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8th DANUBE ACADEMIES CONFERENCE

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SERBIAN ACADEMY OF SCIENCES AND ARTS

PRESIDENCY

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TOPIC 1: Endangered Danube: What can we do?

FOR WHOM ARE THE PH.D. SCHOOLS IN SERBIA TODAY?

Dejan B. POPOVIĆ*

A b s t r a c t. – The educational system allowing creative thinking, life-long learning, mobility and the boosting self-confidence is an essential component of the productive economy and better quality of life. The educational system based on the Bologna declaration is being implemented in most European countries to meet the needs. The current higher education uses the European Credit Transfer System (ECTS) with the 180 ECTS credits for Ph.D. school following MS degree with 300 ECTS credits (MS and BS). In parallel, the governments introduced classifications of jobs to complement the three higher education degrees. The change in the educational system should be the reflection of the society needs; however, in some countries, this is not the case. More precisely, the societal and economic changes are not synchronized with the new educational system resulting in the graduates not being needed on the job market and in insufficient number of experts for the needs of the existing market. The message of this presentation is that a new degree which certifies the know-how and experience in economy-oriented discipline is a possible method to overcome the problem of unsynchronized education and market needs.

Keywords: Ph.D. school, employment, industrial doctorate

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DOCTORAL EDUCATION[1]

Doctoral education in Europe went through extensive transformations during few last decades as the consequence of the: 1) changes of the labor market; 2) the common European agenda in research and education, and 3) the Bologna Process. The European University Association (EUA) facilitates the development of doctoral education and represents European universities in the European Commission. The latest developments in education are improving the quality and increase the attractiveness of European doctoral schools education.

The Bologna Process is implemented across Europe to ensure harmonized higher level education. Although the harmonization is seen by many as a threat to the diversity and unnecessary boundary for creativity in school, most EU governments forced universities to adopt and implement it.

The basis for the curriculum is the European Credit Transfer System (ECTS)[2]. Doctoral education is the highest, third cycle of the higher education in the Bologna Process. 180 ECTS are required to get the doctoral degree, and students can be enrolled in the program after they accumulated 300 ECTS from the higher education institutions. Doctoral students are full-time employees by the university and in the case when registered in the "industrial doctorate" share their time between the school and the industry.

In Europe, a doctoral school can be described as an independent organizational unit of a university (or several universities). In the United States, doctoral institutions are termed graduate schools and provide master and doctoral courses. "Doctoral" or "research" school is a university/interuniversity organization that includes only doctoral students. European universities, like European countries, want to maintain their diversity. Europe's diverse structures of doctoral education may look confusing to outsiders, but the European motto is "one goal, different routes."

The time to get a doctoral degree in Europe was typically six to eight years after graduation; yet, it has shortened to three years for full-time students and six years for industrial doctorates.

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1 https://www.aaup.org/article/reforming-doctoral-education-europe

2 Key Features of the ECTS: 1) 60 credits = realistic workload of an average full-time student in one academic year to achieve pre-established learning outcomes; 2) credits obtained after successful completion and appropriate assessment; 3) student workload comprises time required to complete the learning activities (lectures, study, papers, etc.); 4) credits are allocated to all educational components of a study program (courses, placements, research, etc.); and 5) performance is documented by a national grade plus an ECTS grade ranking performance on a statistical basis (A=best 10%, B=next 25%, C=next 35%, D= next 25%, E=next 10%; F=fail).

New supervision methods are closely related to an improvement of doctoral education. An increasingly used process of supervision is to share responsibilities and rights between the doctoral candidate, the supervisor, and the institution. The professional development of supervisors themselves is envisioned as an essential element in raising the level of the expertise of Ph.D. scholars. United Kingdom, Sweden, Denmark, and Finland have introduced the systematic training of supervisors, with the emphasis on the younger staff.

"Diversity in European doctoral education may be difficult to understand, but it reflects the diversity of the whole continent. After hundreds of years of development, Europe still has diverse cultures and identities as well as diverse approaches to education and research. In the era of globalization, Europe cannot rely only on its distinguished academic and research history. It has to face the many challenges of the contemporary world and respond to them. The reform of doctoral education in Europe is just one of these responses to internal and global developments. European universities deal with these challenges by working together, exchanging good practices, learning from each other, cooperating, and becoming stronger together." [3]

HOW TO HARMONIZE THE DOCTORAL EDUCATION WITH THE JOB MARKET IN SERBIA

The doctoral training in Serbia, like in other European countries, followed a model based on direct one-to-one collaboration between the student and the mentor and only rarely included limited structured coursework. This method was used to create young researchers for multiple careers. Recent developments changed the organization of the doctorate, and today in Serbia the curriculums follow the Bologna process entirely. The economic transitions in Serbia, after the fall of the Berlin wall, are not as fast as one would like them to be. The harmonization of the laws with the laws in European countries is taking place; yet, there are still many specific aspects that need to be addressed especially in the domain of the education and employment.

To illustrate the problems we present few critical facts. The analysis of job announcement for specific fields is shown in Fig. 1

The average number of applications on a single add was 98 (31% of applicants had 10^{+} years of work experience at the time of application; 34% of the applicants had the Master degree; 65% moved to another town).

3 Alexandra Bitusikova, a senior adviser to the European University Association (EUA), Brussels www.eua.be/cde, (accessed in December 2017).

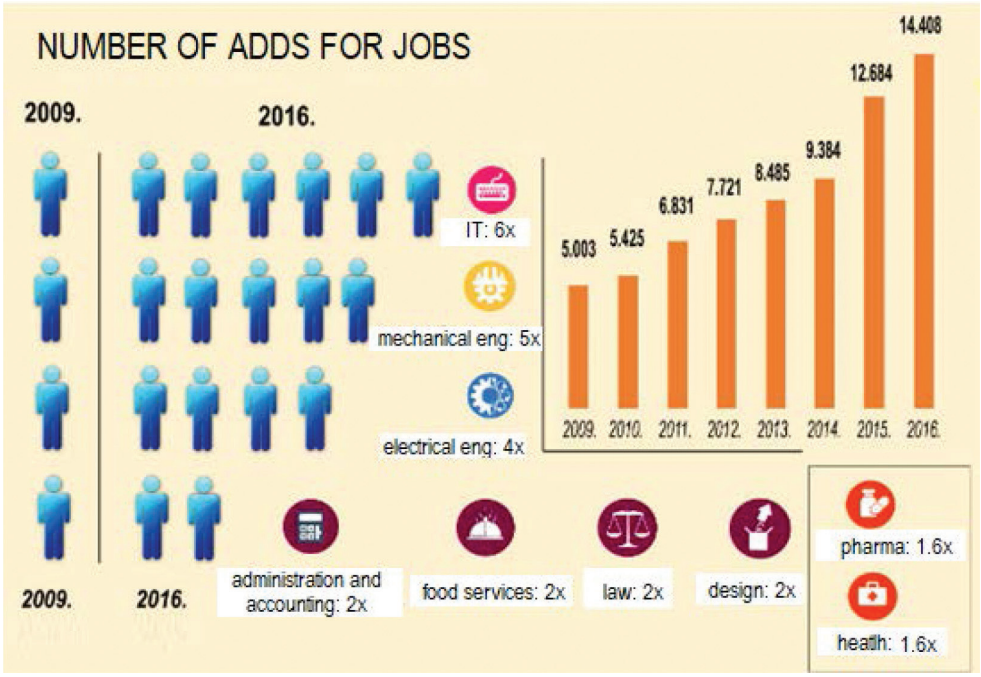

Fig. 1: The number of job adds in Serbia starting from the year 2009.

During the same period, the number of positions for Ph.D. graduates from the companies was 0! Although there were no job openings for the Ph.D. graduates, with the exemption of research institutes and higher education institutions, the government decided to provide funding for 540 Ph.D. students[4] funded by the state money at the University of Belgrade for the school year 2016/1! The numbers of Ph.D. positions, supported by the state money at other major universities in the country is similar. It is interesting to point that in many cases students are not interested in getting a higher degree, and they even stop their education if they can find a job that is paid at the level of their high expectations (e.g., at the School of Electrical Engineering of the University of

4 A Doctor of Philosophy (Ph.D.) is the most senior academic degree awarded by universities in most countries. The completion of a Ph.D. is often a requirement for employment as a university professor, researcher, or scientist in many fields. The term "philosophy" is used by its original Greek meaning: "love of wisdom"; hence, the title Ph.D. is used for the whole breadth of academic fields.

Belgrade only a few Ph.D. students are enrolled in the IT domain, from the total of 35 students)[5].

The doctoral schools in Serbia adopted curricula as the combinations of courses, research work, and doctoral dissertation. The total number of ECTS for the three-year Ph.D. program is 180. The ratio between the educational and research components at the doctoral programs varies between faculties and universities. The infrastructure for the research is in many educational institutions relatively modest, and beyond the standards to allow the training of the graduates to be competitive in the world market. However, individual qualities result in a fair number of highly competitive researchers.

As previously stated, the doctoral school assumes that being a doctoral student is a profession, not a parallel activity. However, the reality in Serbia is different, and many students are full-time employees in companies where their daily jobs are not related to the topics of their doctoral research. Even in cases when doctoral students are employed by research institutes which are partners or members of the university, or employed as teaching/research assistants at the school, their doctoral research topic differs much from their daily duties.

We list some of the problems in Ph.D. education in Serbia: 1) most of the businesses in Serbia do not open positions for the graduates from the doctoral schools; 2) there are no awards for the potential contributions that young brains can create for the company; 3) the investors in Serbia (from inside and outside) in most cases keep the R&D at their homeland and do not have any research in their branches in Serbia; 4) Serbian investors are much more interested in easy money and invest little or no money into the innovations coming as the result of R&D from young talents; and 5) the number of doctoral students would be low if they can find jobs only in research institutions and academia.

One of the possible transitional approaches is to implement a model that is used in several Scandinavian universities. At this point some doctoral schools lead to the degree of an expert, with the title "professional doctor," and the postdoctoral

5 https://www.etf.bg.ac.rs/sr/studiranje/doktorske-akademske-studije

education leads to the degree "science doctor" which is a qualification for academic and research institutions. In parallel, the regulation is set that allows professional doctors to get their leading positions in the businesses.

In Swedish and Finnish universities, a Licentiate's degree, recognized as a pre-doctoral degree, is equal to completion of the coursework required for a doctorate and a dissertation which is formally equivalent to half of a doctoral dissertation.

The licentiate is particularly popular with students already involved in the working life. The Licentiate's degree is called a *filosofie licentiat* in Swedish, *teologie licentiat*, *teknologie licentiat*. For the thesis, two to three peer-refereed articles (or an equivalent monograph) are usually required.

A *licentiate* term comes from Latin word *licentia*, "freedom" (from Latin *licere*, "to allow"), which is applied in the phrases *licentia docendi* meaning permission to teach and *licentia ad practicandum* signifying someone who holds a certificate of competence to practice a profession.

Many countries have degrees with this title, but they may represent different educational levels!

The model that could bring values to students and the society could be to introduce the "Industrial Ph.D.". A three-year industrially focused research project and Ph.D. education carried out in collaboration between a company, an Industrial Ph.D. candidate and a school. In this consortium, the student shares her/his working time between the business and the school and works most of the time on the project. This model considers that the private sector company would apply for funding for the project from Innovation Fund, and the student is employed by the company and receives a salary during the entire Industrial Ph.D. project.

The Industrial Ph.D. project brings several values: 1) the project allows the Industrial Ph.D. to carry out a research project where results are applied in an enterprise setting; 2) the company gets a candidate carrying out a high-quality research project and create effects that can lead to commercial gain. At the same time, the company strengthens its relations to existing and new collaboration partners at the university; and 3) the public sector research institution increases its connections to the business sector, and a foundation for further research is created.

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ЗА КОГА СУ ДОКТОРСКЕ СТУДИЈЕ У СРБИЈИ ДАНАС?

Дејан Б. ПОПОВИЋ

Р е з и м е

Образовни систем који омогућава креативно размишљање, учење у току целог живота, мобилност и који гради самопоуздање је кључни оквир за продуктивну привреду и квалитетнији живот. Да би се задовољиле ове потребе, у већини европских земаља се примењује образовни систем заснован на правилима болоњског програма. Тренутно се у високом образовању примењује Европски систем преношења кредита (European Credit Transfer System - ECTS) који предвиђа 180 ECTS за докторске студије, након стицања звања мастера са 300 ECTS. Упоредо, владе европских земаља су модернизовале класификацију послова тако да она одговара трима нивоима звања у високом образовању, па би то требало да буде и случај у Србији Изазов у образовном систему би требало да буде одражавање потреба друштва; међутим, у неким земљама, то није случај. Прецизније речено, друштвене и економске промене нису синхронизоване са новим образовним системом што доводи до тога да за дипломиране студенте нема позиција на тржишту рада, а истовремено постоји мањак стручњака за задовољавање постојећих потреба на тржишту. Порука ове презентације јесте да би увођење новог облика пост-мастер образовања под насловим звања „индустријски докторат“ за програм нешто мањег обима од садашњег облика докторских студија у економски оријентисаној дисциплини, било могућ начин за превазилажење несинхронизованости образовања и потреба тржишта.

Кључне речи: докторске студије, запослење, индустријски докторат