RISKS FOR THE CAREER DEVELOPMENT OF THE YOUNG ENGINEERS UNDER THE CONDITIONS OF ECONOMIC STAGNATION: A CASE STUDY FOR THE UNIVERSITY OF RUSE

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Abstract: The trends in the number of applicants and of the admission of students in engineering specialties in the University of Ruse, Bulgaria are analyzed in this work. It is found that the admission of students constantly decreases throughout the considered period (2009-2013). The structure of the main sectors of the economy of the North-Central Region of Bulgaria, particularly Ruse District, is reviewed. The largest share is of the sector of the Mechanical Engineering followed by the Chemical Industry sector. The risk of inefficient use of financial and human resources, caused by the economic stagnation, is indicated. S-O, S-T, W-O and W-T strategies for reducing the adverse effect of the economic, social, demographic and other factors are synthesized using SWOT analysis. This will help politicians, decision makers and managers to overcome the risk for the career development of the young engineers in Ruse region, and in Bulgaria. The obtained results can be used in building, designing and implementing strategies to overcome the investigated problems.

Keywords: career development, economic stagnation, young engineers, SWOT analysis

1. INTRODUCTION

The development of any country is impossible without a strong and adequate educational system. The high level of education is a good precondition for easy adoption of highly qualified personnel in the actual working environment and, subsequently, for achieving excellence in the work leading to rising the levels in every field of economy.

The young engineers, who are carriers of the novel spirit and ensure succession and sustainability of the industrial-enterprises human resources, play a significant role in this process. However, it should be taken into account that, at present, the integration of the young engineers is impeded due to the conditions of economic stagnation in which Bulgaria is considered. In this respect, the risk of a lack of professional development and timely start of the career should be studied in depth and limited to the possible minimum, as the low levels are associated with high loss of financial and human resources invested in trainings. This justifies the need of conducting systematic studies and analysis leading to the formulation of strategies, measures and recommendations to overcome the problems.

The conditions for the adaptation of the young engineers in their first employment are investigated. A corresponding procedure for evaluation of ‘their organizational assimilation’ is developed [1]. In Bulgaria, the connections between the higher-education system and the labor market have been studied in [2]. In this monographic work, several solutions for improving the preconditions for professional realization of the
graduating young specialists are proposed. A SWOT analysis of the engineering education and professional realization of the young engineers of the agro-industrial faculty of the University of Ruse, Bulgaria is conducted [3].

The purpose of this work is to study the risk for the career development of the young engineers graduated in the Faculty of Electrical and Electronic Engineering (FEEE) at the University of Ruse.

2. STATISTICS FOR THE DYNAMICS OF APPLYING AND ADMITTED STUDENTS IN FEEE

On Figure 1, the basic statistical data on the dynamics of the applying students in FEEE are shown. It can be seen that the admission of students constantly decreases throughout the considered period. The data can be explained by a decrease in birth rates in the respective years and the increasing tendency for further education of young people in foreign universities.

Statistics for the students enrolled in the FEEE are presented on Figure 2. Durable, though not so well marked trend of reducing the number of the students in full-time education can be noticed. For the same period (2009 to 2013), the admission in the part-time training form remains stable. This can be explained by the difficult economic environment in which the applicants are placed. Most of them prefer to work during their studies in order to cover their costs. This situation hinders further the career development of the graduates as the higher level of knowledge and training of the full-time students largely creates more favorable conditions and facilitates the professional realization compared to the part-time students.

Fig. 1. Statistics for the trends in the applications of students for the Faculty of Electrical and Electronic Engineering at the University of Ruse.

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Fig. 2. Statistics for the trends in the accepted students for education in the Faculty of Electrical and Electronic Engineering at the University of Ruse.
Q3. ANALYSIS OF THE STRUCTURE OF THE MAIN SECTORS OF THE ECONOMY IN THE RUSE REGION

In Ruse district, the industry sectors, shown on Figure 3, are the most significant. The distribution of the relative number of enterprises in these sectors is shown on this slide. It can be seen that the largest share is of the Mechanical Engineering with nine big enterprises and to the Chemical Industry with seven enterprises in the district. A strong aspect of the University of Ruse is that the university prepares specialists in almost all the engineering fields - electrical engineering and computer science, mechanics, heat engineering, transport engineering etc. This has a positive impact on the career development as it responds to the particular needs of the industry at maximum extent.

![Graphical interpretation of the structure of the main sectors of the industry in Ruse District.](image)

4. ANALYSIS OF THE YOUTH UNEMPLOYMENT

The average monthly unemployment rate increases in almost all 26 districts of Bulgaria. The largest increase in the unemployment rate was observed in the areas of Silistra, Vidin, Montana, Targovishte, Vratsa, Razgrad, Sliven, Kardzhali and Yambol. This increase is most marked in the areas with the highest reported levels of unemployment in recent years, mainly due to the depopulation and the closure of traditional industries in their regions and, as a consequence, due to a very significant reduction in their economically active population [4].

**Unemployed young people up to 24 years old**

In 2011, the unemployed youth under 24 are 29,797 people per year on average, as for a year they decreased slightly by 371 persons or 1.2 %, and in 2011 they represents 9 % of the total number of the registered unemployed. The long lasting trend remains the highest share among the unemployed youths to 24 to be those with no qualifications - 67.1 % (at 67.2 % in 2010), and with primary or lower education, which are 52.6 % in 2011 (52 % in 2010), but they show minimal changes from the previous year. The share of the long-term unemployed young people up to 24 over one year is 21.8 % of all registered young people up to 24.

According to Eurostat data [4] for the month of April, 2012, the unemployment rate for the group of the young people up to 24 in Bulgaria is 32.3 %. The number of the registered at the directorates ‘Labour’ youths under 24 as of 31 May 2012 was 32,992, and it decreased compared to that at the end of April, 2012 with 1,655 job seekers. There is a positive trend at the beginning of the summer season. At the same time, a significant increase of 3,195 persons compared to the average level of 29,797 persons for 2011 is present [5].

**Unemployed young people up to 29 years old**

The group of unemployed young people under 29 in 2011 includes 63,690 people who are only 190 persons more than in 2010. Their share is 19.1 % of the total number of registered unemployed, as it increases by one
percentage point. The clear trend the young people without qualifications, who are 63.1% in 2011 and 63.3% in 2010, to be with the highest share, and those with primary or lower education, the proportion of which remained unchanged - 50.3%, continues. The share of long-term unemployed young people aged up to 29 over one year is 24.4% (22.6% in 2010) of all registered people under 29 years of age.

In 2011, the proportion of unemployed people under 29 years was highest in the districts Sliven (25%), Sofia (24.1%), Yambol (23.8%), Stara Zagora (23.6%) and Plovdiv (23.1%), with the lowest proportion for Bulgaria in the districts Targovishte (13.4%), Smolyan (13.5%) and Kardzali (14%). The share of unemployed youths up to 29 years in the districts of Gabrovo (14.9%) and Razgrad (15.1%) remains relatively low.

The young people under 29, registered at the directorates ‘Labour’ in Bulgaria are 70,868 at 31 May 2012, as the young people up to 19, from 20 to 24 and from 25 to 29 are 5,409, 27,583 and 37,876 people, respectively. The number of young people under 29, registered in the directorates ‘Labour’ at 31 May 2012 declined compared to the end of April, 2012 with 2,937 job seekers, which in turn is decreased compared to the end of March, 2012 with 1,829 persons [5].

Conclusion: The conducted studies show that, as a whole, the employment of the population of Bulgaria decreases, as the trend for significantly lower levels of employment for young people is clear. This gives reasons to conclude that the initial efforts to solve the problems should be directed to that particular social group. The areas of central northern Bulgaria emerged as the areas with relatively high unemployment rate with a very clear trend of increasing.

5. SWOT ANALYSIS

SWOT analysis [3, 6] was performed taking into account the factors discussed so far, namely the applicating and the admitted students, the structure of the economy in the Ruse region and the youth unemployment in Bulgaria. An analysis of the external and internal environment is presented in Table 1. The opportunities, threats, strengths and weaknesses are sorted in order of their importance.

Table 1. SWOT analysis in order to overcome the risks for the career development of the graduates of FEEE.

<table>
<thead>
<tr>
<th>External environment</th>
<th>Opportunities (O)</th>
<th>Threats (T)</th>
<th>Internal environment</th>
<th>Strengths (S)</th>
<th>Weaknesses (W)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. European Funds and Programs</td>
<td>1. Demand for engineers with experience</td>
<td>1. Availability of diverse specialties</td>
<td>1. Limited production practices and internships</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Free movement in the cross-border region</td>
<td>2. Lack of opportunities in employers for additional company training</td>
<td>2. Availability of Centre for Career Development</td>
<td>2. Limited contacts with business</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Proximity of European capital</td>
<td>3. Attitudes among employers to relieve workers with little experience first</td>
<td>3. Availability of additional qualifications center</td>
<td>3. Outdated of a part of the curriculum</td>
<td></td>
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<td></td>
<td></td>
<td>5. Demographic crisis and economic stagnation</td>
<td>5. Highly qualified lecturers</td>
<td>5. A financial scheme of faculty not bound by the education quality</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6. Established traditions and prestige of the faculty</td>
<td>6. Few research and testing with commercial purpose</td>
<td></td>
</tr>
</tbody>
</table>
The overall SWAT analysis, apart from the consideration of the internal and external environment, suggests a formulation of strategies to achieve the goal - in this case to reduce the risk for career development of the graduating students. These strategies are divided into four categories [3, 6]:

- **S-O Strategies.** In these strategies, the opportunities from the external environment are realized using the strengths of the faculty;
- **S-T Strategies.** The strategies are characterized by the use of the strengths of the faculty to eliminate the threats of the external environment;
- **W-O Strategies.** Overcome the weaknesses of the faculty using the opportunities of the external environment;
- **W-T Strategies.** Minimizing the weaknesses of the faculty in order to avoid the dangers (threats) from the external environment.

Eight strategies (options, recommendations) to achieve the objective are synthesized by analyzing the current situation represented by Table 1. They are presented in Table 2. The strategies are indicative and not exhaustive. The starting point of Table 1 can be used by politicians, managers and executives to formulate and implement additional strategies as well.

<table>
<thead>
<tr>
<th>No</th>
<th>Description of the strategy</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Integration into the cross-border labor market.</td>
<td>S-O</td>
</tr>
<tr>
<td>2</td>
<td>Development of new projects, based on innovative ideas, in order to support the young-engineers’ career development and provision of their funding using the EU Structural Funds</td>
<td>S-O</td>
</tr>
<tr>
<td>3</td>
<td>Establishment of new and development of existing career centers and centers for lifelong education and additional qualifications after graduation.</td>
<td>S-T</td>
</tr>
<tr>
<td>4</td>
<td>Targeting the new university graduates to contemporary and emerging trends in the field. In particular, for students in Electrical Power Engineering these are renewable energy sources and energy efficiency.</td>
<td>S-T</td>
</tr>
<tr>
<td>5</td>
<td>Establishment of new and development of the existing centers to support the career development through specialized consultation and coordination between the demand and the supply of jobs.</td>
<td>S-T</td>
</tr>
<tr>
<td>6</td>
<td>A full use of the capabilities of the current projects for paid internships in a real production environment. Strengthen the links Students-Business and University-Business through these projects.</td>
<td>W-O</td>
</tr>
<tr>
<td>7</td>
<td>Deepening and developing the contacts of the FEEA teachers with companies and enterprises using European projects for paid internships and graduation theses.</td>
<td>W-O</td>
</tr>
<tr>
<td>8</td>
<td>Adaptation of the curricula of the specialties with the specifics and with the long-term needs of the field.</td>
<td>W-T</td>
</tr>
</tbody>
</table>

6. CONCLUSIONS

1. The young engineers under the age of 29 are one of the most unguarded groups in times of economic stagnation. The established in the most Bulgarian employers psychological attitudes to release employees without experience in times of crisis, make preconditions for increasing the risk for the career development of the graduating engineers.

2. The results show the relevance and the need for urgent and highly active steps to improve the current social and economic situation, as well as for solving the problems of the career development of the engineers graduating the University of Ruse and the other universities in Bulgaria.

3. The results of this research, including the synthesized strategies, can be used by politicians, decision makers and managers to overcome the risk for the career development of the young engineers in Ruse region, and in Bulgaria.

4. The starting point describing the internal and external environment (Table 1) can be used to build, design and implement additional strategies to overcome the problem.
REFERENCES


