Assoc. Prof. Alla Kirova, PhD

BULGARIA IN THE EUROPEAN RATINGS FOR GENDER EQUALITY IN THE ACADEMIC CIRCLES

The implementation of "Europe 2020" Strategy and its standards requires establishment of fair European research area with a view to gender balance. In conformity with that vision, the article presents the results of a study of the gender equality level in the academic circles in Bulgaria. It is carried out by analysis of the place of Bulgaria among the European states in regard to this indicator. The main task is to identify the achieved progress and still existing problem areas.

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In the context of the knowledge economy, strengthening its position in Europe, and with a view to meeting the criteria of "Europe 2020" Strategy, the actions for overcoming the gender differences in higher education and research have a special place in EU for developing a "fair science in a fair society" (Stocktaking 10 years of "Women in Science"…, 2010, p. 7). The goal is academic men and women to be able to fully use the accumulated knowledge, skills and innovation potential in the process of creating knowledge, as well as to participate in establishing socially inclusive society, envisioned in the Strategy. The undertaken initiatives and actions are the result of a general gender mainstreaming policy globally and in Europe, which requires mostly determining the *place of Bulgaria in the relevant ratings by degree of gender equality, achieved in the society*. The suggested evaluations are the result of an analysis of the carried out international comparative studies in this field.

Since 2006 the World Economic Forum has presented annual Global Gender Gap Reports (see EU Strategy for Equality between Women and Men (2010-2015)…), where through the developed *Global Gender Gap Index* they evaluate the gender inequality in percentage.[1] In 2006-2008 Bulgaria occupied respectively 37th, 25th and 36th place among the analyzed 115 countries. Since 2009 the range of the reports has expanded to 134-135 countries. From the 38th place in 2009, Bulgaria has dropped down to 50th, 51st and 52nd place respectively in 2010, 2011 and 2012. Despite this alarming tendency at first sight, Bulgaria was in the third group of countries with index 0.71-0.70 in 2012, which is not such a big difference, compared with the countries in the first group (1.00-0.75) and in the second group (0.74-0.72).[2] It is worth mentioning that almost 1/3 of the EU member states are behind us in this

[1] This index determines how well resources and opportunities are distributed between genders in each country (despite the level of the relevant resources) in four critical areas: economic participation and opportunities (payment, employment, access to highly qualified employment); education achievements (access to primary and higher education); political power (participation in decision-making structures); health and life expectancy.

[2] The results show that three countries with highest rating – Iceland, Finland and Norway – have overcome over 84% of the gender differences in the mentioned fields, while the countries with lowest rating –slightly above 50%. Bulgaria has overcome over 70%, which is quite a good result.

ranking (Poland, France, Estonia, Romania, Slovakia, Czech Republic, Cyprus, Italy, Hungary, Greece).

In 2006 Europe adopted a Roadmap for equality between women and men (2006-2010), which stated the necessity of measuring the level of this equality (see Roadmap for equality between women and men..., 2006). For this purpose in 2010 an European Institute for Gender Equality (EIGE) was established. During its first middle-term work programme (2010-2012) the Institute developed and published the *European Gender Equality Index (EGEI)* in 2011 (see Bericat, 2012, p. 1-28), which ranged 27 member states of EU (EU-27). It can be defined as a "macro" index of gender equality, since it measures only the relative state of the existing balance in the access to basic resources in three public areas of the social structure, determining the social status of men and women – education, work and power.[3] The best news is that Bulgaria is on 1st place among EU-27 with its highest average value of this index (results in 2009) – 73.1 (EU-27 average value is 55). Concerning access to education and work, its values are even more significant – respectively 87.1 (EU-27 average – 76.4) and 83.6 (EU-27 average – 58.7). Only concerning access to power the index is not so promising – 53.7. However, again the result for Bulgaria is significantly higher than EU-27 average (37.6). Different index values in different areas reflect the specifics of the process of achieving gender equality in them, which lets us identify the priorities of the necessary encouraging measures and actions. Deciphering the index leads to the conclusion that EU average level of women status is only 55% of the men status, while in Bulgaria it is 73%. Although to a different degree, structural gender inequality in Europe still exists.

Data published in *European Commission Report on the progress on equality between women and men in 2011* are more detailed (ref. Progress on equality between women and men in 2011). On most indexes Bulgaria is at level above or close to EU average, which means that the EU specific problems in gender equality area exist in Bulgaria as well. We have to mention that on some indicators Bulgaria is on 1st place (in a positive sense). For example, Bulgaria has lowest share in EU of part-time workers women and men in the total number of employed people in 2010 – 2.6% women and 2.2% men; and the difference in the shares of men and women is minimal – 0.4%. In comparison, the average value of this indicator in EU-27 is 31.9% women and 8.7% men. Important fact is that the part-time employment in general and the inequality of women in this regard is one of the significant problems before many European countries.

The report data show another positive tendency specific of Bulgaria – decrease by 2.3 points of gender differences in employment (from 9.7% in 2005 to 7.4% in 2010). The difference is in favor of men. The value is one of the lowest

[3] The index shows correlation between the status of men and women in the relevant area, i.e. its values show in percentage the achievements of women in reaching equal status with men through determining the degree of equality in the access to relevant resources in the mentioned three areas. Index value under 100 shows degree of inequality for women, index value over 100 shows degree of inequality for men. If it is 100, it shows a complete gender equality.

among the European countries in 2010, after Latvia (0.2% in favor of men), Estonia (2%), Finland (3%), Denmark (5.6%) and Sweden (6%), with EU-27 average 13%. At the same time concerning level of employment for women aged 25-49 with children aged under 12, Bulgaria with its 64.8% in 2010 "follows" closely the EU-27 average (64.7% in 2010). This shows possible problems in the reconciliation between work and family life for over 35% of the women in this group. Such tendency (but only for women) in Bulgaria exists concerning implementation of the Europe 2020 headline target – 75% employment rate for men and women – average level of employment for women in EU-27 in 2010 is 62.1%, while in Bulgaria it is 61.7%. However, Bulgaria falls behind on this index for men – 69.1% compared with 75.1% average level in EU-27. This means that the Strategy set target of employment level of men has already been reached in most European countries, while the others have to overcome the obvious gender differences in the next years.

The information published in the report about the share of young people (aged 30-34), tertiary educated and with a higher level of education, is especially significant for determining the available academic potential. Concerning women, Bulgaria is close to the EU average level (35.5% compared with 37.2% in EU-27). At the same time in Bulgaria the share of men is significantly lower than the one of women, and than the EU average level – 20.7% of men in Bulgaria compared with 30% in EU-27. To a certain extent the stated difference of 14.8 points in favor of women in Bulgaria is an indicator of a tendency towards feminization of higher education.

In accordance with the data in the analyzed report, practically all European countries, including Bulgaria, face one of the main problems in determining the inequality of women in all areas of the public life – their insufficient or rather quite limited participation at management level, respectively involvement of women in decision-making processes. Data in 2012 illustrate the scale of this problem in all Europe. For example, the share of women filled board seats of the largest publicly listed companies is average 13.7% in EU-27 and 15.6% in Bulgaria, while the share of women presidents of the highest corporate boards of the largest publicly listed companies are respectively 3.2 and 13.3%. As the mentioned data show, values of this indicators in Bulgaria are higher than the EU average level, while the share of women presidents of corporate boards leads Bulgaria to the 1st place in Europe. This happens because Bulgaria exceeds the EU average level by 4 times. On the other hand, it shows significantly higher rates of increase in their number in 2004-2012 – by 10.7 points compared with 0.6 in EU-27 (with even start for Bulgaria and EU-27 in 2004 – 2.6%). The established tendencies indicate of positive changes towards overcoming the gender stereotypes in the society. However, the positive comparative data do not deny the actuality of this problem and the low participation of women in public governance in Bulgaria by absolute number. Still insufficient but higher is the participation of women as ministers in national governments: average in EU-27 they are 1/4 (24.7%), while in Bulgaria the share is significantly lower – 17.6% in 2011. The situation in the private sector is obviously better – the share of women in leadership and business performance is little over 30% in 2010, both in EU-27 (33%)

and in Bulgaria (31%). This information is confirmed by another study of the European Commission – *Progress report on women in economic decision-making in the EU (2012)*. According to the published data, Bulgaria is on the 4th place after France, Iceland and Slovenia by increase in number of women filled board seats with over 4% in the period October 2010 – January 2012, while the EU-27 average rate in the same period is almost 2%. However, Bulgaria is among 1/3 of the EU member countries, where in 2012 about half of the registered corporate boards (in Bulgaria – 53%) have no woman member.

The analysis of international studies on gender equality in the early 21st century show that *Europe as a whole, and Bulgaria in particular, have achieved certain though uneven progress in overcoming the gender differences in the main aggregated areas of socio-economic life*. The undertaken common actions in this direction are supplemented also by their concentration in different areas and sectors, important for each stage of the development, like R&D.

Gender balance in the academic employment

The contours and changes of the European roadmap for equality between women and men in the academic fields in the first decade of 21st century are drawn in the four three-year reports of Directorate-General for Research and Innovation at the European Commission – "She Figures".[4] published since 2003. The developed, constantly added and analyzed indicators there, presenting the gender situation in the science field, directly correspond to the established during the study changes in the approach towards analysis and policies in this field in the beginning of the new century – from measuring the degree of inequality of female researchers[5] to evaluating the balance in the participation of both genders, the trajectories of their career development and the progress concerning overcoming the gender differences existing in this field.[6]

The analysis of the structure of employment participation by gender shows that in 2010 in EU-27 people with higher education in science and technologies working by profession are average 56.1% women and 54.6% men in the total number of women and men with higher education. This means that *there are equal chances for the highly qualified men and women in Europe for finding a job*. The little majority of women is specific of most European countries. Only in five of them (Italy, France, Cyprus, Luzemburg and Czech Republic) the share of men is higher

[4] The analyses and evaluations in the paper are based on the statistical information published in She Figures – 2003, 2006, 2009, 2012, if not specifically mentioned otherwise. The last available data, published in She Figures – 2012, are for 2009-2010.

[5] According to the methodology of the reports, the term "researcher" refers to the representatives of the academic community – teachers in the system of higher education and scientists in the research institutions in different economic sectors.

[6] This is reflected in the changing titles of the She Figures reports, showing their theme direction from "Women and Science" to "Gender Equality in Science" and "Gender in Research and Innovation", as well as in the constantly added indicators.

than women in a close range between 3 and 7 points. Bulgaria (and Lithuania, Latvia and Estonia) has relatively lower employment of men with higher education in science and technologies. The share of women exceeds the one of men by 14.5 points (respectively 59.1% of women and 44.6% of men with higher education in Bulgaria).[7] This means that *women are more active than men in finding fields of applying their specific (professional) human capital and its realization in employment*. This tendency exists also in the analysis of data on the *share of female and male researchers in the total number of employed women and men*: in 2009 the share of female researchers in the total number of employment women in Bulgaria (and Lithuania, Latvia and Turkey) is higher than the one of men. In comparison, by this indicator men have higher share than women by over 10 points in most European countries, except Croatia and Romania, where the genders are presented evenly. Concerning the indicator *share of women/men among all scientists and engineers*, Bulgaria is among the three countries with full parity in the gender participation: in 2010 the share of women scientists and engineers is 50% in Bulgaria and Iceland, and 53% in Poland, while the EU-27 average is 32% (at the bottom is Switzerland with 18%). In accordance, Bulgaria has gender-even but lower than EU average share of women and men scientists and engineers in the labour force[8] by gender – 1.63% for each gender in Bulgaria (in EU-27 it is 1.75% for women and 3.65% for men).

As mentioned above, despite the slight increase in the last years, women in EU participate insufficiently in science – 33% average for EU-27 in 2009. We have to mention the large differences between the countries. For example, in Lithuania and Latvia the share of women among all researchers exceeds the one of men (it is over 50%). At the same time *Bulgaria is among the six countries* (with Portugal, Romania, Estonia, Slovakia and Poland) *with over 40% participation of women* (47.7% in 2009 with slight increase in 2002-2009 – 5.4% for women and 4.6% for men in Bulgaria, which is close to EU-27 average rate of 5.1% for women and higher than the EU average for men – 3.3 and 49% in 2011[9]). *This result corresponds to the adopted criterion of balanced gender participation* – at least 40% per gender. The same is valid for the *female and male researchers rates per 1000 people of the total labour force* by gender: in 2009 it is practically the same for men and women in Bulgaria – respectively 4.3 and 4.1%, while in EU-27 average the women are behind by 5 points (7.1% for women and 11.9% for men). Despite the positive significance of the achieved gender balance in Bulgaria in the academic employment, by this indicator there is a significant difference with the European countries, both for male and female researchers as a share of the labour force – *Bulgaria is among the last four countries* (with The Netherlands, Cyrpus and Romania) *with lowest participation in*

[7] Less significant but still available differences in favor of women are registered concerning the share of research personnel with higher education: by calculations of preliminary data of NSI for 2011 the share of women in this personnel group is 50.7%.

[8] "Labour force" indicator includes all unemployed and employed people aged over 15.

[9] Calculated by preliminary data of NSI for 2011.

science compared with the national labour force (only 4%). This is indicative of the evaluation of the science potential of the country.

The proportion of researchers by gender and by sector in 2009 again demonstrates good results for Bulgaria in achieving gender balanced participation: in the higher education sector the share of female researchers is 43.2% (EU-27 average is 40%), in the government sector it is 54%[10] (EU-27 average is 40%), and in the private sector (enterprises) it is 43% (EU-27 average is only 19%). By this indicator Bulgaria is on the 2nd place after Latvia. The direction towards overcoming the gender differences is specific to a great extent of the higher education in Bulgaria, where the share of female researchers increased by 8.2 points in 2000-2009 (from 35 to 43.2%), reaching 45.3% in 2011.[11] The conclusion we can draw from the mentioned data is that the *gender inequality in the three economic sectors in Bulgaria has been practically overcome in the first decade of 21st century*. The positive tendency towards decreasing the gender differences is specific also of the higher education and the government sector in Europe, where this topic is about to be closed. However, still problematic in this sense is the private sector, with significant delay of the participation of female researchers. Obviously for determining the reasons of this phenomenon, the She Figures – 2012 Report introduces separation of private sector on employment of researchers into two areas – research private non-profit sector and research business enterprise sector. However, it turns out that the research private non-profit sector is of some significance to the employment of male and female researchers only in Italy, Portugal and Cyrpus (6-7% of all female researchers and 3-7% of male researchers in 2009). In the other countries, including Bulgaria, this indicator has quite insignificant share – under 1% of the male and female researchers in Bulgaria.

The progress in achieving a balanced employment of both genders in the science field to a great extent is due to the results of the undertaken European initiatives towards attracting and encouraging women to advance an academic career. This is evident from the data of the compound annual growth rates of female researchers in the economic sectors in the beginning of 21st century, average in EU.

Table 1

Increase in Number of Researchers by Sectors and Gender in 2002-2009 (%)

	EU -27		Bulgaria	
	Women	Men	Women	Men
Higher education sector	5.5	3.5	14.7	9.9
Government sector	4.3	1.7	0.3	-1.8
Private sector	4.3	3.4	7.0	11.7

Source: She Figures – 2012, p. 37-39.

[10] According to calculations of preliminary data of NSI for 2011, there is a slight increase of the share of female researchers in the government sector to 54.9%.

[11] Calculated by preliminary data of NSI for 2011.

We have to mention that Bulgaria has significantly higher rates of increase in the female participation compared with Europe. By this indicator Bulgaria is on 5th place in Europe. These data show overcoming the negative tendency in Bulgaria towards a drop of the total number of male and female researchers, specific of the country at the end of 20th and the beginning of 21st century (-2% for women and -4% for men in 1999-2003 (She Figures – 2006), which places it at the last place among the European countries, analyzed in the relevant report). However, there is an alarming *tendency towards a negative rate of number of male researchers in government sector in Bulgaria, and quite higher rate of increase in the private sector, compared with the one for women*. This leads to an increase in the share of women in all researchers in the government sector by 5% in 2000-2009 (from 49 to 54%) and a decrease by 6% for the same period in the private sector (from 49 to 43%). This tendency continued also in 2009-2011 – according to NSI data the number of male researchers among all researchers decreased by another 1.3%, while the number of female researchers increased by 2.7%, mainly on account of the changes in their participation in the government sector. Obviously, the low prestige of the profession and the insatisfactory payment in the state research sector in Bulgaria provoke men to leave and look for work in the private research sector or in other employment areas. If corresponding measures and actions are not taken, in the next years this will lead to quite negative consequences for the country concerning establishment and development of knowledge economy and using the innovation potential of the nation. The unfavorable changes in this direction are seen also in the analysis of NSI data for 2010 and 2011 (preliminary data) about the gender differences in researchers by age. In the age groups under 35, 35-44 and 45-54 (with highest possible scientific achievements) the number of female researchers in the government sector exceeded the one of male researchers by average 1.5 times. Only in age group over 55 men were 1.2 times more than women. In comparison, in higher education sector the problem with male researchers leaving has not existed at all – in 2010-2011 their number was 1.1 times lower than the number of women only in age group under 44, but significantly (almost twice) higher in age group over 45.

For evaluating the equal opportunities of academic career for men and women, the She Figures – 2012 Report introduces new indicator – *researchers' mobility*.[12] Average in EU in 2006-2009, female researchers have lower mobility than male researchers. Bulgaria again performs quite well by this indicator, being one of the two exceptions (with Ireland, where the female mobility exceeds by 5 points the male one). In Bulgaria it is equal for both gender (the shares of mobile male and female researchers are 50:50), while the EU-27 average is 65:35 in favor of men (data for European countries in the analyzed period varies by 7 points in favor of male researchers in Finland to 0% mobility for female researchers in Latvia).

[12] According to the used methodology, the term "mobility" means professional travel abroad for a period of at least 3 months in the last 3 years (She Figures – 2012, p. 43).

Probably the issue of reconciliation between work and family life is not a serious problem for the male and female researchers in Bulgaria. The data for their research mobility are an obvious indicator of the existence of equal gender opportunities in Bulgaria regarding their chances for realization in the European and global research space. We have to mention that the other indicator introduced in the She Figures – 2012 Report about the relation between parenthood and/or a scientific career does not register substantial gender differences and barriers in Bulgaria. Despite the next to last place of Bulgaria between Romania and Lithuania by share of female and male researchers with children aged under 15 in 2010 (respectively 30 and 20%), their number is bigger than the share of working parents as a whole for both genders. The low share of researchers with children is rather a result of the general demographic situation in the country and of the aging academic staff, not of the problems emerging from the necessity of maintaining the balance "professional/personal life".

Progress towards achieving gender equality in Europe and in Bulgaria is seen in the analysis of the *average success rates of PhD graduates both men and women*. The share of women in all male and female PhD graduates average for EU-27 is 46% in 2010, while in Bulgaria it is close to the European average (47.8%). According to calculations from latest NSI data for 2011 and 2012, it exceeds significantly respectively by 55.3 and 51.7%. We have to mention that *achieving gender balance close to the parity in this field in the first decade of 21st century* in Bulgaria is specified by a zigzag movement of this indicator – from clear domination of male PhD graduates at the end of the last century (female PhD graduates were 38% in 1999 and 42% in 2001), through slight tendency towards feminization of this education-qualification sector in the years of the period (52% female PhD graduates in 2003, 53% in 2006 and 55% in 2011), to achieving a relative equality – in 2012 women were 51.7% of all PhD graduates in Bulgaria. These changes are result of a certain "withdrawal" of men from PhD study in the beginning of the century, which is probably a result of their lost interest due to the negative influence of the unsatisfactory payment and low prestige of the scientific career, incompatible with the efforts of developing and defending the dissertation theme. In accordance, the number of male PhD graduates in 1999-2003 has dropped by -3% together with a significant increase in the number of women by 13% in the same period. After that the rates of growth of men and women PhD graduates was equal and reached 10.9% for both genders in 2002-2006, which was significantly higher than the EU-27 average level (increase by 6.8% for women and 3.2% for men, thus placing Bulgaria among the nine countries with a rate above 10%). The positive trend towards achieving balanced male and female participation in PhD study continues in the next years. Bulgaria (with Latvia and Macedonia) is one of the few European countries with compound annual growth rates of male PhD graduates exceeding the female one in 2002-2010 – 4.3% for women and 7% for men, respectively 3.7 and 1.6% average for EU-27. The extended dynamic row in 2010-2012 shows a sharp increase in the total number of PhD

graduates in Bulgaria by 1.6 times, including for women by 1.8 times and for men by 1.5 times. The result for men is actually more significant, having in mind the registered drop of their share among the PhD graduates in 2011 by 8%.[13]

Horizontal gender segregation

Unlike the relatively even average distribution of male and female researchers in higher education and science, there are significant disproportions in their participation by scientific fields and disciplines. There is a substantial imbalance in the gender participation or the so-called *horizontal gender segregation*.

Concerning *PhD graduates*, according to latest data for EU-27 in 2010, clearly feminized are the science fields traditional for women – they were 64% of the PhD graduates in education, 56% in medicine and 54% in the humanities and arts. There was a relatively balanced gender composition only in the social sciences (including business and law), where 49% of PhD graduates were women, as well as in agriculture and veterinary, where women were 52%. Significant masculinization exists mainly in the science, mathematics and computing, where female PhD graduates were less than 26%, as well as in engineering, including manufacturing and construction (40% are women). The information on Bulgaria is substantially different than the European.

Table 2

Proportion of Female PhD Graduates in Bulgaria in All PhD Graduates by Broad Field of Study (%)

Field of science	2003	2006	2010
Education	52.2	52.0	47.0
Humanities and arts	68.4	68.0	57.0
Social sciences, business and law	50.0	58.0	51.0
Life and physical sciences, mathematics and computing	52.8	56.0	58.0
Engineering	31.4	33.0	32.0
Agriculture and veterinary	46.4	54.0	80.0
Medicine	56.4	56.0	43.0

Source: She Figures – 2006, p. 39; 2009, p. 51; 2012, p. 54.

Data show that in the beginning of the analyzed period Bulgaria was in a different situation than Europe, mainly concerning female PhD graduates in the field of natural sciences, where the feminization continues to increase in the next years as well. In 2006 there was a deeper lack of desire in men to advance in the academic field. Engineering remained the only field of science where they dominate.

At the end of the period the situation concerning the *movement towards balanced gender distribution of PhD graduates by fields of science improved, except in agriculture and natural sciences, where female domination reached "unhealthy"*

[13] Calculation for 2011-2012 are from NSI data.

values. More detailed information on different scientific fields shows that in 2010 women were 66% of the PhD graduates in life science, 51% in physical science, 56% in mathematics and statistics, and reached 50% in architecture and building. In this sense, the leadership of Bulgaria regarding the European desires and tendencies towards achieving gender equality in traditionally "male" scientific fields goes to another extreme – *weakening desire in young men to pursue academic career.* This requires undertaking relevant encouraging measures in regards to the interests of the science itself, as well as its gender composition.

This tendency exists also in the analysis of the *shares of female researchers in the total number, disaggregated by fields of science and sectors*, mainly the government sector.

Table 3

Proportion of Female Researchers in Bulgaria in the Number of Researchers by Sector (in Higher Education Sector – HES; Government Sector – GS) by Field of Science (%)

Scientific directions	2003		2006		2009	
	HES	GS	HES	GS	HES	GS
Natural sciences	55.0	51.6	55.0	54.0	42.0	52.0
Engineering and technologies	24.4	34.3	22.0	33.0	31.0	38.0
Medical sciences	55.6	51.2	53.0	53.0	45.0	70.0
Agricultural sciences	35.9	52.7	41.0	53.0	39.0	60.0
Social sciences	40.1	59.3	43.0	58.0	51.0	57.0
Humanities	52.4	66.2	58.0	63.0	54.0	66.0

Source: She Figures – 2006, p. 42, 44; 2009, p. 57, 60; 2012, p. 66, 71.

Analysis of the presented data denies the settled in the society *fallacy concerning the strong feminization of the higher education field*: in 2003-2009 there was a clear tendency towards more balanced gender composition of such scientific fields in the higher schools like natural sciences, engineering, agriculture, medicine and social sciences, with relevant decrease of the feminization or increase in the share of women in fields where they have been significantly behind the male researchers. This means that *the higher education field remains attractive to both genders,* either due to the satisfactory payment, or to the prestige of the profession and/or acceptable work conditions and working time. At the same time men show more and more neglected participation in the science in the government sector, i.e. *in budget research institutions. Except the engineering and technologies, all scientific fields are obviously feminized*. In medicine, agriculture, social sciences and humanities the shares of female researchers varies between 60-70%. We have to mention that bending the gender balance in any direction harms the economy of the country, which should fully use the professional research potential of both men and women for achieving progress in meeting the targets of "Europe 2020" Strategy and establishing knowledge economy.

In a concentrated form the horizontal gender segregation by science fields in higher education and science is presented through the values of the calculated since 2003 *dissimilarity index*.[14]

Table 4

Dissimilarity Index – DI

	2003	2006	2009
EU member countries	DI – EC-25	DI – EC-27	DI – EC-27
Higher education sector	0.14	0.14	-
Government sector	0.21	0.18	-
Bulgaria			
Higher education sector	0.23	0.27	0.16
Government sector	0.12	0.14	0.15

Source: She Figures – 2006, p. 48; 2009, p. 64; 2012, p. 77.

The She Figures – 2003 Report measured for a first time the dissimilarity index for the whole science field (p. 58). Its value for Bulgaria in 2000 placed the country on 1st place (in a negative sense) in Europe with its highest level of 0.31. Deciphering the index means that 1/3 of the researchers should change their scientific field, so that there will be a progress in the gender equality in the academic institutions in Bulgaria through practical impllementation of the EU criterion for that period – achieving 35% female participation in every scientific field. The further detailing of the dissimilarity index and its measuring in higher education and government sectors shows significant improvement of their gender composition, especially in higher education. The 2009 results mean that respectively only 16 and 15% of lecturers and scientists in both sectors in Bulgaria should change the science field of their position for achieving balanced gender distribution. Determining the gender of people hypothetically "leaving", respectively segregated in these fields, is in accordance with the data on their participation in the respective sectors. In this sense, the results in table 3 show that *in higher education average for all scientific fields 16% of men should "move", while in the government sector – 15% of women.*

[14] The *Dissimilarity Index* (DI) provides a theoretical measurement of the percentage of women and men in a given field who would have to move to an occupation in another field of science to ensure that the proportions of women were the same across all fields. It can therefore be interpreted as the hypothetical distance from a balanced gender distribution across fields of science. In order to interpret this index correctly, it is important to know which gender is in the majority overall. The maximum value is 1, which indicates the presence of only either women or men in each of the occupations, depending on the majority gender. The minimum value of 0 indicates a distribution of women and men within each occupation which is equal to the overall average proportion of women and men. Therefore the closer the index is to 1 the higher the level of dissimilarity and thus the more men and women would have to move across science fields in order to achieve a balanced gender distribution (She Figures – 2012, p. 76).

Vertical gender segregation

One of the most substantial problem in the higher education and science both in Europe and in Bulgaria is the existence of strong *vertical gender segregation*.

The vertical segregation by academic staff positions (scientific ranks)[15] is shown most clearly in the analysis of the trajectories of academic career of men and women in higher education and science. Data in table 5 (average for EU-27) show increasing difference in the proportions of women and men in moving to higher academic positions*. With relative gender balance at the start of academic career, achieving grade B and mostly grade A becomes "a stumbling block" in the career development of women in the academic fields. Despite the slight closing of the scissors in the analyzed period, the difference, particularly for grade A, remains more than significant.*

Table 5

Proportions of Women and Men in a Typical Academic Career, EU-27 (%)

Gender	PhD graduates	Grade D	Grade B	Grade A
2002				
Women	41	40	33	16
Men	59	60	64	84
2006				
Women	45	44	36	18
Men	55	56	67	82
2010				
Women	46	44	37	20
Men	54	56	63	80

Source: She Figures – 2009, p. 73; 2012, p. 88.

Slowing the academic career of women can be traced also by scientific degrees. According to preliminary information of NSI for 2011, the share of women with PhD and DrSc degrees is 41.7% of all research personnel with higher education. In the reported lowered participation of men with higher education in all research personnel the share of men with scientific degrees is significantly higher than the one for women – 47.9%.

The stated differences in favor of men are confirmed also by the quite slowly changing values of the *glass ceiling index*.[16] By this index Bulgaria is substantially

[15] The European statistics presents data for four types of academic positions – grade A, B, C, D. As mentioned in She Figures – 2009 report, in Bulgaria valid are three of them: A – full professor; B – associated professor and D – assistant.

[16] The *Glass Ceiling Index* (GCI) measures the relative chance for women, as compared with men, of reaching a top position. The GCI compares the proportion of women in grade A positions (equivalent to Full Professors in most countries) to the proportion of women in academia (grade A, B, and C), indicating the opportunity, or lack of it, for women to move up the hierarchical ladder in their profession. A GCI of 1 indicates that there is no difference between women and men being promoted. A score of less than 1 means that women are over-represented at grade A level and a GCI score of more than 1 points towards a Glass Ceiling Effect, meaning that women are underrepresented in grade A positions.

above the EU average level. This does not deny *the existence of vertical segregation by academic positions in Bulgaria – the glass ceiling continues to weigh on the heads of the female researchers, but it is considerably "thinner" than in most European countries.*

Table 6

Glass Ceiling Index in the Academic Field

Countries	2004	2007	2010
EU-27	1.90	1.80	1.80
Bulgaria	1.73	1.50	1.40

Source: She Figures – 2006, p. 59; 2009, p. 78; 2012, p. 96.

This index is presented to the science community in 2006, while the first She Figures – 2003 Report measured the so-called feminization ratio among senior academic staff (grade A) (number of female grade A per 100 male grade A staff). According to 2001 data, Bulgaria was on the 2nd place among the EU candidate-members (behind Latvia) with a value of this indicator of 21.7. The country is close to the "leaders" in the then EU-15 like Portugal (23.9) and Finland (23.4), which means that little more than 20 women per 100 men are in the "top positions" of the academic hierarchy. Obviously the women are strongly segregated, but the data for other European countries report substantially worse results – about 10 women per 100 male full professors. The values of the lately calculated glass ceiling index, particularly for 2010, place Bulgaria on 5th place (in a positive sense) among the European countries. However, the considerably good state of the country does not deny the existence and maintaining in time of the problem of vertical segregation, which is shown in the analysis of the participation of women on higher academic position in the typical career of the researchers.

Data in Table 7 on the *share of grade A staff (full professors) of academic staff* in Bulgaria show significant, though decreasing, majority of men: in the four studied years their number exceeds the number of female full professors respectively 3.5, 3.25, 2.8 and 2.5 times.

Table 7

Percentage of Grade A Staff (Full Professors) of Academic Staff by Gender (%)

Years	Women	Men
2001	3.7	13.1
2004	4.0	13.0
2007	5.0	14.0
2010	6.0	15.0

Source: She Figures – 2003, p. 64; 2006, p. 58; 2009, p. 77; 2012, p. 92.

In other words, the interpretation of the GCI is that the higher the value, the thicker the Glass Ceiling and the more difficult it is for women to move into a higher position (She Figures – 2012, p. 95).

Even more indicative in this sense is the information on the *proportion of female grade A academics among all grade A academics:* 18% in 2001 and 2004, 24% in 2007, and 25.9% in 2010. Despite the obvious progress in the number of career "advancing" women, they are slightly over 1/4 of all grade A academics. Significantly better, though not entirely equal, is the situation with the grade B academics: the proportion of women there was 40% in 2010, which was 5.1% higher than in 2004. The more difficult and slow process of professional advancing of women in higher education and science is seen also their "leading" positions at grade D staff level. Their share in all grade D staff shows surprising persistency – in the four years from 2004 to 2007 it increased only by 1.6%, and since then it has maintained the "leading" place of 54% till 2010. These tendencies are even more negative regarding the female segregation, when we have in mind their increasing share in all researchers from 43.4% in 2001 to 46% in 2010 and 48% in 2012.

Despite the long awaited Law on Academic Staff in Bulgaria, active since May 2010, the analysis of the proportion of men and women by academic staff position in the following period shows the indestructible stable character of the tendencies outlined above, which can be traced regarding the higher education sector.

Table 8

Proportion of Women in All Researchers in State and Private Universities in Bulgaria by Academic Positions (%)

Academic Positions	2010-2011	2011-2012	2012-2013
Grade A academics	25.9	26.6	29.4
Grade B academics	39.7	40.8	41.7
Grade D academics	51.1	52.4	53.0
Teachers and research fellows	61.7	63.2	61.0

Source. Calculated by NSI data, www.nsi.bg

The share of female grade A academics increases only by 3.5% and *due to the low "start" level remains under 1/3 of all academics on this position,* despite the fact that the absolute number of female grade A academics in the three academic years shows high increase in 39% compared with the one of men (17%). Whether it is a beginning of positive changes towards overcoming the vertical segregation of women by academic positions or it is a temporary phenomenon as a reaction of the delayed facilitated procedures for academic career, only time will tell.

Practically the influence of the new Law on *gender distribution of grade B academics is unseen – the share of women on this position increases only by 2%.* The same is the increase in the share of the "working bees" in the higher education – *women grade D academics, still dominating at the lowest level of the academic hierarchy.* Even more "representative" is the participation of women in category "lecturers and research fellows" – people without scientific degree and probably

without obvious academic perspective. Their share exceeds 60%, and there are no any signs in the years of dropping under this "threshold" (63.8% in 2000, 68.4% in 2006, 63.2% in 2011 and 61% in 2012).

Data of the number of *men and women grade A academics in the European countries by age groups* are indicative (in 2010 the available information is only for 12 countries, including Bulgaria). As in most of them, in Bulgaria as well the biggest number of grade A academics is in age group above 55. Only in Germany the number of men and women grade A academics is bigger in age group 45-54. In Austria, Romania and Belgium the number of female grade A academics is bigger than the male in the mentioned age group. We have to mention that in Germany, Italy and Romania there is a registered significant number of men and women grade A academics aged 35-44, while in Bulgaria there are lower opportunities for professional career for the younger generations. Among the researchers aged 35-44 in Bulgaria the number of men and women grade A academics is equal (5 people). In comparison, in Romania their number is 1165 women and 1294 men, in Germany – 560 women and 2293 men, in Italy – 108 women and 460 men, in Austria – 93 women and 281 men. In accordance, we can draw the conclusion that *in Bulgaria the academic career has slow rates for both genders, but women are in a more unfavorable situation than men also in temporal sense, since their number is 1/4 of the one of men grade A academics even in age group over 55.*

Besides by academic positions, there is a *vertical segregation by highest hierarchical levels (top-positions)* of the academic career. A landmark for evaluation of the male and female participation in the management is the determined target by the EU Strategy for Equality between Women and Men (2010-2015) of achieving 25% participation of women in top hierarchy positions in the research sector, as well as target of at least 40% participation of one gender in the scientific boards in academic structures and commissions and expert groups at the European Commission in this field.

The disproportionate *participation of women and men in the scientific boards*, as seen from the data in table 9, shows not only insufficient participation of women and lack of a fair competition between the genders for these positions, but also their weak desire to "overcome" the still insurmountable glass ceiling effect. It is curious that the latter is specific not only of men but also of women who consciously or not do not understand their "defrauded" situation. Having in mind the elective nature of these positions and already analyzed balanced participation of female researchers in the higher education and science in Bulgaria, *the insufficient participation of women in the management of the research activities to some extent is a result of the fact that women, on one hand, do not apply enough for certain positions, and on the other hand, male candidates are nominated and tend to be elected*. However, such behavior is rather a reaction to the settled social cultural gender stereotypes than to professional-organizational or institutional barriers before science career of women.

Table 9

Proportion of Women on Scientific Boards in Research Institutions and Universities (%)

Countries	2001	2004	2007	2010
EU -27	27.3*	-	22	36**
Bulgaria	14.7	32.8	37	29

* Data for EU-15; average for 11 EU candidates is 19.1.

** As mentioned in the relevant report, this result is slightly increased due to some methodological changes in measuring the average indexes for EU-27 compared with the She Figures – 2009.

Source: She Figures – 2003, p. 76; 2006, p. 71; 2009, p. 99; 2012, p. 117.

The data presented for Bulgaria show a serious increase in female participation in the analyzed period from one of the lowest levels average in EU-15 and the 11 candidates in 2001 and highest level after Norway (48%) and Denmark (35%) among EU-27 in 2004. However, it remains under the mentioned target of 40% participation. In 2010 there was a substantial drop by 8 points, which positions Bulgaria far from the European average level. Europe is closer and closer to reaching the envisioned target, but only in four European countries it has already been reached – Iceland (40%), Finland (45%), Norway (46%) and Sweden (49%). For information, Poland and Cyprus are at the bottom of the ranking by this indicator – only 7% of women there participate in scientific boards in the relevant institutions.

Much more visible are the *gender differences in participation in scientific boards of academic institutions*. The proportion of female heads of institutions in the higher education sector increased from 8% in 2007 to 14.4% in 2010. However, with another 15 countries it remained under the EU-27 average level (15.5% in 2010). It is absolutely insufficient both for Europe and Bulgaria in regard to the mentioned target of achieving 25% participation of female heads of institutions in science sector. We have to mention that in such a scale the female participation was reached only in three European countries – Finland (25%), Sweden (26.9%) and Norway (31.8%), while in Latvia it was 0, despite the fact that this country is among the few with highest female academic employment (over 50%). This raises again the question about the relation between the gender stereotypes settled in the society and the low self-esteem of women, specific of the countries with not so striking but still exceptionally low results by this indicator.

Even more indicative is the information about the proportion of female heads of universities or assimilated institutions based on capacity to deliver PhD. In 2007 it is 9% both in EU-27 and Bulgaria, with quite insignificant increase to respectively 10 and 12% in 2010. Leaders are again the Scandinavian countries, where unlike the rest of Europe female heads of universities are not a phenomenon (Sweden – 43%, Iceland – 33%, Norway – 29% and Finland – 25%). There are also countries

where the term “female head of university” is totally unknown phenomenon – Cyprus, Lithuania and Hungary with 0% of women on this position.

The latest data for Bulgaria support the outlined tendencies. The proportion of female directors of institutes at the Bulgarian Academy of Sciences (main representative of the government sector for science) is 21.7% (10 women among totally 46 directors – 6 of them are in the traditionally feminized scientific fields and only 4 are female directors in the natural sciences and engineering) (see Bulgarian Academy of Sciences: directory 2011…). The “progress” of women is seen also with the decrease of the level of top positions – 40.9% are female deputy directors and 70% are scientific secretaries. Composing scientific boards remains under the criterion determined by EU – women are 36.6% of all chairpersons of scientific councils in the BAS institutes. Despite the fact that since 1869 there has not been any woman – president of BAS, the central management bodies of the academy in 2011-2012 register certain progress in achieving a balanced gender participation. Ratio of number of BAS deputy presidents men and women changed from 3:0 to 1:2; of number of scientific secretaries by scientific fields – from 5:2 to 4:3; of shares of members of Management Boards – from 40:60% to 50:50%, i.e. a full parity between women and men is achieved. The positions President of BAS and Chairman of the General Assembly of BAS are still a “trade mark” for male scientists. The female participation among the academicians and corresponding members of BAS remains quite low – having in mind the newly elected BAS members in 2012, their share is only 3% of the academicians (2 women among all 68 academicians) and 14% of corresponding members (13 women of all 93, and 7 of them are again in the social sciences and humanities).

The situation in the highest management boards in the higher education is quite the same: the new Council of Heads of the higher schools in Bulgaria elected in 2012 has a Chairman (man) and 6 members of the Management Board (men). In accordance with the data from the Register of accredited higher schools at the Ministry of Education, Youth and Science, as at 1st May 2013 - in 51 state and private universities and higher schools female heads are only 2, i.e. 3.9% of all heads (the heads are also chairmen of the Academic Councils). Women deputy heads are 32 (mainly on international cooperation and public relations and education activity), which is not enough regarding the fact that the average number of deputy heads in a higher school varies between 2 and 4. Among the chairpersons of General Assembly (highest management body in the higher schools) women again are only 2; the number of women deputy chairpersons of General Assembly is significant.

Gender differences in the access and size of the project financing

The weak participation of women in the management structures of science raises the question how much this reflects on their chances to receive financial grants for research. In this connection since 2006 the European statistics on

women and men in research has included additional data for *analysis of the gender differences in the access and size of the project financing* through measuring the gender differences of the success rates of researchers to obtain research funding. We have to mention right away that the *analysis of the relevant data has not established serious gender imbalance*. In 2004 the higher success rate of men is registered in 17 of the monitored 26 European countries, and of women – in 9 countries (among which Bulgaria too), where there is a "reverse proportional dependency" – the lower the level of R&D expenditures per researcher, the higher the success rate of women. In 2010 higher success rate of men by average 2.5% is registered in 17 of the monitored 22 European countries, and of women – higher than the one of men average by 1.9% in 5 countries, including Bulgaria (with Slovenia, Luxemburg, Iceland and Norway). We have to mention that compared with 2002 the difference of the success rate of men in the countries, where it is higher for them, significantly decreased from 12.3 to the mentioned 2.5% in 2010, while in the countries with difference of the success rate in favor of women it remained constant in the period – 1.9%.

The results of a *comparison of the number of male and female applicants and beneficiaries of research funding in Bulgaria show insignificant differences* (average by 2% in favor of women in 2002 and 2010) – 30% women beneficiaries of research funding in the total number of women applicants, and 28% men of the same group in 2002, and respectively 28.7 and 26.8% in 2010. We have to mention that the number of applicants from both genders decreased drastically in the analyzed period (by 2.8 times for women and 2.7 times for men), while the share of beneficiaries remained the same with maintained higher success rate for women in Bulgaria. Analysis of this indicator by scientific fields gives more detailed information about the access to financing for women and men in Bulgaria in 2010 – men exceed women by 4.1% in the natural sciences, by 5.6% in medicine, by 23.9% in agriculture. At the same time women have higher success rate than men by 13.4% in engineering, and mainly in social sciences – by 27.4%. However, in the "feminized" humanities there is an absolute gender balance.

The analysis of the size of the granted financing is a different situation.[17] Here all men and women in the academic field in Bulgaria are "defrauded" compared with other European countries. *The available data for 2003, 2006 and 2009 place Bulgaria on the leading places among the European countries by total number of female researchers (almost and above 50%) and by female success rate, and also on one of the last places by granted research funding per researcher (under 50 000 PPS), especially about 30 000 PPS in 2006 and about 35 000 PPS*

[17] The *purchasing power standard* (PPS) refers to the artificial common reference currency unit used in the European Union to express the volume of economic aggregates for the purpose of spatial comparisons in such a way that price level differences between countries are eliminated. One PPS thus buys the same volume of goods and services in all countries, whereas different amounts of national currency units are needed to buy this same volume of goods and services in individual countries (She Figures – 2012, p. 121).

in 2009.[18] It is revealed in the sustainable gender paradox, specific of the European Roadmap for equality between women and men in science – the higher the share of female researchers in a country, the lower the size of project funding per researcher. And vice versa – the lower the share of women, the larger the project funding. As an illustration, it is highest (over 190 000 PPS) in Austria, Germany, Sweden, and almost the same in Italy, with respective share of female researchers of 28, 25, 36 and 34%. In these and the neighbouring countries the distribution of project funding is certainly "to the detriment" of women, participating more in project fields and sectors with smaller funding. *In countries with considerable balance of participation of men and women in the academic field, including Bulgaria, funding as a whole is small, which leads to certain gender "equality" in some sense*. At the same time there is a tendency, unfavorable by gender equality, of female participation in the 6th Framework Programme on all positions in projects with lower financing. If in such projects (Smaller Instruments CA's, SSA's and Streps) it is average 43.3%, in the larger financed projects (Integrated Projects, Networks of Excellence) there is a drop of female participation to average 30.5%.

Concerning distribution of funding by economic sectors average in EU-27, including in Bulgaria, there are similar tendencies. The amounts in the research structures of the private sector are highest, followed by the government research institutions, and then the higher education sector, where the amounts are average 50% of those in the government sector and 25% of those in the private sector. Due to one of the main problems of the gender composition of the academic employment in Europe (quite limited participation of female researchers in private research structures with significant funding), there is a clear inequality of the European women concerning access to projects with highest budget. In Bulgaria, however, employment of female researchers in private sector is 43%, which excludes this problem from the agenda on the account of the limited opportunities for solidary financing of scientists of both genders.

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The analysis proves that Bulgaria has a decent place on the European Roadmap for Gender Equality in Science, with achieved obvious progress reflecting the refocused priorities from gender equality to balanced participation of men and women. Many of the problems in this field, average in Europe and in different countries, have been practically overcome in Bulgaria. However, three main problems are identified – horizontal segregation by fields of science, tendency towards men leaving the government research sector, and substantial vertical segregation by

[18] In 2009 the average total volume of project financing in million PPS in EU-27 is as follows: in private research sector – 137 412, in government sector – 30 800, and in higher education sector – 54 693. In Bulgaria it is as follows: in private sector – 125, in government sector – 230, and in higher education sector – 58 (She Figures – 2012, p. 129). No comment needed.

academic and leading positions – requiring further ways and mechanisms to be overcome.

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