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Entrepreneurship Competencies of School Principals: A Scale Development Study

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Abstract

This research aims to produce a reliable and valid scale that includes the entrepreneurship competencies of school principals according to the perceptions of teachers working in state-owned schools. First, after the literature review, an item pool consisting of five-point Likert item type and seventy-four items was created, and then the relevant items were presented to eleven experts to determine the content validity. After the expert evaluations, the content validity rates of the relevant items were calculated with the Lawshe technique, the nineteen items below the criterion value were removed from the scale, and a scale draft form consisting of fifty-five items was created. To carry out the EFA of the scale, the first application was performed with 436 teachers working in Çekmeköy district of Istanbul province on an online platform in March-April 2020. In the EFA process carried out in line with the data obtained, observations revealed that the scale had a four-factor structure. Then, the Varimax technique was used to clarify the distribution of scale items to factors, and seventeen items that were found to have a load of .30 and above from more than one factor and that the load difference was less than .100 were removed from the scale. As a result of EFA, a scale consisting of 38 items and subdimensions of “Personal Competencies”, “Organizational Competencies”, “Relational Competencies”, and “Commitment Self-Confidence Competencies” which explain 73.32% of the total variance was obtained. Subsequently, reliability coefficients of the scale (Cronbach’s Alpha .98), discrimination indices, item-total – item-residual correlations, and correlations between scale total and subdimensions were calculated. Finally, to carry out the CFA, the second application was carried out online with a sample of 724 teachers in May-June 2020 and the obtained goodness of fit values confirmed the scale model. All these obtained values confirm the valid and reliable structure of the developed scale.

Keywords: Entrepreneurship, Entrepreneurship Competencies, School Principals, Scale Development

Introduction

The concept of entrepreneurship has been defined from various perspectives such as introducing a new invention or producing a new product (Schumpeter, 2011), mobilizing resources and maximizing opportunities (Blake & Mestry, 2014), creating new organizations to pursue opportunities (Bygrave, 1992), determining the unused opportunities (Hitt, Ireland, Camp, & Sexton, 2002), a dynamic vision, the process of change and creation (Kuratko, 2017), and the creation of new enterprises and products (Mazzarol & Reboud, 2017). In this respect, entrepreneurship can be considered as the process of directing existing creative mental processes to innovation and change by the individual, creating new initiatives by creating opportunities and taking risks.

Entrepreneurship is an important element, especially in the economic competition of societies and their emergence as an economic power, therefore, entrepreneurship competencies have attracted attention in recent years (Armuna, Ramos, Juan, Feijóo, & Arenal, 2020). Man, Lau, and Chan (2002) state that entrepreneurship competencies encompass a higher level of competence that includes personal characteristics, skills, and knowledge. According to Man et al. (2002), these competencies are; (1) relationship competencies, (2) opportunity competencies, (3) organizing competencies such as team building or leadership, (4) conceptual competencies such as being proactive or taking risks, (5) strategic competencies including project management, (6) engagement competencies that include the ability to overcome hard work. Mitchelmore and Rowley (2010), on the other hand, proposed a four-category framework for entrepreneurship. These are; (1) entrepreneurial

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competencies, (2) human relations competencies, (3) conceptual competencies, and (4) business and management competencies. Chen, Greene, and Crick (1998) discussed entrepreneurship competencies in the context of self-efficacy and suggested a five-category competency framework. These are; (1) innovation, (2) financial control, (3) management, (4) marketing and (4) risk-taking.

A study was carried out by the European Commission in 2016 to increase the entrepreneurship capacity of European citizens and organizations under the name of “The Entrepreneurship Competence Framework” known as “EntreComp”. Fifteen competence elements were determined with this study. These are spotting opportunities, vision, creativity, sustainable and ethical thinking, valuing ideas, self-efficacy and self-awareness, perseverance, motivation and mobilizing resources, economic-financial literacy, taking the initiative, mobilizing others, management and planning, uncertainty & risk, coping with ambiguity, learning through experience and working with others (Bacigalupo, Kampylis, Punie, Van den Brande, 2016).

The literature on entrepreneurship mostly focuses on the personality, traits, and qualities of an entrepreneur. Accordingly, Van der Kuip (1998) summarized the characteristics of entrepreneurs with elements such as motivation, creativity, need for autonomy, independence, taking risks, taking initiative, thinking about possibilities, self-confidence, setting challenging goals, resilience, internal locus of control, and originality (as cited in Onstenk, 2003). Kets de Vries (1993) and Mintzberg (1990) emphasize that entrepreneurs have the power for independence and success and they have a strong need to maintain control. However, the managerial or organizational roles of entrepreneur individuals also cover an important area in these competencies. These managerial competencies can be evaluated as planning, organization, financial management, leadership, and control and these managerial roles have changed with the age towards new management competencies such as facilitator, enabler, and coordinator, change manager, communicator and negotiator, and internal consultant (Onstenk, 2003).

Entrepreneurship competence is an integrated skill related to performing entrepreneurial activities adequately and solving entrepreneurship problems. A competent entrepreneur can use his/her knowledge, attitude, and skills to cope with difficulties (such as tasks, dilemmas, problems, and contradictions arising from the intense competition or changing demands of customers) (Onstenk, 2003). In this sense, Dornelas (2008) formulated elements such as a vision of the future, consistent decision, search for opportunity, dynamism and determination, devotion, passion and optimism, independence, good relations, leadership, organization, knowledge, planning, acceptance of calculated risks and creating value for society as the most important characteristics of entrepreneurs.

Minello et al. (2014) listed entrepreneurship competencies as relationship, opportunity, conceptual, strategic and commitment, administrative (managerial) competencies in the literature. However, McClelland (1961) described the characteristics of entrepreneurs as the need for high success and reasonable risk-taking; J.A. Timmons expressed as commitment and determination, taking responsibility, constantly seeking opportunity, high self-confidence, creativity and flexibility in problem-solving, high energy, long-term perspective and being future-oriented, learning and not being afraid of failure, visionary leadership (as cited in Zimmerer & Scarborough, 1996); Bhatt (2016) indicated as the need for success, spontaneous action, desire to take risks, self-confidence, creativity and innovation, commitment, openness to new ideas, effective time management, leadership and decision-making ability, and desire for independence.

Kuratko and Hodgetts (1998) identified seventeen entrepreneurial characteristics that are likely to be present among entrepreneurs as well as related to the entrepreneurial process. These are commitment, moving on to achieve success, perseverance and determination, opportunity orientation, internal locus of control, persistent problem solving, failure tolerance, calculated risk-taking, innovation and creativity, self-confidence and optimism, initiative and responsibility, team building, uncertainty tolerance, seeking feedback, high energy, integrity and reliability, independence and vision.

Lackeus (2015) defined the knowledge, skills, and attitudes that motivate entrepreneurs towards entrepreneurship and increase their willingness in the process of creating a new value. According to Lackeus (2015), while the elements such as the knowledge possessed and presented about entrepreneurship elements such as mental models that include information about how to do things without risk, resources and probability models, opportunities, value creation, finance, idea generation, marketing, technology, accounting, risk and others and insight including personal compliance knowledge by being an entrepreneur or entrepreneurial constitute the knowledge dimension, factors such as marketing, interpersonal relationships, fundraising, learning, opportunity, and strategic skills constitute the skill dimension, and entrepreneurial passion, self-efficacy, entrepreneurial identity, proactivity, innovativeness, uncertainty tolerance, and perseverance constitute the attitude dimension. Dollinger (2008) made a classification of entrepreneurship as the creation of a new enterprise, individual, environmental, opportunity analysis, and organizational dimensions.

An important field of application of the talent and skill areas of entrepreneurship is educational organizations. In this direction, Abbas (2014) states that entrepreneurship competencies in educational organizations contain two meanings and applications. These are (1) to strive to apply entrepreneurial values in the management of educational organizations and (2) to transform the potential of an educational organizations into economic activities in obtaining benefits that can be used to develop and advance the educational organizations. Mulyasa (2005) states that to create an effective, generative, independent, and developed school, school principals should have ten key competencies to achieve success in leadership processes. These are (1) having a vision, (2) setting an example, (3) responsibility, (4) developing teachers and staff, (5) providing the best service, (6) encouraging a sense of unity and togetherness, (7) managing by prioritizing applications (8) focusing on students, (9) setting leadership style, and (10) utilizing power and expertise to strengthen schools (Abbas, 2014; Mulyasa, 2005, as cited in Syapriyuda & Santosa, 2020). These competence components also constitute important talent and skill gains for school leaders in guiding the entrepreneurship process in schools.

Having entrepreneurial competencies in an educational context, school leadership includes expectations and goals that are integrated into the school's mission, vision, strategic plan and goals by the school's abilities, conditions, and supporting factors. In the context of institutional innovation, entrepreneur principals can develop and implement new ideas that lead to critical change and development in schools. Thus, they also ensure the development of creative and innovative attitudes put forward by teachers and other employees in the process (Wibowo & Saptono, 2018; Pihie, Asimiran, & Bagheri, 2014; Ruskovaara, Pihkala, Rytkölä, & Seikkula-Leino, 2011).

According to Yemini, Addi-Racciah, and Katarivas (2014), the entrepreneurship of school principals is guided by certain visions and values that are important to them and adopted by school employees. In this sense, the success of school principals in entrepreneurship activities depends mostly on the fact that school principals gain the commitment of school personnel to their visions. According to Yemini et al. (2014), entrepreneur school principals are not affected by monetary or financial constraints to realize their entrepreneurial visions, they are not afraid to start a new project even if no funds are provided, in other words, they feel ready to take risks and are self-confident. Alfirevic, Vican, Pavicic, and Petkovic (2018) stated that school principals who have entrepreneurial orientation make use of entrepreneurial opportunities, perceive themselves as creative persons, innovation and success-oriented, good problem solver, communicator, and leader, they can develop new and market-oriented proposals, new business relationships and connections, accept responsibility by taking risks, and consider themselves competent in creating financial resources for the school.

As a result, dynamic factors such as a rapidly changing world, increasing accountability and localization, improving performance in teaching and learning require school principals to have entrepreneurial competencies (Research Centre for Learning and Teaching of Newcastle University, 2015). For this reason, revealing the entrepreneurship competencies of school principals in the school leadership dimension of educational processes will provide an advantage to the education systems of countries in changing education and competition conditions. At the same time, it is important to develop a scale that will reveal these competencies and facilitate the selection of school leaders with entrepreneurial orientation and evaluation of their performance. In this direction, this research aims to develop a reliable and valid scale that includes the entrepreneurship competencies of school principals and the items covering these competencies according to the perceptions of teachers working in public schools.

Method

Research Model

The research was carried out using the screening model to develop the "Entrepreneurship Competencies Scale". Screening models are pieces of research carried out on the whole of the population or on the sample taken from it to make a general judgment about the population consisting of many elements. In this model, there is what is intended to be known and it is there, the important thing is to observe and determine it properly (Karasar, 2012).

Population and Sample

The application of the scale was carried out in two stages. In the first application, "EFA" was performed to determine the construct validity and subdimensions of the scale, and in the second application, "Confirmatory Factor Analysis (CFA)" was performed to verify the scale model obtained. The first application was carried out in March and April 2020, and the second in May and June 2020. Teachers working in the state primary, secondary and high schools (secondary education) in Çekmeköy district on the Anatolian side of Istanbul

constitute the population of the study. The total number of teachers in the research population (primary school-secondary school-high school) is 1826. The sample number calculation method developed by Cochran (1977) was used to determine the required sample size of the population (as Cited in Gürbüz & Şahin, 2018). According to this method, the minimum sample size to be reached in a population of 1826 is presented below;

N: Population size: 1826

n: Sample size: ?

t: Table z value corresponding to the confidence level: z value corresponding to 0.05 (confidence level 95%) is 1.96.

S: The std. deviation estimated for the population: 0.5

d: Acceptable deviation tolerance: 0.05

$$n = \frac{n_0}{1 + \frac{n_0}{N}}$$

$$n_0 = [(t \times S)/d]^2 \quad n_0 = \frac{1.96^2 \times 0.5^2}{0.05^2} = 384.16$$

$$n = \frac{384,16}{1+384,16 / 1826} = 317$$

In the research, the stratified sampling was used to reach the relevant sample, and each education level (primary, secondary, and high school) was determined as a stratum, and participants with a proportional value from each stratum were included in the sample. In the stratified sampling method, the research population is divided into sub-strata that are similar in themselves, and the units to be included in the sample are randomly selected from these sub-strata within the framework of their ratios in the population. Because similar subgroups of the universe are taken into account within the framework of their ratios in the population, the level of representation of the universe by this method is higher than other methods, and at the same time, the sampling error is lower (Gürbüz & Şahin, 2018). Although the minimum number of samples calculated in the study and required to be reached was 317, in the framework of the idea that the reliability and validity of the applied scale would increase and the error about the population would decrease as the sample mass grew (Altunışık, Coşkun, Bayraktaroğlu, & Yıldırım, 2010) and after the systematically marked scale forms were removed, 436 participants were reached in the first application (EFA) and 724 participants in the second application (CFA).

Creating the Pool of Items and Submitting the Items to Expert Opinion

In the process of developing the Entrepreneurship Competencies Scale, primarily, the literature on entrepreneurship and entrepreneurs' characteristics and competencies was reviewed and a candidate item pool consisting of 74 items covering the relevant field was created. According to Clark and Watson (1995), the main purpose of creating an item pool is to sample all the content potentially related to the target structure to be measured. The studies used in the creation of the item pool are as follows;

Table 1. The Researchs Used in the Creation of the Items of the EC Scale

Schumpeter (2011)	Drucker (1985)	Kets de Vries (1993)
Blake & Mestry (2014)	Gupta, MacMillan & Surie (2004)	Gibb (1998)
Bygrave (1992)	Thornberry (2006)	Tolentino (1998)
Mazzarol & Reboud (2017)	Van der Kuip (1998)	Bueno, Leite & Pilatti (2004)
Bhatt (2016)	Mintzberg (1990)	Dornelas (2008)
Minello, Scherer & Alves (2014)	McClelland (1961)	Zimmerer & Scarborough (1996)
Abbas (2014)	Kuratko & Hodgetts (1998)	Pahuja & Sanjeev (2015)

Stevenson & Jarillo (1990)	Currie, Humphreys, Uçbaşaran & McManus, (2008)	Slater & Doig (1988)
Ghasemi, Rastegar, Jahromi & Marvdashti (2011)	Najim et.al. (2013)	Nieman, Hough & Nieuwenhuizen (2004)
Du Toit (1990)	Alberti, Sciascia & Poli (2004)	Ayub & Othman (2013)
Zimmerer & Scarborough (2001)	Norasmah (2002)	Fernald, Solomon & Tarabishy (2005)
Kirkley (2017)	Yemini et.al. (2014)	Alfirević, Vican, Pavičić & Petković (2018)

One of the most important focal points in scale development is the content validity of the created items. Content validity (CV) is often seen as the initial and lowest level requirement for measurement sufficiency. Content validity is checked immediately after the items are created, and it allows making necessary changes and improvements before preparing the scale (Schriesheim, Powers, Scandura, Gardiner, & Lankau, 1993). After creating an item pool, candidate items were submitted to the opinion of eleven referees who had the expertise to evaluate the relevant subject area and item properties, eight of whom were experts in the field of Educational Management and could evaluate the field of entrepreneurship, and three of whom were experts in the field of Measurement and could evaluate the item properties. An invitation was sent to the referees by e-mail to evaluate the candidate items, and the referees were requested to grade the items with three levels (must be removed, must be revised, must remain), to evaluate whether the items cover the relevant area and the item properties, and to write in the blank under the relevant item that needs to be revised about what kind of correction should be made.

Calculation of Content Validity Ratio (CVR) and Index (CVI)

The evaluations from the experts (referees) were combined in a single form, and to obtain the content validity ratios of the candidate items, the CVR of each item and then the CVI of the scale were obtained using the Lawshe (1975) technique. CVR are calculated by the number of experts expressing the “necessary (must remain)” opinion for any item over one less than half of the total number of experts expressing an opinion. The CVI is obtained from the mean of the CVR of the items that are significant at the 0.05 level and will be included in the final form. The criterion values for whether the candidate items have content validity or not were transformed into a table by Veneziano and Hooper (1997), and minimum values measuring the content validity according to the number of experts (referees) at a significance level of 0.05 were established. According to these criterion values given below, the minimum CVR value was determined as 0.59 in 11 expert evaluations (as cited in Yurdugül, 2005).

Table 2. Minimum Values for CVRs Determined by Veneziano and Hooper (1997)

Number of Referees	Minimum CVR Criterion
5	0.99
6	0.99
7	0.99
8	0.78
9	0.75
10	0.62
11	0.59*
12	0.56

* $\alpha = 0.05$ Significance Level

After expert evaluations, the calculated CVR values of the candidate items were compared with the relevant criterion value .59, and 19 items that did not meet the CVR criterion were removed from the scale. At the same time, the CVI was calculated by taking the mean of the CVR values of the items that met the content validity rate criterion. The content validity index rate obtained was calculated as .75. A higher CVI value of .16 than the content validity criterion indicates that the items have good content validity. As a result, it is possible to observe that the remaining items have significant content validity (Lawshe 1975).

Table 3. Content Validity Ratios (CVRs) and Content Validity Index (CVI) Obtained After Expert (Referee) Evaluation of Candidate Items of ECS

Number of Experts		11			
Item Content Validity Criterion		0.59			
Number of Items under the CVR Criterion		19			
Content Validity Index		0.75			
Items	CVR	Items	CVR	Items	CVR
1	0.64	26	0.64	51	0.82
2	-0.09*	27	0.64	52	0.09*
3	0.64	28	0.64	53	0.45*
4	0.64	29	0.82	54	0.64
5	0.82	30	0.64	55	0.64
6	0.64	31	0.45*	56	0.09*
7	1.00	32	0.64	57	0.82
8	0.82	33	0.45*	58	1.00
9	0.64	34	1.00	59	0.64
10	0.45*	35	0.64	60	0.27*
11	0.45*	36	0.64	61	0.27*
12	0.82	37	0.82	62	0.82
13	0.64	38	0.64	63	0.82
14	0.82	39	0.82	64	0.45*
15	0.64	40	0.64	65	1.00
16	0.45*	41	0.64	66	0.82
17	0.82	42	0.45*	67	0.64
18	0.27*	43	0.82	68	0.82
19	0.64	44	1.00	69	0.45*
20	0.09*	45	0.45*	70	0.82
21	0.82	46	0.82	71	0.64
22	1.00	47	0.64	72	0.27*
23	0.82	48	0.64	73	0.64
24	0.82	49	0.64	74	0.45*
25	0.64	50	0.82		

*19 items below the Content Validity Measure (0.59) were removed.

Revision of Some Items According to Referees Opinions and a Pilot Survey

The 12 items (3, 6, 8, 26, 27, 28, 39, 47, 48, 55, 59, 71), which the experts had requested to be revised among the items remaining after the content validity analysis and the expert evaluations of the candidate items of the ECS, were corrected in line with the consistent opinions of the referees. At the same time, the items were examined by two Turkish teachers and reviewed in terms of spelling rules and punctuation marks. After this editing, the scale item draft form consisted of 55 items, and the items of the scale were re-ordered randomly (1. 2. 3... .55); at the same time, a five point Likert-type rating (“Strongly Disagree”, “Disagree”, “Partially Agree”, “Agree”, “Strongly Agree”) was preferred for grading the items. The scale draft form was implemented as a pilot survey for 20 teachers in a secondary school in Çekmeköy district of Istanbul province. The pilot survey was carried out directly by the implementer, the opinions of the participants regarding the items and the draft form were noted during the application and the participants were asked to write their evaluations about the items in the draft form after the application. In line with the feedback obtained after the application, some corrections (generally writing and spelling corrections) were made and the scale form was made more useful. Then, the final scale application form was prepared.

Data Collection and Analysis

In the process of developing the Entrepreneurship Competencies Scale, an online scale form was used to collect data from the relevant sample, and the application of the scale was carried out in two stages. In the first stage, "EFA" was performed to reveal the construct validity and sub-dimensions of the scale, and in the second stage, "CFA" was performed to verify the scale model obtained. In order to analyze the data obtained during the scale development process; The SPSS package program was used to perform EFA, reliability and discrimination analyzes and correlation analyzes, and the Lisrel program was used to perform CFA, which is used to determine whether the scale model is verified or not.

Results

The results of the reliability and validity analysis of the scale and the findings obtained by comparing these results with the criterion values are presented below.

Exploratory Factor Analysis (EFA)

During the EFA process, firstly the data obtained from the sample were transferred to the SPSS 21 system and the data were cleared of outliers. Then, the Skewness-Kurtosis values of the data set were examined to determine whether the data set showed normal distribution (univariate normality assumption). In a normal distribution, "Skewness-Kurtosis" values are zero (Field, 2009). Therefore, the closer these values to zero, the normality of the distribution increase. Accordingly, some authors (George & Mallery, 2010) stated that when the data set's "Skewness-Kurtosis" values between +2 and -2 and some authors (Tabachnick & Fidell, 2015) stated that the "Skewness-Kurtosis" values between +1.5 and -1.5 meet the normality of the data set. The calculated Skewness (-.630) and Kurtosis (-.111) values of the scale were observed to be within the range specified by the authors, so the assumption that the data set showed a normal distribution was confirmed.

The correlation matrix of the relevant data set was examined before proceeding with the factor analysis and it was checked whether there was any item with a correlation value below .30 (Tabachnick & Fidell, 2015). In the examination, no item with a correlation value below .30 was found. Then, the anti-image correlation values of the items were examined and it was checked whether there was any item with a correlation value below .50 (Tabachnick & Fidell, 2015). In the examination, an item with an anti-image correlation value below .50 was not detected and all of them were .90 and above. To reveal whether the sample is sufficient for factor analysis, the Kaiser Mayer Olkin (KMO) value was calculated and found to be .985. According to Hutcheson and Sofroniou (1999), KMO value was stated as a medium between .50 and .70, good between .70 and .80, very good between .80 and .90, and excellent above .90. In this sense, the KMO value obtained is at an excellent level. To determine whether there is a high correlation between variables and whether the data set comes from a multivariate normal distribution, the Bartlett Test of Sphericity was conducted and it was found to be significant at the $p < .001$ level ($\chi^2 = 28274.82$; $df = 1485$). The significance of the Bartlett test proves that the data comes from a multivariate normal distribution and shows linearity (Tavşançıl, 2010). All these obtained values show the factorizability of the scale and provide valid parameters for the subdimensions to be revealed.

Table 4. KMO ve Bartlett Test Values of the EC Scale

KMO Sample Adequacy		.985
Barlett Test	Ki-square Value	28274.82
	Degree of Freedom	1485
	P	.000

After the KMO and Bartlett tests, EFA was performed to determine the construct validity of the scale and to determine the distribution of scale items to factors or dimensions. Varimax technique was used in the EFA process because it provides convenience in principal component analysis and naming factors (Altunışık et al., 2010). The principal component analysis is used to discover which variables in the data set combine to form a subset (Tabachnick & Fidell, 2015). In determining the factors in the EFA process, the eigenvalue was taken as 1 and the acceptable minimum load value of the factors was determined as .30 (Büyüköztürk, 2006; Ntoumanis, 2001). Tabachnick and Fidell (2015), on the other hand, determined this value as .32. In this reserach, the minimum factor load value was determined as .30.

Table 5. The Number of Factors Obtained After EFA of the EC Scale and the Total Variance Explained by Factors

Factors	Initial Eigenvalues			Total Factor Loads		
	Total	Variance %	Set %	Total	Variance %	Set %
1	36.349	66.089	66.089	36.349	66.089	66.089
2	1.487	2.703	68.792	1.487	2.703	68.792
3	1.239	2.253	71.045	1.239	2.253	71.045
4	1.077	1.959	73.004	1.077	1.959	73.004
5	.849	1.544	74.548			
6	.763	1.388	75.935			
7	.730	1.327	77.262			
8	.635	1.154	78.417			
55	.79	.143	100			

* Factor Method: Princ. Comp. Analysis

**Rotat. Method: Varimax

After EFA analysis performed as seen in Table 5 above, it is possible to observe that the scale is collected in 4 factors with an eigenvalue greater than 1 and the total variance amount explained by these factors is 73%. After this process, the Varimax technique was used to clarify the distribution of scale items to factors and to reveal the dimensional plane of the items. The Varimax orthogonal rotation technique clarifies the distribution of items or variables to factors by maximizing the high correlation values in the correlations between variables and factors and minimizing the low ones. The Varimax technique is also a method of maximizing the variance of loads on each factor (Tabachnick & Fidell, 2015). After the Varimax technique, observations exhibited that some items had a load of .30 and above from more than one factor, and items with a load difference of less than .100 were excluded from the scale. In this process, the items 5, 6, 17, 19, 21, 22, 23, 24, 26, 37, 39, 40, 43, 46, 52, 53, and 55 were removed one by one from the scale and the analysis was performed repeatedly (17 times) until the dimensions became clear. After the Varimax orthogonal rotation technique, a total of 17 items were removed from the scale and the total amount of variance explained by the scale was 73.32%. At the same time, the Kaiser Mayer Olkin (KMO) value of the scale was found to be .982, and the Barlett Test of Sphericity test at $p < .001$ level ($\chi^2 = 17719.70$; $df = 703$). The factor (subdimension) number of the scale was determined as 4.

Table 6. The Number of Factors of the Scale After Varimax Orthogonal Rotation Technique

Factors	Initial Eigenvalues			Total Factor Loads			Rotated Totals of the Factor Loads		
	Total	Variance %	Set %	Total	Variance %	Set %	Total	Variance %	Set %
1	24.460	64.369	64.369	24.460	64.369	64.369	8.800	23.158	23.158
2	1.296	3.409	67.778	1.296	3.409	67.778	7.073	18.613	41.771
3	1.098	2.891	70.669	1.098	2.891	70.669	7.049	18.549	60.320
4	1.008	2.652	73.320	1.008	2.652	73.320	4.940	13.000	73.320
5	.690	1.816	75.136						
6	.678	1.784	76.920						
7	.575	1.514	78.434						
8	.537	1.413	79.847						
9	.472	1.242	81.089						
10	.464	1.220	82.309						

* Factor Method: Princ. Comp. Analysis

**Rotat. Method: Varimax

Table 7. The Clarifying Factors of the Post-Varimax EC Scale and the Load Values of These Factors

Items	Factors			
	Fact. 1	Fact. 2	Fact. 3	Fact. 4
30)He/she has a curiosity about creating new values.	.750			
34)He/she is committed to his/her goals.	.718			
33)He/she is aware of his/her competencies.	.677			
47)He/she realizes his/her ideas.	.669			
31)He/she is willing to learn.	.669			
35)He/she continues a job he/she undertakes.	.624			
38)The desire for high success is reflected in his/her behavior.	.610			
48)He/she develops alternative projects.	.597			
54)When he/she detects opportunities, he/she uses them without hesitation.	.592			
45)He/she manages his/her time effectively.	.586			
32)He/she updates himself/herself.	.583			
36)He/she allocates resources while starting a new job.	.562			
41)He/she has high energy.	.562			
20)He/she takes into account the possibilities before starting a business.	.523			
2)He/she can revise old applications and present them in a new format.		.764		
1)He/she follows up opportunities regarding the development of the institution.		.722		
4)He/she activates the institution towards a new target.		.678		
3)He/she supports the discovery processes of the employees.		.613		
8)He/she is the person who initiates change in the organization.		.600		
13)He/she likes to research.		.599		
14)He/she does not miss opportunities that arise for the improvement of institutional practices.		.588		
10)He/she can bring together different resources belonging to the institution and reveal them in a useful way.		.582		
12)He/she has a dynamic vision.		.578		
15)He/she likes to present innovation.		.565		
16)He/she creates new values out of existing resources.		.538		
9)He/she supports the diversity of ideas.			.729	
7)He/she creates an environment in the institution where people can present their ideas without hesitation.			.717	
44)He/she is open to new ideas.			.697	
49)He/she supports good practices produced by employees.			.696	
29)He/she cooperates with employees in achieving goals.			.685	
50)He/she cares about employee participation in achieving a job.			.650	
27)He/she uses communication processes well.			.574	
28)He/she analyzes the requirements of the environment well.			.571	
11)He/she takes risks.				.729
42)He/she is not afraid of failure.				.662
25)He/she makes independent decisions.				.660
18)He/she takes initiative.				.607
51)He/she does not hesitate to start a new project even if the resources are not provided.				.579

* Factor Method: Princ. Comp. Analysis

**Rotat. Method: Varimax

As seen in Tables 6 and 7 above, it is possible to observe that the items of the scale were collected in 4 factors with an eigen value greater than 1. The scale items were determined to have acceptable load values (lowest .523, highest .764) in the factors they entered. After examining the items in the factors, factors (dimensions) were named by considering the majority of items entering the factors within the framework of the relevant literature. The factor names, item numbers, numbers, and the studies used in naming the factors are shown in Table 8 below;

Table 8. Characteristics of EC Scale

Factor (Subdimension)	Factor (Subdimension) Name	Number of Items	Item Numbers	Studies Used in Naming the Factors (Subdimensions)
1	Personal Competencies (IC)	14	20, 30, 31, 32, 33, 34, 35, 36, 38, 41, 45, 47, 48, 54	Dollinger (2008) Van der Kuip (1998) Bueno, Leite & Pilatti (2004) Dornelas (2008) Najim et.al. (2013) McClelland (1961) Zimmerer & Scarborough (1996) Bhatt (2016) Kuratko & Hodgetts (1998)
2	Organizational Competencies (OC)	11	1, 2, 3, 4, 8, 10, 12, 13, 14, 15, 16	Dollinger (2008) Onstenk (2003) Najim et.al. (2013) Kuratko & Hodgetts (1998)
3	Relational Competencies (RC)	8	7, 9, 27, 28, 29, 44, 49, 50	Minello, Scherer & Alves (2014) Gibb (1998) & Tolentino (1998) Najim et.al. (2013) Bhatt (2016)
4	Commitment Self-Confidence Competencies (CSCC)	5	11, 18, 25, 42, 51	Minello, Scherer & Alves (2014) Van der Kuip (1998) Mintzberg (1990) & Kets de Vries (1993) Dornelas (2008) Bhatt (2016) Najim et.al. (2013) Zimmerer & Scarborough, 1996 McClelland (1961) Kuratko & Hodgetts (1998) İşcan & Kaygın (2011) Ağca (2004) Caird (1991)

As seen in Table 8, the first subdimension of the scale consists of 14 items, the second subdimension has 11 items, the third subdimension consists of 8 items, and the fourth subdimension consists of 5 items. The scale consists of 38 items in total. The variables (items) loading the determined scale factors were examined and the subdimensions were named by determining the common points between the variables (Altunışık et al., 2010). In other words, the basic dimension that combines the variable (item) group loaded on the factors was taken into account in naming the factors (Tabachnick & Fidell, 2015). For this purpose, the first subdimension of the scale was named as “*Personal Competencies*”, the second subdimension as “*Organizational Competencies*”, the third subdimension as “*Relational Competencies*”, and the fourth subdimension as “*Commitment-Self-Confidence Competencies*”.

Reliability Analyses

Split-half and Cronbach's Alpha (CA) methods were used to reveal the reliability levels and reliability coefficients of the scale and its subdimensions obtained after EFA. CA is the most used reliability determination method and calculates under the consistency between scale items. In the splitting test method, the scale items are divided into two halves and the correlation between these two halves is calculated, and then the resulting correlation coefficient is applied to the correction formula to obtain the reliability coefficient of the whole scale (Şeker & Gençdoğan, 2014; Kan, 2009). The values obtained are shown in Table 9 below;

Table 9 Calculated Reliability Coefficients of Post EFA Scale and Its Subdimensions

EC Scale and Its Subdimensions	Cronbach's Alpha Coefficient	Split Half Spearman-Brown Coefficient	Split Half Guttman Coefficient
Personal Competencies (PC)	.96	.95	.95
Organizational Competencies (OC)	.96	.94	.94
Relational Competencies (RC)	.95	.93	.93
Commitment Self-Confidence Competencies (CSCC)	.88	.85	.80
EC Scale Total	.98	.96	.96

As seen in Table 9, the reliability analyses of the scale total and subdimensions performed after EFA reveal that the Cronbach's Alpha Value, which was performed to determine the internal consistency reliability, ranged from the lowest $\alpha = .88$ and the highest $\alpha = .98$. In the Split Half method, which is a reliability analysis for halving the scale and its subdimensions and determining the consistency between two halves, Spearman-Brown Coefficient was observed to vary between the lowest $S = .85$ and the highest $S = .96$, and the Guttman Coefficient was observed to vary between the lowest $G = .80$ and the highest $G = .96$. According to Livingston (2018), a reliability coefficient is an absolute number that can vary between .00 and 1.00. The value of 1.00 indicates the perfect consistency, and the closer it gets to the .00 value, the consistency and reliability disappear. The lowest reliability coefficient suggested in the literature is .70 (Fraenkel & Wallen, 1993; Şeker & Gençdoğan, 2014). The high-reliability coefficient values of the scale obtained prove that the reliability and internal consistency of the scale and its subdimensions are high (Price & Mueller, 1986; Nunnally, 1978 as cited in Germain, 2006).

Discriminant Analysis

After the reliability analyses, the Independent Groups t-test was used to calculate the discrimination of the scale, its subdimensions, and scale items. In this direction, using the scale and subdimension total scores and item scores, the upper 27%, and the lower 27% segments were determined, and whether the differences of arithmetic means between these groups was significant and if it was significant, it was calculated whether it was in favor of the upper group. Discrimination is comparing high and low scorers of an item or scale, and the ability to distinguish between the high and low score in a particular feature. A ratio of 27% is generally considered sufficient to separate upper and lower groups because this value provides a sufficient rate for the analysis of discrimination, while at the same time maximizing the differences in normal distributions (McCowan & McCowan, 1999; Wiersma & Jurs, 1990).

Table 10. Independent Group t-test Conducted to Reveal the Discrimination of the EC Scale and its Subdimensions

Subdimensions	Groups	<i>N</i>	\bar{X}	<i>SS</i>	$Sh_{\bar{x}}$	<i>t</i>	<i>t test</i> Df	<i>p</i>
Personal Competencies (PC)	Upper	118	64.03	3.96	.36	35.986	172.15	.000
	Lower	118	34.71	7.91	.73			
Organizational Competencies (OC)	Upper	118	50.14	3.194	.29	35.371	165.92	.000

	Lower	118	25.60	6.824	.63			
Relational Competencies (RC)	Upper	118	36.92	2.035	.19	37.381	155.32	.000
	Lower	118	18.48	4.957	.45			
Commitment Self-Confidence Competencies (CSCC)	Upper	118	21.57	1.727	.16	42.542	209.91	.000
	Lower	118	9.81	2.457	.22			
EC Scale Total	Upper	118	170.37	10.261	.94	38.833	175.24	.000
	Lower	118	90.42	19.874	1.83			

Table 11. Independent Group t-test Conducted to Reveal the Discrimination of the EC Scale Items

Items	Groups	N	\bar{X}	t	Df	p
1	Upper	118	4.84	32.260	175	.000
	Lower	118	2.46			
2	Upper	118	4.46	28.901	234	.000
	Lower	118	2.14			
3	Upper	118	4.75	33.781	194	.000
	Lower	118	2.19			
4	Upper	118	4.75	31.628	196	.000
	Lower	118	2.38			
7	Upper	118	4.92	38.863	150	.000
	Lower	118	2.12			
8	Upper	118	4.45	35.915	234	.000
	Lower	118	1.85			
9	Upper	118	4.59	33.794	234	.000
	Lower	118	1.94			
10	Upper	118	4.57	29.896	209	.000
	Lower	118	2.18			
11	Upper	118	4.44	44.896	234	.000
	Lower	118	1.52			
12	Upper	118	4.52	36.057	234	.000
	Lower	118	1.80			
13	Upper	118	4.53	31.152	234	.000
	Lower	118	2.05			
14	Upper	118	4.76	30.045	181	.000
	Lower	118	2.31			
15	Upper	118	4.78	32.850	186	.000
	Lower	118	2.25			
16	Upper	118	4.65	32.035	203	.000
	Lower	118	2.10			
18	Upper	118	4.63	47.412	234	.000
	Lower	118	1.66			
20	Upper	118	4.57	28.687	205	.000
	Lower	118	2.23			
25	Upper	118	4.40	43.665	231	.000
	Lower	118	1.73			
27	Upper	118	4.61	32.685	199	.000
	Lower	118	1.89			
28	Upper	118	4.58	30.953	234	.000
	Lower	118	2.01			
29	Upper	118	4.72	31.851	191	.000

	Lower	118	2.14			
30	Upper	118	4.74	31.243	204	.000
	Lower	118	2.45			
31	Upper	118	4.84	33.362	173	.000
	Lower	118	2.33			
32	Upper	118	4.66	32.576	206	.000
	Lower	118	2.13			
33	Upper	118	4.75	29.537	183	.000
	Lower	118	2.34			
34	Upper	118	4.79	30.302	185	.000
	Lower	118	2.47			
35	Upper	118	4.86	32.217	168	.000
	Lower	118	2.52			
36	Upper	118	4.59	28.093	205	.000
	Lower	118	2.32			
38	Upper	118	4.68	31.945	201	.000
	Lower	118	2.16			
41	Upper	118	4.69	36.558	234	.000
	Lower	118	1.92			
42	Upper	118	4.38	43.548	234	.000
	Lower	118	1.61			
44	Upper	118	4.65	31.328	199	.000
	Lower	118	2.10			
45	Upper	118	4.46	28.187	204	.000
	Lower	118	2.13			
47	Upper	118	4.60	27.307	213	.000
	Lower	118	2.50			
48	Upper	118	4.49	30.589	234	.000
	Lower	118	2.10			
49	Upper	118	4.97	36.862	127	.000
	Lower	118	2.33			
50	Upper	118	4.89	33.750	158	.000
	Lower	118	2.42			
51	Upper	118	4.42	38.049	234	.000
	Lower	118	1.81			
54	Upper	118	4.56	28.389	210	.000
	Lower	118	2.30			

As seen in Tables 10 and 11, a significant difference in favor of the upper group ($p < .001$) was found between the EC scale and subdimension scores and the arithmetic means of the lower 27% and upper 27% of the item scores of the scale, thus, observations exhibited that the scale, its subdimensions and the items of the scale were discriminants. The significant difference between the lower and upper group means shows that the internal consistency of the scale is also high (Büyüköztürk, 2012).

Correlation Calculations

After the discrimination process, item-total (IT) and remaining item (IR) correlations of the items of the SC scale were calculated, and the results revealed the internal consistency of the scale and whether the items measure the same structure.

Table 12. EC Scale IT and IR Correlation Results

Items	Item-Total Correlation			Item-Remainder Correlation	
	N	r	p	r	p
1	436	.804	.000	.793	.000
2	436	.705	.000	.688	.000

3	436	.806	.000	.794	.000
4	436	.834	.000	.825	.000
7	436	.732	.000	.715	.000
8	436	.846	.000	.836	.000
9	436	.789	.000	.776	.000
10	436	.864	.000	.855	.000
11	436	.733	.000	.715	.000
12	436	.884	.000	.875	.000
13	436	.832	.000	.821	.000
14	436	.853	.000	.844	.000
15	436	.843	.000	.833	.000
16	436	.871	.000	.862	.000
18	436	.787	.000	.772	.000
20	436	.743	.000	.729	.000
25	436	.624	.000	.603	.000
27	436	.805	.000	.791	.000
28	436	.832	.000	.821	.000
29	436	.821	.000	.809	.000
30	436	.704	.000	.688	.000
31	436	.845	.000	.836	.000
32	436	.845	.000	.835	.000
33	436	.810	.000	.799	.000
34	436	.796	.000	.784	.000
35	436	.799	.000	.788	.000
36	436	.843	.000	.834	.000
38	436	.788	.000	.775	.000
41	436	.825	.000	.813	.000
42	436	.689	.000	.670	.000
44	436	.826	.000	.815	.000
45	436	.829	.000	.819	.000
47	436	.793	.000	.783	.000
48	436	.851	.000	.842	.000
49	436	.793	.000	.781	.000
50	436	.787	.000	.774	.000
51	436	.745	.000	.730	.000
54	436	.833	.000	.823	.000

As seen in Table 12, the correlation values obtained as a result of item-total correlation (lowest .624; highest .884) and item-remainder correlation (lowest .603; highest .875) were above .30 and a positive significant relationship was determined at the $p < .001$ level. All these results show that the internal consistency of the scale is high and it measures the same structure (Büyüköztürk, 2012; Gürbüz & Şahin, 2018). After this process, Pearson Analysis was performed to reveal the relationships between the scale and subdimensions and between the subdimensions themselves. Analysis results shows the strength and severity of the relationship between two variables, it is represented by “r” and takes values between -1 and +1 (Altunışık et al., 2010). If the coefficient obtained after the correlation calculations between variables is lower than .30, the relationship between variables is described as weak, if it is between .30-.70, the relationship between variables as a medium, and if it is .70 and above, the relationship between variables as strong in the literature (Gürbüz & Şahin, 2018).

Table 13. Pearson Analysis Performed to Reveal the Relationships Between the EC Scale and the Subdimensions and Between the Subdimensions themselves

The Scale and Subdimensions		Organizational Competencies (OC)	Relational Competencies (RC)	Commitment Self-Confidence Competencies (CSCC)	Entrepreneurship Competencies Total
Personal	r	.896	.860	.812	.967
	p	.000	.000	.000	.000

Competencies (PC)				
Organizational	r	.857	.804	.959
Competencies (OC)	p	.000	.000	.000
Relational	r		.766	.929
Competencies (RC)	p		.000	.000
Commitment Self- Confidence	r			.875
Competencies (CSCC)	p			.000

As seen in Table 13, as a result of the Pearson Analysis, a high positive relationship was found between both sub-factors and between sub-factors and the total score of the scale. A positive significant relationship was found between the “*EC Scale*” and “*Personal Competencies*” subdimension with $r = .967$ at $p < .001$ level, between the “*EC Scale*” and the “*Organizational Competencies*” subdimension with $r = .959$ at $p < .001$ level, between the “*EC Scale*” and the “*Relational Competencies*” subdimension with $r = .929$ at $p < .001$ level, and between the “*EC Scale*” and the “*Commitment-Self-Confidence Competencies*” subdimension with $r = .875$ at $p < .001$ level. Nevertheless, a positive significant relationship was found between the “*Personal Competencies*” subdimension and the “*Organizational Competencies*” subdimension with $r = .896$ at $p < .001$ level, between the “*Personal Competencies*” subdimension and the “*Relational Competencies*” subdimension with $r = .860$ at $p < .001$ level, between the “*Personal Competencies*” subdimension and the “*Commitment-Self-Confidence Competencies*” subdimension with $r = .812$ at $p < .001$ level, between the “*Organizational Competencies*” subdimension and the “*Relational Competencies*” subdimension with $r = .857$ at $p < .001$ level, between the “*Organizational Competencies*” subdimension and the “*Commitment-Self-Confidence Competencies*” subdimension with $r = .804$ at $p < .001$ level, and between the “*Relational Competencies*” subdimension and the “*Commitment-Self-Confidence Competencies*” subdimension with $r = .766$ at $p < .001$. All these results show that all factors of the EC scale measure the same structure and that all factors have a positive correlation between themselves and with the total score of the scale.

After the above procedures regarding the EC scale, the items of the scale were reordered. The new and old item numbers of the scale are shown below;

Table 14. EC Scale New and Old Item Numbers Before the Second Application and CFA

New Item Number	Old Item Number	Items	Subdimensions			
			PC	OC	RC	CSCC
1	30	He/she has a curiosity about creating new values.	.750			
2	34	He/she is committed to his/her goals.	.718			
3	33	He/she is aware of his/her competencies.	.677			
4	47	He/she realizes his/her ideas.	.669			
5	31	He/she is willing to learn.	.669			
6	35	He/she continues a job he/she undertakes.	.624			
7	38	The desire for high success is reflected in his/her behavior.	.610			
8	48	He/she develops alternative projects.	.597			
9	54	When he/she detects opportunities, he/she uses them without hesitation.	.592			
10	45	He/she manages his/her time effectively.	.586			
11	32	He/she updates himself/herself.	.583			
12	36	He/she allocates resources while starting a new job.	.562			
13	41	He/she has high energy.	.562			
14	20	He/she takes into account the possibilities before starting a business.	.523			

15	2	He/she can revise old applications and present them in a new format.	.764	
16	1	He/she follows up opportunities regarding the development of the institution.	.722	
17	4	He/she activates the institution towards a new target.	.678	
18	3	He/she supports the discovery processes of the employees.	.613	
19	8	He/she is the person who initiates change in the organization.	.600	
20	13	He/she likes to research.	.599	
21	14	He/she does not miss opportunities that arise for the improvement of institutional practices.	.588	
22	10	He/she can bring together different resources belonging to the institution and reveal them in a useful way.	.582	
23	12	He/she has a dynamic vision.	.578	
24	15	He/she likes to present innovation.	.565	
25	16	He/she creates new values out of existing resources.	.538	
26	9	He/she supports the diversity of ideas.	.729	
27	7	He/she creates an environment in the institution where people can present their ideas without hesitation.	.717	
28	44	He/she is open to new ideas.	.697	
29	49	He/she supports good practices produced by employees.	.696	
30	29	He/she cooperates with employees in achieving goals.	.685	
31	50	He/she cares about employee participation in achieving a job.	.650	
32	27	He/she uses communication processes well.	.574	
33	28	He/she analyzes the requirements of the environment well.	.571	
34	11	He/she takes risks.	.729	
35	42	He/she is not afraid of failure.	.662	
36	25	He/she makes independent decisions.	.660	
37	18	He/she takes initiative.	.607	
38	51	He/she does not hesitate to start a new project even if the resources are not provided.	.579	

Confirmatory Factor Analysis (CFA)

After EFA and reliability analyses, CFA was performed to reveal whether the scale model and model-data fit were verified. The data obtained in the practice carried out in a sample of 724 teachers were first transferred to the SPSS 21 system and the Skewness-Kurtosis values of the data set were examined to reveal whether the data set showed normal distribution (univariate normality assumption). The fact that the “Skewness-Kurtosis” values of the data set are in the range of +2 and -2 indicates that they meet the normality assumption. Observations revealed that the calculated Skewness (-.827) and Kurtosis (.703) values of the scale were within the specified range, so the assumption that the data set showed a normal distribution was confirmed (George & Mallery, 2010; Tabachnick & Fidell, 2015). Then, the application of CFA was performed using the Lisrel program. In CFA, the status of representation of the variables of the scale in the factors they enter is revealed and verified, at the same time, the researcher determines the distribution of the variables to the factors in the creation of the model (Özdamar, 2004; Albright & Park, 2009). However, CFA is a data reduction technique that evaluates the relationships between several variables. Depending on the results in the CFA process, that is, if the model is not verified, it may be necessary to take a new sample and perform an EFA again, or interventions such as item deletion or revision in measurement may take place (Germain, 2006). As a result, the general purpose of EFA and CFA is to ensure the stability of the factor structure (Hinkin, 1995). For this purpose, the relevant data were transferred to the Lisrel program and the model of the scale was determined by the researcher, and items (variables) were assigned to the model. Then, the model was calculated and the fit values of the model were revealed. In Table 15 below, item statistics obtained from the items in the scale as a result of the CFA analysis performed for the EC scale are given.

Table 15. CFA Item Statistics

Factor	Item No	Factor Load Value	R ²	Error	t
Personal Competencies (PC)	1	.85	.73	0.27	24.17**
	2	.83	.69	0.31	32.59**
	3	.81	.66	0.34	31.53**
	4	.81	.65	0.35	31.31**
	5	.86	.74	0.26	34.59**
	6	.84	.70	0.30	33.15**
	7	.85	.71	0.29	33.63**
	8	.89	.78	0.22	36.25**
	9	.84	.71	0.29	33.54**
	10	.84	.70	0.30	33.17**
	11	.90	.81	0.19	37.38**
	12	.82	.69	0.31	32.68**
	13	.86	.75	0.25	34.83**
	14	.80	.64	0.36	30.92**
Organizational Competencies (OC)	15	.87	.75	0.25	34.97**
	16	.86	.73	0.27	34.35**
	17	.89	.78	0.22	36.24**
	18	.88	.77	0.23	35.83**
	19	.87	.75	0.25	34.96**
	20	.89	.79	0.21	36.38**
	21	.88	.77	0.23	32.18**
	22	.89	.78	0.22	36.28**
	23	.91	.83	0.17	38.28**
	24	.91	.82	0.18	37.67**
	25	.91	.82	0.18	37.62**
Relational Competencies (RC)	26	.85	.73	0.27	33.71**
	27	.84	.71	0.29	33.04**
	28	.89	.78	0.22	35.93**
	29	.88	.78	0.22	35.85**
	30	.90	.81	0.19	37.03**
	31	.88	.77	0.23	35.37**
	32	.84	.71	0.29	33.31**
	33	.86	.74	0.26	34.10**
Commitment	34	.88	.77	0.23	35.19**
Self- Confidence	35	.81	.66	0.34	31.02**
Competencies (CSCC)	36	.63	.40	0.60	21.87**
	37	.84	.71	0.29	32.83**
	38	.82	.68	0.32	31.76**

**p<0.01

As seen in Table 15, according to the CFA results of the Entrepreneurship Competencies Scale, the factor load values of the scale items vary between .63 and .91. The factor load values obtained are at an acceptable level. Also, the relationships between scale items and latent variables were determined to be statistically significant at a 99% confidence interval ($t > 2.58$). The path diagram of CFA is presented below:

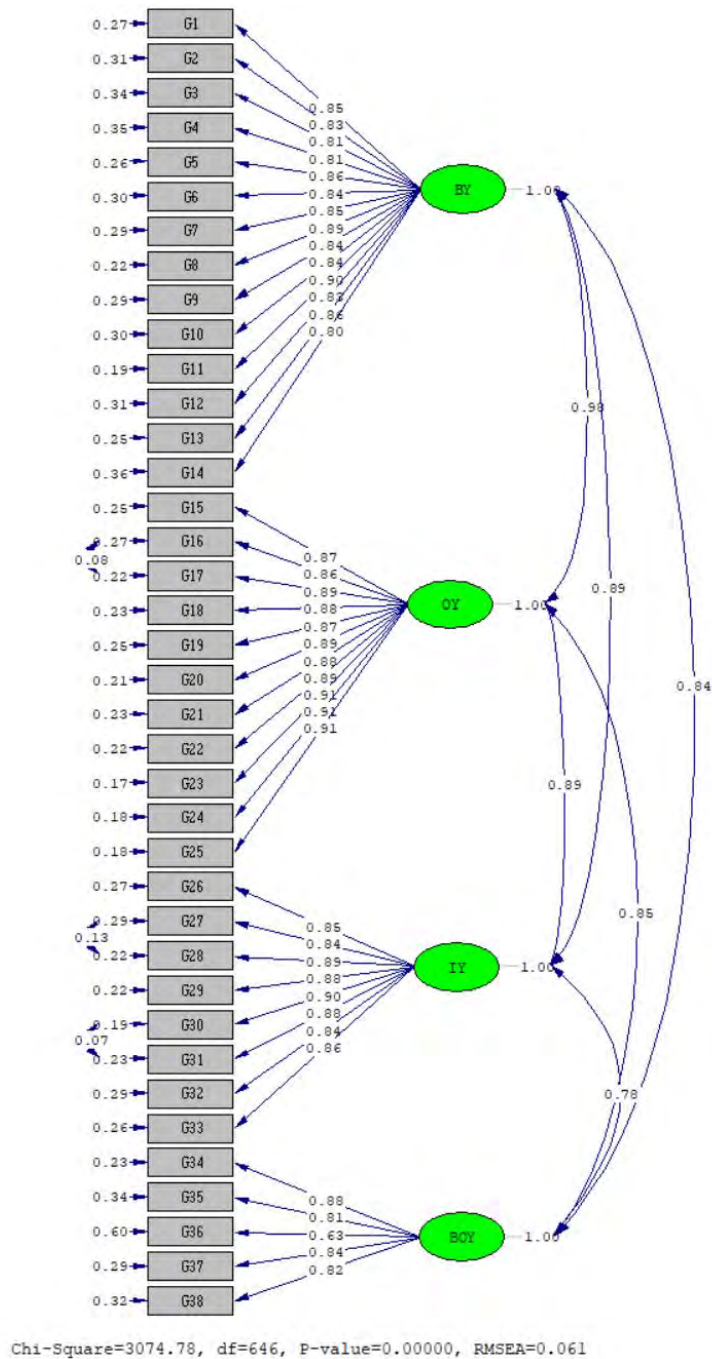


Figure 1. EC Scale CFA Model

As seen in Figure 1, the CFA model of the EC scale has been presented as a four-factor structure. PC represents the “Personal Competencies” subdimension, OC represents the “Organizational Competencies” subdimension, RC represents the “Relational Competencies” subdimension, and CSCC represents the “Commitment-Self-Confidence Competencies” subdimension. When looking at the path diagram obtained after CFA analysis of the EC scale model, at the first stage, the fit criteria did not come out at the desired level, so modifications, which are suggested by the program, were made between items 16-17, 27-28 and 30-31. The goodness of fit values calculated after the CFA application are presented below:

Table 16. EC Scale Goodness of Fit Values

X^2/df	p	RMSEA	GFI	CFI	AGFI	NNFI	NFI	SRMR	RMR
4.759	0.000	.061	.91	.99	.86	.99	.99	.023	.025

As seen in Table 16, the chi-square value calculated as a result of the CFA of the EC scale model was found as $\chi^2 = 3074.78$, degree of freedom as $df = 646$ ($p < .001$), and chi-square/df value as 4.759. A value of χ^2/df below 5 indicates that the model fit is at an acceptable level (Schermelleh-Engel, Moosbrugger, & Müller, 2003). Looking at the results of fit indexes, the RMSEA value was calculated as .061, CFI value as .99, NFI value as .99, GFI value as .91, and the RMR value as .025. The facts that the RMSEA value is below .08, the GFI value is .90 and above, the RMR value is below .1, the CFI value is .90 and above, and the NFI value is .90 and above reveal that the model is compatible with the real data and all fit indexes have acceptable or perfect values (Rigdon, 1996; Erkorkmaz, Etikan, Demir, Özdamar, & Sanisoğlu, 2013; Hu & Bentler, 1999; Schermelleh-Engel et al., 2003; Bentler & Bonnet, 1980; Byrne, 2011; Yaşlıoğlu, 2017; Çokluk, Şekercioğlu & Büyüköztürk, 2010; Plichta & Kelvin, 2013).

The Scoring of the Scale

The Entrepreneurial Competencies Scale is structured as a five point Likert type, and the “Strongly Disagree” option is 1 point, the “Disagree” option is 2 points, the “Partially Agree” option is 3 points, the “Agree” option is 4 points, and “Strongly Agree” option is 5 points. As the total score of the scale increases, the assumed “Entrepreneurial Competencies” feature also increases. There is no reverse item on the scale. The lowest 14 and highest 70 points can be obtained from the “Personal Competencies” subdimension of the scale, the lowest 11 points, and highest 55 points can be obtained in the “Organizational Competencies” subdimension, the lowest 8 points, and highest 40 points can be obtained in the “Relational Competencies” subdimension, the lowest 5 points, and highest 25 points can be obtained in the “Commitment-Self-Confidence Competencies” subdimension, and the lowest 38 and highest 190 points can be obtained in the “Entrepreneurship Competencies Scale” in general. Regarding the scoring of the Entrepreneurship Competencies scale, the score and decision ranges are as follows:

Table 17. The Scoring of the Entrepreneurship Competencies Scale and Decision Ranges

	Strongly Disagree	Disagree	Partially Agree	Agree	Strongly Agree
When the means of the scoring points are calculated	1.00-1.8	1.9-2.69	2.70-3.49	3.50-4.29	4.30-5.00
When the total point means are calculated	38-68.4	68.5-98.8	98.9-129.2	129.3-159.6	159.7-190
Decision Direction	Entrepreneurship Competencies Decrease			Entrepreneurship Competencies Increase	
	←			→	

Discussion and Conclusion

School principals need to have competencies that include entrepreneurship qualities in terms of the development and competition of today’s educational institutions. For this reason, the development of a measurement tool that covers and measures these competencies in both the selection of pre-service school leaders and the evaluation of the in-service performance of school leaders guided this research. In this study, which was conducted in line with this orientation, a measurement tool consisting of four subdimensions and 38 items was obtained to develop a scale that has items including entrepreneurship competencies of school principals according to teachers’ perceptions. The measurement tool obtained consists of “Personal Competencies” with fourteen items, “Organizational Competencies” with eleven items, “Relational Competencies” with eight items, and Commitment-Self-Confidence Competencies with five items.

During the development phase of the EC Scale, the total variance amount explained by the four factor obtained in the EFA analysis, which was carried out to ensure the structural validity of the scale and to determine the factor structures, was 73.20%. Observations revealed that the factor loading values of the variables (items) that load on the factors were between .523 and .750 in the Personal Competencies subdimension, between .538 and .764 in the Organizational Competencies subdimension, between .571 and .729 in the Relational Competencies subdimension; and between .579 and .729 in the Commitment Self-Confidence Competencies subdimension which are acceptable load values.

In the reliability analysis performed after determining the factor structures of the measurement tool, observations exhibited that CA value at the level of the scale and its subdimensions was between the lowest .88 and the highest .98, the Spearman-Brown Coefficient varied between the lowest .85 and the highest .96 range, the Guttman Coefficient ranged from .80 to the highest .96, and the scale had a high of reliability.

In the discrimination analysis performed after the reliability analysis, observations revealed that there was a significant difference in favor of the upper group ($p < .001$) between the scale and its subdimensions, as well as the upper and lower mean scores of the scale items, and the scale's items and subdimensions had a distinctive structure. After the discrimination analysis, item-total (lowest .624; highest .884) and item-remainder correlations (lowest .603; highest .875) were calculated, and among the items, a highly positive ($p < .001$) significant relationship was detected. After this process, Pearson Analysis was performed to reveal the relationships between the scale and the subdimensions and between the subdimensions themselves, and it was observed that the correlation values ranged from the lowest .766 to .967. All these correlation values show that the scale, its items, and subdimensions are consistent within themselves and have a highly significant relationship with each other.

Finally, CFA was performed to verify the scale model and the obtained fit values ($\chi^2 / df=4.759$; RMSEA = .061; CFI = .99; NFI = .99; GFI = .91; AGFI = .86; RMR = .025; SRMR = .023) confirmed the scale model and its four-factor structure. All these values obtained prove that the EC scale has a valid and reliable structure.

The four-factor scale structure obtained in this study within the subject area and scope of entrepreneurship competencies matches with various studies and evaluations in the literature. Thus, the personal competencies subdimension has been defined by various researchers (Dollinger, 2008; Van der Kuip, 1998; Bueno, Leite & Pilatti, 2004; Dornelas, 2008; Najim et al., 2013; McClelland, 1961; Zimmerer & Scarborough, 1996; Bhatt, 2016; Kuratko & Hodgetts, 1998) and it includes specificities that contain the character and behavioral qualities that find their expression in individuals' characteristics and distinguish them from others. Organizational competencies subdimension is reflected by the views of Dollinger (2008), Onstenk (2003), Najim et al. (2013), and Kuratko and Hodgetts (1998) and it includes the attitudes that direct the leadership and management processes to entrepreneurship, such as the leader guiding the organization within the framework of his/her vision, ensuring organizational commitment to initiatives, introducing initiatives to ensure change and innovation to the organization, and activating the organization. The Relational Competencies subdimension has been emphasized by the evaluations of Minello, Scherer, Alves (2014), Gibb (1998), Tolentino (1998), Najim et al. (2013), and Bhatt (2016) and it includes cooperation regarding implementation of initiatives and relationship management, participation, communication processes, and diversity of ideas. Commitment-Self-Confidence Competencies are also expressed by various researchers (Minello, Scherer, Alves, 2014; Van der Kuip, 1998; Mintzberg, 1990; Kets de Vries, 1993; Dornelas, 2008; Bhatt, 2016; Najim et al., 2013; Zimmerer & Scarborough, 1996; McClelland, 1961; Kuratko & Hodgetts, 1998; İşcan & Kaygın, 2011; Ağca, 2004; Caird, 1991) and includes taking risk and initiative, self-confidence, not being afraid of failure, perseverance, and determination.

As a result, innovation and change processes in organizations and original productions and value creation start with the initiatives of the organization leaders. The fact that school leaders perceive the opportunities by observing the dynamics within their organizational structure and turning them into initiatives puts these schools in the foreground in educational terms. In this context, school leaders need to acquire these competencies and adopt them in an individual structure to carry out the process with entrepreneurial eyes.

Recommendations

Although the developed EC scale was developed in the sample and context of school leaders, it has an item character that can be used in different sectors. For this reason, to see the big picture, it is important to use the scale to determine the entrepreneurship competencies of leaders in different professional fields and sectors, as well as to test and adapt the scale in different cultural and regional sampling structures. At the same time, it will

be beneficial for the development of the education system if decision-makers take these competencies into account in the selection and evaluation of school leaders and reflect these competencies to pre-service and in-service training processes.

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Appendix-1

ENTREPRENEURSHIP COMPETENCIES SCALE						
Please mark the relevant option considering the level of your school principal in the situations below.						
	My School Principal;					
Item No	Items	Strongly Disagree	Disagree	Partially Agree	Agree	Strongly Agree
1	He/she has a curiosity about creating new values.	①	②	③	④	⑤
2	He/she is committed to his/her goals.	①	②	③	④	⑤
3	He/she is aware of his/her competencies.	①	②	③	④	⑤
4	He/she realizes his/her ideas.	①	②	③	④	⑤
5	He/she is willing to learn.	①	②	③	④	⑤
6	He/she continues a job he/she undertakes.	①	②	③	④	⑤
7	The desire for high success is reflected in his/her behavior.	①	②	③	④	⑤
8	He/she develops alternative projects.	①	②	③	④	⑤
9	When he/she detects opportunities, he/she uses them without hesitation.	①	②	③	④	⑤
10	He/she manages his/her time effectively.	①	②	③	④	⑤
11	He/she updates himself/herself.	①	②	③	④	⑤
12	He/she allocates resources while starting a new job.	①	②	③	④	⑤
13	He/she has high energy.	①	②	③	④	⑤
14	He/she takes into account the possibilities before starting a business.	①	②	③	④	⑤
15	He/she can revise old applications and present them in a new format.	①	②	③	④	⑤
16	He/she follows up opportunities regarding the development of the institution.	①	②	③	④	⑤
17	He/she activates the institution towards a new target.	①	②	③	④	⑤
18	He/she supports the discovery processes of the employees.	①	②	③	④	⑤
19	He/she is the person who initiates change in the organization.	①	②	③	④	⑤
20	He/she likes to research.	①	②	③	④	⑤
21	He/she does not miss opportunities that arise for the improvement of institutional practices.	①	②	③	④	⑤
22	He/she can bring together different resources belonging to the institution and reveal them in a useful way.	①	②	③	④	⑤
23	He/she has a dynamic vision.	①	②	③	④	⑤
24	He/she likes to present innovation.	①	②	③	④	⑤
25	He/she creates new values out of existing resources.	①	②	③	④	⑤
26	He/she supports the diversity of ideas.	①	②	③	④	⑤
27	He/she creates an environment in the institution where people can present their ideas without hesitation.	①	②	③	④	⑤
28	He/she is open to new ideas.	①	②	③	④	⑤
29	He/she supports good practices produced by employees.	①	②	③	④	⑤
30	He/she cooperates with employees in achieving goals.	①	②	③	④	⑤
31	He/she cares about employee participation in achieving a job.	①	②	③	④	⑤
32	He/she uses communication processes well.	①	②	③	④	⑤
33	He/she analyzes the requirements of the environment well.	①	②	③	④	⑤

34	He/she takes risks.	①	②	③	④	⑤
35	He/she is not afraid of failure.	①	②	③	④	⑤
36	He/she makes independent decisions.	①	②	③	④	⑤
37	He/she takes initiative.	①	②	③	④	⑤
38	He/she does not hesitate to start a new project even if the resources are not provided.	①	②	③	④	⑤