MEASURING GENDER GAP AT THE UNIVERSITY

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Abstract

The changes of technology, policy, market conditions etc. evoke and make new environment and conditions on the labour market. The competences, skills, knowledge required by the employers on the potential employees, students or graduates are the permanent. The gender issue in the labour market has gained increased importance in recent decades. This is partly the outcome of the European Union’s continuous efforts to attract attention to the main factors which might contribute to promote policies towards decreasing gender labour market differentials and finally to introduce more efficient legislative measures against discrimination.

This contribution presents a broad overview of the existing gender gap at the university. The focus is on the rate of women in the total number of students at all levels of higher education, e.g. bachelor, master and doctoral level by Bologna system as well as in the total number of employees, teachers and researchers. The rates identify also the differences between faculties by their specialization. These results are compared with the proportion of women in key sectors in Slovakia. The project also monitors the representation of women in the scientific institutions and the managerial position. The measuring gender gap or equality at the university has been carried out within the framework of the Horizon EU project Change (2018-2020) of which the University of Zilina, Slovakia is partner. The identification and measuring gender gap at the university is based on the concept of the Glass Ceiling Index developed by the institutions of the GenderTime consortium (University of Padova).

Slovakia has put in place some actions aimed at narrowing the gender gap in economy including the education and universities. According to Eurostat data, the pay gap between men and women in Slovakia was approximately 23% in 1998. The gap remained constant for the year 2003 (Eurostat, 2004). Given this, the pay gap for this period was quite large. In 2016 the gap was at about 14%. We could say that is better figure but the gap is still 14%. The issue of occupational segregation in Slovakia also reveals labour market gender inequalities. The share of female managerial positions in 2016 was 3.5% women and 5.2% men, in contrast with the 2002 year 2.6% women and 4.5% men. Gradually, gender plans and questions or solutions are part of the strategy of universities and other research institutions, despite traditional barriers, stereotypes and approaches. At the same time, new technologies make it possible to significantly strengthen gender equality as well as the applicability in different sectors and in different positions. The first results of the gender gap identification at the University of Zilina have been obtained. The proportion of female students, researchers and academics varies by the specialization and by the faculty but the clear under-representation of female is observed in the managerial positions at all the levels.

Keywords: university, gender gap, index, measuring, vertical segregation.

1 INTRODUCTION

The changes of the curriculum, contents and forms of education or learning are characterized by conversion from classic to integrated education or learning. The changes cause also an intense debate around the role of universities, their strategies and performances. In addition, the competition at the labour market as well as at the education and research areas is rising in both the acquisition of research resources and high-quality students. That’s why universities under pressure of change their strategy, policies, goals, processes and expand their human resources management. In addition, competition is rising in both the acquisition of research resources and high-quality students even internationally. The gender issue in the education as well as labour market has gained increased importance in recent decades. The European Union continuous efforts attract attention to the main factors which might contribute to promote policies towards decreasing gender labour market differentials and finally to introduce more efficient legislative measures against discrimination.

In general, there are two basic components of the issue of gender discrimination in the labour market e.g. pay discrimination and employment discrimination. Naturally, there are a number of other related indicators which are also helpful in establishing a more accurate picture of gender inequalities. These
include unemployment rate gap, sex distribution in employment by sector, share of part-time employment, fixed term employment, average working hours and others.

Gender equality is a keystone of a prosperous, modern economy that provides sustainable inclusive growth (OECD, 2018). The processes as well as the opportunities connecting with the digital disruption and digital transformation provide new possibilities to eliminate some kinds of jobs and to empower women or gender equality in the labour market, boost economic growth and build a more inclusive, digital world.

2 THEORETICAL BACKGROUND

Concept of measuring the gender gap at the university or generally at the academic institution can be based on several tools. These tools measure the gender aspects from different points of view. It is possible to focus on access to education in some specializations as well as socio-cultural norms curtail women and girls’ ability to benefit from the opportunities offered by the society based on knowledge.

By the She Figures reports (2012, 2015) women’s academic career is characterized by vertical segregation e.g. identifiable women group is under-represented at some academic levels. Certainly the gender imbalance varies depending of sector or research area or science, e.g. horizontal segregation exists (She Figure 2015).

For the evaluation of vertical segregation at university it is possible to use:

- Glass ceiling index GCI\textsubscript{women} that represents the proportion of women at university and women with the highest grade (professor),
- Glass ceiling index GCI\textsubscript{men} as proportion between total number of men at university to men with the highest grade (professor)

GCI\textsubscript{women} could be equal 1 that indicates no differences between women and men, GCI\textsubscript{women} < 1 – the women are over represented at university and GCI\textsubscript{women} > 1 women are under-represented in grade professor (Badaloni, Perini 2015).

Of course, the Glass Ceiling Index is focused only on the representation of women or men in certain positions. Other indices deal with equality issues from a number of perspectives and evaluate different aspects. These include the Global Gender Gap Index developed by the World Economic Forum on four social areas, the Gender inequality index of the United Nations on poverty.

Under the conditions of the university, we were based on the typical representation of women and men in the different levels of education and in the individual positions. We used the Glass Ceiling Index to express this.

3 DATA AND METHODOLOGY

For the evaluation of gender issues at the university including its faculties related to conditions by the glass ceiling index it is necessary to obtain staff structure data. However, databases or long-term statistics did not include these aspects until 2014. Data on the structure of employees at universities including University of Zilina (further University) were reported only in total in the Slovak Republic (further SR). Thus, only aggregated data is available. That is why we were only in the 2015-2018 period.

University employment statistics as well as employment analyses did not touch gender issues and did not pay attention to these facts. Only the changes in 2010-2013 led to adjustments to the statistical statements with a partial focus on vertical segregation. So far, these statistics and analyses do not address either horizontal segregation or other inequality indicators.

So, the main research question: is it possible to identify by the glass ceiling index some differences in the vertical segregation at the university as well as at the faculties? Can we compare the tendencies at the university and faculties? We decided to investigate the conditions at the University. The individual data related to the proportion of women and men at University are based on the annual reports of university and statistics. The analysis is included in the overall framework of inequalities and segregation within the SR.
4 RESULTS

According to Eurostat data, the pay gap between men and women in Slovakia was approximately 23% in 1998. The gap remained constant for the year 2003 (Eurostat, 2004). Given this, the pay gap for this period was quite large. In 2016 the gap was at about 14%. We could say that is better figure but the gap is still 14%.

The decomposition of the survey data from 2004 year has revealed some other interesting aspects of the pay structure and its gender dimension. Focusing on particular categories, the lowest figures for women's wages as a proportion of men's were as follows (EIRO, 2004):

- by level of education - 57.9% among employees with a bachelor's degree;
- by occupational group - 62.1% among legislators, senior officials and managers;
- by sector - 63.1% in the wholesale and retail trade and in financial intermediation;
- by age - 65.5% among employees 60 years of age or above;
- by form of ownership - 66.2% in foreign-owned companies.

In contrast, women's wages were closest to men's in the following categories:

- by level of education - 81.6% among employees with a higher vocational education;
- by occupational group - 86.5% among skilled agricultural and fishery workers;
- by sector - 87.6% in mining;
- by age - 88.8% among employees aged 20 years or below; and
- by form of ownership - 111.3% among employees of local government enterprises and services.

The issue of occupational segregation in Slovakia also reveals labour market gender inequalities. The share of female managerial positions in 2016 was 3.5% women and 5.2% men, in contrast with the 2002 year 2.6% women and 4.5% men.

As can be seen, the share of female managers is quite a lot lower than male ones. However, Slovakia seems to be in a better position in comparison with the average share female managers in EU-15 and in even better position in comparison with EU-25.

The sectoral approach to employment segregation also shows some interesting characteristics. By the OECD statistics in 2016 the female share of industrial employment is 21.1% (men 47%), employment in services – women 77.5% and men 47%, agriculture – women 1.4% and men 4.1%. From the 2002 the share of women employed in services increased by 8.8% (from 68.7% in 2002 on 77.5% in 2016) and is higher than male employment. It seems that female service employment lacks behind the trends in other EU member states. The same results of comparison holds for female employment in high tech jobs or in the knowledge intensive based jobs: it is higher than male employment but below the European average.

Table 1. Proportion of women at the University and its Faculties in 2018 in %.

<table>
<thead>
<tr>
<th>Faculty</th>
<th>BSc students</th>
<th>MSc students</th>
<th>PhD students</th>
<th>researchers</th>
<th>assistant professors</th>
<th>associate professors</th>
<th>professors</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEDAS</td>
<td>53.73</td>
<td>54.94</td>
<td>42.11</td>
<td>57.14</td>
<td>60.56</td>
<td>53.13</td>
<td>31.25</td>
</tr>
<tr>
<td>SJF</td>
<td>9.76</td>
<td>10.98</td>
<td>13.04</td>
<td>21.43</td>
<td>32.65</td>
<td>20.83</td>
<td>26.09</td>
</tr>
<tr>
<td>EF</td>
<td>14.04</td>
<td>15.78</td>
<td>9.62</td>
<td>4.35</td>
<td>20.69</td>
<td>15.15</td>
<td>6.25</td>
</tr>
<tr>
<td>SvF</td>
<td>36.80</td>
<td>35.4</td>
<td>38.46</td>
<td>46.67</td>
<td>24.24</td>
<td>61.11</td>
<td>0.00</td>
</tr>
<tr>
<td>FRI</td>
<td>23.29</td>
<td>23.21</td>
<td>31.58</td>
<td>33.33</td>
<td>30.19</td>
<td>12.00</td>
<td>38.46</td>
</tr>
<tr>
<td>FBI</td>
<td>31.63</td>
<td>31.99</td>
<td>45.45</td>
<td>100.00</td>
<td>48.15</td>
<td>42.86</td>
<td>20.00</td>
</tr>
<tr>
<td>FHV</td>
<td>64.07</td>
<td>65.33</td>
<td>62.5</td>
<td>50.00</td>
<td>65.22</td>
<td>40.00</td>
<td>62.50</td>
</tr>
<tr>
<td>University 2018</td>
<td>33.18</td>
<td>34.62</td>
<td>27.68</td>
<td>28.57</td>
<td>39.25</td>
<td>32.03</td>
<td>24.73</td>
</tr>
<tr>
<td>University 2015</td>
<td>33.82</td>
<td>34.30</td>
<td>28.87</td>
<td>23.53</td>
<td>42.06</td>
<td>32.52</td>
<td>22.00</td>
</tr>
</tbody>
</table>

Source: University Annual Reports 2015-2018
University of Zilina was founded in Prague in 1953; in 1959 the government of Czechoslovakia decided to move the university from Prague to Zilina as the University of Transport. During the time in relation with the development of communication and information technologies as well as the new specialization in industry the university changed two times the name. First change in 1980 was on the University of Transport and Communication and second change in 1996 was on the University of Zilina.

University includes 7 faculties and several institutes, at about 1500 employees and 7530 students. The rate of women among the students (bachelors, masters, PhD) in the 2018 was 34,1% and by faculties, Faculty of operation and economics of transport and communications (FPEDAS) had 53,97%, Faculty of mechanical engineering (SjF) 11,32%, Faculty of electrical engineering (EF) 15,32%, Faculty of management sciences and informatics (FRI) 23,36%, Faculty of civil engineering (SvF) 35,62%, Faculty of security engineering (FBI) 31,8%, Faculty of humanities (FHV) 65,17%. The rate of women among the employees was 53,3% at the University in the 2018. By the faculties: FPEDAS 55%, SjF 28%, EF 18,5%, FRI 27%, SvF 32,5%, FBI 32,78%. FHV 43,6% (see Table 1).

The level and the tendencies of differences of inequalities at the University and faculties are determined by the study programmes as well as the stereotypes in some industries. Traditionally, the highest proportion of women at all levels of academic career is in the humanities. By contrast, women have the lowest share in electrical engineering. Engineering study programs and professions have a lower proportion of women in each level of higher education, but this proportion is increasing with a shift to a higher degree of study, indicating a higher degree of success in studying these fields in women. Equally, the proportion of women among the faculty staff is significantly higher than among students. This positive result, however, also indicates that the labour market in education, where wages are lower than in industry, work and position, will also be accepted by women, although compared to lower wage earnings.

![Figure 1. Proportion of women and men at the University in a typical career in 2015 and 2018 (in %).](image-url)
The GCI index (Fig. 3) illustrates the state of inequalities from the perspective of vertical segregation at professor positions within the university and its faculties. In general, however, the university had GCI women at 1.43 in 2018, which was above the EU average (average for 2016 was 1.64, S. Figures 2018). But it is still a long way to go to achieve full gender equality in professor academic ranks. Paradoxically, the best situation is at two faculties that have a completely different focus, namely humanities and engineering. On the other hand, the worst situation is at the civil engineering faculty, but amongst students at all levels of study, women are represented by more than one third. Of course, the significantly lower representation of women in professorships is naturally at the electrical engineering disciplines and faculty (also very low rate of students on all levels) and the security engineering disciplines, which in the past was aimed into military science.

**Fig. 2 Proportion of women by the Faculties of the University in the typical career in 2018**

**Fig. 3 GCIwomen and GCImen for University and Faculties in 2018**

**5 CONCLUSION**

Gender equality has increasingly emerged in the attention of various institutions, politicians and the public in recent years. No wonder universities also reflect these trends. In the Slovak Republic, it is also a search for and addressing potential students in connection with the decreasing demographic
curve. Especially technical universities and study programs aimed at engineering or science seek to reach more girls and women to offer their programs. At the same time, heavy manual and stereotyped work is being replaced by vending machines or robots, especially in traditional sectors related to male employment - engineering, electrical engineering, construction, etc. At the same time, the average level of educational attainment in formal education at schools is higher for women. Nevertheless, we encounter vertical segregation. However, if we want to address and find solutions that are beneficial for reducing disparities, then it is also necessary to analyse trends within individual entities. Therefore, the paper deals with the university and its faculties and points out the different state of the university.

The main conclusions from the analysis of the university and faculty environment may be that the differences in vertical segregation are associated with historically conditioned stereotypes. However, positive trends can also be identified in the field of engineering sciences. In a further assessment, we expect to focus on several aspects of equality assessment. The starting point will be probably the Gender Equality Index (Eige-Gei) that evaluates eight domains, e.g. work, money, knowledge, time, power, health, intersecting inequalities and violence.

ACKNOWLEDGEMENT

This contribution was undertaken as a part of the research projects 1/0152/18 VEGA Business and business models and platforms in the digital environment, 1/0087/18 VEGA Enhancing competitiveness of the Zilina region by increasing influence of the University of Zilina in the region and in Zilina town and the Horizon 2020 project 787177 Challenging Gender (In)Equality in Science and Research (CHANGE).

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