



ENTREPRENEURIAL AND INNOVATIVE UNIVERSITIES: NUMBER OF CITATIONS IS AN EVIDENCE OF INNOVATION?

Elyase İSKENDER ¹, Hatice Yasemin İSKENDER ²

¹ Hakkari University, Hakkari, Turkey

² Hakkari University, Hakkari, Turkey

ABSTRACT

In this study the relationship between number of scientific article citations and Universities entrepreneurial activities in Turkish Universities has investigated. Tubitak's entrepreneurial and innovative index rankings for 2011 – 2015 (EIUI) and Webometric's Ranking of scientists in Turkish institutions based ranking (WGS) and WGS per academician based ranking (WGSP) have been issued with spearman correlation coefficient to find an answer to this. The correlation between EIUI's and WGSP is quite higher than the correlations between EIUI's and WGS. 2012's EIUI has the most correlation with WGSP the correlation between them is strong. This shows that the time of maturity for number of citations is important indicator for using the number of citations in the EIUI decision model.

Keywords: Entrepreneurial Universities, Innovation, Turkish Scientists, Google Scholar Citations

INTRODUCTION

The movie named “Prestige” started with a lecture of a magician:

Every magic trick consists of three parts, or acts. The first part is called "the pledge." The magician shows you something ordinary. A deck of cards, a bird or a man. He shows you this object. Perhaps he asks you to inspect it, to see that it is indeed real, unaltered, normal. But, of course, it probably isn't. The second act is called "the turn." The magician takes the something ordinary and makes it something extraordinary “pulling something out” or “making something disappear”. But this isn't enough. You have to

bring it back. That's why every magic trick has a third act. The hardest part. The part called “the prestige”.

Economic realities is very similar to this illusion processes. First you present something to the customers (or mass individuals of the economic system) Then that ordinary thing becomes extraordinary with marketing strategies and advertisement hypnosis inflation of the bubble. The nature of the over inflated bubble requires a boom as World wide web boom, mortgage boom. The prestige act requires innovation at the last phase. The prestige of the economists is hidden at there.

Similar to the theory of evolution’s *survival of the fittest* principle, economies as an organism needs a *constructive destruction*, an innovation. Innovation has to be central to any meaningful response to global crises. A new economic paradigm cannot be rebuilt by excluding the universities. In the future, the buildings where well-paying, sustainable jobs formed, and a better life provided to us all in a sustainable way in the global economy, are not banks, plazas, but research labs, classrooms, and innovation centers where knowledge translated into the products or services and sustainable global economy.

An short look to historical development of Research university in World could be seen at Thorp & Goldstein[1]:

German diplomat Wilhelm von Humboldt founded the University of Berlin in 1809 as an institution of change. Cornell University was founded in 1865 as our first modern research university. Cornell was the result of a partnership between an academic, Andrew D. White, and an entrepreneur, Ezra Cornell, the founder of Western Union. Soon after, in 1876, a second such partnership between Johns Hopkins, a railroad man, and Daniel Coit Gilman, an academic, resulted in the creation of Johns Hopkins University. The University of Chicago was established by John D. Rockefeller and William Rainey Harper for the purpose of spreading “useful knowledge.” Stanford University was established by Leland Stanford, another railroad man, to help young people undertake a “useful life.”

Entrepreneurs innovate so do the Universities. The union of this two distinct identities is the main challenge of the new balance. In other words at the center of the new economic system must be an “Entrepreneurial University”.

Entrepreneurial University is the commercialized version of Research Universities. Research universities produce knowledge but entrepreneur university produce knowledge and transform it to commercial product.

This study's main question is "is there the relationship between scientific article citations and Universities entrepreneurial activities in Turkey?". Tubitak's entrepreneurial and innovative index rankings for 2011 – 2015 and Webometric's Ranking of scientists in Turkish institutions based ranking issued with spearman correlation coefficient to find an answer to this question.

WEBOMETRIC'S RANKING OF TURKISH SCIENTISTS ACCORDING TO GOOGLE SCHOLAR CITATION DATABASE

The Turkish Scientist Ranking database was built with data collected during the third week of May 2016 (16 may 2016) from the public profiles of researchers working in Turkish (Turkey, Europe/Asia) institutions. It is a ranking of the scientists according to their declared (voluntarily) presence in the Google Scholar Citations database.

Turkish University rankings according to the number of citations of their academic staff which have h-index greater than 9 is shown at Table 1.

Rank	Universities	Citations	Rank	Universities	Citations
1	Istanbul Technical University	281329	51	Dicle University	28885
2	Boğaziçi University	256105	52	Acibadem University	27409
3	Middle East Technical University	243045	53	Gaziantep University	27028
4	Bilkent University	227007	54	Istanbul Medipol University	25435
5	Koç University	224855	55	Yıldırım Beyazıt University	23489
6	Istanbul University	203094	56	Afyon Kocatepe University	22866
7	Hacettepe University	199622	57	Bezmialem Vakıf University	22578
8	Ankara University	162367	58	Trakya University	22521
9	Erciyes University	148723	59	Abant İzzet Baysal University	22293
10	Dokuz Eylül University	131255	60	İzmir Katip Çelebi University	21789
11	Sabancı University	120052	61	İzmir Institute of Technology	19833
12	Gazi University	116867	62	Yüzüncü Yıl University	19046
13	Çukurova University	100323	63	Mustafa Kemal University	19004
14	Akdeniz University	89252	64	Istanbul Kültür University	18467
15	Marmara University	83622	65	Kadir Has University	18440
16	Ege University	81000	66	Kırıkkale University	17994
17	TOBB University of Economics and Technology	80950	67	Çanakkale Onsekiz Mart University	16564
18	Fırat University	77715	68	Namık Kemal University	15719
19	Atatürk University	75669	69	Celal Bayar University	15670
20	Mersin University	70109	70	Niğde University	15572
21	Karadeniz Technical University	68176	71	Konya Necmettin Erbakan University	15169
22	Pamukkale University	56959	72	Başkent University	14638
23	Near East University	54699	73	Düzce University	14634
24	Istanbul Medeniyet University	54161	74	Yaşar University	14552
25	Selçuk University	53968	75	Abdullah Gül University	14487
26	Istanbul Bilgi University	53763	76	Başkent University	14351
27	Gebze Technical University	49701	77	Aksaray University	13379
28	Yıldız Technical University	46362	78	Hasan Kalyoncu University	12572
29	Anadolu University	45994	79	Mevlana University	12463
30	Bahçeşehir University	43071	80	Özyeğin University	12079
31	Gülhane Military Medical Academy	41144	81	Adıyaman University	11987
32	Yeditepe University	40248	82	Atilim University	11668
33	Eskişehir Osmangazi University	40228	83	MEF University	11535
34	İnönü University	39536	84	Karadeniz Technical University Turkey	10420
35	Ozyegin University Istanbul	39366	85	Cankaya University	10089
36	Kahramanmaraş Sütçü İmam University	38945	86	Bülent Ecevit University	9963
37	Adnan Menderes University	38547	87	TED University	9834
38	Uludağ University	37935	88	Harran University	9833
39	Işık University	36724	89	Erzincan University	9259
40	Süleyman Demirel University	35946	90	Recep Tayyip Erdoğan University	9171
41	Cumhuriyet University	35693	91	İzmir University of Economics	8783
42	Kocaeli University	35062	92	Canik Başarı University	8247
43	İzmir Institute of Technology	33953	93	Kafkas University	7889
44	Sakarya University	33336	94	Balıkesir University	7708
45	Fatih University	32791	95	Okan University	7491
46	Özyeğin University	32439	96	Bozok University	7420
47	Ondokuz Mayıs University	32262	97	Dumlupınar University	7204
48	Muğla Sıtkı Koçman University	31998	98	Üsküdar University	7123
49	Gaziosmanpaşa University	30954	99	Istanbul Kemerburgaz University	7088
50	Eastern Mediterranean University	29283	100	Balıkesir University	6952

Table 1 Top 100 Turkish Universities based on WGS

To examine the citation number or the citation number per university additional ranking according to WGS per academicians numbers [3] have done. This ranking (ranks) have not

contain all Turkish universities but 62 Turkish universities which could enter to the EIUI list from 2012 to 2015. This list can be seen in Table 2

Rank	University	Citations	# of Academics	Citations Per Academic
1	SABANCI UNIVERSITY	114477	277	413,27
2	KOÇ UNIVERSITY	206490	517	399,40
3	İHSAN DOĞRAMACI BİLKENT UNIVERSITY	221853	812	273,22
4	BOĞAZİÇİ UNIVERSITY	256105	1053	243,21
5	TOBB EKONOMİ VE TEKNOLOJİ UNIVERSITY	43950	279	157,53
6	IŞIK UNIVERSITY	36724	245	149,89
7	İSTANBUL TEKNİK UNIVERSITY	280938	2240	125,42
8	İSTANBUL MEDENİYET UNIVERSITY	54161	441	122,81
9	ORTA DOĞU TEKNİK UNIVERSITY	242623	2176	111,50
10	ÖZYEGİN UNIVERSITY	32439	314	103,31
11	GEBZE TEKNİK UNIVERSITY	49701	512	97,07
12	KADİR HAS UNIVERSITY	18440	254	72,60
13	BAHÇEŞEHİR UNIVERSITY	43303	623	69,51
14	ABDULLAH GÜL UNIVERSITY	14487	209	69,32
15	İZMİR YÜKSEK TEKNOLOJİ ENSTİTÜSÜ	33953	532	63,82
16	ERCİYES UNIVERSITY	148723	2371	62,73
17	FATİH UNIVERSITY	32791	574	57,13
18	HACETTEPE UNIVERSITY	198915	3687	53,95
19	ÇUKUROVA UNIVERSITY	100323	2167	46,30
20	FIRAT UNIVERSITY	78646	1700	46,26
21	MERSİN UNIVERSITY	70109	1552	45,17
22	ANKARA UNIVERSITY	161782	3645	44,38
23	YEDİTEPE UNIVERSITY	40248	916	43,94
24	İSTANBUL UNIVERSITY	203094	5116	39,70
25	DOKUZ EYLÜL UNIVERSITY	131255	3358	39,09
26	AKDENİZ UNIVERSITY	90141	2502	36,03
27	ÇANKAYA UNIVERSITY	10089	310	32,55
28	KARADENİZ TEKNİK UNIVERSITY	78596	2416	32,53
29	KAHRAMANMARAŞ SÜTÇÜ İMAM UNIVERSIT	38945	1230	31,66
30	PAMUKKALE UNIVERSITY	58022	1962	29,57
31	GAZİ UNIVERSITY	116867	4086	28,60
32	ATATÜRK UNIVERSITY	75083	2642	28,42
33	MARMARA UNIVERSITY	83622	3097	27,00
34	GAZİ OSMAN PAŞA UNIVERSITY	32484	1214	26,76
35	ESKİŞEHİR OSMANGAZİ UNIVERSITY	40228	1526	26,36
36	ATILIM UNIVERSITY	10875	414	26,27
37	İNÖNÜ UNIVERSITY	39536	1538	25,71
38	EGE UNIVERSITY	81000	3169	25,56
39	YILDIZ TEKNİK UNIVERSITY	44917	1760	25,52
40	GEDİZ UNIVERSITY	6502	271	23,99
41	MELİKŞAH UNIVERSITY	3914	179	21,87
42	ANADOLU UNIVERSITY	45994	2157	21,32
43	SELÇUK UNIVERSITY	55220	2688	20,54
44	İZMİR EKONOMİ UNIVERSITY	8783	453	19,39
45	İSTANBUL ŞEHİR UNIVERSITY	3951	206	19,18
46	NİĞDE UNIVERSITY	15572	833	18,69
47	GAZİANTEP UNIVERSITY	27603	1581	17,46
48	ABANT İZZET BAYSAL UNIVERSITY	22293	1288	17,31
49	SAKARYA UNIVERSITY	34016	1971	17,26
50	AFYON KOCATEPE UNIVERSITY	22866	1331	17,18
51	KOCAELİ UNIVERSITY	35062	2052	17,09
52	SÜLEYMAN DEMİREL UNIVERSITY	35946	2169	16,57
53	GALATASARAY UNIVERSITY	4235	267	15,86
54	OKAN UNIVERSITY	8158	522	15,63
55	ULUDAĞ UNIVERSITY	37935	2460	15,42
56	DÜZCE UNIVERSITY	14634	965	15,16
57	TRAKYA UNIVERSITY	24780	1646	15,05
58	ONDOKUZ MAYIS UNIVERSITY	32851	2264	14,51
59	ÇANAKKALE ONSEKİZ MART UNIVERSITY	16564	1571	10,54
60	ZİRVE UNIVERSITY	3307	341	9,70
61	BAŞKENT UNIVERSITY	14638	1535	9,54
62	KARAMANOĞLU MEHMET BEY UNIVERSITY	2476	490	5,05

Table 2 The EIUI List University's ranking based on WGSP

The list consists of the Top 4342 Turkish scientist's profiles (with h-index ≥ 10) ranked first by h-index¹ in decreasing order and, when ties appear, total number of citations used as a secondary criteria.

Google Scholar is a free very large bibliographic database. Its current size is over 160 million unique documents, many of them with links to openly available full-text versions. This is almost three times the current coverage of the competitors like WoS/Thomson or Scopus/Elsevier[2].

The data taken from webometric's website used to rank the Turkish universities according to their academic staff's studies number of citations. The h-index don't used as a factor because the top h-indexed academic staff obtain this index with ATLAS project studies of their collaboration at CERN.

ENTREPRENEURIAL AND INNOVATIVE UNIVERSITY INDEX

TÜBİTAK have initiated calculating an index for creating awareness on entrepreneurship and innovation to university administrations in Turkey called Entrepreneurial and Innovative Universities Index (EIUI). TUBITAK has calculated EIUI every year starting from 2012. This index contains 50 Universities and published this first 50 Turkish universities every year.

This index consists of 23 indicators at 5 dimensions. These dimensions are[4]:

1. Scientific and Technical research competence
2. Intellectual Property pool
3. Collaboration and interaction
4. Entrepreneurship and Innovation culture
5. Economic Contribution and Commercialization

The 23 indicators are:

- Number of Scientific Publication
- Number of Citations
- Number of Projects of R&D Innovation Program
- Amount of fund taken from R&D Innovation Program

¹ H- index is the maximum number of h such that the citations, that cited the related scientist's article, has h citations at least.

- Number of Scientific Awards
- Number of Personnel has PhD degree
- Number of Patent applications
- Number of Patent documents
- Number of utility model / industrial design registration
- Number of international patent registration
- Number of R&D Innovation Projects with University industry collaboration
- Total amount of fund taken by R&D Innovation Projects with University industry collaboration
- Number of R&D Projects with international collaboration
- Amount of fund taken from international R&D Innovation Projects
- Number of faculty members / University students in circulation
- Number of lessons related with technological management, innovation and entrepreneurship
- The number of full time employees which are working at TTO, Tech Center, Technopark, Incubation Center
- Availability of TTO
- Number of course or certificate programs related with technological management, innovation and entrepreneurship to outside of the university
- The number of firms belonged to academicians which are working at TTO, Tech Center, Technopark, Incubation Center
- The number of firms belonged to university students or alumniees of last 5 years which are working at TTO, Tech Center, Technopark, Incubation Center
- The number of employees which are working for the firms belonged to academicians which are working at TTO, Tech Center, Technopark, Incubation Center
- The number of international patent / utility model / industrial design licensed

METHOD AND RESULTS

EIUI rankings of 2012-2015 and Google Scholar Number of Citations obtained by Webometrics for Turkish Academicians based ranking(WGS) have issued and between EIUI and WGS the Spearman Rank Correlation Coefficient has calculated.

Method

In this study entrepreneurial and innovative universities index from 2012 to 2015 (I2012, I2013, I2014, I2015) and WGS rankings for 2016 have merged as in Table-1. After this Spearman Rank Correlation Coefficient has calculated with this data.

Spearman Rank Correlation has been offered by a Psychologist Charles Spearman in 1904.

$$\rho = 1 - \frac{6 \sum_{i=1}^n d_i^2}{n(n^2-1)} \text{ burada } d_i = R_{X_i} - R_{Y_i}$$

And R_{X_i} is the rank of i'th element in the X vector and R_{Y_i} is the rank of i'th element in the Y vector.

UNIVERSITIES	I2012	I2013	I2014	I2015	WGS2016	WGSP	UNIVERSITIES	I2012	I2013	I2014	I2015	WGS2016	WGSP
ABDULLAH GÜL UNIVERSITY				17	52	14	YILDIZ TEKNİK UNIVERSITY	19	15	11	10	26	40
GEBZE TEKNİK UNIVERSITY	9	13	12	11	24	11	MARMARA UNIVERSITY	47			43	15	34
KOCAELİ UNIVERSITY	24	23	24	27	36	52	FATİH UNIVERSITY		39	30	29	40	17
ORTA DOĞU TEKNİK UNIVERSITY	2	1	1	2	3	9	ÖZYEĞİN UNIVERSITY	4	7	6	7	42	10
HACETTEPE UNIVERSITY	11	10	14	14	7	18	YEDİTEPE UNIVERSITY	21	18	26	25	29	23
İHSAN DOĞRAMACI BİLKENT UNIVERSITY	3	3	4	4	4	3	BAHÇEŞEHİR UNIVERSITY	18	24	27	36	28	13
ANKARA UNIVERSITY	23	26	29	32	8	22	KADİR HAS UNIVERSITY	30	45	47	37	47	12
GAZİ UNIVERSITY	15	12	16	18	11	32	İŞİK UNIVERSITY	32	43			34	6
BAŞKENT UNIVERSITY		48			50	62	İSTANBUL MEDENİYET UNIVERSITY			40	48	23	8
ATILIM UNIVERSITY	26	20	17	26	53	37	GALATASARAY UNIVERSITY	49		39		58	54
TOBB EKONOMİ VE TEKNOLOJİ UNIVERSITY	10	9	8	9	27	5	İSTANBUL ŞEHİR UNIVERSITY		50	36		59	46
ÇANKAYA UNIVERSITY	17	19	22	20	54	28	OKAN UNIVERSITY	46	41	35	40	56	55
SÜLEYMAN DEMİREL UNIVERSITY	14	22	20	28	35	53	ABANT İZZET BAYSAL UNIVERSITY	50				46	49
ATATÜRK UNIVERSITY	33	37	43	50	19	33	İNÖNÜ UNIVERSITY				48	31	38
ESKİŞEHİR OSMANGAZİ UNIVERSITY		49	42	49	30	36	AKDENİZ UNIVERSITY	22	25	34	30	14	27
ANADOLU UNIVERSITY	37	16	13	16	25	43	ONDOKUZ MAYIS UNIVERSITY		44	50		39	59
EGE UNIVERSITY	12	14	15	15	16	39	DÜZCE UNIVERSITY	36	31	41	38	51	57
İZMİR YÜKSEK TEKNOLOJİ ENSTİTÜSÜ	7	6	9	8	38	15	FIRAT UNIVERSITY	39	34	46	45	17	20
DOKUZ EYLÜL UNIVERSITY	27	32	33	23	10	25	SELÇUK UNIVERSITY	16	11	10	12	22	44
İZMİR EKONOMİ UNIVERSITY	34	35	28	39	55	45	KARAMANOĞLU MEHMET BEY UNIVERSITY	43		44		62	63
GEDİZ UNIVERSITY				41	57	41	GAZİ OSMAN PAŞA UNIVERSITY		47		46	41	35
ÇANAKKALE ONSEKİZ MART UNIVERSITY	45				48	60	ÇUKUROVA UNIVERSITY	20	17	18	22	13	19
KARADENİZ TEKNİK UNIVERSITY	31	30	38	35	18	29	SAKARYA UNIVERSITY	38		45	21	37	50
ERCIYES UNIVERSITY	13	21	21	13	9	16	KAHRAMANMARAŞ SÜTÇÜ İMAM UNIVERSITY	41	33	23	33	32	30
MELİKŞAH UNIVERSITY		40	37	34	60	42	PAMUKKALE UNIVERSITY	40	42	48	42	21	31
NİĞDE UNIVERSITY	42	38	49		49	47	AFYON KOCATEPE UNIVERSITY		46			45	51
İSTANBUL UNIVERSITY	35	36	32	31	6	24	ULUDAĞ UNIVERSITY	25	29	19	19	33	56
İSTANBUL TEKNİK UNIVERSITY	5	5	7	6	1	7	GAZİANTEP UNIVERSITY	28	28	25	24	43	48
SABANCI UNIVERSITY	1	2	2	1	12		ZİRVE UNIVERSITY				47	61	61
KOÇ UNIVERSITY	8	8	5	5	5	2	TRAKYA UNIVERSITY	44				44	58
BOĞAZIÇI UNIVERSITY	6	4	3	3	2	4	MERSİN UNIVERSITY	29	27	31	44	20	21

Table 3 EIUI Index Rankings from 2012 - 2015 merged with WGS and WGSP

Before the calculation the two vectors are ranked in ascending order. Then the rank of the elements written down. The final dataset have used is shown at Table 3.

Spearman Rank Correlation is used for investigating a relation between two random variables. The hypothesis of this statistical tests are

$$H_0: X \text{ and } Y \text{ are independent from each other}$$

$$H_1: \text{There is a relation between } X \text{ and } Y \text{ and the desicion rules are.}$$

If $\rho > t_{n,1-\frac{\alpha}{2}}$ or $\rho < t_{n,\frac{\alpha}{2}}$ H_0 is rejected with α significance. These t values are the critical values of Spearman Tables[5].

Spearman Correlation Coefficient is a non parametric measure and could be applied to the data in the normal or ordinal scale.

Data does not need to normally distributed and Spearman Correlation Coefficient can take values between -1 to 1.

The meaning of values for Spearman Correlation is as follows:

- 0 to 0.19 - very weak
- 0.20 to 0.39 - weak
- 0.40 to 0.59 - moderate
- 0.60 to 0.79 - strong
- 0.80 to 1.00 - very strong relationship[6,7].

RESULTS

The values of Spearman Coefficient between EIUI – WGS 2016 are given in Table 4.

	I2015	I2014	I2013	I2012	WGS2016	WGSP
I2015	1	0,908	0,914	0,852	0,394	0,454
I2014		1	0,933	0,862	0,45	0,515
I2013			1	0,905	0,57	0,547
I2012				1	0,546	0,696
WGS2016					1	0,633
WGSP						1

Table 4 Spearman Correlations

The coherence between TEIUI 2012-2015 is quite high. The Spearman Correlation Coefficients between this variables takes values in 0.852 – 0.933 interval. This high correlation shows that the change in the TEIUI list is fairly slow. The highest correlation between 2013 – 2014 and the lowest correlation is between 2012 - 2015. All the intra correlations of EIUI are very strong. This implies very slightly difference of the ranking takes place year by year.

The correlation between I2015 and WGS is 0,394 and weak. The number of citation's impact on 2015's EIUI is very low.

The correlation between I2014 and WGS is 0,45 and moderate. The number of citation's impact on 2015's EIUI is moderate.

The correlation between I2013 and WGS is 0,57 and moderate. The number of citation's impact on 2015's EIUI is moderate.

The correlation between I2012 and WGS is 0,546 and moderate. The number of citation's impact on 2015's EIUI is moderate.

The spearman rank correlation coefficient has effected from the time passed between the publishing date and the citation of articles this can be the reason of the weak relationship between EIUI 2015 and WGS, the indicator dominance varies year by year, the variance of quality of the studies changes. Number of Citation is an indicator for the quality of the research. EIUI 2013 and WGS correlation is the highest and break the monotonicity of the correlations over years of Index.

The correlation between I2015 and WGSP is 0,454 and Moderate. The number of citation's impact on 2015's EIUI is moderate.

The correlation between I2014 and WGSP is 0,515 and Moderate. The number of citation's impact on 2015's EIUI is moderate.

The correlation between I2013 and WGSP is 0,547 and Moderate. The number of citation's impact on 2015's EIUI is moderate.

The correlation between I2012 and WGSP is 0,696 and Strong. The number of citation's impact on 2015's EIUI is strong.

Correlation between Number of Citation Per Academic Staff in related university and EIUI is moderate and strong.

The correlation between WGS and WGSP is 0,633 and Strong. The number of citation's impact on 2015's EIUI is moderate.

CONCLUSION

The correlation between number of citations per academician and EIUI is stronger than the correlation between number of citations and EIUI. According to this result while calculating EIUI, using number of citations as a factor is quite biased.

The relation between EIUI 2012 and WGS or WGSP is the stronger than the other years correlations This shows that using Number of Citations or Number of Citations per academician as a factor while calculating EIUI, adds time as a variable to the model and this makes the newer universities go backward at the ranks. This evidence also means that the EIUI index of related year is not just a point of that year but the point of universities past years as well, This points to the EIUI decision model must rearrange for equity.

Citations are effective 4 – 8 years after from the scientific articles publish date, this variable could be added as 6 year shifting it to the future. In other words while calculating EIUI of 2016, Google Sitation Value of 2022 must be issued. The other indicators have their own time of maturities. So they all must be shifted to the same time for using them in a model.

Atlas Project is another issue for the number of citations, it effect enourmously the ranking so if number of citations issued for the EIUI calculations, at least the citations from the atlas projects oriented paper must be excluded.

If the number of citations makes the university more entrepreneurial then it means that the more the university has medical doctor, the more entrepreneurial it is. While calculating the number of citations this issue must be reviewed. To give an example to this İstanbul Medeniyet University is at 8th rank with 54161 citations and 441 academicians 50 of them have h-index greater than 10, first 17 academicians (number of citations is greater than 1000 selected) has 34161 citations and 14 of them is from medical school with 26163 citations.

EIUI's indicator list must be reviewed using entrepreneurship and innovation context.

REFERENCES

- [1] Thorp, Holden, and Buck Goldstein. Engines of innovation: The entrepreneurial university in the twenty-first century. UNC Press Books, 2013.
- [2] Webometrics(2016), retrieved from <http://www.webometrics.info/en/node/72> at 16 June 2016
- [3] YÖK (2016), retrieved from <https://istatistik.yok.gov.tr/>, at 20 june 2016
- [4] TÜBİTAK (2016), http://www.tubitak.gov.tr/sites/default/files/gyue_gosterge_seti.pdf, at 10 may 2016
- [5] Dodge, Yadolah. The concise encyclopedia of statistics. Springer Science & Business Media, 2008

[6] statstutor. (2016). <http://www.statstutor.ac.uk/resources/uploaded/spearmans.pdf> at 28

May 2016

[7] Sipahi, B, Yurtkoru,S., Çinko,M. (2008). Sosyal Bilimlerde SPSS ile Veri Analizi