et al. (2022)	Learning	212	18.6%	7.3%	0.81 [0.76; 0.86]
<i>Total (common effect, 95% CI)</i>		<i>6341</i>	<i>100%</i>	<i>-</i>	<i>0.39 [0.37; 0.41]</i>
<i>Total (random effect, 95% CI)</i>			<i>-</i>	<i>100%</i>	<i>0.30 [0.17; 0.43]</i>

**Figure 9**

*Correlation between HEI Components and EI (Source: Authors)*



Only one study reported a significant correlation between entrepreneurial content with entrepreneurial inclination ( $r=0.532$ ) and promotion ( $r=0.72$ ). Thus, it can be assumed that the entrepreneurial contents also have an impact on EE outcomes.

### **Influence of Passion in EE**

The relationship between passion and other factors in EE has been evaluated in nine studies. The reported analysis on passion involves various forms, such as a passion for founding and inventing (Anjum et al., 2018; Anjum et al., 2019), learning and entrepreneurial passion (Majeed et al., 2021; Li et al., 2020; Murad et al., 2021), intense positive feelings (Zhou et al., 2022), thinking and feeling (Mónico et al., 2021) as well as problem-solving (Mei et al., 2020; Okolie et al., 2021). Meta-analytic results of the weighted estimate of correlation coefficients using the REM between passion and a few HEI components and EE outcomes are presented in Table 6. The aggregated meta-correlation results for distinct entries of different factors in Table 6 indicate that

the passion and HEI components ( $r_c=0.340$ ) such as environment and lecturers are moderately related and is similar to the link between passion and EE outcomes ( $r_c=0.319$ ). Also, passion has a moderately higher association with individual determinants ( $r_c=0.406$ ).

**Table 6***Relationship between Passion and Other Factors (Authors' Calculations)*

Factors	K	N	$r_c$	95% CI
<b>Entrepreneurship Educational Outcomes</b> ( $r_c=0.3191$ ; 95% CI, 0.18, 0.44)				
Entrepreneurial Intention	9	4353	0.4082	0.360 and 0.456
Entrepreneurship Education	6	3969	0.3475	0.188 and 0.507
Entrepreneurial Attitude	4	2131	0.3358	0.125 and 0.547
Entrepreneurial Behaviour	2	586	0.2446	0.168 and 0.321
Entrepreneurial Self-efficiency	2	1537	0.4099	0.368 and 0.452
Entrepreneurial Alertness	3	1911	0.1567	-0.020 and 0.334
<b>Individual Determinants</b> ( $r_c=0.4061$ ; 95% CI, 0.28, 0.54)				
Innovativeness	6	3393	0.2984	0.152 and 0.445
Entrepreneurial Orientation	2	394	0.5188	0.411 and 0.626
<b>Components of HEI</b> ( $r_c=0.3403$ ; 95% CI, 0.17, 0.51)				
Institutional Environment	2	384	0.5312	0.460 and 0.602
Entrepreneurial Lecturers	2	1565	0.1513	-0.107 and 0.410

Note. K=#study effects, N=Total sample size,  $r_c$ =weighted estimate of correlation coefficients using REM

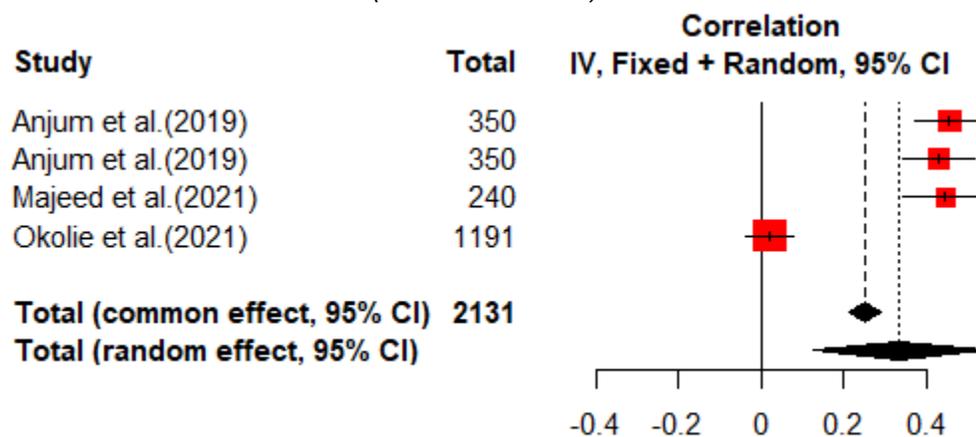
The detailed analysis indicates that the institutional environment ( $r_c=0.531$ ) and EO ( $r_c=0.519$ ) have a significant and strong relationship with the passion towards entrepreneurship. Also, passion has a moderate influence on enhancing the EI ( $r_c=0.408$ ) and ES ( $r_c=0.41$ ) of the students pursuing entrepreneurial education. It is also found that EE (0.35) and EA (0.34) have a moderate relationship with passion. On the other hand, the relationship between passion with that of entrepreneurial alertness (0.16) and lecturers (0.15) is weaker when compared with EB (0.24) and innovativeness (0.30). A meta-analysis of the correlation between passion with EA and EI are presented in Tables 7 and 8 respectively. Figures 10 and 11 show the forest plot representing the correlation between passion with EA and EI.

**Table 7***Meta-Analysis of Correlation between Passion and EA (Authors' Calculations)*

Study	Factors	Total	Weight (common)	Weight (random)	Correlation IV, Fixed +Random, 95% CI
Anjum et al. (2019)	Passion for Inventing	350	21.0%	25.0%	0.46 [0.37; 0.54]
Anjum et al. (2019)	Passion for Founding	350	19.9%	24.9%	0.43 [0.34; 0.52]
Majeed et al. (2021)	Entrepreneurial Passion	240	14.1%	24.5%	0.45 [0.34; 0.55]
Okolie et al. (2021)	Problem-Solving	1191	45.0%	25.5%	0.02 [-0.04; 0.08]
<i>Total (common effect, 95% CI)</i>		2131	100%	-	0.25 [0.22; 0.29]
<i>Total (random effect, 95% CI)</i>		-	-	100%	0.34 [0.12; 0.55]

**Figure 10**

*Correlation between Passion and EA (Source: Authors)*



Heterogeneity:  $\tau^2 = 0.0445$ ;  $\chi^2 = 117.91$ ,  $df = 3$  ( $P < 0.01$ );  $I^2 = 97\%$

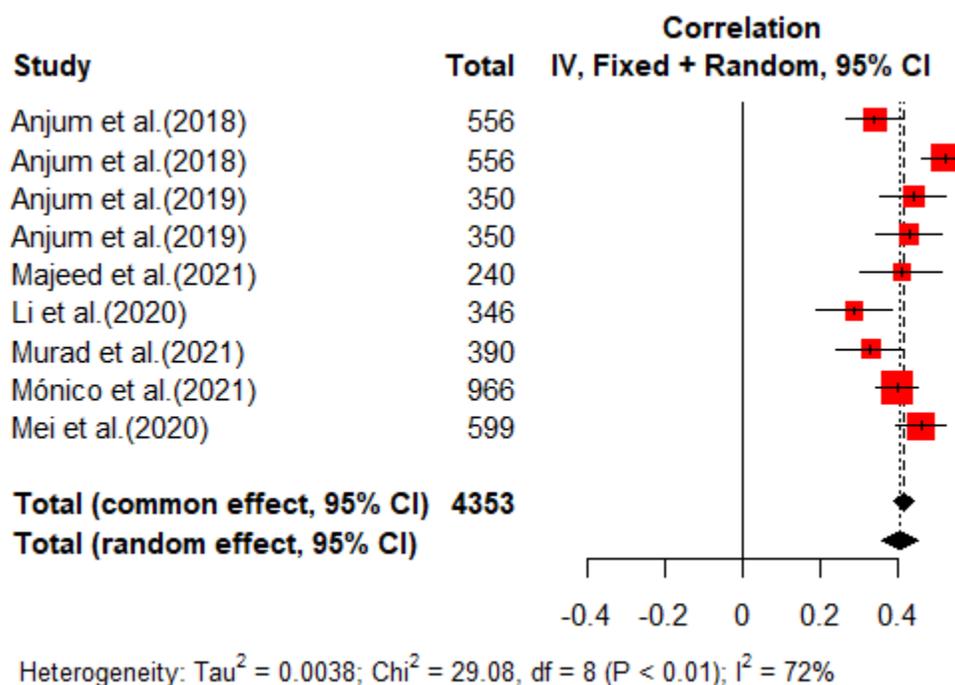
**Table 8**

*Meta-Analysis of Correlation between Passion and EI (Authors' Calculations)*

Study	Factors	Total	Weight (common)	Weight (random)	Correlation IV, Fixed +Random, 95% CI
Anjum et al. (2018)	Passion for Founding	556	11.1%	11.6%	0.34 [0.27; 0.42]
Anjum et al. (2018)	Passion for Inventing	556	16.4%	12.7%	0.52 [0.46; 0.58]
Anjum et al. (2019)	passion for Inventing	350	8.4%	10.6%	0.44 [0.36; 0.53]
Anjum et al. (2019)	passion for Founding	350	8.2%	10.5%	0.43 [0.35; 0.52]
Majeed et al. (2021)	Entrepreneurial Passion	240	5.4%	9.0%	0.41 [0.31; 0.52]
Li et al. (2020)	Entrepreneurial Passion	346	6.4%	9.6%	0.29 [0.19; 0.39]
Murad et al. (2021)	Entrepreneurial Passion	390	7.6%	10.3%	0.33 [0.24; 0.42]
Mónico et al. (2021)	Thinking and feeling	966	21.3%	13.3%	0.40 [0.35; 0.45]
Mei et al. (2020)	Problem-Solving	599	15.1%	12.4%	0.46 [0.40; 0.53]
<i>Total (common effect, 95% CI)</i>		<i>4353</i>	<i>100%</i>	<i>-</i>	<i>0.42 [0.39; 0.44]</i>
<i>Total (random effect, 95% CI)</i>			<i>-</i>	<i>100%</i>	<i>0.41 [0.36; 0.46]</i>

**Figure 11**

Correlation between Passion and EI (Source: Authors)



Two studies discretely reported a significant correlation between entrepreneurial passion with perceived behavioural control ( $r=0.554$ ) and proactive personality ( $r=0.249$ ). Another study indicates that passion for learning has a positive association with entrepreneurial content and knowledge application. This indicates that passion also has a considerable impact on perceived behavioural control, proactive personality, entrepreneurial content and knowledge application.

### Influence of Innovativeness in EE

Seven studies established a significant statistical correlation between innovation or innovativeness with factors of individual determinants such as learning passion (Manik et al., 2021), risk-taking (Iizuka et al., 2022), perseverance (Okolie et al., 2021), entrepreneurial passion for founding and inventing (Anjum et al., 2018), with EE outcomes such as EI (Murad et al., 2021), EE (Anjum et al., 2019) and EA (Wathanakom et al., 2020). A meta-analysis has been carried out with a weighted estimate of correlation coefficients using a REM between innovativeness with individual determinants and EE outcomes and the results are presented in Table 9. The aggregated meta-correlation results for distinct entries of different factors in Table 9 indicate that innovativeness has a weak positive relationship with individual traits ( $r_c=0.281$ ) and EE outcomes ( $r_c=0.277$ ).

**Table 9***Relationship between Innovativeness and Other Factors (Authors' Calculations)*

Factors	K	N	$r_c$	95% CI
<b>Individual Determinants</b> ( $r_c=0.2809$ ; 95% CI, 0.12, 0.45)				
Learning Passion	3	1781	0.1682	0.017 and 0.320
Entrepreneurial Passion for Founding	2	906	0.5052	0.457 and 0.554
Entrepreneurial Passion for Inventing	2	906	0.2924	0.233 and 0.352
Risk-Taking	3	1775	0.1979	0.025 and 0.371
Perseverance	2	1391	0.2421	-0.121 and 0.606
<b>Entrepreneurship Educational Outcomes</b> ( $r_c=0.2771$ ; 95% CI, 0.11, 0.44)				
Entrepreneurial Intention	6	2210	0.3732	0.277 and 0.469
Entrepreneurship Education	3	2097	0.2311	0.022 and 0.440
Entrepreneurship Attitude	3	1871	0.2252	0.036 and 0.414

Note. K=# study effects, N=Total sample size,  $r_c$ =weighted estimate of correlation coefficients using REM

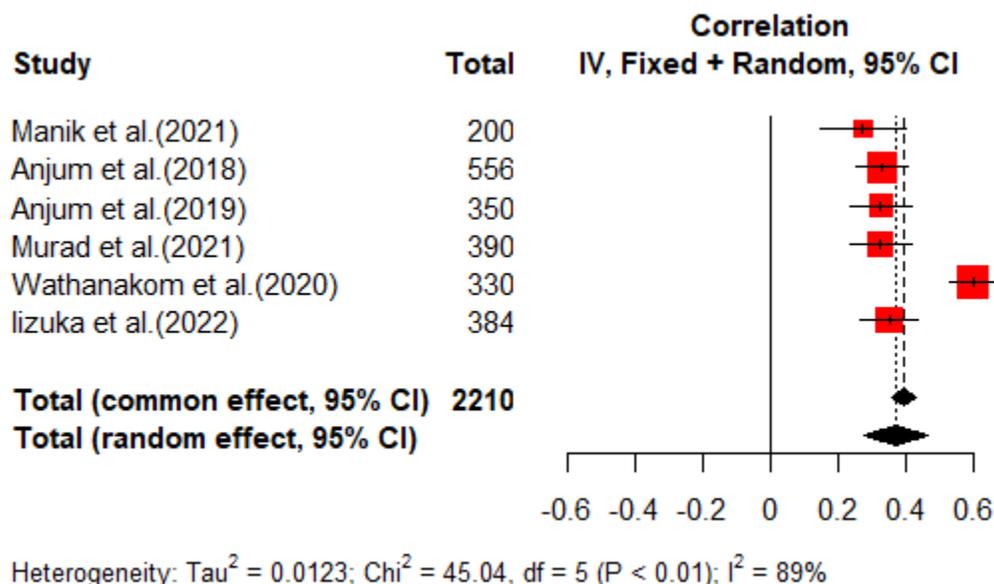
While analysing individual determinants, the existing studies indicate a moderate association between innovativeness and passion ( $r_c=0.322$ ) (combined results of learning passion and entrepreneurial passion for founding and inventing). More specifically, entrepreneurial passion for founding ( $r_c=0.505$ ) has strong association whereas entrepreneurial passion for inventing ( $r_c=0.292$ ) has a weak association with innovativeness respectively. However, EI ( $r_c=0.373$ ) has a moderate association with innovativeness. Moreover, the association between innovativeness with learning passion (0.17) and risk-taking (0.19) are weaker than relationship between innovativeness with EE (0.23), EA (0.23) and perseverance (0.24). A meta-analysis of the correlation between Innovativeness with EI and risk-taking are presented in Tables 10 and 11 respectively. Figures 12 and 13 show the forest plot representing the correlation between innovativeness with EI and risk-taking ability.

**Table 10***Meta-Analysis of Correlation between Innovativeness and EI (Authors' Calculations)*

Study	Total	Weight (common)	Weight (random)	Correlation IV, Fixed +Random, 95% CI
Manik et al. (2021)	200	7.4%	14.5%	0.28 [0.15; 0.40]
Anjum et al. (2018)	556	22.1%	17.5%	0.33 [0.26; 0.41]
Anjum et al. (2019)	350	13.9%	16.5%	0.33 [0.23; 0.42]
Murad et al. (2021)	390	15.4%	16.8%	0.33 [0.24; 0.42]
Wathanakom et al. (2020)	330	25.4%	17.8%	0.60 [0.53; 0.67]
Iizuka et al. (2022)	384	15.8%	16.8%	0.35 [0.26; 0.44]
Total (common effect, 95% CI)	4353	100%	-	0.40 [0.36; 0.43]
Total (random effect, 95% CI)	-	-	100%	0.37 [0.28; 0.47]

**Figure 12**

Correlation between Innovativeness and EI (Source: Authors)



**Table 11**

Meta-Analysis of Correlation between Innovativeness and Risk-taking (Authors' Calculations)

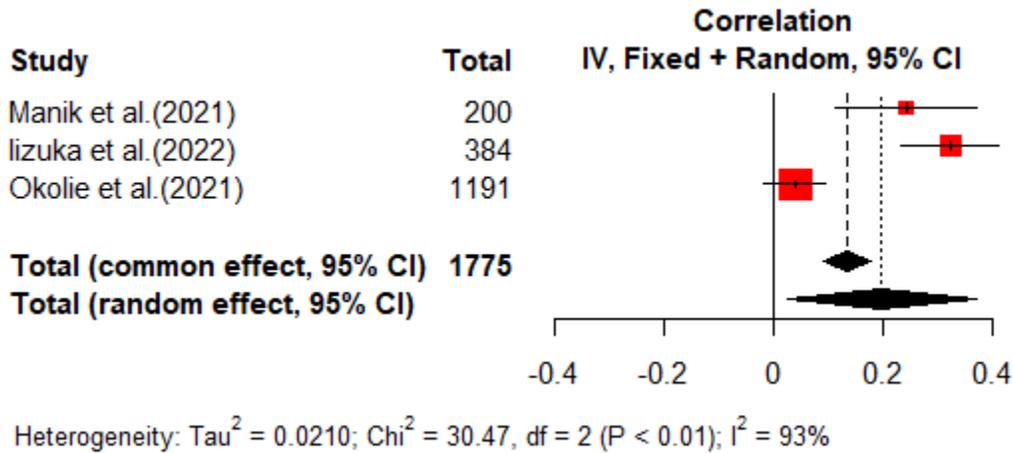
Study	Total	Weight (common)	Weight (random)	Correlation IV, Fixed +Random, 95% CI
Manik et al. (2021)	200	7.4%	14.5%	0.28 [0.15; 0.40]
Iizuka et al. (2022)	384	22.1%	17.5%	0.33 [0.26; 0.41]
Okolie et al. (2021)	1191	13.9%	16.5%	0.33 [0.23; 0.42]
Total (common effect, 95% CI)	4353	100%	-	0.40 [0.36; 0.43]
Total (random effect, 95% CI)		-	100%	0.37 [0.28; 0.47]

Moreover, two individual studies established the relationship between innovativeness with EB ( $r=0.342$ ) (Manik et al., 2021), ES ( $r=0.476$ ), institutional environment ( $r=0.336$ ), leadership and governance ( $r=0.385$ ) (Iizuka et al., 2022). Thus, the notable correlation value indicates that innovativeness has a moderate relationship with other factors such as EB, ES, institutional environment, as well as leadership and governance.

Upon analysing the existing articles used in the meta-analysis, it is found that EI, EE, EA, EB and ES are primarily discussed in many of the articles. Thus, 19 out of 24 articles established a relationship between any of the two EE outcomes. Though there exists a positive relationship between each factor, the correlation between EI and EB is strong (0.51) and the association between EA with EI (0.46) and EB (0.47) as well as EE and EI (0.37) are moderate (Hopkins, 2000). The correlation values obtained are shown in Figure 14.

**Figure 13**

*Correlation between Innovativeness and Risk-taking (Source: Authors)*



**Figure 14**

*Correlation Coefficients for EE Outcomes (Source: Authors)*

ES	0.18	0.32	0.38	0.29	1
EE	0.28	0.37	0.29	1	0.29
EB	0.47	0.51	1	0.29	0.38
EI	0.46	1	0.51	0.37	0.32
EA	1	0.46	0.47	0.28	0.18
	EA	EI	EB	EE	ES

## Discussion

This meta-analytic review examines the role of HEIs in promoting innovativeness and passion among students pursuing entrepreneurship programs. It combines results from various individual studies to identify the research gap and expand the research further (Glass, 1976). This study has assessed the impact of HEIs on EE outcomes and individual traits. The influential components of HEIs, and indices of individual student traits and the outcomes of EE have been identified. A detailed analytic review has been conducted on the impact of HEI components, passion, and innovativeness on EE outcomes. The results are concluded based on the research objectives. Several review studies were conducted on the existing research, and a list of notable studies that are similar to the proposed study is presented in Table 12.

**Table 12***Existing Review Studies Related to the Proposed work*

<b>Author</b>	<b>Method</b>	<b>Focus</b>	<b>Results</b>	<b>Implication</b>
Schlaegel, & Koenig (2014)	Meta-analytic review	To identify the determinants of EI	Contextual boundary conditions moderate EI growth.	The integrated model provides additional power and develops EI.
Nabi et al. (2017)	Systematic review	To emphasis the contribution of EE to higher education	EE often understates pedagogies being examined.	The impact of university-based EE are still needs to be explored
Othman & Othman (2019)	Systematic review	To examine EE in higher education	Most research focuses on EI to pursue entrepreneurship.	The institution must align its curriculum with the results of entrepreneurial education.
Wong & Chan (2021)	Systematic review	To assess the outcomes of EE at HEIs	EE affects people, institutions, and society.	New EE outcomes must be included into curricula.
Martínez-Gregorio et al. (2021)	Meta-analytic review	To examine the efficacy of the EE	EI effect sizes increased with intervention program duration.	EE impact studies must be improved.
Zhang et al. (2022)	Meta-analytic review	To investigate the impact of EE on EI	EE is positively associated with EI	Other factors like personality traits and ES are still needs exploration.

Though several studies focused on the EE, which is similar to the proposed research, the proposed research varies in different ways. Few of the existing studies were systematic reviews, which lack analysis of the existing results. Moreover, only a few studies focus on HEIs, which play a crucial role in promoting EE. Most studies focus primarily on EI and other EE outcomes. Thus, none of the studies deeply analyse the impact of HEI and its components on EE outcomes and individual differences. Thus, this study intensively analyses the role played by HEI in EE and its impact on creating individual differences such as passion and innovativeness among students.

### **Impact of HEI Components in EE**

First, it is found that the HEI components such as entrepreneurial lecturers, entrepreneurial teaching and learning, grade, entrepreneurial /institutional environment, policies and practice followed in the institutions, preparing and supporting entrepreneurs, practicum and course-taking, entrepreneurial activity, entrepreneurial support, and motivation instigate more differences among students' minds (see Table 2). More specifically, the HEI components such as content, teaching and learning, and preparing and supporting entrepreneurs have a stronger influence on knowledge application and enhancing leadership skills than the passion for learning and intense positive feelings. Likewise, the institutional environment and entrepreneurial activities moderately influence the EO that covers the innovativeness, proactiveness, and risk-taking abilities of individuals. Moreover, the HEI components also moderately influence the EE outcomes, such as EE and EA, more than EI, EB, and ES. So, it is clear that HEI components can induce differences among individual students studying entrepreneurship programs and influence EE outcomes.

### **Influence of Passion in EE**

Second, the impact of passion (passion for founding and inventing, learning passion, entrepreneurial passion, intense positive feelings, and identity centrality, thinking and feeling, and problem-solving skills) among individuals pursuing entrepreneurship programs in HEIs has a moderate relationship with EE outcomes and HEI components (see Table 6). However, it is found that passion among students helps them transform themselves towards entrepreneurship by enhancing innovativeness, proactiveness, and risk-taking abilities. More specifically, the institutional environment has a strong influence on the passion towards learning among students. Passion also strongly influences the EO and moderately influences personality traits. Moreover, the passion for learning also creates EI, EA, and ES among students. Also, passion has a weaker association with EB and innovativeness. It is also found that there is no relationship between entrepreneurial alertness and passion. So, it is clear that learning passion can induce a difference among students studying entrepreneurship programs. Notably, it could moderately influence EE outcomes and could be influenced by HEI components.

### **Influence of Innovativeness in EE**

Third, the impact of innovativeness does not create much difference among individuals pursuing entrepreneurship programs in HEIs and their EE outcomes. However, innovativeness persists among students and has a greater influence on an entrepreneurial passion for founding. It is also found that individual differences such as passion towards learning, entrepreneurial passion for inventing, risk-taking, and perseverance have a weak association with innovativeness. Moreover, EE outcomes such as EI are moderately associated, and other outcomes such as EE and EA are weakly associated with the innovativeness that persists among students, respectively. Remarkably, it has a moderate effect on EE outcomes and HEI components, similar to passion.

To conclude, HEI components strongly create an impact on individual differences and moderately influence EE outcomes. Passion, an individual determinant, moderately influences and is influenced by EE outcomes and HEI components, respectively. Moreover, the relationship between innovativeness and passion for founding is strong, and that of EI is moderate.

### **Study Implications**

#### ***Policy Implications***

There are several significant policy implications that might influence entrepreneurial education. Effective entrepreneurial education programs need sufficient money and resources. For entrepreneurial education, policymakers may allocate funding towards curriculum, training for teachers, and infrastructure. Policymakers can create regulations that make it easier to start and run a business and offer incentives to encourage taking risks and being creative. Government officials may foster diversity and equality in the field of entrepreneurship education. Policies can be implemented for evaluating and ensuring the quality of entrepreneurship education programs. A global perspective and a focus on internationalisation are two more characteristics that can be considered when designing entrepreneurial courses.

### ***Implications for Theory***

HEIs are more significant in creating differences among individuals and improving EE outcomes, and they have a direct and indirect effect on EE outcomes and individual differences. Despite this, very few studies have focused on the role of HEIs in EE, and the relationships between various factors of EE outcomes have been more focused on by researchers (Valencia-Arias et al., 2022; Song et al., 2021). Few studies have investigated the role of HEIs in EE, focusing on one or two components. It is quite surprising that the grading system and type of teaching-learning system adopted by the institutions were rarely analysed in terms of individual traits and EE outcomes (Liu et al., 2019). Thus, there exists a research gap in analysing the impact of individual HEI components. Future studies should explore more of the various components of HEIs, their influence on EE outcomes, and the individual traits of students pursuing EE.

Passion or self-interest plays a crucial role in the successful outcome of any process. From the analysis, it is evident that passion has a strong influence on EI (Murad et al., 2021) and EO (Zhou et al., 2022). Few studies have considered passion a significant factor in EE, despite its importance in problem-solving and risk-taking (Manik et al., 2021). More studies are needed to understand how passion for learning affects students' EE outcomes. Passion and EE outcomes were studied often, whereas passion and EB and ES outcomes were seldom studied. Future studies can explore passion with these educational outcomes. Course content, entrepreneurial activities, and training have not been studied in relation to student learning passion. Thus, future research may examine passion in these aspects.

Entrepreneurs develop their businesses through innovation. Thus, entrepreneurial programs must develop competency rather than impart theoretical knowledge. However, only a few studies focused on promoting innovativeness among students. Surprisingly, no research has linked any HEI component to entrepreneurial innovation. This should be the subject of future research. Innovativeness has been linked to EI, EE, and EA (Anjum et al., 2019), but research on ES and EB is also needed. Only a few studies found a link between innovativeness and learning passion, risk-taking, and persistence. This implies that further research is necessary before drawing any conclusions about the importance of innovation among students studying EE.

### ***Implications for Practice***

The findings of this study have various HEI implications. The effectiveness of EE can be enhanced in HEIs in various ways. HEIs must educate students on the importance of entrepreneurship. This may be done by providing suitable resources and opportunities. Instead of conveying theoretical knowledge, it must provide innovative approaches and opportunities for students to build skills like problem-solving, innovativeness, decision-making, competence, creativity, and leadership. Appropriate support and encouragement help them gain business skills. EI fosters EA, EB, and ES only when students share information and collaborate with the public sector, businesses, and entrepreneurs. Thus, HEIs may encourage and nurture the entrepreneurial spirit in students by offering off-campus seminars and workshops. Moreover, the entrepreneurial training and environment must enable students to access their role models. This helps them emulate a successful business and underlines the benefits of entrepreneurship. The components, such as entrepreneurial lecturers, entrepreneurial teaching and learning, entrepreneurial contents, the institutional grade system, policies and practice followed, must promote passion and

perseverance, provoke risk-taking, and leverage opportunities. Moreover, auxiliary programs at HEIs must provide expertise, training, and assistance for starting businesses. Thus, HEIs must realise that the only difference in becoming entrepreneurs through EE is through unlimited resources and unrestricted opportunities for their prospective entrepreneurs.

### **Limitations of the Study**

The meta-analysis has limitations. The foremost concern is the reliability of the results obtained from the meta-analysis. A relatively small number of research articles (24) related to the study have been analysed to assess the role of HEIs in entrepreneurial education. Moreover, each study utilises self-reported survey methods by framing individual questionnaires, utilising common assessment tools, or combining existing scales for each category, such as the EI scale (Parreira et al., 2017) and the self-efficacy scale (Oliveira et al., 2016). Thus, though the results obtained from each existing study are reliable, their consideration and interpretation could be different. For example, to assess entrepreneurial passion, the questionnaires might have a different number of questions focusing on a different level on a variety of scales.

Also, the data collected from different students separated by region shows different levels of entrepreneurial awareness. Thus, the meta-analysis results obtained from these studies could lead to self-reported bias and common method variance (Biswas et al., 2022). Moreover, there are plenty of HEI components, and most of the studies focus on a few indices such as institutional environment and preparing and supporting entrepreneurs repeatedly. Thus, the results obtained are likely to depend on only these factors. Though HEI components affect various students' personality traits, the current study focuses only on passion and innovativeness. Thus, the meta-analytic results obtained tend to incline on the impact of the passion and innovativeness of the students on various EE outcomes.

### **Conclusion**

To conclude, this study on meta-analytic review of the literature indicates the significant role played by the HEI components in achieving entrepreneurial education outcomes and inculcating differences among the students. Factors such as entrepreneurial lecturers, entrepreneurial teaching and learning, the learning process, the entrepreneurial/institutional environment, policies and practices followed in the institutions, preparing, supporting, and motivating entrepreneurs, and entrepreneurial activities are strongly associated with individual determinants such as leadership skills and applying knowledge. The HEI components also play a huge role in promoting passion and innovativeness among students, which in turn is moderately associated with entrepreneurial education outcomes. This confirms the study objective that HEI and its components play a very strong role in creating difference among individuals, whereas the impact of passion and innovativeness in entrepreneurial education is moderate. Future studies should focus on assessing the role of HEIs in promoting passion and innovation with empirical analysis. Also, future research should focus on other missing HEI components in promoting entrepreneurial education outcomes.

## **Conflict of Interest**

The authors disclose that they have no actual or perceived conflicts of interest. The authors disclose that they have not received any funding for this manuscript beyond resourcing for academic time at their respective university.

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