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Opportunities and Challenges of Digitalization for International Academic Cooperation Using the Example of the German Higher Education

Elisabeth LAZAROU, Laura TRIFAN
Department of Engineering in Foreign Languages, Faculty of Engineering in Foreign Languages, University Polytechnic of Bucharest, Romania
elisabeth.lazarou@upb.ro, laura.trifan@upb.ro

***Abstract**: The worldwide development in recent years has shown that there is a huge interest in virtual forms on education whether it be in higher education, in trainings or in Lifelong Learning. MOOCs are the most popular version of such a development. The higher orientation of universities on competition and business is a reaction of the globalization and internationalization, related to the focus on the Bologna-process, it aims to fulfil the higher demand of students for ICT and the necessity of improving the University teaching and a significant cost reduction. New study models as an alternative to the presence-based courses are interesting approaches, which can be enforced by e-learning and virtualization. New aspects, like Apps, cloud computing and security of information get more and more important, but also a new distribution of knowledge is expected. Universities have to cope with Marketing and develop ways for Diversity Management, i.e. new roles come towards them. Based on a series of projects at German universities, the authors would like to consider the opportunities and challenges, which demonstrate digitalization of international academic cooperation in the field of higher education. The article would like to show and further elaborate with the help of three categories, how internationalization of curriculum can take place through digitalized lectures. The joint creation of individual courses can be taught either fully online or in blended learning form at respective Universities. The common development of the joint studies can be implemented in the Bachelor and Master Degree courses.*

***Keywords:** internationalization; digitalization; academic cooperation*.

I. KNOWLEDGE-BASED MODEL AND TRENDS FOR HIGHER EDUCATION

Francis Bacon considered that "knowledge itself is power" [1]

Knowledge implies a double, quantitative and qualitative perspective. The quantitative aspect is described, as in [2], by the *Knowledge Doubling Curve*. As presented in [3], until 1900 human knowledge doubled approximately every century, by 1945 knowledge was doubling every 25 years. Today things are ambiguous, as different types of knowledge have different growth rates. For example, nanotechnology knowledge is doubling every two years and clinical knowledge every 18 months. But on average human knowledge is doubling every 13 months. According to IBM, cited by [4], the build out of the "internet of things" will lead to the doubling of knowledge every 12 hours.

The qualitative perspective of knowledge regards the reluctance about the quality of the virtual educational offer and the concern that this could endanger the classical higher education and lead to a decrease. Knowledge is inseparably linked to university, as a place for knowledge creation and transfer, for research and critical thinking. The development path of the university as a knowledge creating entity is intrinsically linked with the development of the society and economy, called knowledge society, creative society or creative economy. According to [5], the concept of *creative economy* is of relatively recent origin, emerging in Australia in 1994 with the launching of the report Creative Nation.

On the pursuit of economic value, the model, the means and the vision need to be adapted to the trends of change. The trends of change are: an easy access to the university, which leads to a global "education and knowledge value revolution", a global-scale paradigm shift, as defined by [6], and a shift of attitudes, values and norms in society, as stated by [7].

Based on [8], the main challenges and trends for the higher education are: internationalization and globalization, university-industry collaboration, trend to distance education and massification, privatization of the education, digitalization, marketing strategy, quality assurance.

Hereinafter some characteristics of the knowledge-based model are presented as for some of them there are some correlations between companies and universities.

1.1 The Internationalization

According to [9], cited by [10], internationalization is "a process by which enterprises increase their involvement in international business activities" and according to [11] "a process that prepares the community for successful participation in an increasingly interdependent world …, which should infuse all facets of the post-secondary education system fostering global understanding and developing skills for effective living and working in a diverse world".

As stated in [12], the internationalization of higher education means "integrating an international dimension into the teaching/learning, research and service functions of a university or college", introducing "an international/intercultural/global outlook into the major functions of an institution of higher education".

The internationalization of higher education has led to changing roles for academics, including the participation in international projects, conferring global perspectives to international business, work and studies. These new perspectives dissolved and reshaped borders, the paradigm of cooperation and collaborative work. Internationalizing the curricula on programme and course levels is the main principle by which international perspectives, global citizenship and intercultural competence are promoted.

"Internationalization is changing the world of higher education, and globalization is changing the world of internationalization." [13]

1.2 The Globalization

Globalization means on the one hand the access to new markets and labour force, a tremendous exchange of information and knowledge, on the other hand, it marks the academic reality of the 21st century, proving an enormous increase of the participation to the tertiary educational system: 183 million persons study at the world universities. [14] According to a prognose, in 2030 there will be more than 414 million students worldwide. [15] This process means "the closer integration of the countries and peoples of the world which has been brought about by the enormous reduction of costs of transportation and communication, and the breaking down of artificial barriers to the flows of goods, services, capital, knowledge, and people across borders". [16]

Economic globalization has been described by five key factors in the past fifty years. The internationalization process has some specific characteristics for the economy. As the main and traditional keeper of knowledge, the university is entangled with the knowledge-based economy and runs through similar processes. How do universities understand and process the impact of globalization on education? A better understanding raises the awareness of their new role and give universities the perspective of focusing on their core activity of curriculum development by internalizing internationalization and globalization and developing their own mechanisms of adaption to the requirements of the society.

The figure below (figure 1) presents, following [17,18] (some features of the dynamic process model of internationalization), the key dimensions of the knowledge-based society and organizations.

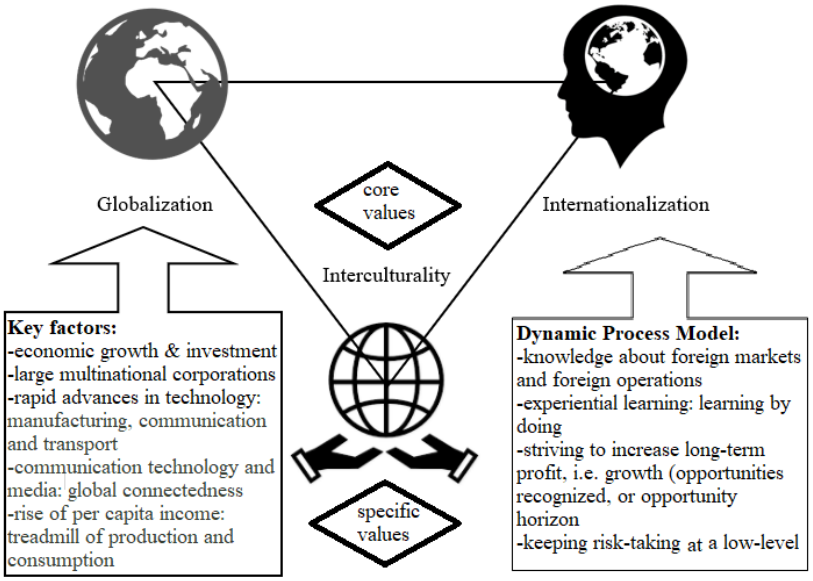

Figure 1. Key Dimensions of knowledge-based society and organizations

According to [19, 20], these five factors have an influence over the processes of the university and the important point to note is that they are mutually reinforcing. Rapid advances in information and computer technology have reduced the time and costs of global communications, thus reinforcing the effects of these economic factors. Faster, easier and cheaper communications have enabled the rapid transfer of huge amounts of money electronically and the organisation of production on a multi-continental scale, as much of the world's business is carried out on a global scale.

According to [21], some dimensions of the globalization are: the social (mass media, telecommunications, and information and computer technologies), cultural migration, relocation, and international educational exchange, economic (international trade, finance, and economics), environmental (issues of sustainability and global climate change), political (international relations, foreign affairs, and systems of regulation) dimension. Other authors [22] define other dimensions, like economic, cultural, political, technological, environmental, ethical, bioethical, and other dimensions.

The „challenge of massification" is the main cause for the change of the higher education system in the last years and this trend in global higher education was called by UNESCO as an „academic revolution".[14] To achieve competitive advantages and contribute to the fight against youth unemployment, it is necessary „to introduce change, innovation and productivity growth". [23] cited by [24]. Therefore „more highly skilled workers" are essential and the vocational education and training has to switch to lifelong learning.

1.3 Trend to distance education. Interculturality. Virtual and real mobility

Because of the globalization, universities must have an international orientation, Classic real mobility consists of exchanges of students, teachers, researchers and personnel of companies involved in the internationalization process. The number of exchange students and staff counts to the most relevant indicators of the internationalization of universities. According to [25], a total number of 358.895 foreign students studied at German institutions of higher education in the academic year 2016-2017, this number surpassed a forecast from 2013, which prognosed a number of 350.000 in 2020.

The broad range of virtual courses, from language courses to qualification courses (for instance, "engineering in Germany") represents a way to give an insight to foreign potential students about the quality standards and the scientific culture (experiencing beforehand the "guest land") of the higher education in Germany at specific universities as well as a way to networking (Alumni-tutoring), integration and linguistic and intercultural exchange. The virtual mobility would never replace the real mobility but addresses to new target groups and offer complementary information for a later real mobility. [26]

II. VIRTUALIZATION PROCESS AND DIGITALIZATION

The Internet, that made virtual education possible, led to the vision of providing a cost-free access to the knowledge and culture of humankind and makes possible to generate a place-free knowledge transfer. Since 2001 more than half of the US-population and a quarter of the EU-citizens (worldwide 8%) have been connected to the internet and thus could access various types of documents, texts and information. [27]

The high subscription fees for publication in some scientific journals led to the decision of creation of open access databases and E-journals since 2003 [28, 29]. All these initiatives of creating lots of educational materials and thus intellectual property were quickly spreading, because knowledge has increasingly been perceived as a competitive advantage on the educational market and in the international university rankings.

According to [30], the two main reasons for the increase of innovation of higher education learning in Germany, until the mid-2000s, in a first phase, were: Learning Management Systems (Moodle, Blackboard, etc.) and the funding of pilot projects for best practices in the infrastructures of universities.

In the second phase, there was a shift to a new paradigm e-learning 2.0, the situational self-regulated learning. The perspective of this phase is the emergence of the Mobile learning and related to the ubiquity of the internet, "mobile learning can be defined as a learning which merges e-learning strategies and presence learning". Some mobile apps can provide new media dimensions and new ways of learning (for instance, Augmented Reality for Google Glass) [31]. In the third phase, the transfer from e-learning to digitalization of education takes place (including e-services, like e-library on the way to e-science).

2.1 Emergent Forms of Digital Education

There is a big demand for good academic education, reflected in big numbers of participants to digital virtual educational offers.

2.1.1 Open Educational Ressources (OER) and Massive Open Online Courses (MOOCs)

All the OER are a part and a consequence globalization and as well a driver of the international competition. According to [32], the new transparency of the worldwide educational offers through provisioning of seminar contents and curricula open up new basis of decision making for potential students. Through OER projects new target groups can be gained as students and thereby life-long-learning models can be applied and thus the development of the knowledge society is supported, as a combination of formal and informal learning forms. [33]

Massive Open Online Courses (MOOCs) have tremendous demand, with many participants on courses and educational platforms, which influences the dynamics of the education market.

The virtual university *iversity* offers in Germany a platform for MOOCs. Yet, after the euphoric interest in the worldwide cost-free access to education, people got skeptical. The skepsis regarded especially the qualitative and didactical aspects of the content of the online offers of xMOOC. People looked again towards the universities. [13] The *iversity* platform has been founded as a start-up financed by the Federal Ministry of Economy and Technology, as a MOOC-platform for universities [34]. The company together with the Donors' association for the promotion of humanities and sciences in Germany organized the contest "MOOCs Production Fellowship" and supported the costs for the development of 10 cost-free courses offered on the platform. Some German universities offer courses over Coursera, some made their own platforms for their online-education-activities.

The German Federation and the German states have been supporting the development and use of e-learning at universities since 1998. The focus fell on the development of e-learning-content and the necessary software for the implementation and some accompanying measures for opening, documentation, networking and dissemination of the developed contents for education. [35], cited by [36].

The German Federal Ministry of Education and Research - Bundesministerium für Bildung und Forschung (BMBF) – invested 430 million Euro in 2000 and 2004 for the development of ICT in universities. The promotion programme „New media in education" (2000–2006) was a central

component of the university and scientific programme launched in 1999 for supporting the development of new media with regard to the deployment in university teaching. A major part of the grants was used for the development of teaching and learning software in the 100 collaborative projects which were chosen for piloting. Moreover, five leading projects have been financed until 2004 by the BMBF for development of new learning strategies, for supporting the transition from traditional learning and studying forms to a self-directed learning. An example of such a national (german) leading project was the Virtual University of Applied Sciences for Technics, Informatics and Economy. The objective of the project was to establish a Virtual Group of Universities of Applied Sciences and to develop three online study programmes. [37]

Nevertheless, not every university is developing its strategy according to the fashionable public discussions regarding MOOC. Indeed, most top- tier universities do not offer online courses at all, save for limited engagements with MOOC providers such as Coursera or EdEx. For instance, the top two institutions in the United Kingdom – Oxford and Cambridge – have publicly stated that neither intends to join the MOOC movement, despite moves by competitors to do so. [38]

2.1.2 E-learning, Blended Learning

As a supplement of attendance teaching, the Blended-Learning-format is the most promising approach for the use of virtual education in terms of internationalization of higher education. [39]

The Sloan Consortium defined in [40] blended learning as "courses that blends online and face-to-face delivery. substantial proportion (30 to 79%) of the content is delivered online, typically uses online discussions, and typically has some face-to-face meetings. In a blended learning course, for example, students might attend a class taught by a teacher in a traditional classroom setting, while also independently completing online components of the course outside of the classroom". Blended education involves embedding online products, such as MOOCs, online courses or open educational resources in campus course.

The only real public distance education institution is the FernUniversität in Hagen, which also happens to be the largest German university. In 2015, 88.168 students were enrolled. Although the FernUniversität was launched to reach other target groups than the traditional, campus-based universities, it is not and never was an open university in terms of entrance requirements. Of the 81 providers of distance education university programmes, 59 are public universities or universities of applied sciences and 18 are private providers. [41]

2.2 Privatization of the education

According to [42], the Organization for Economic Cooperation and Development (OECD) classifies higher education institutions into three categories: public, government dependent private, and independent private institutions. Most German institutions are in the first category. The majority of universities in Germany are public universities, actually about 95% of all universities in Germany are considered public. The advantage of attending a public university is that most students pay nothing or a very negligible amount to attend. Private universities in Germany need to be accredited and approved by the government. In most cases, these universities are for the applied sciences. Students attending a private College will have to pay considerable tuition fees to attend, especially in comparison to free public universities. Private universities are increasing in popularity. Around 140.000 students were enrolled in private universities in Germany in 2015, compared to 2005, when 24.000 students attended private universities.

According to OECD statistics, all German universities are public. However, in 1998 official German documents listed 75 (22 percent) of the approximately 344 higher education institutions in Germany as "nongovernmental" and as accommodating about 2 percent of all students. These institutions can be categorized as church-related colleges of theology or social work; private universities pursuing a specific educational philosophy; outsourced segments of public institutions of higher education (i.e., specific divisions that generate income or need specific administrative flexibility not provided in the public sector); and specialized colleges for business studies and a few other fields, primarily funded by donations and tuition fees.

2.3 Lifelong Learning

The digitalization builds an advantage for more and more target groups of adults, who have a possibility to study in alternative forms of OER, MOOCs or blended learning. Some of these target groups are working persons, student drop-outs, young mothers, persons who didn´t get the Abitur (Baccalaureate) but completed vocational training and have at least three years of work experience. The Meister – master craftsman's certificate or diploma – is now recognised like the Abitur. [43]
Evaluations of the MOOCs reveal that the participants to the education offer are mainly persons over 30, more interested in offers of lifelong learning than in an academic diploma. [44]

The individual learning platforms are complementary to the Learning Management Systems and make the individual-flexible learning in social-collaborative context of Web 2.0 possible. The Personal Learning Environment (PLE) contains „all the different tools we use in our everyday life for learning", [45] cited by [46]. According to [46], a PLE is a web application for individual decentral use of webtools, available lifelong and independent of education institutions, it is actually a individual learning platform.

2.4 Marketing Strategies (virtualized market)

The Uppsala Model for companies [17] suites for universities, too. The Knowledge of market applies also for universities. Exactly like each company has the task to acquire market knowledge as well as internationalization knowledge, the authors consider that universities must adapt their strategies to the internationalization process and develop curricula, as well as the teaching, learning and service fields for global alumni with adequate knowledge, skills, experience and attitudes. It is essential that universities have understood their role not just as knowledge and teaching method provider, but as a promoter of its services and offers, for a better market position among other internationalized universities and a tight relation with industrial companies.

Identifying the target market helps developing a marketing communication strategy of the university. Mainly the educational offer has to meet the requirements of worldwide potential students, additionally an accurate communication strategy, essentially through marketing professionals and investments in institutional brands, as well as through innovation and growth in the online and digital space (including tools like social media and other emerging platforms).

Investments in MOOCs are also an investment for strategic academic marketing. MOOCs build long-term networks, which beside their initial task, as marketing tool and multiplier for communication to students, alumni, for fundraising, research marketing and the transfer of the scientific results in the enterprise praxis. [47]

2.5 Diversity Management

This concept represents the increasing ability to learn and collaborate and to manage diversity, complexity and ambiguity, to cope with equity, workforce diversity, workplace diversity. Companies aim to foster their competitive position for scarce resources (competition model).
Universities, as well as other public organisations and companies, must comply with some legally conditions, to ensure the prevention of every form of discrimination. In Europe and Germany there are laws for equity and equal opportunity. [48]

2.6 Quality of Knowledge and Quality of Life

The potential for internationalization of the internet education influences the legal framework (for instance, the German Higher Education Framework Law - Deutsches Hochschulrahmengesetz - HRG10 or the University Laws of the Federal States – Landeshochschulgesetze - LHG11) which exists for distance education in Germany, which are also applicable for higher education. According to [48], all the 16 German states "have authority over their respective educational systems, although their similarities are much greater than their differences".

Beside the universities' growing activities in the field of higher education, the introduction of the ISO 2999013 as an international quality standard for learning services has also influenced the discussions on quality standards in online education. A Quality Assurance Model for virtual higher education (this kind of courses are more intangible than the presence courses) is very complex and includes aspects like excellence, interculturality, team-orientation, consistence, "fitness for purpose", openness, good benefit-cost ratio (investment for further better employment opportunities) and

citations, rankings, fundraising, research prizes, etc. Thus, the *high quality of the courses* and of the entire virtual learning system of the higher education influences the *quality of life* for its beneficiaries.

III. CONCLUSIONS

The present paper analyzes the model of the virtual education in Germany, prevailing in higher education, but also in the other forms of further education in distance (online) learning. The core activities of the universities get enriched by the vast amount of information about the globalized world, which claims innovative approaches for the expansion of communication among universities and the new target groups as potential students. From a higher awareness regarding the expansion of knowledge (as a factor of production) and the knowledge management, over environment-friendly behavior, to ethical paradigms and heading to new disruptive potentials of new products of e-learning.

The motivation of using digital media for education is high both for universities and students, these alternative means have a lot of potential for a better branding of the German universities and increasing numbers of international students, who are interested in the e-learning offer. The authors strongly believe in the model of entrepreneurial approaches both in the industry and in universities, that is why the university needs to think global and act local, as every company on the free market. The experiential learning in the international environment is transferred on the universities through the virtualization process and the digitalization, based on ICT and on international networking and academic cooperation.

The *core values* in fig. 1 refer to the universal human values and the performances of *diversity management* and the *specific values* regard the distinctive features which define each culture, on one side, and the brand of the university, on the other side.

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