A MODEL DEVELOPMENT RESEARCH: ENTREPRENEURIAL UNIVERSITIES

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ABSTRACT

It is observed that the understanding of neo-liberal education has transformed universities into student centered institutions aiming for an education consistent with global development, generating an entrepreneurial and creative human resource and accordingly developing consistent education programs. Besides, efforts for constituting a competitive, entrepreneurial and innovative university governance system that meets the expectations of all stakeholders and creating Entrepreneurial and Innovative University Indexes that will contribute to the development of this system have been on the rise. In Turkey, only one index named as the Entrepreneurial and Innovative University Index developed and implemented by TUBITAK for this purpose has been used since 2012.

The presence of different measurement tools in this regard would be scientifically useful. The aim of the present study is to develop a new index regarding university entrepreneurship. The statements that were considered to be included in the measure were created in accordance with the literature and the opinions of experts. At this stage, a draft form consisting of 53 items was obtained. This draft index was sent to experts from the field and their opinions were asked. Following the expert opinions, a Content Validity Index (CVI) study was conducted and 50 items were found to be left on the candidate scale. The candidate scale was subjected to an exploratory factor analysis and a structure composed of 47 items and 5 factors was obtained. The Cronbach's Alpha value of the scale was found as .986. In conclusion, it was determined that the scale was a valid and reliable measurement tool

.**Key words:** *Entrepreneurship, University Entrepreneurship, Entrepreneur-friendly Universities, Scale Development Study*

1.INTRODUCTION

The proliferation and achievement of effective entrepreneurship, which plays an important role for economic, technological and social development and progress, to a large extent depends on discovering entrepreneurial individuals. The significant contributions that entrepreneurship provides to the creation of new work areas and to the solution of employment problems is also a topic that has recently been emphasized more frequently. This has also increased the importance of the research and studies aimed at discovering potential entrepreneurs.

Universities are continuously affected by the socio-economic, socio-political and socio-cultural changes caused by globalization. This has brought about radical changes in the functions, responsibility areas, structures and processes of universities and their abilities for creating funds and their levels of perceiving their environments. This change forces universities to undertake a new mission. This mission has been to raise the awareness of universities regarding entrepreneurship and to embed the ecosystem of entrepreneurship across the university at the institutional level.

The dissemination of an entrepreneurial culture at universities and their affiliated institutions started to be discussed as an issue in our country in relatively recent times. Research studies on the measurement of the effectiveness of policy measures for the dissemination of an entrepreneurial culture are also not yet adequate. The Entrepreneurial

University Ranking Method named as the Entrepreneurship and Innovativeness Index, which has been developed and implemented at the university level by TUBITAK under the management of the Ministry of Science, Industry and Technology, has been used since 2012.

Experts on entrepreneurship emphasize the significance of studies on measuring university entrepreneurship. When evaluating the Entrepreneurial University Index Model, it is necessary to perform evaluations by considering the different judicial systems of countries, structural differences and regional characteristics, histories of the universities and the stages they passed through, and the development level of the countries. Moreover, it is also necessary to take into consideration the own conditions of each university and the differences and diversities among their practices. For this reason, a standard model is not stated when making reference to the entrepreneurial university model. The important role of entrepreneurship on the economy and the society has led us to think that more studies are needed to be conducted on university entrepreneurship measurement models and motivated us to conduct a study on this topic.

2. ENTREPRENEURIAL UNIVERSITY MODEL AND TURKEY

Entrepreneurial university model has followed a process that started with the consultancy services offered by the academic staff in the areas of industry and commerce at the investigative and innovative universities of the US such as MIT and Stanford at the end of the 19th century and today spread to European universities like Cambridge and Twente and developed through the formation of independent institutions working between the university and the industry and the assignment of new characteristics and functions to the university. Universities have been changing in the direction of providing an increase in regional, social and economic welfare through interacting with the industry without obstructing their traditional function of education and research (Odabaşı, 2006).

When we examine the development achieved by entrepreneurial universities, we observe two different trends of value production activities. In the first of these two trends, universities conduct activities that will maintain the increase of entrepreneurial intentions and skills among the whole public starting from their students and including their staff. These serve as training and skill-building activities covering a large scope ranging from raising awareness to guiding individuals with entrepreneurial intentions. In the second of these trends, universities carry out activities that will create value (activities that improve and increase the qualities of products and services, and ultimately the production and presentation of these to the consumers) almost like a business organization. This second case is a structural transformation which is also represented through concepts such as 'intrapreneurship, corporate entrepreneurship, etc.' in the 'Entrepreneurship' literature. There are certain reasons that require this transformation in higher education. The tendencies of deregulation, privatization and liberalization, which are the outcomes of the 'Globalization' process, decrease the dependence on public funding and thus the role of the state in higher education, and necessitates universities to have more entrepreneurial and competitive structures with regard to the market (Altbach et al., 2009).

Besides, the number of students in higher education that increased with the increasing competition and transition to mass education in the 1990s in the world and in our country made public resources inadequate and forced the institutions to look for new resources. This competitive environment, which was something new for universities, led them to projects that provide external resources, cooperation with universities in different regions, opening new campuses in different cities and countries, international mobility of students and academicians, and to processes of incorporation that regard students as 'customers'. With the adaptation of the neo-liberal policies of some country governments such as the US to universities, it was also suggested that universities needed to be 'entrepreneurial' to create new resources (Küçükcan and Gür, 2009).

Rinne (2009) states the elements that activate universities on the way to become entrepreneurial as internal and external factors. The external factors are listed as (1) the formation of European Higher Education Area-EHEA, (2) demand for more autonomy, (3) international competition, and the internal factors are (1) traditional culture and administration mechanisms, (2) academic capitalism, (3) entrepreneurial activities, and (4) role of the university in the higher education system (Rinne, 2009, as cited in Sakınç and Bursalıoğlı, 2012).

The dissemination of entrepreneurship training activities at universities and thus the development of the entrepreneurial characteristics of individuals is also as important as the success of universities in gaining an entrepreneurial structure for the development of entrepreneurship (Yelkikalan et al., 2010). The first step for a university to develop its entrepreneurial characteristics is to measure the level of entrepreneurship in the current situation. The following steps are the assessment of the developments within the process and the creation of the roadmaps that will contribute to achieving the desired level.

2.1. Aim

The aim of the present study is to develop an index that evaluates the entrepreneurial and innovative potentials of universities and presents their entrepreneur-friendliness levels. The first trend regarding university entrepreneurship was taken as base for our study. That is, the approach which suggests that the university conducts activities that maintains the increase of entrepreneurial intentions and skills among the whole public starting from their students and including their staff was adopted in the study. In our study, the development of entrepreneurial intentions and skills in these environments has been named with the term 'Entrepreneur-friendly University', which is aimed to be contributed to the literature.

3. METHOD

3.1. Research Model

This study is a methodological research in which validity and reliability studies were conducted to develop an entrepreneurial and innovative university index. A model consisting of three phases and ten steps was used in this study (Geçkil and Tikici, 2015:51).

3.2. Population and Sample of the Study

In a scale development study for measuring university entrepreneurship, it is necessary to collect the information regarding the entrepreneurial characteristics and skills of universities and the things they can and cannot do and their products from the administrations of those universities. This is because such information is possessed by university administrations. This procedure was adopted also in our study. However, since we did not have the chance to collect data within the required sample from university administrations (this could not be possible because of the following reasons: 1. The project was limited to KOP region universities, 2. The sample required for the exploratory factor analysis conducted in the scale development process needs to be five times or more than the number of items in the candidate scale, which means that almost all of the universities across Turkey –public and private included- needed to provide data, 3. Since we were completely ignored when we tried to collect information from university administrations, we adopted an alternative way) a procedure that could be a substitute to this one was used in the study. In the new procedure, we resorted to collecting data from faculty members. The faculty members were asked to assess the applicability of each item in the candidate scale to be included in the scale. For this purpose, a five-point Likert type reply form was created. A total of 500 questionnaires were distributed. The study was conducted using the 155 usable forms out of the 274 forms that were received back.

3.3. Validity Study

There are three primary criteria for testing the validity of a measurement tool (Tezbaşaran, 1996; Gözüm and Aksayan, 2003). These are;

1.   Content validity

2.   Construct validity

3.   Criterion-related validity.

The validity study of the developed index was conducted based on the content validity explained below.

3.3.1. Content Validity

This is the stage at which the ability of the items to measure the characteristics that are aimed to be measured is determined. The comprehensiveness of the scale is generally tested by using the opinions of the experts on the topic of the scale and the related literature (Tezbaşaran, 1996). At this stage, the content validity study known as Lawshe's technique was employed (Lawshe, 1975). Lawshe's technique consists of the following 6 steps:

1.   Constitution of the domain expert group

2.   Preparation of the candidate scale form

3.   Obtaining experts' opinions

4.   Calculation of the content validity indexes regarding the items

5.   Obtaining the content validity index of the scale

6.   Constitution of the candidate scale form based on the content validity index.

At this first stage of the study, these 6 steps of content validity were implemented.

3.3.1.1. Data Collection

An item pool consisting of 145 items was created based on the literature review and the opinions of the domain experts to determine the statements to be included in the index (Grave et al., 2013; Tübitak, 2013a; Tübitak, 2013b). The obtained items were reviewed by the researchers, the repeated items were deleted and a draft measurement instrument of 52 items was formed.

The draft scale was sent to 28 faculty members from the related field in Turkey through electronic mail to obtain expert opinions for content validity, and 13 of these faculty member experts replied back. The experts were asked to evaluate each statement that was planned to be included in the measurement tool and to give points between 1 and 5. In the evaluation that was asked to be performed regarding the applicability of each item for measuring the attribute aimed to be measured, 1 point is explained with the statement "by no means applicable", 2 points with "not applicable", 3 points with "applicable", 4 point with "very applicable", and 5 points with "completely applicable". The opinions of the experts who gave 3, 4, and 5 points to an item on the expert opinion form were regarded as "essential".

Following the expert evaluations, the Item Content Validity Index (I-CVI) was calculated for each of the 52 items. The content validity index is calculated by dividing the number of experts who indicated an item as "essential" (ng) to the total number of experts (N) (Polit and Beck, 2006). Although the acceptable Item CVI values of the items to be included in the scale vary depending on the number of experts, this value is recommended to be not lower than .78 (Polit and Beck, 2006). According to Lawshe (1975), the minimum CVI values that the items are required to have to be included in the scale are as shown in Table 1. The items with a CVI value smaller than the minimum value shown in Table 1 would not be included in the developed scale.

3.3.2. Findings

In this study, 13 experts evaluated a total of 52 items, and the content validity index of each item was calculated. The content validity index (CVI) calculated for each item was compared with the minimum value (0.54) in Table 1 depending on the number of experts, and the items with a value bigger than this minimum value were accepted (A). Accordingly, since the CVI values of 50 of the 52 items were bigger than the minimum value, the candidate scale form consisted of 50 items. The statements in the items were given their final shape by taking into consideration the suggestions of the experts for minor changes.

Table 1: Minimum content validity index values the items are required to have to be

included in the scale depending on the number of experts

Number of experts	Minimum value	Number of experts	Minimum value
5	0.99	13	0.54
6	0.99	14	0.51
7	0.99	15	0.49
8	0.78	20	0.42
9	0.75	25	0.37
10	0.62	30	0.33
11	0.59	35	0.31
12	0.56	40+	0.29

While the I-CVI values of the items included in the candidate scale varied between .62 and 1.0, the Scale Content Validity Index (S-CVI) for the entire scale was calculated as .82. An S-CVI of .80 or higher is stated as an acceptable value (Polit and Beck, 2006). Accordingly, the item and scale CVIs of the candidate measurement tool were at acceptable levels.

3.3.3. Construct Validity

Construct Validity shows the ability of an instrument to measure the whole of the related conceptual structure. It is the process of understanding what a point obtained from a scale signifies in reality (Gözüm and Aksayan, 2003:11). Exploratory factor analysis was used to test the construct validity of the scale.

3.3.3.1. Exploratory Factor Analysis

Exploratory factor analysis is a multivariate statistical technique used to work on a large number of interrelated variables in order to find a smaller number of conceptually meaningful new variables (factors/dimensions) (Tezbaşaran, 1996:51; Gözüm and Aksayan, 2003:12; Büyüköztürk, 2002:472; Çokluk et al., 2012:178). For construct validity, the Kaiser-Meyer-Olkin coefficient and the Bartlett test need to be performed before the factor analysis. The result of the Bartlett test was (P<.000) and the KMO value was found as .914. These values state that the sample was adequate and the data showed a normal distribution.

3.3.3.2. Determining the Number of Factors

The percentage of variance explained by the factors (Table 2) and Scree Plot were taken into consideration when determining the number of factors. The factor analysis revealed a 5-factor structure with an eigenvalue higher than 1 which explained the 73.875% of the total variance. Factor 1 explained 29.405%, Factor 2 explained 14.898%, Factor 3 explained 13.97%, Factor 4 explained 8.070% and Factor 5 explained 7.530% of the total variance.

Table 2: Percentages of the Variance Explained by the Dimensions (n=155)

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	31,098	62,196	62,196	14,703	**29,405**	29,405
2	2,505	5,009	67,205	7,449	**14,898**	44,304
3	1,993	3,986	71,191	6,986	**13,971**	58,275
4	1,396	2,792	73,983	4,035	**8,070**	66,345
5	1,185	2,369	76,352	3,765	**7,530**	**73,875**

A high percentage of variance explained is interpreted as an indicator of the success of the measurement conducted on the structure. A case in which the variables included in the analysis explain 2/3 of the total variance is considered as significant. However, it is difficult to reach this rate in social and behavioral sciences (Büyüköztürk, 2002:479). In social sciences, a percentage of variance between 40% and 60% is considered to be sufficient (Scherer et al., 1988; Özcan and Balyer, 2013:142).

3.3.3.3. Examining and Naming the Factors

The five factors obtained as the result of the EFA conducted using Varimax rotation and the factor loads of the items included in the factors are presented in Table 3. Factor loading indicates the correlation between the item and the factor. A low factor load shows that the item does not have a strong correlation with the factor in question. Although it is stated that the factor load value of an item should not be lower than .30, there are also theoreticians who argue that this value needs to be .40 (Çokluk et al., 2012:194). As can be seen in Table 3, item factor loads were found to be considerably good (the lowest value was .46, and the highest value was .87). Three of the statements on the candidate scale were lost due to statistical reasons.

Table 3: Factor Structure and Factor Loads of the Items (n=155)

SCALE ITEMS	Inputs and framework conditions in the promotion of entrepreneurship	Project Patent Utility Model Industrial Design Outputs	Project Size and Collaborations	Initiatives	Academic Performance and Environmental Conditions
Item48	**,790**	,180	,244	,168	,189
Item46	**,789**	,155	,144	,260	,136
Item38	**,770**	,223	,176	,130	,060
Item41	**,769**	,267	,359	,026	,185
Item36	**,748**	,229	,155	,211	,150
Item47	**,730**	,204	,316	,255	,118
Item42	**,726**	,140	,201	,188	,130
Item49	**,721**	,463	,108	,244	,173
Item43	**,721**	,285	,274	,252	,148
Item50	**,712**	,409	,295	,203	,123
Item45	**,706**	,183	,266	,373	,077
Item39	**,684**	,395	,203	,140	,072
Item40	**,677**	,413	,048	,229	,025
Item35	**,671**	,337	,242	,261	,151
Item32	**,646**	,345	,320	,268	,211
Item37	**,639**	,228	,404	-,001	-,068
Item44	**,628**	,470	,314	,288	,168
Item33	**,627**	,312	,351	,337	,222
Item31	**,590**	,397	,396	,120	,130
Item34	**,590**	,330	,362	,282	,207
Item29	**,587**	,352	,356	,152	,170
Item30	**,574**	,220	,430	,199	,113
Item21	**,573**	,312	,436	,187	,152
Item26	**,548**	,305	,365	,169	,170
Item27	**,547**	,202	,280	,263	,279
Item11	,384	**,744**	,238	,261	,165
Item14	,361	**,726**	,378	,123	,177
Item13	,356	**,707**	,301	,227	,226
Item12	,338	**,674**	,335	,355	,162
Item10	,342	**,672**	,339	,145	,251
Item17	,499	**,560**	,258	,221	,208
Item1	,391	**,518**	,366	,200	,138
Item6	,312	,256	**,769**	,218	-,021
Item3	,291	,267	**,743**	,323	-,010
Item7	,356	,483	**,666**	,095	,186
Item4	,249	,262	**,632**	,259	,316
Item2	,378	,402	**,618**	,248	,143
Item5	,378	,479	**,614**	,162	,182
Item22	,431	,278	**,546**	,326	,346
Item8	,334	,351	**,463**	,365	,124
Item23	,354	,268	,281	**,781**	,076
Item24	,364	,275	,283	**,768**	,098
Item25	,412	,224	,283	**,755**	,129
Item19	,091	,214	-,010	,039	**,867**
Item18	,055	,194	,083	,051	**,831**
Item20	,146	-,114	,299	,132	**,731**
Item9	,196	,208	,013	,033	**,688**

As is seen in Table 3, the first factor was composed of 25 items and the factor loads of these items varied between .55 and .79. The items included in this factor consisted of Input and Framework Conditions of university entrepreneurship. For this reason, this factor was named as Inputs and Framework Conditions. The second factor consisted of 7 items and the item factor loads varied between .52 and .74. This factor was named as Project Patent Utility Model Industrial Design Outputs. The third dimension consisted of 8 items and the item factor loads had values between .46 and .77. This dimension was named as Project Size and Collaborations. The fourth dimension was composed of 3 items, and the item factor loads varied between .76 and .81. This dimension was named as Initiatives. The last dimension consisted of 4 items with factor loads between .69 and .87. This dimension was named as Academic Performance and Environmental Conditions because of its relevance to this aspect of university entrepreneurship.

3.4. Reliability

The α coefficient developed by and named after Cronbach (1951) was used to determine the reliability of the scale. Cronbach's α coefficient is a measure of the internal consistency and homogeneity of the items existing in the scale (Tezbaşaran, 1996:46). Cronbach's α coefficient for the entire scale was measured as .986. As for the dimensions, it was measured as .983 for Factor 1, .956 for Factor 2, .954 for Factor 3, .958 for Factor 4, and .830 for Factor 5. In a Likert type scale, while an α coefficient above .70 is considered to be adequate for test reliability (Kurnaz and Yiğit, 2010:38), this value needs to be close to 1 as much as possible (Tezbaşaran, 1996:47). In general, a reliability coefficient (Cronbach's α) above .90 is considered to be 'excellent', above .80 is considered to be 'very good' and above .70 is considered to be 'adequate'. Accordingly, it can be seen that the internal consistency (reliability) of the entire Entrepreneurial and Innovative University Index and its first four dimensions was excellent, and that of the last dimension was found to be very good.

4. CONCLUSION AND SUGGESTIONS

In the present study, which was carried out to develop a valid and reliable instrument for measuring the entrepreneurial and innovative potentials of universities, it was decided to include 50 items in the candidate measurement tool as the result of the evaluation performed to determine the statements that would appear in the index. As the result of the subsequent exploratory factor analysis, three more statements were eliminated from the candidate scale, and a 47-item and 5-factor scale which explained the 73.875 of the total variance and which had excellent reliability values was obtained. Since entrepreneurship and innovativeness are terms that are close in meaning and are sometimes used instead of one another in the literature, and the scale on the whole focuses on the ecosystem of entrepreneurship, we suggest that it would be more appropriate to name it as Entrepreneur-friendly University Index instead of Entrepreneurial and Innovative University Index.

The items that would be included in the Entrepreneur-friendly University Index were determined in this study. In the following stages, it is suggested to determine the weights of the scale dimensions by taking local and foreign indexes into account. In addition, it is recommended to implement the Entrepreneur-friendly University Index at the universities in our country and to compare the results among the implementations. Such a case can provide our universities and decision makers with different perspectives.

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