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Career opportunities for PhD graduates in the knowledge-based economy: case of Slovenia

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Abstract

Higher education institutions are recognized as key agents of creating knowledge society and knowledge-based economy. In this context, the preparation of doctoral students for careers in various sectors of society is a key task. Recently, the role of doctoral studies has changed significantly. Traditionally, they were treated as an entrance ticket for an academic career, but nowadays the importance of doctoral studies is recognized in various spheres of society. Once considered elite, the PhD graduate nowadays faces an increasing competition. Therefore, when deciding whether to enroll in doctoral studies, they should consider their interests and the needs and demands of the labor market. This paper investigates the career opportunities of doctoral students in Slovenia.

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1. Doctoral education in knowledge society and knowledge based economy

1.1. The role of doctoral education

Since the adoption of the Lisbon Strategy in 2000 the European Union has been working towards the creation of European knowledge society and knowledge-based economy - an effort that requires cooperation of various actors

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(COM, 2003). In its documents, the European Commission does not clearly define the term “knowledge society” neither does the term “knowledge-based economy”. Mostly it uses them alternately as synonyms (Valimaa & Hoffman, 2008, p. 275–276). In this paper, we use them in the same manner.

Through the discourse on knowledge society and knowledge based economy, higher education with its core activities of knowledge production, utilization and dissemination, as well as training of highly skilled labor increasingly has become important for the international competitiveness of countries in the global world. Knowledge and intellectual property seem to be key factors in economic and societal development, and universities key providers of knowledge and human resources aiming at achievement of the common good (Nokkala, 2006, p. 177). The new “mission of universities is to promote cooperation and knowledge transfer to the economy and society” (Probst & Lepori, 2008, p. 479), which results in the increasing importance of applied research. Doctoral studies are one of the most important indicators of knowledge society as well as knowledge based economy, since PhD graduates are the most highly skilled researchers and best qualified for knowledge production, use and dissemination (Auriol, 2010, p. 5–6). As such, they “provide the essential resource for knowledge-based economy, i.e. new knowledge” (Carter et al., 2010, p. 247).

One of the roles of higher education is to integrate education, research, and innovation through cooperation with a wider community, and to prepare researchers to work in various areas of society. Due to the strategic role of higher education in solving socioeconomic problems (Gül et al., 2010, p. 1883), the role of doctoral degrees has changed in recent years a lot. Traditional doctoral degrees are nowadays confronted with challenges of how to cope with changes in society (Park, 2005, p. 190), but they are mostly too specialize meaning that they do not encourage interdisciplinary work and do not provide a sufficiently broad set of skills required by new societal conditions (Usher, 2002, p. 10).

Table 1. The traditional understanding of higher education and the requirements of knowledge society.

<i>Traditional understanding of higher education</i>	<i>Requirements of knowledge society and knowledge-based economy</i>
Research is the primary endeavor and the center of academic life	Marketing of research is the primary endeavor of academic life
Professional evaluation and professional autonomy guide quality	Social responsibility guides quality
An emphasis on basic knowledge	An emphasis on applied knowledge
The task of higher education is to discover the cognitive truth	The task of higher education is to create knowledge in the field of services and innovation
Disciplines best organize knowledge	Knowledge is best organized in an interdisciplinary way
Reputation is achieved through publications, conferences, participation, and research funding	Reputation is achieved through the cooperation with the economy
An emphasis on the specialization of discipline/field	An emphasis on the marketing of intellectual property

Source: adapted from Nicholls in Usher, 2002, p. 8.

Knowledge society, as well as the knowledge-based economy, require higher education to enable the doctoral students for solving contemporary economic and societal problems through original research with the emphasis on practical knowledge, cooperation between higher education and the economy, and social responsibility (see Table 1). Scott (2015), for example, establishes a close link between higher education and knowledge society by referring knowledge societies as ‘graduate societies’, Välimaa and Hoffman (2008, p. 269) emphasize a broader interpretation by framing the knowledge society in the context of associations and interactions at various levels and claiming that “the knowledge society aims to describe a new situation in which knowledge, information and knowledge production are defining features of relationships within and among societies, organizations, industrial production and human lives”.

1.2. Doctoral education as an opportunity for a career

In the past, doctoral studies were treated mostly as an entrance for the career in higher education and research institutes. Today, the recognized importance and role of PhD graduates in various spheres of society, especially in the economy, and “the need for the transfer of knowledge and applied knowledge, have made the academic understanding of a doctorate as aimed basic knowledge outdated” (Probst & Lepori, 2008, p. 477). PhD graduates

now have an opportunity for careers in various spheres of society. This means that they have more employment opportunities increasingly nowadays as they had in previous times. However, changes that affect the employability and career path of PhD graduates result in “key human resources for development, research, and innovation, facing many problems in the labor market” (Auriol, 2010, p. 3).

Besides the promotion of doctoral education and doctoral student’ employment in variety of society’s sectors and not just in academic sphere, the key change affecting the employment of PhD graduates is also the appearance of mass education also at the doctoral level. PhD graduates, once the elite in society, today face intense competition on the labor market especially in business and research sectors. “The supply of PhD graduates in the labor market is increasing” (The Economist, 2010), and the rapid growth of the number of graduates at the “doctoral level raises the question of the absorption capacity of the labor market” (Auriol, 2010, p. 11). A huge supply of PhD graduates has an impact on their working conditions both in higher education and the economy. Higher education represents a relatively secure employment for PhD graduates, but due to high competition among faculty, they are often treated as relatively cheap intellectual workforce. The economy, on the other hand, represents a new working environment and conditions for which most PhD graduates are not well prepared and trained (The Economist, 2010). Furthermore, “the economy often complains about the lack of knowledge at the high level, suggesting that PhD graduates are not taught the right things” (The Economist, 2010). Instead of new opportunities, a career in the economy can bring new obstacles if traditional doctoral study programs do not provide PhD graduates with the skills and knowledge needed by the economy. The employability of PhD graduates is to be increased by modernizing doctoral programs, particularly by developing students’ leadership skills, teamwork abilities, soft skills, etc. (Auriol, 2010, p. 5–6). Increasingly attention is given to “professional doctorates” that represent a critical response to the shortcomings mentioned above of traditional doctoral study programs and focus on the needs of knowledge society and knowledge-based economy. They are an alternative to traditional doctoral study programs because they provide the economy with professionally qualified PhD graduates (Fink, 2006, p. 35).

Doctoral study programs offer the graduates the opportunity to work either in economy or higher education. However, when choosing a doctoral study program, the needs and demands of the labor market should be considered from two points of view, i.e. that of the individual choosing the program, and that of the institution offering the program. Individuals should consider market demands and conditions as well as the added value of their program, while higher education institutions offering doctoral study programs should examine the expectations of the labor market and society.

Välilmaa and Hoffman (2008) suggest that in knowledge societies, universities, which are traditionally the primary producers and conveyors of knowledge, have become only one player in a network of actors that generate, apply, and disperse knowledge. The ‘boundarylessness’ of the knowledge economy is explicated as follows by the League of European Research Universities (LERU 2010, p. 4): “Knowledge is developed, marshalled, and disseminated in international fora and congresses. Cross-fertilization between disciplines breeds much of the new thinking in the modern world. Key challenges for society feed research in our universities, and findings of academic research are tailored and exploited in society. The business of research and innovation in the knowledge economy is therefore international, interdisciplinary and increasingly intersectoral ...”

Nevertheless, UNESCO (2005:87) argues that higher education institutions are still “destined to play a fundamental role in knowledge societies, based on radical changes in the traditional patterns of knowledge production, diffusion and application”. Fourie-Malherbe et al. (2016, p.7) argue that the tension between the traditional purposes of the doctoral study programs and the pressures of the knowledge economy for particular kinds of output can be seen at the core of what a doctorate is – and how we assess ‘doctorateness’. The key role of innovation in the knowledge society has spawned the need for innovative thinking around research.

Plowright (2011) proposes a practically and conceptually flexible framework for an integrated methodology (FraIM) to meet the needs of rigor and usefulness in both academic and workplace research, he discuss »...in the knowledge society, the emphasis of research has changed from disciplinary-focused scholarship to instrumental knowledge useful for solving real world problems. This shift in focus calls for a reconceptualization of research to respond to this changing emphasis. «

Our paper investigates career opportunities of doctoral students and PhD graduates. We believe that better career opportunities for those groups of people may significantly affect the existence and operation of knowledge society

and knowledge based economy. We present the situation in Slovenia in the last 12 years focusing on the enrolment and completion of doctoral studies. On the one hand, we have witnessed a significant increase in the enrolment in doctoral studies (3rd Bologna cycle), and on the other, the number of graduates is not proportionated to the number of enrolled students. From the national survey, we present the data on satisfaction at work of doctoral graduates according to different criteria.

2. Doctorates in Slovenia – from enrolment to career opportunities

2.1. Doctoral studies in Slovenia – enrolment, graduates

In this chapter, we conduct an overview of the state of doctoral studies in Slovenia. In accordance with the Bologna Declaration guidelines, the Higher Education Act (ZViS-UPB2) was adopted in 2004. With it, the Slovenian higher education entered the process of creating the European higher education area. A new structure of studies was introduced, i.e. first-cycle undergraduate studies (academic and professional higher education study programs), second-cycle postgraduate studies (master and uniform master study programs), and third-cycle postgraduate studies (Doctorate of Science). “Doctoral study programs provide students with an in-depth understanding of theoretical and methodological concepts, and prepare them for the independent development of new knowledge, for solving the most challenging problems through testing and improving already known and discovering new solutions, for managing the most complex work systems and scientific research projects in a broad professional and academic field, and for the development of critical reflection” (ZViS-UPB2, Article 33). According to the 2006 Higher Education Act (ZViS-UPB3), graduates of “old” 4-5 years Bachelor higher education study programs can enroll in third-cycle doctoral study programs (MVTZ). This has undoubtedly had an impact on the significantly increased enrolment in doctoral study programs, another important factor being the fact that “old” academic higher education degrees were made equal to “Bologna” Master degrees which mean that doctorate of science is the only option to continue studies in a vertical direction.

First students enrolled in Bologna doctoral study programs in 2005/2006 and the last enrolment in the “old” programs were in 2008/09 (see Figure 1). However, the first mass enrolment in Bologna doctoral study programs was recorded in 2009/2010, with 1415 more students enrolled compared to the previous academic year (70% more).

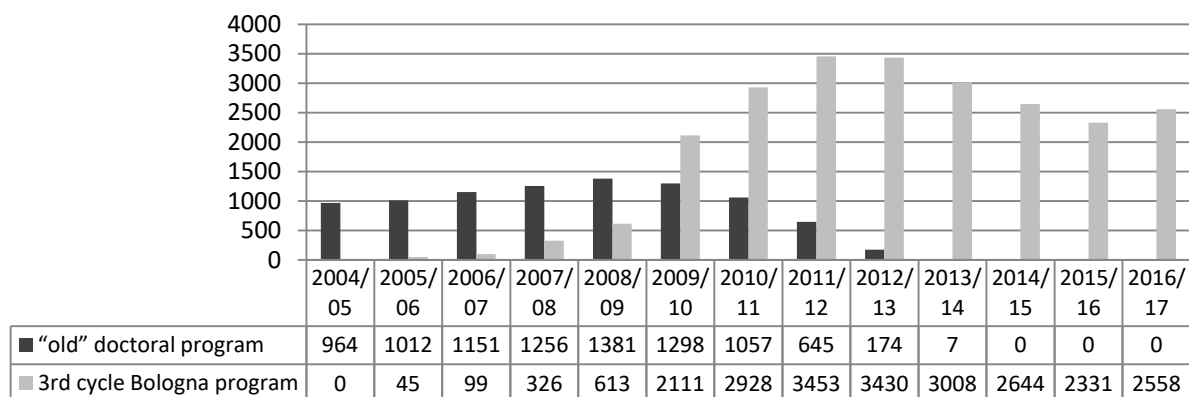


Fig. 1. Students enrolled in doctoral studies in the period from 2004/2005 to 2016/17.

Source: Statistical Office of the Republic of Slovenia

The number of doctoral students increased until 2011/12 when the number of all enrolled doctoral students was 4098, which is 4 times the number of doctoral students before the introduction of the Bologna system of studies (2005). The increase in the number of doctoral students is also attributed to the financial incentives of the state since the Ministry of Education financed the tuition fee. Figure 2 shows the number of graduates, and we can deduce that the effectiveness of studies has decreased in the Bologna programs.

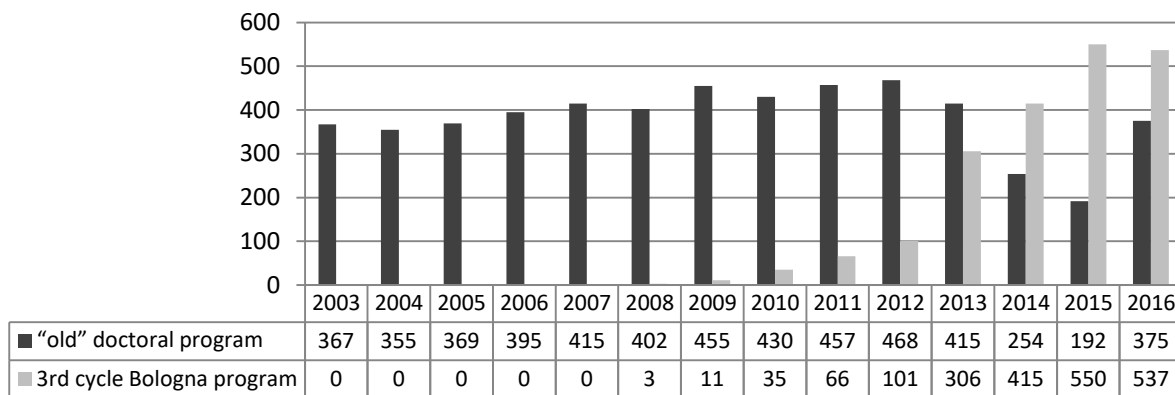


Fig. 2. Graduates of doctoral study programs from 2003 to 2016.

Source: Statistical Office of the Republic of Slovenia

As shown in Figure 2, in the period observed most doctoral students completed their studies in accordance with the old, pre-Bologna system. In 2009, there were 455 graduates of old doctoral programs and 11 of new, Bologna doctoral programs.

According to the Statistical Office of the Republic of Slovenia, the average age of students at obtaining the doctoral degree is 34.88 years in 2009 and 35.49 years in 2012. The average duration of doctoral studies was 4.59 years in 2009 and 4.49 years in 2012. In the old study programs, in the period from 2004/05 to 2010/11, we can observe a relatively stable number of enrolled students, between 1000 and 1300, and the production of graduates was also relatively stable, between 350 and 450, except for the years 2014 – 2016, as the old study programs were phased out, the last enrollment was in 2008/09. In the Bologna programs, the number of students ranged from 3000 to 3500 at the time of the study programs implementation, while it stabilized at around 2500 students in the last three years.

To calculate the efficiency of the study, we will take a three-year period in both types of programs and consider the average duration of studies (4.5 years), which means that a student should graduate in the next 4 to 5 years:

- in the old study programs, we recorded a total of 3935 students in the years 2007/08 to 2009/10 (averaged 1312 per year), and a total of 1340 graduates in the years 2011 to 2013,
- in Bologna programs, we recorded a total of 9811 students in the years 2010/11 to 2012/13 (averaged 3270 per year), and a total of 1502 graduates in the years 2014 to 2016.

We deduce the effectiveness of studies from the ratio between the annual average of students in the 3-year period and the number of graduates in this time. We can conclude that almost all students enrolled in old PhD study programs also graduated, while we assess that less than half of the enrolled students completed their studies in new Bologna doctoral study programs (46%).

Slovenia has a small percentage and number of PhD graduates, and the enrolment in doctoral study programs in Slovenia have been increasing is positive news for the country. However, as noted in the National Higher Education Program 2011-2020, such enrolment took place “without suitable selection of students based on necessary skills, and without considering the capacities of higher education institutions for quality implementation of doctoral studies” (NPVS, 2010, p. 17).

2.2. Employment of PhD graduates and their satisfaction at work

In the last decade, the number of PhD graduates is increasing, Figure 3 shows the data for years 2011 to 2016, it is evident that the number of PhD graduates is growing, but it is worrying that the number of unemployed PhD graduates is also increasing.

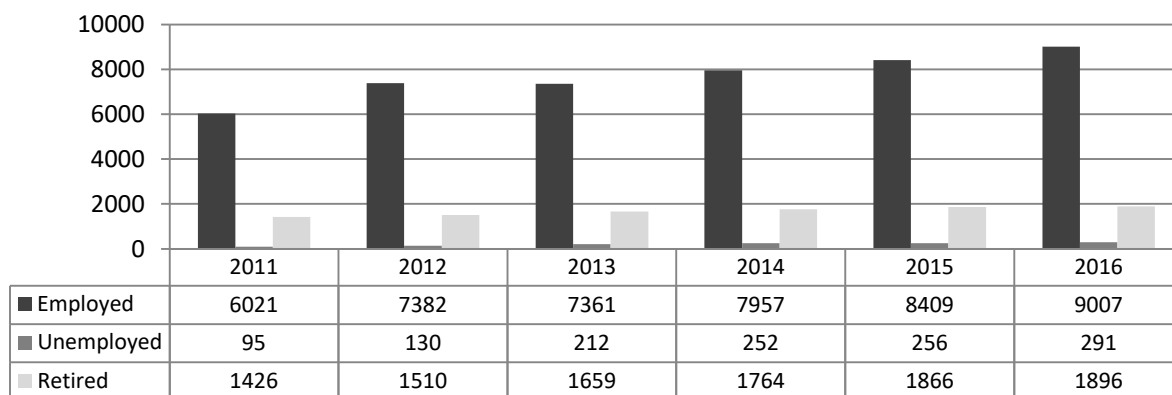


Fig. 3. Number of employed, unemployed and retired PhD graduates from 2011 to 2016.

Source: Statistical Office of the Republic of Slovenia

According to data from Statistical Office of the Republic of Slovenia for 2012, there was 59% of men and 41% of women among the people with a doctoral title. Most of them (27%) received their doctorate in natural sciences, and most of them had permanent employment. 75% of PhD graduates were employed indefinitely and 25% for a fixed term. Among fixed-term employees, most were women. The share of PhD graduates employed for a fixed-term was the largest among people younger than 35 years (more than half were employed for a fixed-term); in each of the following higher age groups, this share was smaller. It follows that younger PhD graduates are in a worse position in the labor market than their older counterparts. The average gross annual income of PhD graduates amounted to 45,164 EUR. The highest incomes were earned on average in the business sector and higher education.

At the end of 2012 almost half (49%) in higher education, most of them were doctors of social sciences. 24% of all PhD graduates worked the business sector, and 23% worked in the state sector. The rest were working in other educational institutions and the private non-profit sector, as can be seen from Table 2.

Table 2: Percentage (%) of PhD graduates employed in various sectors.

Year	Business sector	Public sector	Higher education sector	Another education sector	Private sector
2009	19%	23%	54%	1%	2%
2012	24%	23%	49%	2%	2%

Source: Statistical Office of the Republic of Slovenia

Since PhD graduates are one of the main actors in creating knowledge society, it is necessary to promote their employment in the economy and adapt doctoral study programs to the needs of the labor market and the new role of PhD graduates in society. The data for 2009 and 2012 shows that in Slovenia the largest share of PhD graduates is still employed in the higher education sector and the lowest share in the business and private sectors (see Table 2). From the number of students enrolled in doctoral study programs (see Figure 1) we can conclude that the higher education sector cannot recruit all future PhD graduates. Due to the possibility to work in the economy, it is particularly important that their studies prepare them for careers in various sectors, not only in higher education.

What doctoral students 'know' and 'can do' because of a postgraduate experience? In the past, the doctorate was primarily seen as qualifications preparing people for academic careers. Now, in knowledge societies, the doctorate is increasingly regarded as a high-level qualification that trains people for a much wider variety of positions including those beyond the university (McAlpine et al. 2013, Ryland and Solomon 2014, Arzenšek, Košmrlj and Trunk Širca 2014).

The intellectual, academic, technical, personal, and professional management skills typically developed and inculcated through postgraduate studies enable doctoral candidates to become creative, critical, and autonomous intellectual risk-takers (LERU 2010). Such flexibility, skills and attributes are increasingly important in

contemporary workplaces as is the need for rigorous, well-informed, and effectively executed research in organisations across the public, private and non-profit sectors. Furthermore, increasingly information dense societies benefit from members who can assemble, interpret, and manage massive amounts of evidence for complex decision-making (Croussard 2013, Marjetič and Lesjak 2016, Breznik 2016).

The employees will have greater effects if their work is related to the field of study and if they are satisfied with the work. Below we present data from the national survey (Statistical Office of the Republic of Slovenia). Table 3 shows how employed PhD graduates perceive the connection of their work with their doctoral studies. 70 % thinks that their work relates to studies; there are no differences between man and women.

Table 3: Perception (in %) of employed PhD graduates – connection of their work with their doctoral studies.

	2009			2012		
	<i>Gender total</i>	<i>Male</i>	<i>Female</i>	<i>Gender total</i>	<i>Male</i>	<i>Female</i>
Connection total	5985	3731	2254	7107	4221	2886
Connected	75%	76%	72%	70%	70%	70%
Partly connected	20%	19%	22%	22%	22%	22%
Not connected	5%	5%	6%	8%	8%	8%

Source: Statistical Office of the Republic of Slovenia

In Figure 4, we show how employed PhD graduates assess their work satisfaction according to the following criteria:

- satisfaction with income from work
- satisfaction with the benefits offered by the employment
- satisfaction with employment security
- satisfaction with the place, location of employment
- satisfaction with working conditions
- satisfaction with the possibility of promotion
- satisfaction with the intellectual challenge offered by employment
- satisfaction with responsibility in the workplace
- satisfaction with autonomy in the workplace
- satisfaction with the contribution to society
- satisfaction with social status
- overall job satisfaction

We can sum up that they are least satisfied with income from work, with the benefits offered by the employment, with the possibility of promotion, with social status; on the other hand, they are most satisfied with the place/ location of employment, with the intellectual challenge offered by employment, with autonomy in the workplace and with the contribution to society.

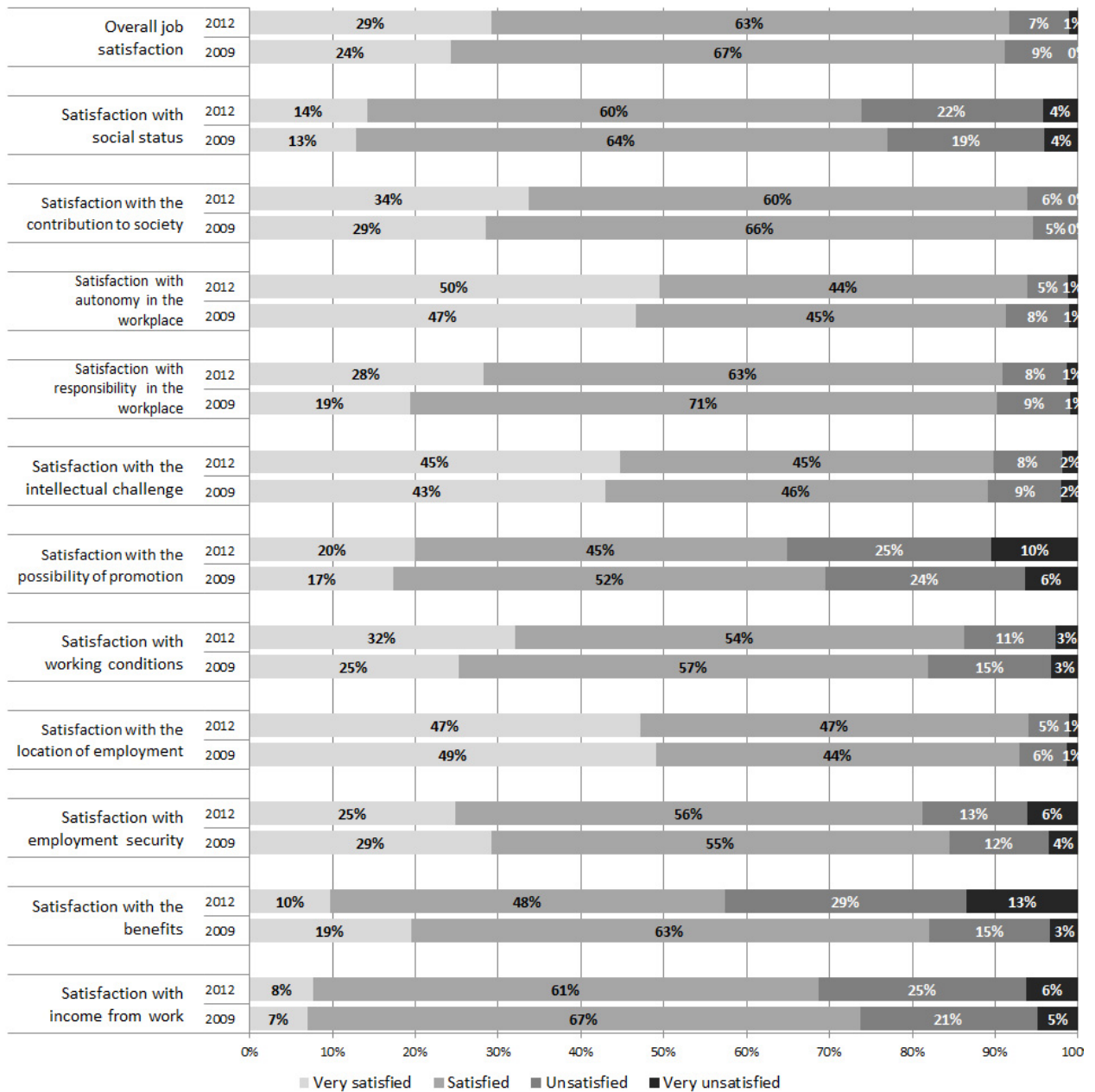


Fig. 4. The levels of satisfaction of employed PhD graduates (in %) with different criteria of job satisfaction.

Source: Statistical Office of the Republic of Slovenia

3. Conclusion

Today, doctoral studies are "increasingly under pressure due to significant changes in higher education and wider socio-economic environment" (Enders 2004, Kehm 2005, 2007, in Probst & Lepori 2008, p. 47). Slovenia needs PhD graduates who will with new knowledge and innovations turn Slovenian society into knowledge society. Our paper provides some data on the enrolment and graduating in doctoral programs as well as the employment of PhD

graduates. We believe that we need thorough market analyses and the modernization of doctoral study programs that will prepare future PhD graduates for development and research work in various sectors. Doctoral studies should not only become more applied but should also prepare future PhD graduates for research work, particularly research in the economy. We can see that most PhD graduates in Slovenia are still employed in higher education, but the situation is gradually changing. This trend and the awareness of the need to promote the education and employment of PhD graduates in the economy is also evident from various documents, e.g. the 2006 scheme for young researchers from the economy, the National Higher Education Program 2011-2020, and the 2010 scheme for co-funding doctoral studies which provides for the co-funding of doctoral candidates who “in the frames of their doctoral studies carry out research related to the economy or solving of contemporary societal challenges” (RISS 2010, p. 17), etc.

Our paper can serve as a starting point for further analysis, as it raises many issues to be considered in the future, i.e. whether professional doctoral study programs should be introduced in Slovenia or not, what the demands and needs of the labor market are and how doctoral study programs should be adapted to meet these requirements, etc. Today, a doctoral degree is no guarantee for a job in higher education or the economy, so the decision to enrol in doctoral studies should be well thought over. It can be an excellent opportunity for creative individuals with passion for research, teaching and learning. Depending on one’s cognitive skills and resourcefulness, doctoral studies might or might not be a business opportunity as today “being bright is not enough”, as wrote Peggy Hawley (2010).

Education is central to the knowledge society and knowledge based economy for producing knowledge workers to “develop human capital in knowledge industries” (Danby & Lee 2012). In doctoral education, the literature routinely refers to the imperatives of the global ‘knowledge economy’ as the key rationale for change and expansion of doctoral study programs worldwide. What is clear from these discussions about the role of knowledge creation and dissemination is that the contributions of doctoral education are increasingly seen as inextricably tied to the perceived fortunes and futures of nations (Croussard 2013).

The changing conditions and needs of both the knowledge based economy and the knowledge society require PhD supervisors to think creatively about their programs and practices while doctoral students need to reconsider their motivations and the possible outcomes from their postgraduate experiences.

Michael Samuel in Fourie-Malherbe et al. (2016, p.10) challenges higher education to think about the kind of support needed for current and future interconnectedness of doctoral students who should be a part of rapidly changing knowledge expansion within a larger community of scholars. He argues that postgraduate studies in the knowledge society and knowledge based economy should centre on being responsive to the local and global context and employ innovative practices to address the expectations and experiences of various role-players, and, in so doing, extend knowledge production for the common good.

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