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Conference paper

COLLABORATIONS IN THE FIELD OF EDUCATION AT UNIVERSITY LEVEL

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Summary

The goals of the present review are the following three:

a) To present the Bologna process and the recent changing at European high educational level.
b) To provide an updating on actual situation and perspectives of the PhD system in developed countries and around the world.
c) To discuss possible models of collaboration across ASD's countries and international systems and institutions of higher education.

Key words: Education, Collaboration, Perspectives, University.

1. Introduction

Changes on systems of public higher education are in progress around the world; a shift is occurring in the support and perception of the purpose of public research universities. Several national governments are attempting to bend their higher education systems to meet their perceived long-term socio-economic needs. At the same time, there are relatively new supranational influences on higher education markets and practices that will grow in influence over time, including the Bologna agreement, the European Commission, and the pending General Agreement on Trade and Services. Generally, changes in several countries have followed careful observation of what has made the U.S. successful, but the change of new emerging countries has not been examined closely, therefore arises the need to find alternative and peculiar solutions for each country.

The U.S. led the world in the development of a cadre of highly productive public research universities and state systems of higher education. Public universities remain a large social and economic force in the nation, but there are many signs that the international leadership of the U.S. in higher education is fading.

Many nations have sought to adopt elements of the U.S. model on their own political and social terms. Their systems are maturing and they are making great progress (although still too slowly for many critics). New and productive centres of research are emerging in both developed and developing economies; international collaborations among universities are growing and many OECD countries now exceed the U.S. in higher education participation and degree attainment rates for young adults.

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While recognizing that there are many reform efforts that relate to the peculiar political cultures and needs of individual nations, it seems to be unanimously agreed that there is commonality in the challenges facing public universities internationally, including:

- The need to expand or maintain access and improve graduation rates.
- Increasing expectations by governments and the public to serve the broad social needs of society.
- Disinvestment by state governments and the need for new financial models.
- Avenues for increasing efficiencies in teaching and university management.
- Increased reliance on research universities as drivers of economic development.
- Growing emphasis on professionalism and scientific and technological prowess.
- Relatively new global markets for academics and research excellence.
- The rise of relatively new and for-profit competitors all over the world.
- Increased global collaborations with other universities and businesses in research and teaching programs.

2. Education at university level in Europe

In Europe, the Bologna Agreement, also called Bologna Process or Declaration of Bologna, was underwritten on 19th June 1999, among the ministries of higher education of 29 European countries at Bologna (Italy). This is an important agreement for harmonizing various European higher education systems that is creating an European area of Higher Education and to promote the European system of higher education on a worldwide scale, in order to increase its international competitiveness. The Declaration of Bologna was preceded by a significant debate on the role of the university in the development of the cultural dimensions of Europe. Two fundamental stages were the "Convention on the recognition of qualifications regarding higher education in the European region", signed in Lisbon in April 1997 by the ministries of education of numerous countries (not only EU), and "The joint declaration of the Sorbonne on the harmonization of the architecture of the European system of higher education," underwritten on the 25th May 1998 in Paris by the ministries of higher education of France, Germany, Italy, and the United Kingdom. In the latter document the four ministries demonstrated alliance on the opportunity "to realise a common European area of higher education, where the national identities and the communal interests could be integrated and mutually enforced to the benefit of Europe, the students, and more in general, the European citizens". At the conclusion they hoped that "other EU member countries and other European countries" would join in the project.

The Bologna Process has led to structural reforms, particularly in Germany and Italy, and the development of matriculation agreements and a rising transnational flow of students. The European Commission has launched a potentially significant effort to create an European research area with ambitious goals for exceeding the U.S. in non-defense R&D. This document initiated an important and presently irreversible process to harmonize the various European systems of higher education. Objectives of the Bologna agreement is to allow the Europe of solve a growing number of new and difficult challenges: globalisation, integration of several new members, as well as the transformation of Europe into an economic area founded upon knowledge. In order to successfully confront these challenges, it is of most importance now to encourage scientific and cultural exchanges at all levels and to allow for the maximum mobility of qualified workers, students, and researchers. It is necessary, therefore, to gain harmonization of the university systems that, with respect to the diverse cultures and academic traditions, facilitates the recognition of university qualifications, have the possibility to issue joint-degree, favours the mobility of students and researchers, and thus enlarges the horizons of the labour market on a European scale. In the Declaration of Bologna, the central role that education holds in the realisation of this project is recognised, as defined in the course of the European Union summit held in Lisbon in 2000 and in Barcelona in 2002. This recognition has the intent to create in Europe within the next decade an economic area more competitive on the global scale and a more dynamic scientific system in the world, with bigger and better employment possibilities and a larger social cohesion. Education, in particular higher education, represents a powerful axis but also the most delicate aspect in this ambitious project. The so-called Bologna Process constitutes without a doubt the principal tool for the attainment of the elevated standards of quality in the sphere of education. The Declaration of Bologna has defined six objectives, to be carried out by 2010.

- Adoption of a system of qualification readily legible and compatible, also by means of the implementation of a Diploma Supplement.
- Adoption of a system founded upon a two-cycle system, that is a 1st and 2^{n}d level. Entrance to 2nd level cycle will require the completion of a 1st cycle of study, of whose duration cannot be less than three years.
- Consolidation of a system of academic credits - based on the ECTS system - that can be acquired in diverse disciplinary contexts.
- Promotion of mobility (for students, lecturers, researchers and technical-administrative personnel) by means of removing obstacles for the full exercise of free circulation.
- Promotion of European cooperation concerning the assessment of quality.

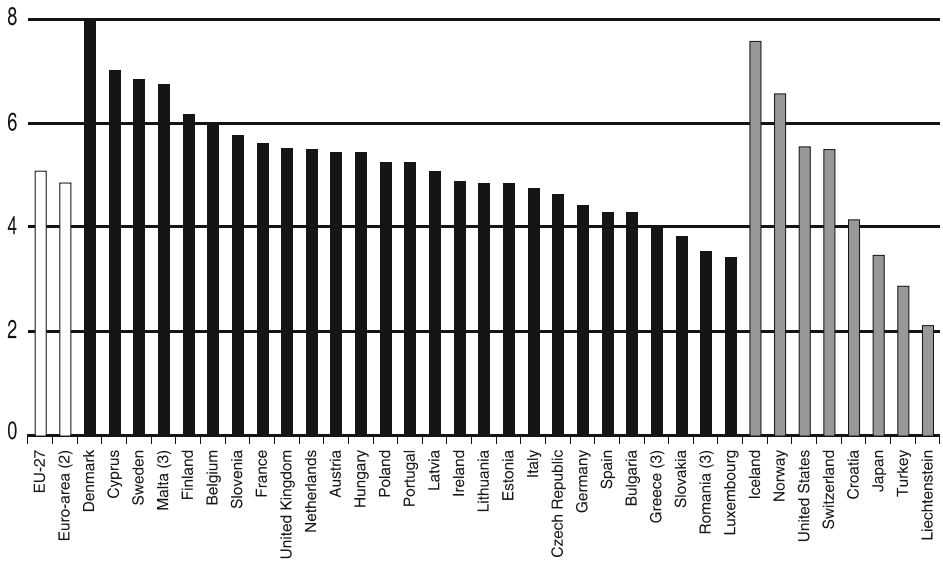
– Promotion of an indispensable European dimension of higher education: development of degree plans, cooperation between university institutions, mobility programmes, integrated studies plans, development and research.

Therefore, in conformity to the 1999 reform, in Italy the undergraduate studies are organised on a First Cycle: 1st Level Degree Courses / One-Long cycle 2nd Degree Courses. Undergraduate studies consist in Corsi di Laurea-CL (1st degree courses) aimed at guaranteeing undergraduate students an adequate command of general scientific methods and contents as well as specific professional skills. First degree courses usually last 3 years. The Laurea-L (1st degree) is awarded to undergraduates who have earned 180 credits. Undergraduate students can also apply for Corsi di Laurea Specialistica a ciclo unico - CLSu (One-long Cycle 2nd Degree Courses). For these courses it is necessary to obtain 300 credits - 360 in the case of Medicine. These degrees controlled by the European Union regulations are single cycle degrees, in other words there is not a first level, but the teaching activities are spread directly over 5 or 6 years. Apart from the aforementioned degree courses within the framework of the Bologna Process, undergraduate students can apply for Summer and Winter Schools which are international courses lasting between one and four weeks. They are usually structured as intensive courses on many different subjects designed to match new educational and professional needs. The courses are addressed to undergraduates and young graduates from all over the world and, in some cases, to highly skilled professionals. This educational activity is conceived as an academic meeting point for scholars from all over the world. Here students can enrich their knowledge by attending courses held by lecturers of international repute and, at the same time, share a unique cultural experience simply by mixing with peers from all over the world. In some courses university credits can be earned and grants are available. During the past academic years the Italian University undertook a relevant new planning of all the courses offered, according to the Ministerial Decree 270/04 which will become effective in the academic year 2008/09. The main changes made by DM 270/04 made the following new names for educational qualifications:

- Laurea (L) (1st level Degree)
- Laurea Magistrale (LM) (2nd level Degree)
- Diploma di Specializzazione (DS) (Specialization Diploma)
- Dottorato di Ricerca (DR) (PhD or Research Doctorate)

In Hungary and Croatia at Zagreb University, the Bologna Agreement is applied (Milisits, 2011, personal communication; Curik, 2011, personal communication).

Figure 1. – PUBLIC EXPENDITURE ON EDUCATION, (% OF GDP AT 2006)



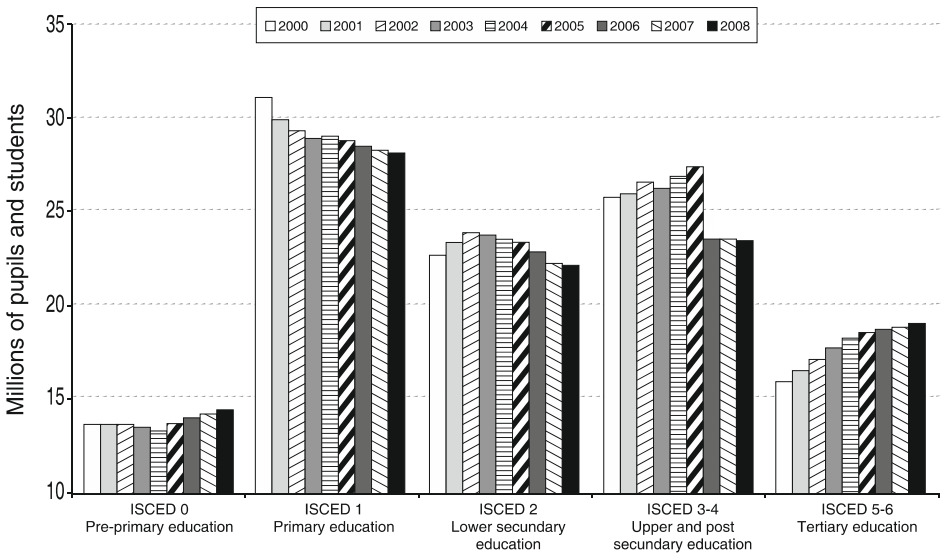
(1) Refer to the Internet metadata file (http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/en/tsiir010_esms.htm).
(2) EA-15 instead od EA-16.
(3) 2005.

Source: Eurostat (tsiir010)

In rough, public expenditure on education in the EU-27 (Figure 1) in 2006 was equivalent to 5.1 % of GDP, while the expenditure of both public and private sources of funds on educational institutions amounted to 5.7 % of GDP. The highest public spending on education was observed in Denmark (8.0 % of GDP), while Cyprus (7.0 %), Sweden (6.9 %) and Malta (6.8 %) also recorded relatively high proportions. Among the countries of Animal Science Days agreement the highest public spending on education was observed in Slovenia, followed by Hungary, Italy and Croatia (Eurostat yearbook, 2010, http://epp.eurostat.ec.europa.eu).

Moreover, in the European area, demographic trends in the last three decades reflect reductions in birth rates, that have resulted in the structure of the EU's population ageing and the proportion of those aged under 30 decreasing in the majority of member states (Figure 2). These changes can have a significant impact on human and material resources required for the sound functioning of education systems – such as average class sizes or teacher recruitment strategies.

Figure 2. – STATISTICS ON EDUCATION IN EUROPE (EU27) IN TERMS OF NUMBER OF PUPILS AND STUDENTS BY LEVEL OF EDUCATION (IN MILLIONS) FROM 2000 TO 2008.



Flags: (i) See additional information in the country-specific notes at the end of the DiF
Source: Eurostat, Education statistics, UOE data collection. (educ ilev)

3. A worldwide comparison at PhD level

In order to compare how nations/states and universities are producing education at high level, in particular at the PhD level (tertiary education), it is important to learn which are the differences among the systems in order to establish collaboration and to transfer ideas at the educational systems. Cyranoski et al. (2011) reported the following differences among countries around the world.

Germany is the country of the progressive PhD, because of the relatively low income of German academic staff that makes leaving the university after the PhD a good option. Germany is Europe's biggest producer of doctoral graduates, turning out some 7,000 science PhDs in 2005. After a major redesign of its doctoral education programmes over the past 20 years, the country is also well on its way for solving the oversupply problem. Traditionally, supervisors recruited PhD students informally and trained them to follow in their academic footsteps, with little oversight from the university or research institution. But, as in the rest of Europe, the number of academic positions available to graduates in Germany has remained stable or fallen. So, these days, a PhD in Germany is often marketed as advanced training not only for the academic career path, but also for the wider workforce. Universities now play a more formal role in student recruitment and development, and many students follow structured courses outside the lab, including classes in presenting, report writing and

other transferable skills. Just under 6% of PhD graduates in science eventually go into full-time academic positions, and most will find research jobs in industry.

Poland have seen dramatic increases. In 1990–91, Polish institutions enrolled 2,695 PhD students. This figure rose to more than 32,000 in 2008–2009 as the Polish government, trying to expand the higher-education system after the fall of Communism, introduced policies to reward institutions for enrolling doctoral candidates.

Despite the growth, there are problems. The country's economic growth has not kept pace with that of its PhD numbers, so people with doctorates can end up taking jobs below their level of expertise. And Poland needs to collect data showing that PhDs from its institutions across the country are of consistent quality, and are comparable with the rest of Europe. In Poland, as in most countries, unemployment for PhD holders is below 3%. Often, PhD holders are not always satisfied with their jobs than those without the degree.

England has embarked on a large range of higher education reforms intended to expand access, bolster accountability measures, and revise funding including the inclusion of post-graduate fees and new infusion of money from the national government.

Australia has experimented also with post-graduate fees and has adjusted to lower levels of government funding by embarking upon a major mission of expanding revenue through accommodation of students from other Asian countries.

Japan has accomplished major systematic change in the organization and funding of its public universities. Japan, in term of PhD educational level, is a system in crisis, indeed, of all the countries in which to graduate with a science PhD, Japan is arguably one of the worst. In the 1990s, the government set a policy to triple the number of postdocs to 10,000, and stepped up PhD recruitment to meet that goal. The policy was meant to bring Japan's science capacity up to match that of the West but is now much criticized because, although it quickly succeeded, it gave little thought to where all those postdocs were going to end up. Academia doesn't want them: the number of 18-year-olds entering higher education has been dropping, so universities don't need the staff. Neither does Japanese industry, which has traditionally preferred young, fresh bachelor's graduates who can be trained on the job. The science and education ministry couldn't even sell them off when, in 2009, it started offering companies around ¥4 million (33,600 Euro or 47,000 US$) each to take on some of the country's 18,000 unemployed postdoctoral students (one of several initiatives that have been introduced to improve the situation). It's just hard to find a match between postdoc and company, and this means that there are few jobs for the current crop of PhDs. Among the 1,350 awarded doctorates in natural sciences in 2010, just over half (746) had full-time positions lined up by the time they graduated. But only 162 were in the academic sciences or technological services; of the rest, 250 took industry positions, 256 went into education and 38 got government jobs. China has announced an ambitious plan for the creation of twenty world-class research universities on a par with MIT. China might be identified with the following slogan: "quantity outweighs quality". The number of PhD holders in China is going through the roof, with some 50,000 people graduating

with doctorates across all disciplines in 2009, and by some counts it now surpasses all other countries. The main problem is the low quality of many graduates: many PhD supervisors are not well qualified, the system lacks quality control and there is no clear mechanism for weeding out poor students. China's booming economy and capacity building has absorbed PhD holders into the workforce. At the present, it is a lot easier to find a position in academia in China compared with the United States and the same is true in industry, but PhD graduates can run into problems if they want to enter internationally competitive academia. To get a position at a top university or research institution requires training, such as a postdoctoral position, in another country. Many researchers do not return to China, draining away the cream of the country's crop. The quality issue should be helped by China's efforts to recruit more scholars from abroad. More institutions are now starting to introduce thesis committees and rotations, which will make students less dependent on a single supervisor in a hierarchical system.

Singapore and Taiwan likewise have each undertaken a major upgrading of their premier universities. The Slogan for Singapore might be the following "Growth in all directions". The picture is much brighter in Singapore. Here, the past few years have seen major investment and expansion in the university system and in science and technology infrastructure, including the foundation of two new public universities. This has attracted students within and outside the country. Enrolment of Singaporean nationals in PhD programmes has grown by 60% over the past five years, assessing to 789 in all disciplines, and the country has actively recruited foreign graduate students from China, India, Iran, Turkey, eastern Europe and farther afield. Because the university system in Singapore has been underdeveloped until now, most PhD holders go to work outside academia, but the continued expansion of the universities could create more opportunities.

India, in 2004, produced around 5,900 science, technology and engineering PhDs, now grown to some 8,900 units per year. This is still a fraction of the number from China and the United States, and the country wants many more to match the explosive growth of its economy and population. The government is making major investments in research and higher education, including a one-third increase in the higher-education budget in 2011–12, and is trying to attract investment from foreign universities. The target is that up to 20,000 PhDs will graduate each year by 2020. Those targets ought to be easy to reach: India's population is young, and undergraduate education is booming. But there is little incentive to continue into a lengthy PhD programme, and only around 1% of undergraduates currently do so. Most are intent on securing jobs in industry, which require only an undergraduate degree and are much more lucrative than the public-sector academic and research jobs that need postgraduate education. Indian students "don't think of PhDs now, not even master's; a bachelor's is good enough to get a job". Even after a PhD, there are few academic opportunities in India, and better-paid industry jobs are the major draw. For many young people intent on postgraduate education, the goal is frequently to go to the United States or Europe.

Egypt is the Middle East's powerhouse for doctoral studies. In 2009, the country had about 35,000 students enrolled in doctoral programmes, up from 17,663 in 1998.

But funding has not kept up with demand. The majority comes through university budgets, which are already strained by the large enrolment of students in undergraduate programmes and postgraduate studies other than PhDs. Universities have started turning to international funding and collaborations with the private sector, but this source of funding remains very limited. The deficit translates into shortages in equipment and materials, a lack of qualified teaching staff and poor compensation for researchers. It also means that more of the funding burden is falling on the students. The squeeze takes a toll on the quality of research, and creates tension between students and supervisors. The doctorate is frequently a means of climbing the civil-service hierarchy, but those in the private sector often complain that graduates are untrained in the practical skills they need, such as proposal writing and project management. Egyptian PhD holders also struggle to secure international research positions. Generally, the overall quality of Egyptian research papers is "mediocre". But, the political upheaval in the region this year could bring a change: many academics who had left Egypt are returning, hoping to help rebuild and overhaul education and research. Few PhDs are trained elsewhere in the Middle East, less than 50 a year in Lebanon.

Several world-class universities established in the oil-rich Gulf States in recent years have increased demand for PhD holders. So far, most of the researchers have been 'imported' after receiving their degrees from Western universities, but Saudi Arabia and Qatar in particular have been building up their infrastructure to start offering more PhD programmes themselves.

Ukraine's academic promotion system, twenty years after independence, is trying to stay competitive in scientific areas such as aerospace, applied mathematics, theoretical physics, energy and organic farming, but its higher education is still tied to the old Soviet system. Reforms are based towards meeting international standards, hence with original research with external peer review, promote autonomy under democratic and competent management, and support academics by encouraging them to stay at home (Corobets, 2011).

In the United States, reforms are focused largely on ways to cope with declining rates of public investment in public higher education and rising fees and rising operating costs, while maintaining access. There is interest also in incorporating new accountability schemes.

Businesses are becoming more international in their activities and are thereby altering their traditional patterns of investing in research, including corporate funding of basic and applied university-based research. Many large high technology firms are shifting portions of their R&D investment to new research centres in China, India, and other countries: regions where research expertise and talent are being aggressively nurtured. In the United States the main aspect is the supply versus demand. The United States is second only to China in awarding science doctorates (it produced an estimated 19,733 in the life sciences and physical sciences in 2009) and production is going up. However, this trend is not considered positive, because of the proportion of people with science PhDs who get tenured academic positions in the sciences has been dropping steadily and industry has not fully absorbed the slack. The problem is most acute in the

life sciences, in which the pace of PhD growth is biggest, yet pharmaceutical and biotechnology industries have been drastically downsizing in recent years. In 1973, 55% of US doctorates in the biological sciences secured tenure-track positions within six years of completing their PhDs, and only 2% were in a postdoc or other untenured academic position. By 2006, only 15% were in tenured positions six years after graduating, with 18% untenured. Recently, several analyses of market suggest that more doctorates are taking jobs that do not require a PhD and the critical point is that the government spend a lot of money training these students and then they go out and get jobs that they're not well matched for. Nevertheless, production of US doctorates continues apace, fuelled by an influx of foreign students. Some universities are now experimenting with PhD programmes that better prepare graduate students for careers outside academia.

In the ASD's countries, following the Eurostat statistics (Eurostat yearbook, 2010, http://epp.eurostat.ec.europa.eu) the students in the tertiary education level (ISCED 5-6), including PhD students, in all disciplines were in 2007 a total of 2,722,000 (Figure 3), with an weighted average of 2.48% involved in agricultural and veterinary programs, with a increment of +17% from 2002 to 2007.

In conclusion, this international analyses provide that the world is producing more PhDs than ever before. The number of science doctorates earned each year grew by nearly 40% between 1998 and 2008, to some 34,000, in countries that are members of the Organisation for Economic Cooperation and Development (OECD). The growth shows no sign of slowing: most countries are building up their higher education systems because they see educated workers as a key to economic growth. But in much of the world, the PhD graduates may never get a chance to take full advantage of their qualifications. Supply has outstripped demand and, although few PhD holders end up unemployed, it is not clear that spending years securing this high-level qualification is worth it for a job as, for example, a high-school teacher. Most PhD education programs are conform to a model in which education is a process of cloning that trains students to do what their mentors do, and the clones are now vastly outnumbering their mentors. In other countries, such as China and India, the economies are developing fast enough to use all the PhDs they can crank out and more, but the quality of the graduates is not consistent. Only a few nations, including Germany, are successfully tackling the problem by redefining the PhD as training for high-level positions in careers outside academia. Therefore, optimization of collaboration models among countries, between public and private companies, and between academic and industry sectors are needed.

In other terms, in the next future, to improve the high educational level around the world, we need to evolve the Adam Smith's concept, who, in the economic contest, said that a group can obtain the best result when each member does what is best for itself, with the more complete theory of John Nash (Nash 1950a; 1950b), who, instead, formulated that the best result is achieved when each member does what is best for themselves and for the group, according the equilibrium theory of Nash; therefore, more collaboration is expected and hoped, in the near future.

4. Models of collaboration

To apply possible models to optimize the collaboration across ASD's countries and international systems and institutions of higher education, first of all it is useful to clarify the definition of the term "collaboration". Collaboration has a variety of definitions and names, but is generally meant as the cooperative way that two or more entities work together towards a shared goal. Collaboration among individuals with shared goals in professions such as mental health and education has been studied (Kabler and Genshaft, 1983; Moriarty, 2000; Smith, Frey and Tollefson, 2003), as collaboration within and among individuals in the development of small groups (Tuckman, 1965; Tuckman and Jensen, 1977). Additionally, some researchers have explored the specific nature of successful relationships within school and business partnerships (Ash, 1989; Del Pizzo, 1990; Kysiak, 1986; Rockefeller, 1986). However, a comprehensive theory of collaboration within the types of shared organizational efforts (Gajda, 2004) formed through grant funded initiatives and other public service efforts has not been presented in the literature.

Preliminary models of collaboration within service-oriented strategic alliances have been presented in the literature (Bailey and Koney, 2000; Gadja, 2004; Hogue, 1993; Peterson, 1991). These models commonly focus on stages of collaboration through which inter-agency initiatives might move. Gadja argues that groups will pass from lower to higher stages of collaboration before they can be effective. These stage theories describe levels of collaboration with the lowest level being little or no collaboration and the highest levels being full collaboration or, ultimately, complete unification. The models differ on the number of stages, the range of levels included, and the definitions of various stages, but they have much in common. Peterson (1991) proposed three types of agency interaction-cooperation, coordination, and collaboration.

Though described by Peterson as distinct states of interactions among agencies and not offered as a strict series of stages, in Gadja's (2004) review of Peterson's model, they are presented as a three point continuum. These categories are differentiated based on the degree of member autonomy associated with each. Hogue (1993) suggested five levels of community linkage- networking, cooperation or alliance, coordination or partnership, coalition, and collaboration. The levels differ by purpose, the structure of decision making, and the nature of leadership. Bailey and Koney (2000) offered a model similar to these with four steps, ending with complete unification-cooperation, coordination, collaboration, and coadunation (which means having grown together). A five-stage model consistent with previous stage approaches was suggested by Gadja. The level of integration model has five ordered steps- networking, cooperating, partnering, merging, and unifying. The steps differ on purpose, tasks and

organizational strategies, leadership and decision-making and type and frequency of communication.

Figure 3. – STATISTICS ON STUDENTS IN TERTIARY EDUCATION, 2007.

	Total number of students in tertiary education (1 000)	of which, studying (%)						
		Humanities & arts	Social sciences, business & law	Science, math. & computing	Engin., manuf. & construction	Agricul. & veterinary	Health & welfare	Services
EU-27	18 877	13.1	33.9	10.5	14.0	1.9	12.6	4.1
Belgium	394	10.9	29.5	6.5	9.5	2.5	19.4	1.9
Bulgaria	259	7.9	44.0	5.1	19.7	2.5	6.2	8.0
Czech Republic	363	8.7	28.6	8.7	14.2	3.7	11.9	4.1
Denmark	232	15.3	29.0	8.7	10.1	1.5	22.0	2.2
Germany	2 279	15.5	27.4	15.3	15.5	1.5	14.5	3.1
Estonia	69	11.4	39.8	9.9	13.1	2.4	8.3	8.1
Ireland	190	14.7	22.0	11.0	10.3	1.2	13.1	4.9
Greece	603	13.5	31.8	13.6	17.0	5.8	9.6	3.1
Spain	1 777	10.3	31.6	10.5	17.6	2.0	11.7	5.6
France	2 180	16.0	35.6	12.4	12.8	1.1	15.1	3.4
Italy	2 034	15.3	35.6	7.9	15.6	2.3	12.9	2.7
Cyprus	22	9.5	49.9	11.9	6.8	0.1	6.1	6.1
Latvia	129	7.2	53.7	5.1	10.4	1.1	6.3	5.6
Lithuania	200	7.1	42.8	5.9	18.2	2.2	8.4	3.1
Luxembourg (²)	3	8.2	45.2	8.4	15.0	0.0	0.4	0.0
Hungary	432	8.6	40.6	6.9	11.5	2.7	8.8	9.1
Malta	10	16.2	35.4	10.3	7.9	0.1	17.6	1.9
Netherlands	583	8.5	37.5	6.5	8.1	1.2	16.9	6.2
Austria	261	15.4	36.5	12.0	12.7	1.1	7.9	1.8
Poland	2 147	10.2	40.3	9.5	12.6	2.2	6.1	5.6
Portugal	367	8.5	32.0	7.3	22.3	1.9	16.5	5.7
Romania	928	9.9	51.0	6.2	17.2	2.7	5.6	4.3
Slovenia	116	7.8	41.7	5.6	16.7	3.2	7.2	9.5
Slovakia	218	6.2	29.4	8.9	15.7	2.6	16.2	5.5
Finland	309	14.6	22.7	11.2	25.4	2.2	13.7	4.9
Sweden	414	12.5	26.3	9.4	16.1	0.9	17.7	2.0
United Kingdom	2 363	17.1	26.9	13.4	8.4	0.9	16.0	3.1
Croatia	140	9.7	41.7	7.7	15.7	3.8	7.0	10.2
FYR of Macedonia	58	11.2	38.0	9.4	14.8	3.2	9.0	4.3
Turkey	2 454	6.2	48.7	7.5	13.1	3.7	5.6	3.8
Iceland	16	14.6	38.5	7.9	7.7	0.6	12.7	1.5
Liechtenstein	1	0.7	74.3	0.0	22.9	0.0	2.1	0.0
Norway	215	11.6	32.3	8.8	7.0	0.8	19.8	4.0
Switzerland	213	12.7	37.0	10.5	13.2	1.1	11.0	3.5
Japan	4 033	15.7	29.1	2.9	15.8	2.2	12.5	5.7
United States	17 759	10.6	27.3	8.9	6.7	0.6	13.9	5.1

(¹) Refer to the Internet metadata file (http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/en/educ_esms.htm).
(²) 2006.

Source: Eurostat (tps00062 and educ_enrl5)

The measurement levels of collaboration among partners might be defined as a level of cooperation that involves teamwork, communication and consideration. The five stages of Hogue's (1993) Levels of Community Linkage model might be the most relevant framework. The taxonomy of Hogue use a 0 to 5 scale with 0 indicating "no interaction at all" and 5 indicating the collaboration level (Table 1). An example of Hogue's taxonomy was applied at the co-ordination committee level of the ASD, by email, using a survey. The results obtained between the components of ASD agreement outlined that the preferred types of cooperation should cover the flow Erasmus, the PhD schools and research groups. The cooperation in education is considered very important, if not extremely important among ASD's partners, with the interest on application of EU projects such as FP7 (Seventh Framework Programme), INTERREG and LLP (Lifelong Learning Programme) calls. The outcome of the questionnaires was particularly poor at the level of cooperation joint courses, exchange of teachers and students.

Table 1. – DESCRIPTIONS OF THE DIFFERENT LEVELS OF COLLABORATION

	5 Levels of Collaboration and Their Characteristics				
	Networking 1	Cooperation 2	Coordination 3	Coalition 4	Collaboration 5
Relationship and Characteristics	-Aware of organization -Loosely defined roles -Little communicatio n -All decisions are made independently	-Provide information to each other -Somewhat defined roles -Formal communication -All decision are made independently	-Share information and resources - Defined roles -Frequent communication -Some shared decision making	-Share ideas -Share resources -Frequent and prioritized communication -All members have a vote in decision making	-Members belong to one system -Frequent communication is characterized by mutual trust -Consensun is reached on all decisions

5. Conclusions

The main criticism for the actual university is that it is inflexibly compartmentalized in disciplines and departments. This compartmentalization stifles innovation among researchers and promotes parochialism in the curricula. When we focus too much on parochialism and competition we don't consider the quality and relevance of the work. That's where cooperation enters. A good educational program is not those which has won on other programs, but the educational program that helps to solve real problems and create a new generation that will optimize the collaboration.

Cooperation stimulates bringing different areas together, and creating more dialog between inside and outside the academy.

Expertise, of course, is essential to the advancement of knowledge and to society; but in far too many cases, specialization has led to areas of research so narrow that they are of interest only to other people working in the same fields, subfields or sub-subfields. Many researchers struggle to talk to colleagues in the same department, and communication across departments and disciplines can be impossible. If doctoral education is to remain viable in the twenty-first century, universities must tear down the walls that separate fields, and establish programmes that nourish cross-disciplinary investigation and communication. They must design curricula that focus on solving practical problems, such as providing clean water to a growing population.

For example, to successfully confront the challenges we face in providing clean water to people in need, we will require collaboration and expertise from such diverse fields as economics and geology, political science and chemistry.

It is important to realize that problems will never be solved as long as each institution continues to act independently. The difficulties are systemic and must be addressed comprehensively and cooperatively, so seeking competitive advantage and financial gain will be made possible by alliances with the private sector that the universities will need to create.

We need for collaboration and the curricular reform in agreement with all partners.

To facilitate change, universities should move away from excessive competition fuelled by pernicious rating systems, and develop structures and procedures that foster cooperation. This would enable them to share faculty members, students and resources, and to efficiently increase educational opportunities. Institutions wouldn't need a department in every field, and could outsource some subjects. Tools as teleconferencing and internet mean that cooperation is no longer limited by physical proximity. Therefore, our colleges and universities must find a way to promote forms of creative specialization not threatened by generalized collaboration. It should be better to call for opening up our schools to more flexible networks of research and learning. The mission of universities should be providing students with specialized skills that include a thirst and capacity for innovative collaboration beyond the disciplines and departments that taught the skills in the first place. Fulfilling this mission will sustain higher education, but more importantly it will shape the culture of the future.

The technologies that have transformed financial markets and the publishing, news and entertainment industries are now changing the education system. In the coming years, growing global competition for the multibillion-dollar education market will increase the pressure on our universities, just when public and private funding is decreasing. Although significant change is necessary at every level of higher education, it must start at the top, with a reform of PhD programmes in almost every field. The future of our youngs people, our countries and, indeed, the world depends on how well we meet this challenge on the collaborations in the field of Education at University level.

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SURADNJA U PODRUČJU OBRAZOVANJA NA SVEUČILIŠNOJ RAZINI

Sažetak

Ciljevi ovog preglednog rada su bili predstaviti bolonjski proces i nedavne promjene europskog visokoškolskog obrazovanja, ukazati na aktualnu situaciju i perspektivu poslijediplomskih doktorskih studija u zemljama u razvoju kao i u svijetu te razmotriti moguće modele suradnje putem suradnje između zemalja kvadrilaterale kao i drugih međunarodnih institucija visokog obrazovanja.

Ključne riječi: obrazovanje, suradnja, perspektiva.

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