

Characteristics of the Networking Interaction among the Universities of Germany

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Abstract – The article presents a system of evaluation criteria for university networking activities. The proposed approach to evaluation of the networking interaction among "elite" universities included into the "Excellence Initiative" program is anchored into analysis of official websites of higher education institutions and other open sources. This issue is highly relevant, since Germany is one of the European leaders in the spheres of higher academic education and scientific research. The first group of criteria deals with the composition of actors in partnership networking communities by drawing on the "pentaspiral" concept. By applying these criteria to Germany's scientific landscape, we can identify a dense network composed of 400 actors, such as universities, world-famous non-university research institutes, powerful scientific production clusters, political structures, and civil society institutions. The second group of criteria determines the characteristics of the interaction process in the selected partnership networking communities. The presented analysis of interactions among the universities accounts of them as both educational institutions and scientific centers. The third group of criteria reveals the prospects of transformation of the role and further development of the networking interaction among the universities that include active presence of educational services on the international market, "export" of educational programs, and provision of assistance in organizing institutions of higher education based on the German model abroad. The obtained data can be used in optimizing universities' strategies for joining international networking communities.

Key words – research and education networks, network partnership, contemporary German elite university, self-presentation

I. INTRODUCTION

Modern, actively developing universities strive to strengthen their competitive position in the international educational market. One of the means to achieve this goal is to develop strategic partnerships with other universities, in particular, in the form of networking. The research conducted within the project of Russian Humanitarian Research Foundation "Theoretical and Methodological Basics of Study of Academic Activity in Partner Networks Communities" focused the idea of development of a common methodological basis for analyzing partner network communities with participation of a university and designing a best practice model of university self-presentation. The article presents the results of the above-mentioned study.

To assess the effectiveness and predict the consequences of universities' network interactions, it is necessary to analyze the experience of leading foreign universities and to assess their best practices in network interaction while avoiding blind copying as well as keeping in mind national and regional peculiarities. One of the goals to reveal the trends how universities position themselves on the local, regional and global levels is to analyze the image the university would like to present to the outside, including self-representation strategies which accurately portray the role the university can effectively play in such networks [1–3].

On the basis of European analysts' published materials we conclude that the distinctive points of networked interaction among European universities include their profiles' standardization, variety of programs, appealing cultural cachet, orientation towards student mobility and project activity. It should be noted that all international ties in education are based on common principles and goals, oriented towards the development of academic collaboration and the achievement of higher levels of education worldwide. The best-known such partnership program in Europe in the fields of higher education and researchers training is Erasmus +, the EU program in the fields of education, training, youth and sport for the period 2014-2020. However, the in-depth detailing of this program is not part of this study.

To solve the stated problem it is necessary to analyze the collaborative partnership of two German elite universities, as advertised on their websites and other public materials. We deem it necessary to justify our choice of elite German universities for the undertaken analysis of network interaction as grounded in their self-representation with the very fact that Germany is one of the most popular study destinations in the world and boasts one of the largest numbers of ranked universities in the QS World University Rankings® at 45, with eight appearing in the global top 150 in in 2018/h19 and a further 10 in the top 300.

In the scientific landscape of Germany it is possible to single out a dense network composed of 400 actors that include universities, world renowned non-university research institutions, powerful scientific-industrial clusters, developed grassroots political structures and civil society institutions that aid in pushing and implementing reforms with the goal of turning Germany into a global science and innovation hub.

The system of higher education in Germany is characterized by a confluence of old university traditions and innovative methods of educational governance, a strong theoretical background alongside a developed empirical research tradition, affordability and high quality. German universities have extensive experience in being part of educational networks and partnerships. This fact is underscored by the more than 500,000 online citations in the area of German university networks, as well as the numerous international forums and conferences given to the problems around organizing science and education networks.

Our analysis takes the two largest and best known universities in Berlin: Freie Universität Berlin and Humboldt University. These are the two most active in international partnerships and influence and among the so-called elite universities as party to the Excellence Initiative. Both universities are located in a metropolitan region, have similar numbers of students and international rankings.

However, there are some differences between the two universities. Humboldt University was founded in 1809. It is the oldest of the four universities in Berlin. The university offers educational programs in 189 disciplines from undergraduate to doctoral levels. The university is associated with 55 Nobel laureates and considered one of the best universities in Europe, as well as one of the most prestigious universities in the world in the arts and humanities.

The Free University of Berlin was founded in West Berlin in 1948, with American support at the beginning of the Cold War period. This is a research university and one of the most prominent universities in Germany, which is known for its research in the humanities and social sciences, as well as in the field of natural and life sciences.

In our estimation, it is precisely the international network activities of these two universities that can serve as a model for building network capacity on the global level.

II. METHODS AND MATERIALS

In publications dedicated to the problems of creation and interaction of scientific-educational consortia, whether pan-European or specifically German, some of their functions have been identified:

Debate function: Provide a common platform, forum, or reference point for discussion and reflection on key issues, policy and research in the field concerned;

Support function: Assist in the networking of projects which are thematically related and funded by the EU program in question;

Forecast function: Identify present, emergent and future needs of stakeholders and highlight potential areas for European cooperation;

Advocacy function: Promote the implementation of innovative results, insights and best practice in relevant fields;

Research function: Provide an overview of the thematic field through comparative analyses and contribute to the development of a shared terminology at a European level.

Dissemination function: Disseminate innovation debate function and best practice generated by European projects and other initiatives [4].

For European networks in science and higher education a distinguishing feature is that the majority of them are not legal entities but rather partnership associations formed specifically for financial support. Networks are forced to develop and realize their programs within a two to three year funding window (with the possibility of secondary rounds of financing). In the context of reduced government funding for education, these networks often fall back on purely EU-level funding, which nonetheless falls far short of their stated goals and needs [5].

Purposeful efficient functioning of the network requires clear understanding of its internal state (state of affairs and development prospects), as well as the degree of network impact on its environment (image of the network association, perception of the achieved results by all participants). Such analysis requires processing, comparing, and evaluating information from various sources using specific tools.

It is also necessary to look at general and specific strategies undertaken for self-promotion and corresponding to their place in the collaborative network according to the proposed system of three clusters of criteria [6].

The first cluster determines the nature of the partnering actors on the basis of “pentaspiral” [7]. The concept is based on the theory of sustainable systems (R. Ackoff, L. von Bertalanffy) and the theory of knowledge of (G. Etzkowitz). The pentaspiral is an open, complex, specialized, developing, self-organizing, deterministic, centralized and self-producing system.

This cluster determines the nature of the partnering actors on the basis of the pentaspiral model based on the interaction of five components. There are three basic and two external components of the pentaspiral framework. The basic (or permanent) components of the pentaspiral are: research – education – business. The external components that smooth the functioning of the basic ones are: authority and institutions of civil society.

The second cluster reveals the relationships that have formed amongst associated networked groups (the way the universities present their own actions within the networks, their interpretations of others’ initiatives, the universities’ background activities evident from their self-presentation intended for the networking community, as well as descriptions of background activities of their partners by other institutions of higher education).

The third cluster presents forward-looking perspectives for growth and development amongst such groups (priority directions of development include active presence on the global educational market, “export” of educational programs, aiding in the establishment of higher education institutions along the German model abroad).

III. RESULTS

A. *The first cluster*

Our analysis demonstrated that the kind of self-representation of the examined universities speaks to several key types of network interactions, which it would be productive to systematize based on the concept of pentaspiral.

The basic components (research institutions, higher education institutions and business). This section looks at issues such as educational institutions that have developed partnership ties and cooperation with universities, their locations and influence on the evolution of the educational system at the global/national/regional levels. Also important is the prevailing type of research organizations, the thrust of their research, and their global prominence, as well as the industry companies which are key business partners of the two universities.

In the area of education, each university, in one way or another lists a sizeable number of partners. These data are evidenced both by references to individual projects (e.g., signing an agreement on cooperation, approval of a partnership program in the field of education, etc.) as well as by general documents and reports on partnerships. Both universities have a wide partnership network in the area of international education, research, and business. Among their broader partnerships are 4 major non-university research organizations: Leibniz Association (Leibniz-Gemeinschaft); Helmholtz Association (Helmholtz-Gemeinschaft); Max-Planck Society (Max-Planck-Gesellschaft) and Fraunhofer Society (Fraunhofer-Gesellschaft).

Both universities are part of the elite group of institutions that are part of the Excellence Initiative, which includes the development of research clusters and graduate schools. Both universities realize the tight collaboration between research studies conducted in both educational and research institutions, which allows them to avoid re-inventing the wheel with their research, eases the spread of the latest technology and speeds up the diffusion and practical application of innovations and – ultimately – increases the scientific potential of the country.

However, each university has also specific characteristics concerning the way these two schools position themselves, which we shall discuss next.

Humboldt University

Research

The main directions of research at the university involve the basic disciplines in humanities, social sciences, mathematics, natural sciences, and agriculture. The development of key research areas is supported with clusters created under the auspices of the Excellence Initiative. Research also takes place under the purview of the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG). For broadening the scope of innovation beyond individual discipline silos, the university has created a number of temporary integrative research institutes and interdisciplinary centers, which bring together various fields of study, determine fruitful paths of future research and bolster the research profile of the university. At a time of temporary limits on financial support, these centers

have served to determine the most promising avenues of research.

Education

The university benefits from a broad network of partners, among which are 375 universities in key regions, making it one of the leading global institutions of higher learning. Among the university partners are the University of São Paulo, National University of Singapore, Princeton University, and others.

Business

The business side of the university is represented by the subsidiary Humboldt-Innovation GmbH (HI), which finances and administers ventures in the name of the university. The dedicated webpage Expertise-Landkarte gives a systematic overview of research carried out at the university. The page intends to help in locating partners for applied projects. Prominent companies such as Accor Hospitality Germany GmbH, Hewlett-Packard Development Company, L.P. are current partners of the university.

Freie Universität Berlin is developing along the conceptual lines of an international networked university. It is one of the most important centers of learning and research in Germany in fields ranging from humanities to social and natural sciences. It works together with all foundations and non-university scientific societies.

Research

The university partners with leading federal and regional research centers: Bundesarchiv, Koblenz; Bundesdruckerei GmbH, Berlin; Deutsches Archäologisches Institut (DAI), Berlin; Deutscher Wetterdienst (DWD), Offenbach am Main; Federal Institute for Geosciences and Natural Resources (BGR), Hannover; Federal Institute for Materials Research and Testing (BAM), Berlin; Federal Institute for Risk Assessment (BfR), Berlin ac.

Education

From its founding, the university has been cultivating partnerships not only in Germany, but internationally. The necessity of such connections became its strategy for success. It is now one of the most international universities in Europe. It hosts more than 100 programs in collaboration with other universities and research institutes around the world, 339 agreements on cooperation with universities in the Erasmus program, and 45 direct department-to-department agreements. It has its own offices in universities and research centers in New York, Beijing, New Delhi, Cairo, and Moscow (in MGIMO), as well as a joint German-Russian project under the banner of DAAD at St.Petersburg University (German-Russian Interdisciplinary Science Center).

Freie Universität Berlin is a member of internationally prominent organizations and networks, among which are UNICA (Network of Universities from the Capitals of Europe), COLUMBUS (Network of Latin-American and European Universities), DAAD (German Agency for Academic Exchanges), EAIE (European Association for International Education), and NAFSA (Association of International Educators).

Business

Among its business partners, the university counts such major companies as Bayer HealthCare Pharmaceuticals, Pfizer, and BASF. However, the university does not focus on business as much as it does on fundamental research, although it does have a number of successful examples of business startups.

The external components

To analyze these **components**, it is necessary to pin down the pool and the role of government and civil society institutions instrumental in the workings of university networks.

The politics of the federal states with regard to higher education is coordinated by the main governing bodies of the educational system. However, the organization and planning of research and academic processes have traditionally been the preserve of individual universities. Currently, in pursuing maximum decentralization in governance as one of the goals of modernization of German education, the competencies of educational institutions are being continuously expanded. The federal states are handing over many financial and administrative decisions directly to the universities, reserving for themselves only the most overarching strategic decisions with regard to higher education. In an environment where an increasing amount of research studies has an interdisciplinary nature, specialized research hubs are becoming widespread. Given the greater tendency towards governance decentralization along with reduced government funding of higher education, German universities are receiving ever greater autonomy for financial decision-making and using their resources.

Both universities (Humboldt and Freie Universität Berlin) display similar features in the way they present their ties to government agencies and associated organizations. German universities are not under the patronage or influence of any political party or movement. In accordance with article 5 of the Constitution of the Federal Republic of Germany “science is free”. There is a degree of clashing interests internal to each university, but the wider matter of politics does not infect the overall process. For their part, university researchers do consult government committees in the role of experts.

Academic independence of universities is maintained by doling out federal funding on the basis of competition. At the same time, the charter of Freie Universität Berlin has taken into account the mistakes around government influence on the old Berlin University, and have guaranteed a certain distance between the academic process and government, to best insure the continuing independence of both education and research.

On their webpages both universities display information about social organizations which provide moral and financial support to the universities and their researchers. Humboldt-Universitäts-Gesellschaft positions itself as the connecting element between the university and society. Humboldt University Fund (Stiftung Humboldt-Universität) is an independent private fund, which supports the university with the goals of preserving cultural legacy and financing young researchers.

Analogous functions are performed by Society of Friends, Sponsors, and Alumni of Freie Universität Berlin (Ernst-Reuter-Gesellschaft der Freunde, Förderer und Ehemaligen der Freien Universität Berlin e.V), being the main investor in the retooling and positioning of the university as a leading center of innovation. Both universities have a wide alumni network with all the needed opportunities for professional networking.

B. The second cluster

Relationships already developed between members of partnership networks

Let us move onto a discussion of the way the two universities present their networking with the partnerships mentioned above. The criteria serve to clarify the range of relationships that have developed among the participants. Scientific-research networks consolidate the strengths of all members. As an example, we can point to conducting fundamental research studies aiming at practical applications of their results. At the same time, the interactions with other scientific research consortia serve as an indicator of international rankings and competitiveness of the universities under examination.

Humboldt University of Berlin

International interactions in science and education, as well as in academic exchanges are some of the defining features of the university. They imply focus on networking with partners and on professional development on the global scale. An international orientation, a strategic focus on globalization of research studies, education and administration are the main priorities of the university. Collaboration with research-scientific centers in the Berlin region gives Humboldt the ability to conduct research in very specialized areas, such as those performed in the so-called “Joint-Labs”. Partners enrich the research and educational practices at the university.

For the university broadening and deepening of research partnerships present a particular challenge. Such cooperation can be implemented in various formats: joint research with shared hosting of researchers, framework agreements/official partnerships with research centers. Collaboration with industry and businesses is actively being pursued, with intensive technology transfers as the main goal. Such partnerships are not just a kind of temporary agreements, but are instead long-standing collaborative efforts with a strategic component. Inviting leading researchers to work with both the university and non-university research partners on joint projects is an important aspect of research collaboration.

Among the types of network interactions are profile partnerships and interactions on the international stage. Competence Centers of scientific collaboration lend support to individual scholars and research centers in terms of planning for and organizing partnerships with the given university. Internationalization as a key goal of the university includes the fulfillment of its vision of the future development framed by the Excellency Initiative, which in turn includes the expansion of the interdisciplinary KOSMOS Summer University as a global center and tool for cutting-edge research, as well as a furthering of the growth of flagship international partnerships.

Freie Universität Berlin

The main characteristic aspect of network interaction of this university is its emphasis on developing of collaborative relations with foreign partners. It aims at a limited number of partners in all key areas of research. Ideally, the strategy entails a single strategic partnership for each evaluation parameter (e.g., such as academic mobility, graduate schools, etc.). Hence a priority for the university is the search for such partnerships, ones that are the best fit along a slate of stated criteria outlined by the framework, irrespective of their rankings, most important being their close, congruent strategies for development.

Already existing projects are meant to serve as templates for future plans. Choice of projects is dependent on self-analysis and mutual monitoring. Future development and plans for further internationalization are under examination. Key projects and partners could be identified in the course of such examination, for example, the University of Copenhagen. Among the most successful international partners are the University of Jerusalem, the University of British Columbia, University of Peshawar (Pakistan), and Saint Petersburg State University.

Thus, the effective development of already successful projects is a priority, as is analysis of perspectives for their continued development and success. Financial incentives are offered for the successful realization of such goals and the creation of additional network contacts. Student can pursue projects in the framework of joint university partnerships.

C. The third cluster

Perspectives for development of university partnership networks

The third group of criteria focuses on the possible transformation of the role and future developments in university network interactions. In a globalized world, knowledge and academic exchanges are valuable resources. Germany considers itself a partner in a web of knowledge, willing to collaborate with institutions even in troubled regions of the world.

Humboldt University of Berlin

Humboldt-University's Institutional Strategy "Educating Enquiring Minds: Individuality – Openness – Guidance" is being funded through the Excellence Initiative since 2012, alongside with other 11 elite universities. Equally convincing are also HU's Clusters of Excellence and Graduate Schools. To implement this strategy, Humboldt-University specifically targets three main areas to secure a lasting place at the top of world-wide research. The promotion of top-level research and young researchers as well as a modernization of the university's governance and administration are therefore the foundation of HU's Institutional Strategy of future development.

Freie Universität Berlin

The award is connected with extensive grant money through 2017. Overall Freie Universität will receive roughly 121 million Euros over the next five years to implement its institutional development strategy as well as to set up or continue to operate three clusters of excellence and seven graduate schools where the university is either the host university or one of the involved partners.

Benefiting from numerous and longstanding contacts in research and education, the university takes special care to foster and expand these relationships on both the national and global levels. The framework for future developments was bolstered in 2007 and 2012 under the Excellence Initiative, and it aims at the continued growth of these network partnerships with the goal of supporting young researchers, internationalization, and development of science on the regional, national and global levels. All of this raises the status of the university as a leading research center and attractive science network partner. The second phase of the project will serve as a logical extension of projects already underway.

One of the founding principles of the university is the equity of the sexes on all levels. The university is an equal opportunity provider, welcomes diversity, is successful in diversity management and offers gender studies under the GenderNet Freie Universität framework. All such initiatives are intertwined amongst each other and are a mark of distinction for Freie Universität. Network collaboration arises as a bottom-up process, based on the interests of individual researchers.

Three strategic centers, created under the framework of the first phase of the Excellence Initiative, serve to broaden and strengthen the network interactions at the university. Special support is being provided to young researchers. Within the model framework for career development, students are given optimal help for the duration of their studies and preparation.

The Center for Research Strategy is responsible for developing optimal ways of engaging in, fostering and expanding research network relationships, e.g. in the Focus Areas direction.

Dahlem Research School (DRS) is the center for junior researchers at Freie Universität Berlin. The DRS develops strategies and concepts in order to enhance support for junior researchers and assure its quality. The DRS fosters careers from the beginning of the doctorate until appointment and facilitates career paths outside academia.

The Center for International Cooperation offers various formats for supporting international research collaboration, with representatives of the university in 7 regions of the world playing major roles. This allows for creation of a very wide and diverse network of collaboration with leading universities around the world. The young researcher support network "Together We Are Stronger" is among the university's leading strategies for development.

Freie Universität Berlin won the DAAD grant to unite all of its partners under a common Strategic Partnership network known as "Alliance for Sustainable Development". Three areas were named as priorities: education, academic mobility, and networked education. The ideal being a total freedom of academic mobility between all the partners within the League of Leading Universities (IVLIC).

University administration determines the strategic development of the institution to be in the following directions: International activities; development of new ways and tools for implementing internationalization; developing of "strategic partnerships"; representation of Freie Universität in key international organizations and conferences; development of

international strategies at the university and academic department levels.

The core motivation behind these deeper bilateral alliances is simple: Enabling the use of synergies and facilitating the pooling of strengths and resources through a closer collaboration in the field of research, teaching and administration. The goals of primary partnerships are:

- Strengthening research through the use of synergies;
- Improving the promotion of young scientists, in particular through closer cooperation in doctoral education and joint supervision of candidates;
- Developing unique opportunities for students, from joint summer schools to structured mobility patterns, to joint teaching modules and collaborative degree programs;
- Advancing the Career-Path-Model of Freie Universität through reliable frameworks for the exchange and qualification of junior researchers and teaching staff;
- Promoting administrative staff through structured exchanges;
- Synchronizing efforts in raising third party funding for joint projects in research and teaching.

We have examined approaches to self-presentations of network interactions developed by two elite Berlin universities, however, there is an entire group of characteristics that inform network interactions and are shared by all leading universities in Germany. For these elite institutions participation in global networks is commonplace, linking them with foreign partners in the realms of education, research, and business/innovation projects.

Out of all the organizations spurring the international academic networks in Germany, it is necessary to highlight the work of the German Academic Exchange Service (DAAD) [8]. One of the major planks in its concept for the future of German higher education is the program “Strategic Partnerships and Thematic Networks”. The program has two main thrusts with respect to developing partnerships of various kinds. Margret Wintermantel, president of DAAD has stressed that strategic partnerships and thematic networks are needed for network interactions between German universities and elite universities abroad.

The German Research Foundation (DFG) supports top quality projects and world-class talents. The organization finances international collaboration in research.

Tools to expand network interactions and to attract researchers from around the world could take various forms: international expos such as “Research in Germany”; job fairs like Karrieremessen; General science-research and technology expos as well.

With the Internet taking an ever-larger role in science and research collaboration, as well as for the purposes of marketing universities to a global audience of mass media and the general public, the English-language site “Research in Germany” is an invaluable gateway. It allows the dissemination of actionable information about projects, competitions, job opportunities

around the world in real time, no additional fees. Also, incredibly useful is the web-portal “Research Explorer (REx)”. A collaborative project between the German Research Foundation (DFG) and the German Academic Exchange Service (DAAD) includes 22,000 departments in German universities and research institutes. Its main mission is the support of German and foreign researchers as they look for research centers that might fit their areas of scientific inquiry [9].

IV. CONCLUSION

From our point of view, the undertaken study has proved to be productive for the purposes of outlining a number of criteria along which it could be possible to organize self-presentation models of the university (the nature of the partnerships network, the university's place in that network, prospects for developing the network further).

Our conclusions are that for elite German universities who are part of the Excellence Initiative, a critical part of their self-presentation is situating themselves as key actors in global educational networks, partnering with leading universities, but also with research institutes and businesses on the local, national and global levels.

An indispensable component of self-presentation of the two examined universities is their focus on research networks that play to their strengths and competences in carrying out fundamental research. Their websites list in-depth information about these networks, the key partnerships, partners, and collaborative projects. Moreover, these materials stress the benefits the universities stand to gain from the further development of these networks in terms of greater innovation, investment attractiveness, institutional prestige, and competitiveness.

It is necessary to underline that alongside common characteristics in their self-presentation, these elite universities also each have particularities that are not specifically mutually exclusive, but nonetheless lend a unique character to each institution.

Humboldt University stresses their international connections to world-leading universities, top research centers and business structures, but considers its main goal to become a world-class university. Going by the data in *Das Times Higher Education World Reputation Ranking*, in 2018/h19 Humboldt University took the 67th place amongst the top 100 universities in the world. This makes it particularly attractive to international students and world-class researchers.

Freie Universität Berlin underscores its international orientation. “The university develops thanks to multifaceted international contacts with universities and other organizations which grant a decisive boost in education and research”. The university points to over 100 partnership agreements with leading universities, primarily in the key North and Latin American regions, East Asia, Eastern Europe, over 300 agreements within the Erasmus program. The main goal of the university is to give the ability to study abroad as well as to attract foreign students and researchers with the intent of turning Freie Universität Berlin into a globally attractive

example of international education. For these purposes it has opened offices in 7 key regions of the world.

The data obtained in analysis of self-presentations of universities and the highlighted factors which determine the success of network interactions can serve as a basis for building an optimal model of international network interactions for Russian universities and their strategic partnerships and collaborations in the fields of education, research, and business [10].

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