

COMMENTS

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CHANGES IN THE RANKING OF THE HIGHER EDUCATION INSTITUTIONS IN BULGARIA IN 2012-2013

RS of HEI in Bulgaria was analyzed, taking into consideration the indexes and methods used and the results achieved. The analysis is limited to the impact of the different indexes on determining the evaluation.

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The Rating System (RS) of the higher education institution (HEI) uses six groups of indexes.¹ Different groups of indexes have different weights, which sum to 100. In 2012 and 2013 the weights in the following groups remained the same:

First group: Education process – 25;

Second group: Scientific studies – 20;

Third group: Teaching environment – 5;

Fourth group: Social-daily and administrative services – 5;

Fifth group: Prestige – 10;

Sixth group: Career and connection with labour market – 35.

The number of the used indexes increases from 47 in 2012 to 69 in 2013.

Although not mentioned clearly, all RS indexes show a positive impact on determining the ranking evaluations of HEI. Table 1 shows the sixth group of indexes (“Career and Connection with Labour Market”).

Table 1

Indexes in Sixth Group “Career and Connection with Labour Market”

2012		2013	
Index	Weight	Index	Weight
6.1. Insurance income of the graduates	12.25	6.1. Insurance income of the graduates	10.5
6.2. Unemployment among graduates	12.25	6.2. Unemployment among graduates	12.25
6.3. Application of the acquired higher education	7.00	6.3. Application of the acquired higher education	7.00
6.4. Contribution to the insurance system	3.15	6.4. Contribution to the insurance system	3.15
6.5. Regional significance	0.35	6.5. Ratio of insurance income of the graduates to the average wage in the field	1.75
		6.6. Regional significance	0.10
		6.7. Significance of the career for the teachers	0.25
Total	35.00		35.00

¹ The term “index” is used as a synonym of the term “criterion” (used in the 2012 ranking system) and the term “indicator” (used in the 2013 ranking system).

It is obvious that the index “*Unemployment among Graduates*” with its considerably high weight (12.25) has also a positive impact in RS, since the sum of the weights of the indexes in this group is 35. So, the higher the value of this index is, the higher the ranking evaluation of the relevant higher education institution is, which is illogical.

In RS the quantitative evaluation of about 1/3 of the indexes derives from sociological studies. To a great extent it brings subjectivity to the evaluations. The use of a scale from 0 to 10 leads to an additional increase in the subjectivity, since the differentiation in more than 5-6 gradations is hard to achieve.

The inclusion of accreditation evaluation of HEI as a separate index in RS raises two questions. First, why a ranking evaluation of HEI is made? Second, why the accreditation evaluation is included as a separate index, if it consists of many indexes used in determining the ranking evaluation? The inclusion of accreditation evaluation in determining the ranking evaluation in essence leads to a double reporting.

Since the ranking evaluation is done by professional field (PF) of HEI, why does it include indexes referring to the whole higher education institution, like: PhD programmes of the higher education institution, economic inventory, equipment, etc.

There is a trend towards an increase in the number of used indexes in determining the ranking evaluation. The number of indexes increases from 47 in 2012 to 69 in 2013, i.e. an increase by 46.8%.

Another question is raised here – why the index “Scholarships” is included and the index “tuition fees” – is not included? Also, the inclusion of indexes, where the variation measured by the variation coefficient $v = \frac{\sigma}{x_{cp}}$ is very big, leads to

predetermining the HEI ranking.

The methods used in RS require the use of quantitatively assigned indexes and weight coefficients², which sum to 100. The used indexes have different dimension. To be in a comparative form, the different indexes are standardized. Z-transformation is used, with the help of which the average value of indexes becomes 0, and the standard deviation – 1.

The use of weight coefficients supports the increase of subjectivity in the ranking evaluations. In this connection, the so-called taxonomic evaluations, which do not use weight coefficients, are interesting. The essence of the method of determining taxonomic evaluations consists of the following:

- Evaluated PF is considered a multi-measured object.
- Many quantitatively assigned indexes are used.

² It is assumed that the sum of used weight coefficients should be 1 or 100. In the ranking system the sum of the weight coefficients is 100 and not 100% as stated in the higher education institutions ranking in 2012 and 2013.

- Comparability of indexes is ensured by the use of z-transformation.
- A “standard” of PF is constructed. It has extreme values for the different indexes.
- Comparison is made based on the Euclidean distance to the “standard”.
- The smaller the Euclidean distance is, the smaller the value of the taxonomic measurer is. Respectively the higher education institution is, the higher is the ranking.
- Values of the taxonomic measurer vary in interval (0.1). Only HEI far behind can get values higher than 1.

Table 2 shows comparative characteristics of the methods used for determining the accreditation, ranking and taxonomic evaluation.

Table 2

Comparative Characteristics of the Methods of Determining the Accreditation, Ranking and Taxonomic Evaluation

	Accreditation evaluation	Ranking evaluation	Taxonomic evaluation
Type of used indexes	Quantitative and qualitative indexes	Quantitatively measurable indexes with a positive impact	Quantitatively measurable indexes with a positive (stimulating) as well as negative (holding back) impact
Using weights	Each of the 13 criteria for programme accreditation of professional direction is assigned a possible maximum number of points. The sum of the points is 100.	Each index is assigned a weight. The sum of the weights is 100.	Weights are not used.
Way of determining the evaluation	Individually for each higher education institution	Simultaneously for all HEI	Simultaneously for all HEI

It is obvious that the method of determining taxonomic evaluations has two main advantages compared with the method of determining the ranking evaluations – it can use both stimulating and holding back indexes and it does not use weights.

The *HEI ranking* in PF 3.7 “Administration and Management”, 3.8 “Economy” and 3.9 “Tourism” by accreditation and ranking evaluation is based on the *published information for HEI ranking in 2012 and 2013*. Taxonomic evaluation is based on database published in the higher education institution ranking.

Ranking of HEI in PF 3.7 “Administration and Management”

The ranking evaluations of HEI in 2012 are in interval [70,36]. This means that the difference between the first and the last higher education institution in the ranking is 34 units. In 2013 the ranking evaluations are in interval [63,38] with a corresponding difference of 25 units. Based on the ranking evaluations these data show that *the differences between HEI in PF 3.7 “Administration and Management” decrease*. Also, the first HEI in the ranking have a substantial decrease of their ranking evaluation in 2013 compared with 2012, and the last – a slight increase. This result might be considered logical for the last HEI in the ranking, but not for the first ones. *The separating capacity of the ranking evaluations is too low.*

Changes in the ranking of the higher education institutions in Bulgaria in 2012-2013

Moreover, many indexes are presented to the full precision, and the ranking evaluation is presented in whole numbers (Table 3).

Table 3

Ranks and Evaluations of HEI in PF 3.7 "Administration and Management"*

Higher education institution**	Accreditation evaluation		Ranking evaluation		Taxonomic evaluation	
	2012.	2013.	2012.	2013.	2012.	2013
SU	7.74(15)	7.74 (14)	70 (1)	61 (2)	0.7254 (1)	0.6720 (1)
AUB	8.00(10)	8.00(10)	69(2)	63(1)	0.7264(2)	0.6826(2)
AMIA	7.92(13)	-	62(3)	-	0.8263(5)	-
UNWE	10.00(1)	10.00(1)	62(3)	58(3Б)	0.8744(12)	0.8249(7)
NBU	8.32(8)	8.32(8)	60(4)	56(4)	0.8336(8)	0.8178(6)
TU-Sf	8.20(9)	8.2(9)	60(6A)	58(3A)	0.8488(9)	0.7556(3)
UCTM	7.00(23)	-	56(5)	-	0.7789(3)	-
UF	7.52(19)	7.52(18)	51(6)	49(6)	0.8702(11)	0.892(15)
PU	8.36(7)	8.36(7)	51(6)	47(8B)	0.8988(16)	0.9055(18)
AZU	7.08(22)	7.08(21)	51(6)	48(7Д)	0.8313(6)	0.9230(24)
VTU	7.96(12)	7.96(12)	49(7)	48(7A)	0.9283(21)	0.8939(16)
UR	7.98(11)	7.98(11)	49(7)	48(7B)	0.8197(4)	0.8133(5)
VFU	9.00(3.5)	9.00(3.5)	47(8)	47(8A)	0.8782(14)	0.8536(9)
IUC	7.66(16.5)	7.66(15.5)	47(8)	48(7Б)	0.8336(7)	0.7994(4)
IBS	8.72(5)	8.72(5)	47(8)	47(8Б)	0.9696(26)	0.9184(21)
AE	8.68(6)	8.68(6)	47(8)	48(7Г)	0.9060(17)	0.8722(10)
SWU	7.24(20)	7.24(19)	47(8)	45(10Б)	0.9112(18)	0.8425(8)
AU	4.00(26)	0(24)	46(9)	39(14)	0.8687(10)	0.9061(19)
CTP	7.86(14)	7.86(13)	46(9)	45(10A)	0.9438(24)	0.9201(22)
ECEM	9.12(2)	9.12(2)	45(10)	44(11Б)	0.8862(15)	0.8803(12)
EU	9.00(3.5)	9.00(3.5)	45(10)	51(5)	0.9406(23)	0.9123(20)
NMU	7.66(16.5)	7.66(15.5)	43(11)	46(9)	0.9203(19)	0.8872(13)
TU-Gb	6.80(24)	6.80(22)	43(11)	43(12)	0.9249(20)	0.9018(17)
BFU	7.58(18)	7.58(17)	40(12)	44(11A)	0.8771(13)	0.8746(11)
CEA	7.16(21)	7.16(20)	38(13)	40(13)	0.9304(22)	0.8904(14)
HSAED	6.34(26)	6.34(23)	36(14)	38(15)	0.9606(25)	0.9226(23)
CT	-	-	-	32(16)	-	0.9437(25)

*The number in brackets shows the place of higher education institution in the ranking.

**The annex shows the list of abbreviations of HEI.

Taxonomic evaluations in 2012 are in intervals [0.7254; 0.9606], i.e. they vary in 0.2352 long interval. In 2013 they vary with 0.2510 long interval. On this basis we can conclude that *the differences between HEI in PF 3.7 "Administration and Management" increase* (Table 3).

Since both ranking and taxonomic evaluations are made using the same database, then *the use of weight coefficients leads to a decrease of the differences between HEI.*

The *stability* of the ranking of HEI in 2012 and 2013 by ranking and taxonomic evaluation is estimated through Spearman rank correlation coefficient, namely:

$$R_{SP} = 1 - \frac{6 \sum d^2}{N(N^2 - 1)},$$

where d is the difference in ranking, and N is the number of HEI.

In the ranking of HEI in 2012 and 2013 by ranking evaluation $R_{SP} = 0.8391$, and by taxonomic evaluation $R_{SP} = 0.6635$. The ranking of HEI by ranking evaluation *remains to a greater extent* compared with the ranking by taxonomic evaluation. However, both types of evaluations *report significant changes in the ranking of HEI for a one year period*, which casts suspicion on the quality of the used information.

In order to estimate the impact of the larger number of used indexes (69) in determining the ranking evaluation of HEI in 2013, taxonomic evaluation in 2013 is determined based on the 47 indexes used in RS in 2012 as well. The changes in the ranking of HEI when using 69 and 47 indexes *are considered insignificant* – the relevant Spearman rank correlation coefficient is $R_{SP} = 0.9692$. This result *raises the question about the point of the increase of the number of used criteria in 2013 by 46.8%*.

The 2012 ranking of HEI by taxonomic evaluations, determined with inclusion and exclusion of accreditation evaluation, remains the same to a great extent. The value of the relevant Spearman coefficient is 0.9979. The result in 2013 is analogical. Using 69 indexes the Spearman coefficient is $R_{SP} = 0.9969$, and using 47 indexes it is $R_{SP} = 0.9923$. Due to the large number of used indexes, the inclusion of accreditation evaluation as a separate index in determining the ranking evaluation has a *disparagingly small impact*.

The results of the study of the rank congruence of HEI in PF 3.7 “Administration and Management” by accreditation (A), ranking (R) and taxonomic (T) evaluation, measured with Spearman rank correlation coefficient, is presented on Table 4.

Table 4

Rank Congruence of HEI in PF 3.7 “Administration and Management”
(values of Spearman rank correlation coefficient)

Congruence	2012	2013
A – R	0.3752	0.4961
R – T	0.6869	0.5809
A – T	- 0.0261	0.2883

It is obvious that the rank congruence of HEI by accreditation and ranking evaluation is *low in 2012 and average in 2013*. It is logical, having in mind the fact that these evaluations are constructed using different indexes.

The rank congruence of HEI by ranking and taxonomic evaluation is *estimated as average*. The differences in the ranking come mainly from the impact of the weight coefficients in determining the ranking evaluations.

The rank *congruence* of HEI in PF 3.7 "Administration and Management" is *lowest* by accreditation and taxonomic evaluation and is determined by the use of different methods and criteria/indexes.

Ranking of HEI in PF 3.8 "Economy"

Table 5 presents the accreditation, ranking and taxonomic evaluations of HEI in PF 3.8 "Economy".

Table 5

Ranks and Evaluations of HEI in PF 3.8 "Economy"*

Higher education institution**	Accreditation evaluation		Ranking evaluation		Taxonomic evaluation	
	2012	2013	2012	2013	2012	2013
AUB	7.36(12)	9.11(5.5)	73(1)	65(1)	0.6749(2)	0.6505(2)
SU	7.04(16)	7.04(20)	73(1)	63(2)	0.6405(1)	0.6026(1)
UNWE	10.00(1)	9.88(1)	67(2)	61(3)	0.8231(4)	0.7575(3)
NBU	6.94(19)	9.52(9)	57(3)	54(5)	0.7932(3)	0.7800(5)
EU	9.32(2)	9.38(2)	55(4)	53(6)	0.8463(8)	0.8233(9)
HTS	6.54(21)	8.50(10.5)	54(5)	55(4)	0.8671(14)	0.8517(16)
EA	9.00(4)	9.14(4)	54(5)	52(7)	0.8365(6)	0.7795(4)
PU	8.40(6)	8.80(7)	51(6)	48(10)	0.8877(20)	0.8931(21)
VUZF	7.50(9.5)	7.50(16)	50(7)	50(8)	0.8708(15)	0.8473(13)
VTU	7.54(8)	8.50(10.5)	49(8)	47(11A)	0.9606(26)	0.9186(22)
IBS	7.50(9.5)	8.35(13)	49(8)	46(12B)	0.9171(21)	0.8909(20)
VFU	8.60(5)	8.60(8)	47(9)	46(12B)	0.8762(16)	0.8487(14)
IUC	7.00(17.5)	7.00(21.5)	47(9)	47(11B)	0.8526(10)	0.8221(8)
ECEM	9.20(3)	9.20(3)	46(10)	41(16A)	0.8844(18)	0.8723(18)
UFT	7.42(11)	7.42(18)	46(10)	38(18B)	0.8590(11)	0.8846(19)
SWU	6.90(20)	8.40(12)	46(10)	49(9)	0.8603(12)	0.8325(11)
UR	7.12(15)	9.12(5.5)	45(11)	46(12Г)	0.8607(13)	0.8272(10)
USH	6.48(22)	7.48(17)	45(11)	45(13)	0.8486(9)	0.8094(7)
BFU	7.34(13)	8.30(14)	44(12)	46(12A)	0.8424(7)	0.8398(12)
MT&MC	7.84(7)	7.84(15)	44(12)	41(16B)	0.9425(25)	0.9737(26)
TrU	7.00(17.5)	7.00(21.5)	44(12)	42(15)	0.8294(5)	0.7991(6)
AU	7.16(14)	7.16(19)	43(13)	44(14)	0.8853(19)	0.8497(15)
TU-Gb	6.18(25)	6.18(25)	41(14)	40(17)	0.8801(17)	0.9208(23)
HSARD	6.34(23.5)	6.34(23.5)	38(15)	36(19)	0.9360(23)	0.9265(24)
AZU	5.60(26)	5.60(26)	38(15)	38(18B)	0.9399(24)	0.9462(25)
CEA	6.34(23.5)	6.34(23.5)	35(16)	38(18A)	0.9195(22)	0.8658(17)

* The number in brackets shows the place of higher education institution in the ranking.

** The annex shows the list of abbreviations of HEI.

The ranking evaluations of HEI in 2012 are in interval [73,35], i.e. the difference between first and last higher education institution in the ranking is 38 units. In 2013 the ranking evaluations are in interval [65,36] and the relevant difference is 29 units. These data show that based on the ranking evaluations in PF 3.8 "Economy" there is a *decrease of the differences between HEI*. The values of the first in the ranking of HEI in 2013 decreases compared with 2012. It is difficult to consider this result logical. Moreover, the first in the ranking has a decreased value of the rating evaluation, i.e. there is a worsening for these HEI for a one year period.

Taxonomic evaluations in 2012 are in interval [0.6405; 0.9606], i.e. they vary in 0.3201 long interval. In 2013 the interval is 0.3711 long. This leads to the conclusion that the *differences between the HEI in PF 3.8 "Economy" increase* (Table 5). As already mentioned, ranking and taxonomic evaluations are made using the same database. This allows the conclusion that the *use of weight coefficients leads to a decrease of the differences between HEI*.

In the rank congruence of HEI in PF "Economy" in 2012 and 2013 by ranking evaluation, the Spearman rank correlation coefficient is $R_{SP} = 0.9002$, and by taxonomic evaluation it is $R_{SP} = 0.9221$. The rank congruence of HEI by taxonomic evaluation remains the same to a greater extent compared with the one by ranking evaluation. However, both types of evaluations *report a considerably high degree of maintaining the ranking of HEI*.

The impact of the larger number of indexes (69) on determining the ranking evaluation of HEI is determined with the help of taxonomic evaluation in 2013, made using 47 indexes for 2012. Changes in ranking of HEI when using 69 and 47 indexes *are considers insignificant* – the relevant Spearman rank correlation coefficient is $R_{SP} = 0.9603$. This result raises *again the question of the point of the increase of the number of used indexes in 2013*.

The ranking of HEI in 2012 by taxonomic evaluations, determined with inclusion and exclusion of accreditation evaluation, *remains to a great extent the same*. The value of the relevant Spearman rank correlation coefficient is 0.9979. The result in 2013 is analogical. When using 69 indexes the Spearman coefficient is $R_{SP} = 0.9969$, and when using 47 indexes it is $R_{SP} = 0.9923$. Because of the large number of used indexes, the inclusion of accreditation evaluation as a separate index in determining the ranking evaluation has a *disparagingly small impact*.

The results of the study of the rank congruence of HEI in PF 3.7 "Economy" by accreditation (A), ranking (R) and taxonomic (T) evaluation, measured with Spearman rank correlation coefficient, is presented on Table 6. Obviously, the rank congruence of HEI by accreditation and ranking evaluation, as well as by ranking and taxonomic evaluation, is considered *average both in 2012 and 2013*. The differences in the ranking come from the use of different indexes, as well as from the impact of the weight coefficients on determining the ranking evaluations.

Table 6
Rank Congruence of HEI in PF 3.8 “Economy”
(values of Spearman rank correlation coefficient)

Congruence	2012	2013
A – R	0.5438	0.6048
R – T	0.5651	0.6930
A – T	0.1068	0.3665

Lowest rank congruence of HEI in PF 3.8 “Economy” is reported by accreditation and taxonomic evaluation. Like in PF 3.7 “Administration and Management”, it comes from the use of different methods and difference criteria/indexes.

Ranking of HEI in PF 3.9 “Tourism”

The ranking evaluation of HEI in 2012 is in interval [65,35], i.e. the difference between first and last in the ranking of HEI is 30 units. In 2013 the ranking evaluation is in interval [51,30], and the relevant difference is 21 units. These data show that by ranking evaluations in PF 3.9 “Tourism” there is also a decrease of the *differences between HEI* (Table 7).

Taxonomic evaluations in 2012 are in interval [0.7576; 0.9620], i.e. they vary with 0.2044 long interval. In 2013 they vary with 0.2677 long interval. Based on this we can conclude that *differences between HEI in PF 3.9 “Tourism” increase* (Table 7).

Table 7

Ranks and Evaluations of HEI in PF 3.9 “Tourism”*

Higher education institution**	Accreditation evaluation		Ranking evaluation		Taxonomic evaluation	
	2012	2013	2012	2013	2012	2013
SU	(1)6.78	(1)6.78	(1)65	(1)51	(1)0.7576	(1)0.6844
NBU	(5)7.30	(7)7.30	(2)58	(3A)46	(2)0.7783	(2)0.7401
IUC	(4)7.36	(6)7.36	(3)55	(4A)45	(3)0.7809	(4)0.8047
SWU	(3)8.16	(2)9.25	(4)52	(3B)46	(7)0.8565	(3)0.7764
IBS	(2)8.44	(3)9.13	(5)51	(4B)45	(11)0.9424	(9)0.8868
PU	(7)7.16	(9)7.02	(6)51	(6)41	(8)0.8950	(10)0.8972
EU	(1)9.32	(1)9.70	(7)50	(2)48	(9)0.9103	(5)0.8243
UFT	(8)7.14	(8)7.14	(8)48	(5B)44	(4)0.7945	(6)0.8387
VTU	(6)7.26	(4)7.82	(9)47	(5A)44	(12)0.9538	(12)0.9133
AZU	(11)6.34	(11)6.34	(10)47	(7)40	(6)0.8333	(11)0.9040
USh	(12)6.16	(12)4.87	(11)47	(9)36	(5)0.8058	(7)0.8740
AU	(9)7.00	(5)7.65	(12)43	(8)38	(10)0.9103	(8)0.8753
CEA	(13)5.88	-	(13)35	-	(13)0.9620	-
CT	-	(13)0.00	-	(10)30	-	(13)0.9521

* The number in brackets shows the place of higher education institution in the ranking.

** The annex shows the list of abbreviations of HEI.

In this PF the ranking and taxonomic evaluations are also made using the same database, which allows us to draw the same conclusion – *using weight coefficients leads to a decrease of the differences between HEI*.

The change in the rank congruence of HEI in PF 3.9 “Tourism” in 2012 and 2013, made with Spearman rank correlation coefficient, by ranking evaluation is $R_{SP} = 0.8741$, and by taxonomic evaluation – $R_{SP} = 0.7273$. Like in PF 3.7 “Administration and Management”, the ranking of HEI by ranking evaluation maintains to a greater extent the same compared with the ranking by taxonomic evaluation. However, when using both types of evaluations *there are significant changes in the ranking of HEI for a one year period*.

The impact of the larger number of used indexes (69) on making the ranking evaluation of HEI is determined with the help of taxonomic evaluation in 2013 based on 47 used indexes in 2012. Changes in the ranking of HEI when using 69 and 47 indexes are *considered insignificant* – the relevant Spearman rank correlation coefficient is $R_{SP} = 0.9945$. This result *raises again the question about the point of the increase of the number of used indexes from 47 to 69 in 2013*.

The ranking of HEI in 2012 by taxonomic evaluations, determined with inclusion or exclusion of accreditation evaluation, *remains to a great extent the same*. The value of the relevant Spearman coefficient is 0.9780. In 2013 there is a *complete congruence* of the ranks of HEI and the relevant Spearman coefficient has a value of 1. When using 47 indexes, $R_{SP} = 0.9945$. Because of the large number of used indexes, the inclusion of accreditation evaluation as a separate index in determining the ranking evaluation of HEI has a *disparagingly small impact*.

The results of the study of the rank congruence of HEI in PF 3.9 “Tourism” by accreditation (A), ranking (R) and taxonomic (T) evaluation, measured with Spearman rank correlation coefficient, is presented on Table 8.

Table 8

Rank Congruence of HEI in PF 3.8 “Tourism”
(values of Spearman rank correlation coefficient)

Congruence	2012	2013
A – R	0.5659	0.4475
R – T	0.6318	0.7637
A – T	- 0.0439	0.2692

Obviously, the congruence between the ranking of HEI by accreditation and ranking evaluation, as well as by ranking and taxonomic evaluation, is considered *average both in 2012 and 2013*. The changes in the ranking come from the use of different indexes and methods, as well as from the impact of weight coefficients in

making the ranking evaluations. *Again, the lowest congruence* in the ranking of HEI in PF 3.9 “Tourism” is by accreditation and taxonomic evaluation.

Generalizations and Conclusions

- The increase of the number of indexes from 47 in 2012 to 69 in 2013 *does not lead to a change in the ranking of HEI* in PF 3.7 “Administration and Management”, 3.8 “Economy”, and 3.9 “Tourism”.
- The methods used for determining the ranking evaluation *do not allow the use of indexes with “impeding” impact*. The inclusion of index “Unemployment among graduates” with a weight of 12.25 undoubtedly lowers the quality of the ranking evaluations.
- The use of information about 1/3 of the criteria from sociological studies, as well as the use of weights in the different indexes *brings subjectivity* to the ranking of HEI.
- In 2013 *there is a decrease of the ranking evaluations* for the first HEI in the ranking in PF 3.7 “Administration and Management”, 3.8 “Economy” and 3.9 “Tourism”, compared with the corresponding ranking evaluations in 2012.
- By ranking evaluations, there are *significant changes in the ranking of HEI for a one year period – a disturbing result*.
- There are significant differences in the ranking of HEI by accreditation and taxonomic evaluation. This is logical since these evaluations are made using different methods and criteria/indexes.

For determining if the drawn conclusions refer to PF from other area of the higher education as well, we will study PF “Communication and Computer Equipment”.

Ranking of HEI in PF “Communication and Computer Equipment”

Table 9 presents the accreditation, ranking and taxonomic evaluations of HEI in PF “Communication and Computer Equipment”.

Except for Plovdiv University with no data for 2013, the ranking evaluations of the other HEI in 2012 are in interval [74,41], i.e. the difference between the first and the last HEI in the ranking is 33 units. In 2013 the ranking evaluations are in interval [70,41] and the relevant difference is 29 units. These data show that by ranking evaluations in PF “Communication and Computer Equipment” there is a *decrease of the difference between HEI* as well.

Taxonomic evaluations in 2012 are in interval [0.6873; 0.9521], i.e. they vary with 0.2648 long interval, and in 2013 – with 0.3644 long interval. Based on this we can conclude that the *differences between HEI in PF “Communication and Computer Equipment” increase*.

In PF “Communication and Computer Equipment” as well the ranking and taxonomic evaluations are made using the same database, which allows the same conclusion that *the use of weight coefficients leads to a decrease of the differences between HEI*. The change in the ranking of HEI in PF “Communication and Computer Equipment” in 2012 and 2013, measured with Spearman rank correlation coefficient, by ranking evaluation is $R_{SP} = 0.8887$, and by taxonomic evaluation is $R_{SP} = 0.8415$. The ranking of HEI by ranking evaluation remains to a greater extent the same compared with the ranking by taxonomic evaluation, but both evaluations *report changes in the ranking of HEI for a one year period*.

Table 9

Ranks and Evaluations of HEI in PF “Communication and Computer Equipment”*

Higher education institution**	Accreditation evaluation		Ranking evaluation		Taxonomic evaluation	
	2012	2013	2012	2013	2012	2013
TU-Sf	(1)9.44	(1)9.44	(1)74	(1)70	(3)0.7645	(1)0.5860
RU	(2)9.36	(2)9.36	(2)59	(5)52	(1)0.6873	(3)0.7159
TU-Vn	(6)9.12	(6)9.12	(3)59	(2)59	(2)0.7528	(2)0.6570
HTS	(3)9.32	(3)9.32	(4)54	(3)57	(8)0.8547	(7)0.8051
NBU	(13)7.00	(13)7.00	(5)54	(4)56	(7)0.8425	(5)0.7626
TU-Gb	(7)8.80	(7)8.80	(6)53	(10)47	(5)0.7995	(9)0.8656
NMU	(4)9.20	(4)9.20	(7)52	(7.5)49	(9)0.8647	(11)0.8903
BFU	(5)9.16	(5)9.16	(8)51	(6)50	(4)0.7896	(6)0.7716
UFT	(9)8.36	(9)8.36	(9)49	(9)48	(11)0.9169	(8)0.8554
CTP	(10)8.20	(10)8.20	(10)47	(7.5)49	(13)0.9402	(12)0.9027
USh	(8)8.44	(8)8.44	(11)43	(11)44	(6)0.8140	(4)0.7563
AZU	(11)7.84	(11)7.84	(12)42	(13)41	(14)0.9521	(13)0.9504
SWU	(12)7.34	(12)7.34	(13)41	(12)42	(12)0.9389	(10)0.8703
PU	(14)6.76	-	(14)35	-	(10)0.9056	-

* The number in brackets shows the place of higher education institution in the ranking.

** The annex shows the list of abbreviations of HEI.

The impact of the larger number of used indexes (69) in determining the ranking evaluation of HEI is measured with the help of taxonomic evaluation for 2013 based on the use of 47 indexes in 2012. Changes in the ranking of HEI when using 69 and 47 indexes *are considered insignificant* – the relevant Spearman rank correlation coefficient is $R_{SP} = 0.9341$. This result *again raises the question about the point of increasing the number of used criteria in the ranking of HEI in 2013*.

The ranking of HEI in 2012 by taxonomic evaluations, determined with inclusion and exclusion of accreditation evaluation, *remains the same*. The value of the relevant Spearman rank correlation coefficient is 1. In 2013 the ranking of HEI to a great extent remains the same – the value of the relevant Spearman rank correlation coefficient is $R_{SP} = 0.9890$. When using 47 indexes the result is the same – $R_{SP} = 0.9890$. Because of the large number of used indexes, the inclusion of accreditation evaluation as a separate index in determining the ranking evaluation of HEI has a *disparagingly small impact*.

The results of the study of the rank congruence of HEI in PF “Communication and Computer Equipment” by accreditation (A), ranking (R) and taxonomic (T) evaluations, measured with Spearman rank correlation coefficient, are presented on Table 10.

Table 10

Rank Congruence of HEI in PF “Communication and Computer Equipment”
(values of Spearman rank correlation coefficient)

Congruence	2012	2013
A – P	0.7714	0.5748
P – T	0.7670	0.7019
A – T	0.6615	0.5055

Obviously, the rank congruence between the ranking of HEI by accreditation and ranking evaluation, as well as by ranking and taxonomic evaluation, in 2012 is bigger than the one in 2013. The differences come from the use of different indexes, and the impact of the weight coefficients in determining the ranking evaluations.

The drawn conclusions about PF “Communication and Computer Equipment” to a great extent correspond to the ones about PF 3.7 “Administration and Management”, 3.8 “Economy” and 3.9 “Tourism”. In the studied PF the values of taxonomic measurer of the first in the ranking of HEI in 2012-2013 decrease, i.e. there is closeness to the “standard” – an indication of *positive changes* in HEI.

In conclusion, the changes in the ranking of HEI in the studies PF are significant for a one year period – a result that can hardly be considered objectively determined. The increase of the number of indexes in determining the ranking evaluation hardly changes the ranking of HEI. The use of information from sociological studies and the use of weight coefficients brings quite a lot of subjectivity to the ranking evaluations.

Annex

List of Abbreviations of HEI

Abbreviation	Full name
AE	"D. A. Tsenov" Academy of Economics
AMIA	Academy at Ministry of Internal Affairs
AU	Agricultural University – Plovdiv
AUB	American University in Bulgaria
AZU	"Prof. Dr. Assen Zlatarov" University – Burgas
BFU	Burgas Free University
CEA	College of Economics and Administration – Plovdiv
CT	College of Tourism – Blagoevgrad
CTP	College of Telecommunications and Post
ECEM	European College of Economics and Management – Plovdiv
EU	Economic University – Varna
HSARD	Higher School on Agro-business and Regions Development – Plovdiv, Veliko Tarnovo, Ruse
HTS	Higher Transport School "Todor Kableshkov"
IBS	International Business School
IUC	International University College – Albena, Dobrich
MT&MC	Management, Trade and Marketing College – Sofia
NBU	New Bulgarian University
NMU	Vasil Levsky National Military University – Veliko Tarnovo
PU	Plovdiv University "Paisii Hilendarski"
SU	Sofia University "St. Kliment Ohridski"
SWU	South-West University "Neofit Rilski"
TrU	Trakia University – Stara Zagora
TU-Gb	Technical University – Gabrovo
TU-Sf	Technical University – Sofia
TU-Vn	Technical University – Varna
UCTM	University of Chemical Technology and Metallurgy – Sofia
UF	University of Forestry
UFT	University of Food Technology
UNWE	University of National and World Economy
UR	"Angel Kanchev" University of Ruse
USh	Konstantin Preslavsky University of Shumen
VFU	Varna Free University "Chernorizets Hrabar"
VTU	Veliko Tarnovo University "St. St. Kiril and Metodii"
VUZF	University of Finance, Business and Entrepreneurship