

# DEVELOPING RESEARCH COMPETENCIES FOR A COMPETITIVE EUROPE – CHALLENGES FOR HIGHER EDUCATION

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**ABSTRACT:** The paper analyses the development and emerging conceptualisations of the European Research Area and its implication on developing skillfull, competitive, and innovative researchers. The approach proposed by the authors includes a comparative analysis of the EU and national policies used to develop innovative researchers able to initiate successful research careers. Comparisons will be made between 4 EU countries (Romania included) and between higher education institutions with a major research orientation. The aim of the paper is to identify the new competencies needed on EU research market as well as the mechanisms to develop, sustain and promote successful research careers, results that can be applied in designing training programmes at doctoral and postdoctoral level.

## 1. DEVELOPMENT AND EMERGING CONCEPTUALIZATIONS OF THE EUROPEAN RESEARCH AREA

The idea of developing a European Research Area (ERA) as a means to encourage a better use of research funding at EU level, to prevent fragmentation of research, to invest smartly in research infrastructure, to increase the use and investment in technology as well as the number of people that follow a research career at EU level was the dominant idea or the European debate in the nineties [1]. Some of its major objectives were focused on developing competitive researchers and successful research career in Europe, which could be attractive both to EU researchers as well as to international researchers [2]. From 2000 to 2007 important steps were taken at the EU level in order to build up the ERA. In terms of funding – in 2002 the Barcelona European Council set a target for EU R&D investment intensity to approach 3% of GDP, associated with specific measures of the European Commission that set national R&D investment targets linked to the overall 3% objective; by the year 2006 important programmes schemes were developed and started to operate – the European Framework Programme, the structural financial instruments associated with EU cohesion policy that start to broadly invest in research, development and innovation at EU level especially in less developed region. However the progress was slow – by the end of 2007 still a great fragmentation of research at EU level and less than expected investment in developing competitive researchers and attractive research careers was reported. The conceptualization of ERA had consequences on the way in which the strategies of developing, retaining and motivating human resources working in the field of RDI<sup>1</sup> were selected, trained by both educational and research institution and then attracted and retained in specific careers. One major debate that started at European level regarded the role of the HE institutions that are training the future researchers will have to pay in the effort to make the area of HR<sup>2</sup> development in the RDI field a more competitive and efficient one.

## 2. EUROPEAN HIGHER EDUCATION AREA VERSUS EUROPEAN RESEARCH AREA

Important reforms took place at the level of EHEA that made its results more adapted to meet as well the objectives of ERA (European Research Area). Some relevant steps were taken with the adoption of Salzburg Declaration and Bergen Communiqué that both stressed the importance of doctoral education mainly on issues such as:

- autonomous work and research as an important part of doctoral education [3];
- researchers are important resources for both the development of EHEA and ERA and should benefit of specific mobility policies and career support policies [4];
- through doctoral education HE institutions can be relevant contributors to the knowledge based society[5];
- by its third cycle, i.e. the doctoral level, HE institutions are playing an important role regarding research and innovation, through the process of creating a relevant, advanced body of knowledge that can foster future discoveries and developments and as well through the process of preparing students for being able to follow research careers – doctoral students are no longer being seen as only students but as well as early stage researchers and their input is seen as extremely relevant in developing the interconnections between EHEA and ERA [6];
- the interconnection and synergy between education and research is vital in making Europe competitive within the international context and is a capital aspect in solving the economic and development crisis that is affecting or might affect Europe in the future – thus competitive researchers and attractive research careers at international level are relevant objectives that should shape the way of conceiving doctoral education and research at European level [7];
- by 2010 researchers are seen as equal resources with academics in developing the EHEA, this concept includes also the early stage researchers (doctoral students) [8].

As consequences of these conceptualizations some important effects emerged regarding mainly the structure and outcomes of the PhD training programmes at European level. The definition of a doctoral student become more and more related not only to fundamental or applicative research competencies

<sup>1</sup> RDI – used here as acronym for Research – Development and Innovation

<sup>2</sup> HR – human resources

but also to the capacity to design and conduct relevant researches in the frame of European or national RDI<sup>3</sup> strategies, developing its capacity to successfully follow a career in research or to transfer his / her research competencies in pursuing a career in the industry, in sectors that are developing and innovate based on the advance of science.

### 3. NATIONAL APPROACHES ON THE FIELD OF DOCTORAL STUDIES

Not so long ago, the PhD was considered as the "finis coronat opus" in the scientific formation. The topic and the scale of the PhD thesis were in agreement with the scientific profile of the future doctor. Bologna process in Europe was a natural consequence of the policies' reforms regarding doctoral studies of the '80s - '90s that took place not only in France and Germany, but also in the USA: The PhD student was a young person, free of responsibilities, able to follow faithfully the advisor's guidance and not more than that. It was a trade off between an experienced person with precise ideas concerning the PhD programme and its goal, but very busy and with little allocated time for the programme (not publishing enough!) and an intelligent, non-experienced person, without ideas concerning the thesis, but faithfully following the advisor's advices, ready to publish. It is hard to decide which approach was the best. "Publish or perish" was fulfilled in the second situation, but the real innovation was, in our opinion, disadvantaged.

Due to the implementation of the Bologna Process, as well as the development of ERA, important changes occur in the manner in which doctoral studies are viewed at European level. Some of the major challenges were: how to organize the doctoral study programme as the third cycle of the Bologna Process – in this new perspective what will the role of student and coordinator be in developing the common research framework and build up the doctoral research experience? Are the needs of PhD graduates different than the ones outside academia that existed before the implementation of the Bologna Process? Is the creation of ERA a fostering factor of a reorientation of doctoral studies towards more pragmatic needs and drivers? What do we want to teach and to develop along the new doctoral programmes – "knowledge" brilliant lonely "workers" or autonomous, independent researchers with competencies that allow them to rapidly adapt their research career on a highly competitive international market, to create research teams and networks and to find funding resources to support their research? Will those graduates be fit to enter only research career or careers in a comparable competitive field of industrial development and innovation? In order to answer to all these questions a very important vision should be confronted – how will the research world of the year 2020 look like?

Different paths emerged in the last 10 years generated by both common European strategies and developments and by specific societal needs in different countries, leading nowadays to a kaleidoscope of views rather than to a coherent, common vision of the RDI future in Europe and the competencies that should be developed in order to create it. Thus, in itself, it remains as an yet unanswered question: what do we expect from the European HE system: to promote a rather coherent, comparable, partly "standardized" education of the PhD students or to create different strategies that allow nations/ institutions to invest more efficiently in creativity and

innovative research competencies development, investments that seems to be at the heart of the international debate<sup>4</sup> a much more reliable one on the long term.

In the frame of implementing the Bologna Process the changes at doctoral level have been "the most impressive in their depth and speed of implementation" [9] with the implementation of ERA that has contributed substantially to support and increase the speed of these transformations.

The traditional model started to be replaced step by step by various formats of carrying out PhD research that encourage a doctoral training that offers more exposure of the PhD student to different educational and training experiences through interactions with different supervisors and different early stage or senior researchers and research teams and to different scientific disciplines. In the year 2010 72% of the institutions that participated in Trends V study of EUA reported that they are offering additional courses to their PhD students, 49% of the institution organize graduate schools for PhD students only and 16% for both master and doctoral studies [10].

But this major process of restructure the doctoral studies was not driven only by the Bologna Process but also by important trigger factors from the labour market. The companies that are increasingly use RDI strategies to improve their presence and performance on the market increasingly recruit graduates of doctoral programmes for their creative, innovative jobs. The competencies they look for when making a selection were also different – if at the beginning employers looked only at the scientific / technical knowledge, approaches oriented towards evidence-based arguments and analytical skills, nowadays they are looking more and more at competencies such as ability to integrate knowledge from different domains and sources and the ability to explore the frontiers of certain domains of knowledge (EUA, Trends V) [11].

As a result not only the traditional structure and composition of the doctoral training has changed but also new forms of doctoral studies such as industrial or professional PhD emerged as a means to rapidly transfer knowledge and research results into practice. The ways in which different countries react and respond to these new challenges and contexts were and still are different.

#### UNITED KINGDOM

The approach of doctoral education in UK tended to be a field of controversies and intense debate starting with the nineties until now as a result of the challenges that doctoral education should face both in terms of European evolutions at the level of HE, as well as in terms of new challenges and expectations from the stakeholders perspective. Major drivers were considered to be: new conceptualization of the skills and training offer, namely that a doctoral programme should offer the quality of supervision and the quality of the thesis, introduction of national benchmark [12]. Concerns also extended in the last years to graduates employability and career development in a sustainable way, which marks important debates and revisions of the doctoral education in UK [13]. Due to these dynamics the last fifteen years were characterized by important debates and efforts to redefine both the structure and purpose of the doctoral education in UK. ABRC (1996) pointed out the necessity of a debate on the future of PhD that

<sup>3</sup> RDI - acronym for Research, Development, Innovation

<sup>4</sup> See for example the international debate on education that was generated by Sir Ken Robinson's view on the relation of traditional education and creativity [www.sirkenrobinson.com](http://www.sirkenrobinson.com)

should be of interest for HE institutions, future PhD students on the role and purposes of the PhD education [14]. This initiative was followed by many different others such as the UK GRAD Programme (2002) that a common debate on the aim and results of the PhD education should be engaged between HE institutions, future PhD students, employers, Government and financing bodies [15]. Even if the system did not rapidly react to the external forces that demand changes, the quality of the thesis and supervision process was seen as not being affected by the changes that occurred [16].

Due to their changing relevance on the market, doctoral studies are not seen anymore only as an entry to careers in academia but also an industry career, the proposed PhD programmes started to take into consideration the need of the employers and the labour market. The aim was not anymore to develop only scientific knowledge and research skills but also transferable skills, attitudes and behaviours that can support a successful research career. Still by 2007 little attention was given to inter-disciplinarity even if it was perceived as being a productive manner to promote innovation and discovery [17].

Major changes were made in order to foster complex competencies development, one of the first steps being the development of specific codes of practice for both PhD degrees as well as for training requirements (Joint Statement of Skills Training Requirements of Research Postgraduates (RCUK 2001) [18], Code of practice for the assurance of academic quality and standards in higher education (QAA 2004) [19], the use of the descriptors from the Framework of Qualifications [20]).

By the year 2010 in UK the structure of doctoral programmes include professional PhD, structured programmes and a large variety of forms of graduate schools that are organised and offer specific programmes to their students but mainly based on the same principles and respecting the same quality assurance guidelines [21].

## **GERMANY**

Germany, in order to adapt to various doctoral students needs and also to various cultural and educational understanding of the doctoral studies values, developed structures that combine individual education with structured programmes and doctoral schools.

The initiative started in 1990 when the German Science Council issued specific recommendations to establish structured PhD programmes that were aiming to increase cooperation in research training, peer to peer learning, reduce the negative impact of a shorter duration of the PhD training and encourage inter-disciplinarity as a means to develop the whole range of competencies needed for a successful career in research [22].

As an effect of these regulations as well as some developments in the field of financing excellence (Excellence Initiative) hundreds of this type of programmes were reported as well as graduate schools financed by the Federal Government [23].

Regardless of the strong support and promotion of a different type of doctoral study the “German Research Foundation” (DFG) [24] showed that in 2002 in German social sciences only 2% of all doctoral students received some kind of structured education [25]. Different strategies were developed in order to stimulate departments to reform their conception of doctoral education: indicator models, collaborative research centres, provision for funds for “Research Training Groups” by

the German Research Foundation (DFG), etc. Due to these measures, departments started to find themselves in an increasingly harsh competition to develop and deliver performant PhD programmes, the situation could become also a dramatic one if the measures suggested by the Wissenschaftsrat (2006) that prohibit non-performing departments from awarding doctoral degrees in the future will be effectively implemented. [26].

Graduate schools aim to offer a distinct training and education for doctoral students in order to both decrease the length of studies and to train them to be able to undertake high level research both in academia as well as in industry on both national and international environments.

As a consequence of the implementation of Excellence Initiative several graduate schools, clusters of excellence and institutional strategies were supported aiming to speed development of the research in HE institutions across Germany.

Furthermore, Germany was very present in dialogues concerning the future of doctoral students both in German speaking countries as well as at European level. The Austrian, German and Swiss Rectors Conference was very active starting with the years 2003 and 2004 and after in debating and proposing a common position regarding the future of doctoral studies in Europe [27].

## **AUSTRIA**

By the year 2007, Austria developed mainly forms of organizing the doctoral schools such as individual education programmes and structured programmes. Even though by the year 2008 / 2009 the emergence of the Doctoral Schools was already a reality [26].

The implementation of the Bologna Process and the process of structuring the third cycle of study in Austria has been assumed by governmental bodies, Universities Austria, and HE institutions. Important steps towards defining a new style of doctorate were made starting with 2002. Specific legislative measures were taken in 2002 when was issued the University Act that stated two types of doctorates – regular PhD – with 120 ECTS and PhD programme with 240 ECTS. This act was amended in 2006 in order to abolish double-track situation and to establish the duration at three years minimum, and in 2009 to establish the right of universities to have qualitative admission criteria in order to recruit and select some of the most talented students for PhD [27].

The strategic initiative at national level was doubled by important position statements that Austria undertook alone or as part of the Austrian, German and Swiss Rectors Conference in 2003, 2004. Joint position papers of the ministry and Universities Austria on the doctoral study in Austria in the context of European developments were generated. Moreover, working groups and national conference regarding this issue were organized. In 2006 Austrian Rectors Conference had a position statement regarding different types of doctorates. Universities of Austria launched a project on the new style of doctorate related to the implementation of the Bologna Process [28].

The main orientation on the new style of doctorate was to create doctoral schools or structured programmes but taking into account the specific discipline and fields and also with specific quality assurance measures. A specific aim that has been followed was the increase in the development of

transferable skills through doctoral programmes and the development of research career management for the graduates of the doctoral programmes. This position is also an articulated response of the Austrian universities to the societal increasing demand towards universities to act as the main provider of highly qualified researchers that are able to conduct research and innovation careers in an increasingly complex and dynamic world.

In debating the role and aim of educating and training future researchers, one major view issued was that “knowledge is and must remain a universal public good, research, knowledge and innovation are different realities and to transfer knowledge into innovation does not imply innovation-driven research, or market-driven research: results cannot be ordered or preset”, the research and researcher freedom and autonomy should be preserved, the creativity of individual aiming to pursue a research career should be developed and encouraged [29].

Due to these perspectives the tendency is towards the creation of doctoral structures and programmes that should aim for developing effective research experiences and environments and not towards the increase in the numbers of training programmes associated with the doctoral programme or to increase the number of credits allocated to the third cycle. The aim of doctoral programmes should be to stimulate a research environment, enhance interdisciplinary and inter-institutions collaboration and to create young researchers [30].

## ROMANIA

The quality of the doctoral studies in Romania, before the changes in December 1989, was rather poor, especially because of the scarcity of the information sources and of the lack of research infrastructure. Full time doctoral students were rare. Freedom of thinking and liberal ideas were stifled maybe not explicitly in many areas, but restricted by the general ideology. So, none of the conditions for obtaining good results from a doctoral programme had been accomplished.

Important changes occurred once the full time doctoral programmes were introduced in 1995. For the first time in post WWII Romania there were full time doctoral students and special scholarships for doctoral programmes. The free access to scientific literature came much later, after 2004. Other additional instruments dedicated to improvement of the quality of the doctoral programmes have been introduced by CNCIS (National Council for Research in Higher Education): doctoral scholarships – BD programme - since 2003 for supporting excellent PhD students to develop research programmes in Romania; or Programmes of Research for young PhD students – TD programme – since 2007 for finalizing their research programmes in universities or research institutes in Romania. Recently, starting with 2009, after the access of Romania to the EU, the Structural Funds provided universities and the Romanian Academy with the possibility of applying for the PhD Scholarship Programmes which replaced the governmental PhD scholarship programme.

Although improved instruments of stimulating the doctoral programmes have already been functioning for some years, it was extremely difficult to accommodate the PhD environment with the rigours of a valuable doctoral thesis. Many of the PhD advisors, even today, in some particular fields, do not know or do not consider, or are not able to comply to the demands of an international PhD programme: innovation, creation of knowledge, and its dissemination on the science market. The critical reflection is still absent. In many cases, the PhD

advisors see the PhD programme as an „internal affair” between the advisor and student. But, undoubtedly, the international visibility of the PhD programmes’ contribution (ISI or SCOPUS publications) has increased a lot especially in the last five years.

There were some isolated initiatives of some universities to create integrated doctoral studies, in the so called Doctoral Schools gravitating around some faculties, this, for the purpose of putting in contact different PhD advisors and their topics and research students in order to develop inter-disciplinary perspectives and approaches.

Starting with 2009, the EU funded programmes dedicated to increasing the competencies of human resources, offered the chance to start the implementation of a strategic programme at national level „ Doctoral Studies in Romania – the organization of doctoral schools” having as its aim “ to promote a unified strategic approach to reforming Romanian doctoral studies in order to make sure that doctoral and postdoctoral programmes contribute effectively to the training of researchers with internationally recognized achievements, and thus ensure the visibility and recognition of the talent of young researchers trained in the country” [31]. As stated, the project’s specific objectives are to:

1. Support the implementation of the doctoral education cycle (3rd Bologna cycle), which is closely and harmoniously associated with the other Bologna higher education cycles (Bachelor and Master), by improving the structure of the national doctoral education system, and building a modern and flexible institutional infrastructure, in accordance with the requirements of a knowledge-based society.
2. Develop and pilot appropriate models of integration of doctoral education programmes in the Bologna cycles, in the fields of research, development and innovation, and in the European Higher Education Area, by defining and developing a specific model of advanced Doctoral School, flexible in its modus operandi, and network-like.
3. Strengthen the doctoral education system by identifying and applying strategic instruments, including quality assurance mechanisms, common pillars of a successful partnership structure;
4. Expand the training capacity and strengthen the cooperation within doctoral school networks by building an e-learning platform that would contribute to "supporting doctoral students and researchers to participate in doctoral programmes”.

The project was aimed at analysing the present situation of the Romanian doctoral studies and at proposing significant measures that should reform the doctoral approaches. Until now it has represented a national forum of debate and reflection that succeeded to gather some of the most relevant voices in the higher education landscape in Romania.

The traditional structure of doctoral studies in Romania was a mentoring based, individual study programme, that over the last 10 years tended to developed more and more into a structured programme at institutional level in the form of doctoral programmes proposed by specific departments or faculties including in the first year programme students coming from the same research domain but who are working with different PhD coordinators.

In the last years the Romanian model evolved towards a doctoral schools structure that will focus on offering specific training programmes to different groups of students both in

scientific subjects as well as on transferable skills, in order to diversify and improve the learning experiences. A major input for the development of this type of programmes was the funding of the modern approaches towards doctoral studies through European Social Fund projects, initiative that was launched in 2008.

In 2010 after some years of institutional transformations and reforms concerning the doctoral studies, the reality shows peaking tensions between PhD coordinators in different fields regarding the efficiency and adequacy of the new style of doctoral studies. National reports shows that 70% of the PhD coordinators in the science field consider the traditional way superior, compared with only 38% in the field of medical sciences. In social and humanity field the opinions are mixed, 70% of the coordinators in the economic field consider that the new form of organizing doctoral studies is superior, while the rest have mixed feelings – 50% to 60% depending on the specific field agree that the new form is better. The main critical points of the controversy were identified to be the distinction between training and research and the duration of study [32].

Consequently, at the level of the year 2011, Romanian doctoral studies are a mix between individual study programmes and structured programmes at institutional level with some initiatives aimed at experimenting and introducing the model of doctoral schools [33].

There is an intense debate concerning the competencies and skills which should be offered to the doctoral candidates during their doctoral programme.

Students are expected to: demonstrate research skills and techniques, e.g. independent thinking, research methodologies; understanding the research environment, e.g. ethics, intellectual property, funding, commercialization; to be able to design and manage research, e.g. project management, using equipment and information technology; demonstrate qualities of personal effectiveness, e.g. be creative, innovative, flexible, open-minded, self-aware, self disciplined, self-reliant; to communicate clearly and effectively, e.g. write in the appropriate style, argue coherently to various audiences; network and work in teams, e.g. develop co-operative networks and relationships, receive and give feedback; develop career management skills, e.g. set career goals, improve their employability.

But “the Bologna Process has not only changed the structures of the study cycles. One of the most important changes induced in higher education is the definition of university qualifications profiles within the European Qualification Framework, which is complementary to the National Qualifications Frameworks. Therefore, the qualifications obtained through a doctorate or the descriptors associated with this qualification have become a reference point for any European doctoral programme [34]:

- specialized knowledge;
- skills and competencies associated with research, knowledge production, use and application of knowledge;
- „transversal” skills and competencies, public communication of knowledge, and particularly management skills and competencies (applied to projects or organizations). Achieving these generic skills and areas of specialty is not an optional matter. It is included in the European legislation and has implications related to the recognition of the title of doctor in the context of international mobility. Moreover, the doctoral programmes are designed to eliminate any isolation of the

doctoral candidate and to open to him or her real world of alternative professions”.

As we may see in the aims of the strategic project „ Doctoral Studies in Romania – the organization of doctoral schools”, there is none focused on developing skills, with the exception of the research ones and these expressed mainly by a generic course, „Research Methodology”. We feel that some recommendations concerning „rationalization of the Doctoral Schools programmes (”Graduate schools”) should be made, namely the Graduate schools should be focused on: (i) learning by research, inclusive systematic assimilation and effective practicing of the research techniques; (ii) really advanced academic knowledge, based on the most recent research in the disciplinary/interdisciplinary field of the doctorate; (iii) formation of the transversal abilities (communication, managerial, leadership, entrepreneurship).. But this is left to the initiative of the university. This approach could make the difference between a Doctoral School in an intensive research university and another one belonging to another type of university, oriented towards education and research. Fortunately, particular initiatives of institutional projects for doctoral programmes are offering project management skills, research management together with academic writing skills in the curricula for doctoral students. Even so the skills needed for doctoral students in order to be able to pursue a career in industry are less or not at all debated. A common perspective of the doctoral students in Romania shows that more than 50% are following a doctoral programme for advancing in academic or research positions in academia with little are no interest to transfer their research results and ideas on the economic market [35]. Also the Romanian enterprises are not specifically recruiting doctoral graduates but mainly graduates of certain universities or certain profiles. An increase tendency to recruit master degree graduates has been developed in the last few years after the graduation of the first Bologna cohort. Doctoral students are recruited in the Romanian labour market mainly by multinational companies, foreign companies or national companies that have an important foreign investment, but the number is really insignificant. Public institutions, other than academia, are taking into account doctoral studies mainly as a way to promote or to capitalize on the already existing human resources and are looking for partnership in selecting the PhD research themes accordingly with their own research needs [36].

#### **4. INSTITUTIONAL PERSPECTIVES ON DEVELOPING RESEARCH COMPETENCIES**

Based on different national orientations, approaches and positions and also based on their own missions and values HE institutions implemented various processes of reform and operated internal changes in order to face both the challenges of EHEA, ERA, the implementation of the Bologna Process, the main stream at national level regarding doctoral studies and their own institutional orientations.

Some representative institutions for the changes that occurred in conceptualizing the competencies needed for doctoral students from UK, Germany, Austria and Romania are:

##### **University College London (UCL) – United Kingdom**

Even if the UCL as a university recognizes the role of the PhD training done on an individual basis or through teams of researchers within a subject – specific department as a “prerequisite for everything else we might accomplish” its

commitment in the field of research that generated a profound impact in the way in which doctoral studies are conducted is towards the integration, synthesis and outreach of the research, based on the premise that the evolution of science frontier is mainly driven by knowledge developed in cross – disciplinary debates, that discover the complex structure of the truth in more nuanced colours and invite to a deeper exploration of different and new aspects of the investigated problem [37].

Based on this commitment UCL focuses its development on the creation and development of multi-disciplinary centres and on the adequate strategies in the formation and training of the doctoral students. The research orientation is toward not specific domains or research area defined by scientific communities at different levels but towards major, challenging problems of the humanities nowadays fostering a more accurate, adequate and sustainable role of research. [38].

As a part of its research strategy UCL defined the UCL Grand Challenges – global research themes; these themes could be addressed by establishing a culture of wisdom, a culture that focuses on: respecting specialist knowledge, while dismantling the barriers to its cross-fertilisation; supporting the synthesis of new knowledge both within and across fields and disciplines; facilitating collective, collaborative working practices in order to gain fresh perspectives and, ultimately, wisdom; establishing and advocating policy and practice based upon the wise counsel so developed [39].

In order to sustain these developments UCL offers through its Graduate School's Skills Development Programme, to all graduate research students at UCL, the opportunity to expand their generic research skills and personal transferable skills. The choice of courses is made by each graduate student after consulting with his/her supervisor. The training courses offered are workshops regarding general and transferable skills, each student can manage their skills training portfolio through an on-line system.

On this site, one can find details of the programme of practical skills training courses and workshops running during the academic year, as well as general information and useful links in relation to generic and transferable skills training. Furthermore, one is able to register for training courses and manage their skills training portfolio through the on-line system. Courses are open for master and doctoral students.

The courses that can be chosen by PhD students are selected based on the requirements of the Joint Statement of Skills Training Requirements and cover: a. Research Skills and Techniques; b. Research Environment; c. Research Management; d. Personal Effectiveness; e. Communication Skills; f. Networking and Teamworking; g. Management. Each graduate student has to participate to appropriate departmental courses to a degree equivalent to at least two weeks per year for all their research programme. In order to foster the good experiences in training postgraduate researchers UCL initiated in the Bloomsbury Postgraduate Skills Network, a network of leading Higher Education institutions. The purpose of the shared skills training programme is to allow students additional opportunities for skills training, through attending training courses and workshops at other member institutions [40].

The courses offered by UCL are: a. the Essential Researcher Development Programme that include exploring skills development and the Log; b. personal and professional management skills residential course; c. facilitation skills training and development; d. leadership and management

residential course, e. induction and research skills programmes; f. library and archive resources; g. IT skills; h. statistics, mathematical packages and techniques; h. languages; i. writing, reading and thesis preparation; j. presenting and publishing research; k. analysis and research techniques; l. research environment; m. entrepreneurship and management of innovation; m. teaching skills; n. personal and professional development; o. career management and employability skills and other.

The Bloomsbury Network also offers courses form other institutions: Birkbeck, Institute of Education, London School of Hygiene and Tropical Medicine, School of Advanced Study, Institute of English Studies, Institute of Germanic & Romance Studies, School of Pharmacy, School of Oriental and African Studies, Royal Veterinary College. UCL offers also suggestions about appropriate courses that could be chosen for 1st, 2nd, 3rd or 4th year as well as for master students or international students [41].

The fact that every student can choose courses from different departments and institutions offers the possibility to work in different groups with different backgrounds, orientation and research themes in multi-disciplinary teams.

### **University of Leipzig (UL) - Germany**

University of Leipzig as a leading research university from Germany which oriented its policy and strategies in the last years towards maximizing its research potential through different measures. One of those was investing in and supporting inter – faculty projects that foster inter-disciplinary approaches. Moreover, the University of Leipzig participated in the first phase of Excellence Initiative programme funded by the German Federal government – the graduate school of "Leipzig School of Natural Sciences - Building with Molecules and Nano-objects (BuildMoNa)" has emerged as one of the leading research and training institutions in the field of the development of new, intelligent materials [42].

The university also established the “Leipzig Research Forum” for coordinating and facilitating the cooperation between the University and the numerous non-university research institutes in Leipzig as well as the “Research Academy Leipzig” as the umbrella body for all structured doctoral training programmes. The focus of these initiatives is the creation of a collaborative multi-disciplinary internationally environment that will enhance both the competencies of the PhD students as well as researchers capitalizing on the high level research results. The cooperation with the Research Academy Leipzig offers the opportunity for leading international scientists to work with best qualified young academics in an “Experiment of mutual understanding” [43].

One can enroll for a PhD degree in any of the subjects at Leipzig as the admission of doctoral students is being done by each faculty. Also the PhD candidates have the opportunity to choose structured international PhD programmes such as Graduate Schools, Research Training Groups and International Max Planck Research Schools at the Research Academy Leipzig that is the umbrella for all the structured doctoral qualification programmes and offers some of the best opportunities for young researchers. The Kompetenzzschule (School of Expertise) - Employability and Leadership Skills for Young Saxon Researchers (ELSYS) is a pilot project of the Research Academy of Leipzig that offers support for PhD students in their career development process. Also the school offers relevant training courses that are oriented towards career

development through 4 types of modules – transferable skills – key competencies and communication; academic leadership – academic coordination, international academic policymaking; private economy / public sector – financing research, IT strategies; entrepreneurs / self-employed persons – expertise for business start-ups, from the idea to Academic Service. The school is also offering individual coaching sessions [44].

### **University of Vienna (UV) – Austria**

PhD studies at University of Vienna are structured on individual basis as well as on structured doctoral programs. Structured doctoral programmes designed as graduated school (Kolleg) combine several doctoral candidates who carry out research on a specific topic and were developed to promote interaction between researchers, different supervision and to offer exposure to different research themes on the same topic. The program is open for national and international students, admission is the responsibility of each Kolleg.

The Doctoral Programs (Doktoratskollegs) funded by the Austrian Science Fund and the Initiative Groups (Initiativkollegs) funded by the University of Vienna are significant developments that are aiming to foster the young researchers formation and career. The Doctoral Programs are running by the University of Vienna alone or in cooperation with other universities. The InitiativKollegs financed by the university has 12 programmes. The selection of those is made on an international peer-review base and is subject of quality evaluation and strong quality assurance. The evaluation of each program is renewed at its end, and based on the final evaluation some programmes might be closed. Furthermore, they are competing each year with new programmes and have to be strongly oriented to constantly improve their scientific relevance and performance. The assessment is done in cooperation with the Center for Doctoral Studies. Through the InitiativKollegs, PhD candidates are exposed to a supervision process carried out by a team of top researchers as well as to interaction with other PhD candidates having in this way the opportunity to develop themselves as researchers by working in multicultural research groups, helping them to network on an international and interdisciplinary level. In order to further facilitate the interaction between students in intercultural environments UV designed also the visiting PhD students program that is dedicated for students from abroad [45].

The Center for Doctoral Studies was created to support doctoral candidates as early stage researchers and to offer them opportunities to choose their route of development as researchers by offering them workshops on transferable skills, information and consultation in administrative matters during doctoral studies. A series of courses on specific research skills and transferable skills are offered aiming for supporting PhD candidates in developing their research skills and enabling them to carry out their scientific tasks in a structured and purposeful way. Workshops are also seen as a platform for exchange and networking. Courses are selected by each PhD candidate based on their individual development needs and supervisor recommendations and will become a part of the Doctoral thesis agreement. Courses are covering aspect such as scientific good practice, how to prepare the expose, academic writing, finding and using information resources, research methods and data analyses methods. Combined with the training programme the Center is offering to the PhD candidates the opportunity to work with their colleagues on writing their dissertation on dissertation writing groups, groups of 4 to 5 doctoral candidates of similar disciplines and stages

who give each other regular feedback on the research and writing process [46].

The Center for Doctoral Studies serves also as a competence center for the directors of Study Programs and the Study Service Centers (SSC) as well as other external academic institutions and universities and is involved in supporting and developing different initiatives at doctoral level in Europe.

### **Babeş-Bolyai University (BBU) - Romania**

Babeş-Bolyai University in the last years oriented its doctoral studies towards the organization of doctoral schools, at the level of each faculty, in order to structure in a different manner its traditional form of doctoral studies that was based on an individual relation between supervisor and candidate. The doctoral schools are offering courses for the first year PhD candidates on research competencies development and are not including in their curricula courses for transferable skills. The schools are conceived as manners to make doctoral students interact and use their peers as important resources for their own scientific development [46]. As they are completing their PhD thesis doctoral students can also take part in research teams that are implementing different research projects in research departments.

Starting with the year 2008 the doctoral scholarships that was previous given by the Romanian Government was now obtained on a competition basis at national level through institutional projects financed under the Sectoral Operational Program for Human Resources Development financed by the European Social Fund and national budgetary allocations. This system offers an attractive scholarship for doctoral student as well as the possibility to study abroad for 3 to 8 months. At institutional level, this type of financing creates the opportunity to establish viable partnerships with national and international HE and research institutions. From 2009 BBU developed partnerships with different institutions from Austria and Germany in the frame of this programme (University of Vienna, Regensburg and for postdoctoral research Leipzig and Karlsruhe) [47].

In the frame of the new projects the structure of the doctoral studies was developed by introducing specific courses and workshops for transferable skills and also the opportunity for doctoral students to meet scientists from abroad. Training programs have been designed to be carried out in close cooperation with national or international experts / partners (the Center for Doctoral Studies of the University in Vienna, the House of Competences at the Karlsruhe Institute of Technology, University Leipzig etc.) in areas such as academic writing, research management and research project management. Doctoral education, as it is organized at this point, encourages the development of scientific competencies but does not encourage yet the development of innovative researchers who can generate major changes in both science and society. This is an issue of reflection for the future design of doctoral programmes and an issue to be further debated with students and industry representatives in a concentrated offer leading to training programs which are more adapted both to today's labor market and to the needs of society.

Meanwhile, the inherent limitations of working on narrow research themes or areas has been overcome through two institutional initiatives – first, doctoral schools in BBU have been opened for co-tutelle/joint supervision doctoral programs, within the same field, but between BBU and foreign partners, and between interdisciplinary fields, especially in what regards

the natural sciences (in an effort to connect chemistry, biology, physics and medical research etc.). Due to its multicultural mission BBU developed cooperation at doctoral levels with partners that can foster the future development of its Hungarian and German lines of study.

Doctoral programs besides the availability of doctoral scholarships have to attract important financial resources in order to effectively run their research; especially the research in fields such as chemistry, physics or biology requires additional and significant financial resources in order to be successfully finalized. The financing is available at national level through specific strategic project aiming to implement measures that can oriented research towards national strategic priorities. This approach might lead to the narrowing of the research themes and to a pre-determined research frame for future PhD students, that is not encouraging individual freedom and creativity in research.

## 5. CONCLUSIONS

PhD students are seen as early young researchers and their training is conceived as research formation training, the majority of institutions in Europe are taking into account the fact that transferable skills are an important part of a successful career in research so a lot of them encourage the inclusion of these topics in doctoral curricula.

The structure of elite doctorates is seen more and more as a structure that allows young researchers an increased exposure to different scientists, different themes and perspectives, different fields and also that encourages team work, networking and a proactive attitude in generating and managing research themes.

Some of the European countries are debating a structure of doctoral study that should combine professional doctorate, and industry – academia type of doctorate that can encourage both the transfer of knowledge from university towards industry as well as the opening of academia towards important challenges and problems that companies are facing nowadays in different fields.

National and institutional doctoral policies need to take more into account the individual research interests by creating the environment where doctoral students are able to make the most of their potential. This will bring institutions closer to the realization of the objective regarding innovation and creativity in all research related activities, whether they are purely academic or “market oriented”.

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