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To cite this article: Jia Jia Tu & Shamim Akhter (2023) Exploring the role of Entrepreneurial Education, Technology and Teachers' Creativity in excelling Sustainable Business Competencies, Economic Research-Ekonomika Istraživanja, 36:1, 2119429, DOI: [10.1080/1331677X.2022.2119429](https://doi.org/10.1080/1331677X.2022.2119429)

To link to this article: <https://doi.org/10.1080/1331677X.2022.2119429>



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Published online: 10 Sep 2022.



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# Exploring the role of Entrepreneurial Education, Technology and Teachers' Creativity in excelling Sustainable Business Competencies

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## ABSTRACT

Encouraging entrepreneurs and transforming entrepreneurship education is a need to a time, which can assist in excelling the economic development, wealth and employment generation. However development of Business Entrepreneurial Competencies remains crucial as it enables the entrepreneurs to excel in the highly competitive market. Moreover, the transformation of Entrepreneurial Education through vocational colleges is an under studied area. Hence the current study aims to explore the role of Entrepreneurial Education, Technology and Teachers' Creativity in excelling Entrepreneurial Competencies through vocational colleges. Based on a thorough discussion and literature exploration, the current study propose the hypothesized relationships which were statistically evaluated through the application of Partial Least Square-Structural Equation Modeling on the data of 357 of potential future entrepreneurs. The results reported a significant association of the said predictors in excelling the Entrepreneurial Competencies. Based on this findings, several policy recommendations were proposed including re-adjustment and timely update of the teaching material whereas facilitators and instructors are also directed to be creative and innovative while integrating the use of technology efficiently.

## ARTICLE HISTORY

Received 30 May 2022  
Accepted 24 August 2022

## KEYWORDS

Entrepreneurial Education; Technology; Teachers' Creativity; Entrepreneurial Competencies; vocational colleges

## JEL CODES

I230; M10; O32; A2

## 1. Introduction

In the current scenario, where economies are striving for the development and economic growth, minimizing unemployment, generating greater economic output, scaling of entrepreneurship could play a crucial role in making difference (Beresford, 2020; Du & O'Connor, 2018). Such positive relationship between economic development and entrepreneurship has been reported by numerous researchers (Akinwale et al., 2020; Stoica et al., 2020) whereas researchers also agrees to utilize it as a

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potential solution for poverty alleviation and eradication for unemployment (Bosma et al., 2018; Peprah & Adekoya, 2020; Shepherd et al., 2021).

Despite of the potential possible benefits associated with the entrepreneurship, its possession and subsequent development in terms of knowledge, skills and competencies are separate issue which requires needful consideration (Machali et al., 2021; San-Martín et al., 2021). Though, some individuals are born with such capabilities, which are either god gifted, or are developed during their up-bringing because of the family shared values and background. However, these skills and capabilities can also be developed and polished through the conventional educational institutions like schools and universities or through specialized educational institutions like vocational colleges (Masri et al., 2021). As already mentioned, vocational colleges are the specialized skills and knowledge generating institutions which are developed to provide assistance to the individuals in the development of hard skills like carpentry, mechanics and so on; and the soft skills like interpersonal, human resources, financial management and so on (Meyer, 2018).

Since entrepreneurship has reported a potential to contribute to the economic and financial aspects of a society, its exploration has also gained a significant attention by the researchers and academicians in the recent times. In addition to this, the researchers and academicians have explored various aspects in order to broaden its scope and understandings. These includes exploration of demographic influences like culture and gender, etc. (Ana et al., 2016; Matlay et al., 2015); entrepreneurial intention of the students (Liguori & Winkler, 2020; Saptono et al., 2020; Wardana et al., 2020); self-efficacy (Murugesan & Jayavelu, 2017; Purwana & Suhud, 2017); personality traits (Zhao & Seibert, 2006); emotional intelligence and family background (Firmansyah et al., 2016); and so on. However there is still a vacuum precisely related to the studies that explores the factors that could play a crucial role in developing competencies of the potential entrepreneurs.

In addition to this, as entrepreneurship is the integration of skills, attitude and competencies that defines the mindset of the individual, the survival in the highly competitive market is highly dependent on the characteristics of the entrepreneur, which can be developed through getting education and trainings from specialized academic institutions (Badri & Hachicha, 2019). Moreover, for the survival and excelling, entrepreneur need to be creative and innovative enough so that they can diligently counter the market challenges and threats, otherwise they could become irrelevant in the market (Zampetakis et al., 2011). On the hand, the role of the facilitator is also very important, for which the instructors need to re-align their teaching material, methodologies and educational discourse in order to achieve great success through entrepreneurship (Bauman & Lucy, 2021).

Entrepreneurial Competencies itself is a vast and broad area which covers the abilities and capabilities of the potential entrepreneurs including the soft and the hard, with an objective to tackle the market challenges and to make adjustments for surviving in the highly competitive market. Moreover, it is extremely difficult to cater all of the Entrepreneurial Competencies in a single research settings, therefore in the current study the operationalization of Entrepreneurial Competencies is the combination of four kind of competencies including Entrepreneurship competencies; Management

and business competencies; Human resources competencies; Interpersonal competencies (San-Martín et al., 2021). In the light of aforementioned discussions, the current study intends to contribute in the literature in various manner. Firstly, by exploring the potential of teachers' creativity and use of technology in developing Entrepreneurial Competencies. Secondly, by exploring the potential of specialized entrepreneurship focused education in developing Entrepreneurial Competencies. Thirdly, by exploring these phenomena in the context of vocational colleges which are the specialized knowledge transfer institutions. Based on these, following are the research questions that the current study is seeking to address:

- RQ1: To what extent the role of Entrepreneurial Education is explained in excelling Entrepreneurial Competencies?
- RQ2: To what extent the role of use of technology Entrepreneurial Education is explained in excelling Entrepreneurial Competencies?
- RQ3: To what extent the role of Teachers' Creativity is explained in excelling Entrepreneurial Competencies?

## 2. Literature review

### 2.1. Entrepreneurial Competencies

According to Kyndt and Baert (2015), the term Competencies refers to the attitudes, skills and knowledge that an individual integrate and combine in order to excel and develop himself/herself in order to deal with certain situation or scenario. Similarly, in the context of entrepreneurship, Entrepreneurial Competencies have been explained as development of the individuals' attitudes, skills and knowledge which enables him to survive, sustain and remain competitive in the business environment by creating an innovative value which caters the needs of the market, that existing market players fails to do so (Lackéus 2014). Since competencies are broader in nature, therefore there are various researchers and theorists who have conceptualize it as per their required objectives and research operationalization, whereas it is relatively impossible to cater all of the competencies in a particular research study (Silveyra et al., 2021). Therefore, as utilized in the researches of Silveyra et al. (2021) and San-Martín et al. (2021), the current study also operationalize Entrepreneurial Competencies as the combination and integration for competencies. These include: '*Entrepreneurship competencies*' that refers to the capabilities of an individual which enables the excellence, survival, growth and nurturing of the business in order to remain competitive in the market (Bird, 1995); '*Management and business competencies*' that refers to the capabilities of an individual that is required while managing, administrating and performing the routine and conventional operations of the business (Ahmad et al., 2010; Bamiatzi et al., 2015). In addition to these, the other competencies includes '*Human resources competencies*' that refers to the capabilities of an individual that is required while managing and administrating the human resources and people working around (Man et al., 2002); and lastly '*Interpersonal competencies*' that refers to the capabilities of an individual which enables him to communicate,

interact and developing network with the individuals, general public and all of the related stakeholders (Rathna & Vijaya, 2009).

## **2.2. Entrepreneurial Education, and Entrepreneurial Competencies**

Entrepreneurial Education is the theoretical foundation of the concept and domain of the entrepreneurship which is being delivered to transform the mindset of the individual towards the entrepreneurship (Wardana et al., 2020). In other words, by making this capital investment in the human resource, the knowledge, skills, attitude and expertise of the students are developed to meet the market challenges and for catering the market needs with an objective to excel the business while remaining competitive (Donald et al., 2019). There are further exploration of this phenomena in terms of their operationalization and process. For instance, in terms of operationalization, the Entrepreneurial Education can be practical, theoretical or the integration of both (Ratten & Jones, 2018). On the other hand, in terms of process, it is the combination of two in which the first step involves the transferring of the education, skills and knowledge, followed by the process in which the overall capacity of the individuals are being built (Wu & Wu, 2008). In the context of current study, it is assumed that, through the effective and efficient transfer of Entrepreneurial Education, the Entrepreneurial Competencies of the prospective entrepreneurs are developed, nurture and groomed (Machali et al., 2021; San-Martín et al., 2021). More specifically, when Entrepreneurial Education is being given to the students through the settings and environment of vocational colleges, it is more likely to enhance the level of Entrepreneurship competencies (Machali et al., 2021; San-Martín et al., 2021), Management and business competencies (Bamiatzi et al., 2015, Human resources competencies (Machali et al., 2021; Machali et al., 2021; San-Martín et al., 2021); and Interpersonal competencies (Machali et al., 2021; Rathna & Vijaya, 2009). Hence it is anticipated that:

H1: Entrepreneurial Education significantly enhance the level of Entrepreneurship competencies.

H2: Entrepreneurial Education significantly enhance the level of Management and business competencies.

H3: Entrepreneurial Education significantly enhance the level of Human resources competencies.

H4: Entrepreneurial Education significantly enhance the level of Interpersonal competencies.

## **2.3. Teachers' Creativity and Entrepreneurial Competencies**

Teachers' Creativity refers to the teacher's capability to innovate, creative, critically think, efficiently organized the learning material for students, address and handle the students queries in the most advanced, innovative and creative manner (Machali et al., 2021). In the current technologically advanced and revolutionized era, Teachers' Creativity is the strong ability of the instructor and education facilitator

when assist himself in inculcating the knowledge towards students (Narmaditya et al., 2018). Researchers are reported to be in agreement that the in the class room settings, the learning success is highly dependent on the teacher's ability to innovate and creative (Rasmi, 2012), whereas this skills enables the teacher to create an interactive learned environment and atmosphere for the students which also assist them in improving the quality of their own learning (Ayob et al., 2013; Pishghadam et al., 2012). In the context of current study, it is assumed that through the teacher's capability to innovate, and being creative, the Entrepreneurial Competencies of the prospective entrepreneurs are developed, nurture and groomed (Machali et al., 2021; San-Martín et al., 2021). More specifically, when the teaching staff of vocational colleges are innovative and creative, it is more likely to enhance the level of Entrepreneurship competencies (Machali et al., 2021; San-Martín et al., 2021), Management and business competencies (Bamiatzi et al., 2015, Human resources competencies (Machali et al., 2021; Machali et al., 2021; San-Martín et al., 2021); and Interpersonal competencies (Machali et al., 2021; Rathna & Vijaya, 2009). Hence it is anticipated that:

H5: Teachers' Creativity significantly enhance the level of Entrepreneurship competencies.

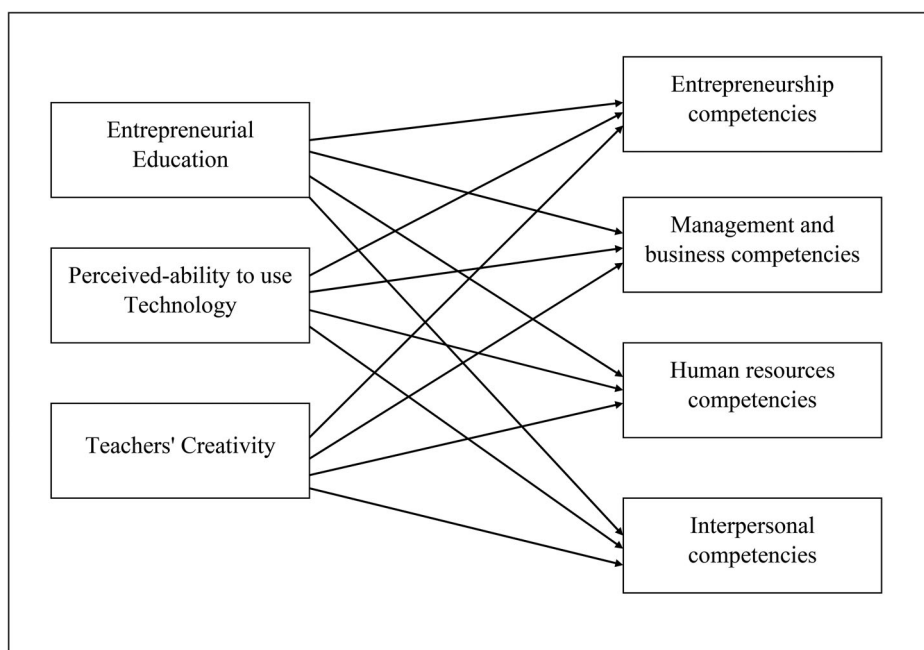
H6: Teachers' Creativity significantly enhance the level of Management and business competencies.

H7: Teachers' Creativity significantly enhance the level of Human resources competencies.

H8: Teachers' Creativity significantly enhance the level of Interpersonal competencies.

#### **2.4. Ability to use Technology and Entrepreneurial Competencies**

In educational settings, the integration and usage of technology in delivering lectures and while conducting workshops has been considered as the sign of professionalism and quality education (Fekete, 2021). Though it is evident that mere investing in hardware and technology devices does not improve the quality of education (McKenzie, 2001), it is the individual who makes the difference. Therefore, teacher ability and proficiency to use Technology enables blended with the latest hardware and technology devices is extremely crucial not for the quality of education but also for the professional discourse (Fekete, 2021). In the context of vocational colleges, when there is a high integration of technology the process of transfer knowledge becomes easy for both the facilitator and the receipts which are the students (Dringó-Horváth & Gonda, 2018; Fekete, 2021). Moreover, when the teaching staff of vocational colleges blend their knowledge transfer with the technology and are proficient in utilizing the technology, it is more likely to enhance the level of Entrepreneurship competencies (Fekete, 2021; San-Martín et al., 2021), Management and business competencies (Bamiatzi et al., 2015), Human resources competencies (Fekete, 2021; Fekete, 2021; San-Martín et al., 2021); and Interpersonal competencies (Fekete, 2021; Rathna & Vijaya, 2009). Hence it is anticipated that:



**Figure 1.** Framework of the study.

Source: Authors' Construction.

H9: Teachers' Ability to use Technology significantly enhance the level of Entrepreneurship competencies.

H10: Teachers' Ability to use Technology significantly enhance the level of Management and business competencies.

H11: Teachers' Ability to use Technology significantly enhance the level of Human resources competencies.

H12: Teachers' Ability to use Technology significantly enhance the level of Interpersonal competencies.

All of the aforementioned hypotheses are graphically shown in [Figure 1](#).

### 3. Methodology

In order to seek the answers of the proposed research questions and to empirically investigate the relationships proposed in the previous section, the present study employs the quantitative research approach. This research approach enables to analyze the collected data quantitatively which further assist in seeking to the numerical conclusions and the generalizing of the findings over the large population (Cooper et al., 2006). In addition to this, as the current research is centered on the vocational colleges which represents as the specialized institutions that used to deliver and transfer the professional hard skills oriented training like carpentry, mechanics and so on. Therefore, survey methodology was utilized while complying with the guidelines discussed by Hlland et al. (2018), in which the data was collected through a structured questionnaire which is made self-administered.

**Table 1.** Source of measures.

Constructs	Number of items	Sources
Entrepreneurial education	6	Denanyoh et al. (2015); Opoku-Antwi et al. (2012)
Teachers' creativity	8	Ayob et al. (2013); Dobbins (2009)
Perceived ability to use technology	4	Fekete (2021)
Entrepreneurship competencies	9	San-Martín et al. (2021)
Management and business competencies	9	San-Martín et al. (2021)
Human resources competencies	8	San-Martín et al. (2021)
Interpersonal competencies	7	San-Martín et al. (2021)

**Table 2.** Descriptive statistics.

		Frequency	Percent
Gender	Female	147	41%
	Male	210	59%
	Total	357	100%
Age		Frequency	Percent
	Less than 18 years	78	22%
	19-21	104	29%
	22-24	147	41%
	More than 25	28	8%
	Total	357	100%
Department		Frequency	Percent
	Business administration	136	38%
	Electronics	87	24%
	Civil construction	64	18%
	Mechatronic	54	15%
	Others <sup>a</sup>	16	4%
	Total	357	100%

Source: Authors estimation.

<sup>a</sup>The Others include respondents from the Department of Medicine; Computer Sciences and Arts and Social Sciences.

Furthermore, the development of the questionnaire is extremely crucial phase in which only those measurements need to be utilized that are either reported or expected to generate consistent and reliable outcome. Therefore for said purpose, the study relied on the adapted scales because of their utilization in the earlier studies and being consistent in terms of generated outcome. The source of adapted scales are listed in Table 1.

Moreover, all of these adapted scales were measured on the Likert Scales of 5-points in which '1 represents Strongly Disagree', '2 represents Disagree', '3 represents neither Disagree nor Agree', '4 represents Agree' and '5 represents Strongly Agree'. In addition to this, the questionnaire also comprised of certain questions that were asked to ascertain the demographic information of the respondents. This information is listed in Table 2.

#### 4. Estimations and results

Since the framework of the study (as shown in Figure 1) requires exploring of multiple hypotheses which may require multiple application of regression models in order to assess the impact of predictors over criterion variables. For instance, as there are four criterion variables in the current study, therefore the researcher need to apply multiple regression four times as one regression model is capable to evaluate the relationships of multiple predictor variables over one criterion variable at a time.



However, a potential solution through which the researcher can get rid of multiple applications of regression analysis is the employing of a Structural Equation Modelling (SEM). SEM enables to compute the relationships of the multiple predictors and criterion variables in a single step, irrespective of their numbers.

On the other hand, there are multiple kind of SEM approaches among which the Partial Least Squares-SEM (PLS-SEM) is the most famous in terms of explaining maximum variation from the data and handling complex models (Hair et al., 2019). Therefore, PLS-SEM is utilized by the help of software SmartPLS (Ringle et al., 2015) which is known for simplicity and user-friendly interface. Moreover, the application of PLS-SEM needs to be done in a two-staged manner as proposed by Hair et al. (2016). According to Hair et al. (2016), first the outer model of the framework need to be assessed and then the inner model need to be evaluated.

#### **4.1. Assessment of outer model**

For, the assessment of the inner model comprised of assessing, internal consistency, convergent validity and discriminant validity. For internal consistency, the values of Cronbach's Alpha and Composite Reliability needed to be checked which according to Hair et al. (2016) must be greater than 0.7. The outcome listed in Table 3 reflects the meeting of the specified threshold.

Regarding convergent validity which is the reflection of the inter-relatedness of the measuring of a single construct (Mehmood & Najmi, 2017), it was assessed by the values of factor loadings and 'Average Variance Extracted' (AVE). According to Hair et al. (2016) factor loadings must be greater than 0.7 whereas AVE must be greater than 0.5. The outcome listed in Table 3 reflects the meeting of the specified thresholds of both of the criteria.

Regarding discriminant validity which is the reflection of the inter-divergence of the measuring of a single construct from another construct (Mehmood & Najmi, 2017), it was assessed by the values of Cross Loadings, Fornell-Larcker criterion and 'Heterotrait-Monotrait ratio of correlations'. For Cross Loadings, Gefen and Straub (2005) suggested the difference of cross loadings which actually is the loadings of a factor of a construct into other construct must be significantly higher than 0.1. The outcome listed in Table 4 reflects the meeting of the specified threshold as discussed by Gefen and Straub (2005).

For Fornell-Larcker (1981) criterion, according to them the value of the AVE's square root should be larger than the values of the construct wise correlations. This shows the degree of divergence of a construct from other construct. Considering Table 5, the values which are listed at the diagonal line are the AVE's square root whereas the values other than that represents construct wise correlations. The outcome listed in Table 5 reflects the meeting of the specified threshold as discussed by Fornell and Larcker (1981).

For 'Heterotrait-Monotrait ratio of correlations' (HTMT) which is the latest indicator to confirm the discriminant validity as proposed by Henseler et al. (2015), the specified cut-off value is 0.85 whereas any value exceeding 1 criticize the meeting of the discriminant validity. The outcome listed in Table 6 reflects the meeting of the specified threshold as discussed by Henseler et al. (2015).

**Table 3.** Measurement model results.

Variables	Items	Factor loadings	Cronbach's alpha	Composite reliability	AVE
Entrepreneurial education	EED1	0.734	0.874	0.777	0.541
	EED2	0.709			
	EED3	0.718			
	EED4	0.826			
	EED5	0.800			
	EED6	0.847			
Teachers' creativity	CRT1	0.808	0.740	0.758	0.505
	CRT2	0.751			
	CRT3	0.716			
	CRT4	0.777			
	CRT5	0.695			
	CRT6	0.715			
	CRT7	0.858			
	CRT8	0.825			
Perceived ability to use technology	PAT1	0.720	0.742	0.783	0.522
	PAT2	0.792			
	PAT3	0.743			
	PAT4	0.777			
Entrepreneurship competencies	ECOM1	0.705	0.865	0.872	0.547
	ECOM2	0.808			
	ECOM3	0.796			
	ECOM4	0.736			
	ECOM5	0.700			
	ECOM6	0.765			
	ECOM7	0.804			
	ECOM8	0.715			
	ECOM9	0.836			
Management and business competencies	MGBC1	0.800	0.737	0.753	0.517
	MGBC2	0.785			
	MGBC3	0.751			
	MGBC4	0.700			
	MGBC5	0.773			
	MGBC6	0.727			
	MGBC7	0.806			
	MGBC8	0.856			
	MGBC9	0.719			
Human resources competencies	HRC1	0.810	0.845	0.874	0.503
	HRC2	0.769			
	HRC3	0.876			
	HRC4	0.731			
	HRC5	0.855			
	HRC6	0.756			
	HRC7	0.837			
	HRC8	0.696			
Interpersonal competencies	INTC1	0.843	0.821	0.763	0.578
	INTC2	0.707			
	INTC3	0.780			
	INTC4	0.875			
	INTC5	0.766			
	INTC6	0.875			
	INTC7	0.846			

Source: Authors estimation.

#### 4.2. Assessment of inner model

In the second step as discussed by Hair et al. (2016), the inner model of the framework is assessed which is the reflection of gauging the level of predictability, relevancy and accuracy. For said purpose, 'coefficient of determination' which is indicated by R-square and 'cross-validated redundancy' which is indicated by Q-

**Table 4.** Results of loadings and cross loadings.

Variable	EED	CRT	PAT	ECOM	MGBC	HRC	INTC
Entrepreneurial education	0.734	0.352	0.300	0.307	0.390	0.337	0.364
	0.709	0.374	0.318	0.316	0.362	0.390	0.395
	0.718	0.357	0.353	0.365	0.315	0.362	0.379
	0.826	0.366	0.329	0.299	0.370	0.389	0.393
	0.800	0.366	0.343	0.393	0.338	0.351	0.300
Teachers' creativity	0.847	0.348	0.381	0.321	0.394	0.309	0.332
	0.385	0.808	0.360	0.318	0.292	0.317	0.308
	0.341	0.751	0.382	0.321	0.377	0.377	0.333
	0.345	0.716	0.385	0.303	0.394	0.358	0.376
	0.292	0.777	0.365	0.341	0.385	0.381	0.341
	0.302	0.695	0.351	0.363	0.379	0.298	0.329
	0.382	0.715	0.317	0.360	0.377	0.380	0.352
Perceived ability to use technology	0.399	0.858	0.297	0.361	0.293	0.335	0.359
	0.297	0.825	0.343	0.337	0.339	0.355	0.388
	0.334	0.297	0.720	0.351	0.307	0.360	0.342
	0.394	0.314	0.792	0.356	0.387	0.297	0.296
	0.369	0.382	0.743	0.341	0.400	0.321	0.339
Entrepreneurship competencies	0.312	0.356	0.777	0.319	0.399	0.353	0.394
	0.320	0.384	0.341	0.705	0.385	0.349	0.330
	0.292	0.391	0.294	0.808	0.350	0.296	0.330
	0.326	0.387	0.360	0.796	0.364	0.308	0.380
	0.350	0.295	0.298	0.736	0.379	0.367	0.346
	0.356	0.318	0.378	0.700	0.336	0.356	0.357
	0.367	0.387	0.294	0.765	0.300	0.330	0.351
Management and business competencies	0.391	0.322	0.308	0.804	0.347	0.309	0.380
	0.324	0.366	0.321	0.715	0.351	0.307	0.296
	0.351	0.305	0.334	0.836	0.326	0.292	0.348
	0.388	0.321	0.309	0.301	0.800	0.323	0.393
	0.328	0.303	0.388	0.300	0.785	0.320	0.294
	0.342	0.373	0.372	0.376	0.751	0.295	0.368
	0.359	0.369	0.333	0.297	0.700	0.336	0.358
	0.361	0.343	0.366	0.375	0.773	0.330	0.358
	0.389	0.299	0.294	0.362	0.727	0.337	0.374
Human resources competencies	0.377	0.295	0.297	0.355	0.806	0.327	0.339
	0.348	0.395	0.305	0.314	0.856	0.322	0.359
	0.399	0.336	0.298	0.359	0.719	0.354	0.361
	0.380	0.304	0.371	0.335	0.380	0.810	0.334
	0.380	0.340	0.394	0.296	0.352	0.769	0.376
	0.294	0.325	0.363	0.365	0.321	0.876	0.350
	0.317	0.396	0.349	0.395	0.358	0.731	0.322
	0.380	0.341	0.368	0.338	0.318	0.855	0.317
Interpersonal competencies	0.291	0.353	0.375	0.310	0.296	0.756	0.390
	0.343	0.313	0.335	0.360	0.369	0.837	0.359
	0.342	0.300	0.359	0.346	0.360	0.696	0.319
	0.366	0.310	0.330	0.297	0.329	0.344	0.843
	0.382	0.375	0.305	0.379	0.299	0.365	0.707
	0.357	0.347	0.296	0.393	0.344	0.355	0.780
	0.387	0.300	0.382	0.328	0.369	0.328	0.875
0.325	0.331	0.352	0.298	0.290	0.292	0.766	
0.377	0.317	0.297	0.329	0.325	0.355	0.875	
0.324	0.369	0.301	0.396	0.343	0.341	0.846	

Source: Authors estimation.

square is evaluated. For R-square, the thresholds specified by Cohen (1988), states that values greater than 0.26 should be considered as substantial, however if the value resides between 0.02 to 0.25 should be considered as weak to moderate. Q-square which is computed through the 'Stone Geisser's cross-validated redundancy', any value which is greater than 0 should be considered as acceptable as per Hair et al.

**Table 5.** Discriminant validity Fornell-Larcker criterion.

	EED	CRT	PAT	ECOM	MGBC	HRC	INTC
EED	<b>0.735</b>						
CRT	0.387	<b>0.711</b>					
PAT	0.427	0.389	<b>0.722</b>				
ECOM	0.436	0.376	0.355	<b>0.739</b>			
MGBC	0.439	0.407	0.442	0.396	<b>0.719</b>		
HRC	0.387	0.395	0.420	0.356	0.363	<b>0.709</b>	
INTC	0.391	0.392	0.414	0.366	0.388	0.433	<b>0.760</b>

Source: Authors estimation.

**Table 6.** Results of HTMT ratio of correlations.

	EED	CRT	PAT	ECOM	MGBC	HRC	INTC
EED							
CRT	0.680						
PAT	0.587	0.695					
ECOM	0.646	0.642	0.529				
MGBC	0.539	0.681	0.449	0.533			
HRC	0.730	0.727	0.657	0.671	0.497		
INTC	0.670	0.661	0.358	0.738	0.358	0.563	

Source: Authors estimation.

**Table 7.** Predictive power of construct.

	R-square	Q-square
ECOM	0.210	0.087
MGBC	0.113	0.051
HRC	0.199	0.093
INTC	0.241	0.075

Source: Authors estimation.

(2016). The assessment of inner model and the generated outcome of R-square and Q-square are listed in Table 7.

### 4.3. Hypothesis testing

Additional edge of PLS-SEM over conventional SEM methodologies is the generation of the significance values by following the methodology of bootstrapping in which various sub-samples are generated and then eventually the significance value is computed. Hair et al. (2016) suggested the number of 5000 sub samples while computing the significance of the predictor and criterion relationships. Moreover, since the current study has four kind of Entrepreneurial Competencies, therefore they are accordingly discussed in terms of their statistical relationships with the focused predictors in the subsequent section.

Firstly, considering the exploration of Entrepreneurship competencies, Entrepreneurial Education is reported to be positively related to Entrepreneurship competencies ( $\beta = 0.237$ ,  $p < 0.01$ ) that is also statistically significant at 1% significance level. This relationship is the reflection of increment in Entrepreneurship competencies by 23.7% when there is an increase in Entrepreneurial Education by 1%. This relationships highlight the importance of the Entrepreneurial Education by showing that through vocational colleges, when such kind of education is being given and taught which is specifically based on

excelling, developing and enhancing the skills and capabilities related to the entrepreneurship, it will eventually improve the Entrepreneurship competencies of the individuals. By that, individuals will be more groomed and developed in terms of ability to sustain and survive as the potential entrepreneurs. In addition to this, Teachers' Creativity is also reported to be positively related to Entrepreneurship competencies ( $\beta = 0.248$ ,  $p < 0.01$ ) that is also statistically significant at 1% significance level. This relationship is the reflection of increment in Entrepreneurship competencies by 23.7% when there is an increase in Teachers' Creativity by 1%. This relationships highlight the importance of the Teachers' Creativity by showing that through vocational colleges, when Teachers' Creativity is integral in delivering education and the education is being given and taught in an advanced, innovative and in an inspirational manner, it will eventually improve the Entrepreneurship competencies of the individuals. By the help of delivering the knowledge in the creative and innovative manner, individuals will be more groomed and developed in terms of ability to sustain and survive as the potential entrepreneurs. On the other hand, Perceived ability to use Technology is also reported to be positively related to Entrepreneurship competencies ( $\beta = 0.139$ ,  $p < 0.01$ ) that is also statistically significant at 1% significance level. This relationship is the reflection of increment in Entrepreneurship competencies by 13.9% when there is an increase in Perceived ability to use Technology by 1%. This relationships highlight the importance of using the technology during tutoring, mentoring and lecturing by showing that in vocational colleges, when Teachers and other support staff integrate the usage of technology in delivering education, providing trainings, workshops and tutorials, etc., it will eventually improve the Entrepreneurship competencies of the individuals. By the help of delivering the knowledge, providing trainings and workshops through efficient utilization of technology, individuals will be more groomed and developed in terms of ability to sustain and survive as the potential entrepreneurs.

Secondly, considering the exploration of Management and business competencies, Entrepreneurial Education is reported to be positively related to Management and business competencies ( $\beta = 0.213$ ,  $p < 0.01$ ) that is also statistically significant at 1% significance level. This relationship is the reflection of increment in Management and business competencies by 21.3% when there is an increase in Entrepreneurial Education by 1%. This relationships highlight the importance of the Entrepreneurial Education by showing that through vocational colleges, when such kind of education is being given and taught which is specifically based on excelling, developing and enhancing the skills and capabilities related to the management and administrating business activities, it will eventually improve the Management and business competencies of the individuals. By that, individuals will be more groomed and developed in terms of ability to manage, and handle the business activities while sustaining in the competitive business environment as the potential entrepreneurs. In addition to this, Teachers' Creativity is also reported to be positively related to Management and business competencies ( $\beta = 0.124$ ,  $p < 0.01$ ) that is also statistically significant at 1% significance level. This relationship is the reflection of increment in Management and business competencies by 12.4% when there is an increase in Teachers' Creativity by 1%. This relationships highlight the importance of the Teachers' Creativity by showing that through vocational colleges, when Teachers' Creativity is integral in delivering education and the education is being given and taught in an advanced, innovative

**Table 8.** Results of path coefficients.

Hypothesized path	Path coefficient	C.R.	P-value	Remarks
ECOM ← EED	0.237	6.274	0.000	Supported
ECOM ← CRT	0.248	6.903	0.000	Supported
ECOM ← PAT	0.139	4.606	0.000	Supported
MGBC ← EED	0.213	7.901	0.000	Supported
MGBC ← CRT	0.124	7.602	0.000	Supported
MGBC ← PAT	0.221	5.163	0.000	Supported
HRC ← EED	0.122	7.424	0.000	Supported
HRC ← CRT	0.138	5.858	0.000	Supported
HRC ← PAT	0.241	8.914	0.000	Supported
INTC ← EED	0.170	7.023	0.000	Supported
INTC ← CRT	0.231	5.586	0.000	Supported
INTC ← PAT	0.131	8.421	0.000	Supported

Note: Level of significance (5% i.e., 0.050).

Source: Authors' estimation.

and in an inspirational manner, it will eventually improve the Management and business competencies of the individuals. By the help of delivering the knowledge in the creative and innovative manner, individuals will be more groomed and developed in terms of ability to manage, and handle the business activities while sustaining in the competitive business environment as the potential entrepreneurs. On the other hand, Perceived ability to use Technology is also reported to be positively related to Management and business competencies ( $\beta = 0.221$ ,  $p < 0.01$ ) that is also statistically significant at 1% significance level. This relationship is the reflection of increment in Management and business competencies by 22.1% when there is an increase in Perceived ability to use Technology by 1%. This relationships highlight the importance of using the technology during tutoring, mentoring and lecturing by showing that in vocational colleges, when Teachers and other support staff integrate the usage of technology in delivering education, providing trainings, workshops and tutorials, etc., it will eventually improve the Management and business competencies of the individuals. By the help of delivering the knowledge in the creative and innovative manner, individuals will be more groomed and developed in terms of ability to manage, and handle the business activities while sustaining in the competitive business environment as the potential entrepreneurs (Table 8).

Thirdly, considering the exploration of Human resources competencies, Entrepreneurial Education is reported to be positively related to Human resources competencies ( $\beta = 0.122$ ,  $p < 0.01$ ) that is also statistically significant at 1% significance level. This relationship is the reflection of increment in Human resources competencies by 12.2% when there is an increase in Entrepreneurial Education by 1%. This relationships highlight the importance of the Entrepreneurial Education by showing that through vocational colleges, when such kind of education is being given and taught which is specifically based on excelling, developing and enhancing the people management skills and individual's oriented capabilities related to the management and administrating of human resource, it will eventually improve the Management and business competencies of the individuals. By that, individuals will be more groomed and developed in terms of ability to manage, and handle the human resource which is integral for the potential entrepreneurs for their survival in the highly competitive business environment. In addition to this, Teachers' Creativity

is also reported to be positively related to Human resources competencies ( $\beta = 0.138$ ,  $p < 0.01$ ) that is also statistically significant at 1% significance level. This relationship is the reflection of increment in Human resources competencies by 13.8% when there is an increase in Teachers' Creativity by 1%. This relationships highlight the importance of the Teachers' Creativity by showing that through vocational colleges, when Teachers' Creativity is integral in delivering education and the education is being given and taught in an advanced, innovative and in an inspirational manner, it will eventually improve the Human resources competencies of the individuals. By that, individuals will be more groomed and developed in terms of ability to manage, and handle the human resource which is integral for the potential entrepreneurs for their survival in the highly competitive business environment. On the other hand, Perceived ability to use Technology is also reported to be positively related to Human resources competencies ( $\beta = 0.241$ ,  $p < 0.01$ ) that is also statistically significant at 1% significance level. This relationship is the reflection of increment in Human resources competencies by 24.1% when there is an increase in Perceived ability to use Technology by 1%. This relationships highlight the importance of using the technology during tutoring, mentoring and lecturing by showing that in vocational colleges, when Teachers and other support staff integrate the usage of technology in delivering education, providing trainings, workshops and tutorials, etc., it will eventually improve the Human resources competencies of the individuals. By that, individuals will be more groomed and developed in terms of ability to manage, and handle the human resource which is integral for the potential entrepreneurs for their survival in the highly competitive business environment.

Lastly, considering the exploration of Interpersonal competencies, Entrepreneurial Education is reported to be positively related to Interpersonal competencies ( $\beta = 0.170$ ,  $p < 0.01$ ) that is also statistically significant at 1% significance level. This relationship is the reflection of increment in Interpersonal competencies by 17% when there is an increase in Entrepreneurial Education by 1%. This relationships highlight the importance of the Entrepreneurial Education by showing that through vocational colleges, when such kind of education is being given and taught which is specifically based on excelling, developing and enhancing the Interpersonal and communicational skills and capabilities, it will eventually improve the Interpersonal competencies of the individuals. By that, individuals will be more groomed and developed in terms of ability to interact, communicate and developing networks with the other individuals which enables them in sustaining in the competitive business environment as the potential entrepreneurs. In addition to this, Teachers' Creativity is also reported to be positively related to Interpersonal competencies ( $\beta = 0.231$ ,  $p < 0.01$ ) that is also statistically significant at 1% significance level. This relationship is the reflection of increment in Interpersonal competencies by 23.1% when there is an increase in Teachers' Creativity by 1%. This relationships highlight the importance of the Teachers' Creativity by showing that through vocational colleges, when Teachers' Creativity is integral in delivering education and the education is being given and taught in an advanced, innovative and in an inspirational manner, it will eventually improve the Interpersonal competencies of the individuals. By the help of delivering the knowledge in the creative and innovative manner, individuals will be more

groomed and developed in terms of ability to interact, communicate and developing networks with the other individuals which enables them in sustaining in the competitive business environment as the potential entrepreneurs. On the other hand, Perceived ability to use Technology is also reported to be positively related to Interpersonal competencies ( $\beta = 0.131$ ,  $p < 0.01$ ) that is also statistically significant at 1% significance level. This relationship is the reflection of increment in Interpersonal competencies by 13.1% when there is an increase in Perceived ability to use Technology by 1%. This relationships highlight the importance of using the technology during tutoring, mentoring and lecturing by showing that in vocational colleges, when Teachers and other support staff integrate the usage of technology in delivering education, providing trainings, workshops and tutorials, etc., it will eventually improve the Interpersonal competencies of the individuals. By the help of delivering the knowledge in the creative and innovative manner, individuals will be more groomed and developed in terms of ability to interact, communicate and developing networks with the other individuals which enables them in sustaining in the competitive business environment as the potential entrepreneurs.

In terms of evaluating the most significant predictors among the studied criterion variables, CRT is found to predict the most of ECOM and INTC. This is because creativity is crucial for both of these kinds of competencies as teachers have to deal with different types of students from diverse backgrounds. Hence the level of creativity assists the facilitation process and, accordingly, in developing these two kinds of competencies the most. On the other hand, PAT is reported to explain the MGBC and HRC. This is also logical as, in the recent time of technological advancement, the handling and the management of the course through efficient utilization of technology also enable the students to learn from the teacher in terms of ability and competency to use the technology appropriately and efficiently. Hence, these outcomes lead to the recommendations and proposition, which are discussed in the next section.

## 5. Conclusion and recommendations

The significance of entrepreneurship education cannot be ruled out in the recent scenario of the highly competitive market. Moreover, the entrepreneurs are reportedly contribute positively in the economic development of the economy by increasing the gross production, wealth generation and providing employment opportunities, etc. However, the success of the business is highly dependent on the capabilities, capacities and competencies of the individual who is the operator of such business. Such entrepreneurial competencies need not to be god gifted only, hence can be learned and developed through proper trainings and education provided through the specialized academic institutions like vocational colleges. Moreover, it is also important to explore the quality of the education that is being given as well as the instructor who is the resource person in developing entrepreneurial competencies.

Hence the current study aims to explore the role of Entrepreneurial Education, Technology and Teachers' Creativity in excelling Entrepreneurial Competencies through vocational colleges. In the current study the Entrepreneurial Competencies are operationalize as the combination of 'Entrepreneurship competencies,



Management and business competencies, Human resources competencies, Interpersonal competencies'. Based on a thorough discussion and literature exploration, the current study propose the hypothesized relationships which were statistically evaluated through the application of Partial Least Square-Structural Equation Modeling on the data of 357 of potential future entrepreneurs. The results reported a significant association of the Entrepreneurial Education, Technology and Teachers' Creativity in excelling the Entrepreneurial Competencies.

Based on the findings, it has been recommended that there is a need to have the development of more specialized institutions that provide the practical trainings especially of the hard skills through which more entrepreneurs are produced. In addition to this, it is also recommended that the teaching material and the curriculum needs to be regularly updated as it defines the quality of the education being provided. Moreover, instructors, teachers and facilitators also need to enhance their personal skills by being innovative and creative so that the knowledge is transfer in the more effective and productive manner. Lastly, the usage of technology need to be encouraged both the level of instructor and the institutions as it signifies the quality of education and the professional discourse.

The current study also comprised of certain limitations based on which future directions are proposed. Firstly, there is a need to have further exploration of both hard and soft kind of competencies as the current study is only focused on the soft nature of competencies. Secondly, the current study is the quantitative study in which the study only explores within the drafted outline and hence in-depth interview based qualitative researchers are recommended as it enables the researchers to explore and extract the in-depth of the hurdles, challenges and prospectus of the market. Lastly, the current study did not explore the gender comparison and hence the role of gender and the comparison within gender need to be drawn as there are relatively lesser number of successful female entrepreneurs.

### Disclosure statement

No potential conflict of interest was reported by the authors.

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