

The Fifth Function of University: “Neutrosophic E-function” of Communication-Collaboration-Integration of University in the Information Age

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The study is based on the following hypothesis with practical foundation:

- Premise 1 - if two members of university on two continents meet on the Internet and initiate interdisciplinary scientific communication;
- Premise 2 - subsequently, if within the curricular interests they develop an academic scientific collaboration;
- Premise 3 - if the so-called collaboration integrates the interests of other members of the university;
- Premise 4 - finally, if the university allows, accepts, validates and promotes such an approach;
- Conclusion: then it means the university as a system (the global academic system) has, and it is, exerting a potential function to provide communication, collaboration and integration of research and of academic scientific experience.

We call this last function of the university “neutrosophic e-function” because it mixes heterogeneous and uncertain notions. It is specialized, according to the functions of “teaching-learning, researching, the public interest and entrepreneurial interest,” as the fifth function. As the other four have structured and shaped university paradigms, this one configures one as well. E-function makes visible a functional structure in a scientific scan: the communicative-collaborative-integrative paradigm.

Beyond the practical and inferential logic arguments, the research bases the hypothesis on historical and systemic-operational arguments. The foundation consists of the fundamental contributions of some academics (Y. Takahara, C. Brătianu, M. Păun, R. Carraz, Y. Harayama, I. Jianu, A. Marga, M. Castells, H. Etzkowitz, A. Ghicov, T. Callo, and S. Naidu), and our contribution is apprehending the strong tendency of the university system to exercise an e-function and to move toward a global university e-system.

Keywords: university, system, e-function, communication, collaboration, integration.

I. The concept of university. Axis 1

In relation to the requirements of accuracy, the side resonances turn the idea of university into an elusive and vague concept. This does not come from the specialists' lack of concern for the radiography of such a major social agent. University is, from all existing institutions, the organization with the oldest, most solid and most thorough history. As a place of knowledge, it is also a medium of self-understanding. From this perspective, it is paradoxical that in the house of knowledge is not found a thorough and robust self-understanding. It seems that the university does not have a clear and lucid self-awareness. Epistemologically, the university is the fountain, the criteria and the archive of knowledge. Any knowledge, it appears, implies a lack of knowledge. And maybe, once the status of knowledge is accepted, ignorance can be considered as the foundation of knowledge. Therefore, an explanation of the elusiveness of the concept of universality comes from the uncertainty about the content of the ignorance. In a way, the meaning of university is the unknown. The awareness of the unknown and the awareness of the need for developing knowledge forms the energetic poles that feed the university system.

Another line of explanation is to understand current university as moving quickly in relation to the subject of knowledge and to the actors of knowledge. University is the most agile, insidious and versatile of all the institutions of knowledge.

Thirdly, the fact that it knows itself better and better, while rapidly changing, makes visible knowledge variable itself. Variability is the subject of entropy and thus of negentropy and information. Therefore, the accuracy of self-knowledge induces an effect of vagueness that reinforces the impression of elusiveness.

Practically and conceptually, the university is all right. The first axis of understanding the university is this conceptual elusive understanding.

II. University as an organization. Axis 2

On a second axis of preliminary understanding-explaining, the university is specialized, as shown by Professor Constantin Brătianu as “a very complex organization” (2005, pp. 43-55). Generically, the organization is founded as a social group dedicated to a specific task. Subsequently, Norman Goodman shows it has a “formal structure that tries to accomplish the task” (1998, p. 71). In

accomplishing the defining task, it exploits some of the statutes and potential roles of its members. Related, it generates status and roles arising from the title of member and of organizational actor.

The genesis of organization is not conceptual, but social. Through it, society solves social problems. Essentially, traditionally, university solves two categories of problems: knowledge and education. The first category includes the production and transfer of knowledge. The other includes ethical, political, medical, economic-entrepreneurial education etc.

Organizations are defined not by the tasks they propose, by the objectives they set or by the mottos they are acting under, but by the problems they solve. They are not ends but means. Organization is a social tool for solving problems. The word organization comes from the French vocable “organisation” and etymologically comes from the Greek “organon” which means “instrument.” Basically, the organization carries out activities that lead to solving social problems. The first feature of the organization is to be an association of people interacting in the idea of preparing a group engaged in cultural, social, educational, and administrative activities. Underlying features are linked to it. Members related to a set of values, are subjected to rules and accomplish shared tasks when performing roles and statutes.

Organizations may be firms, companies, associations, governmental or non-governmental entities, foundations, etc. The most important organizations have legal grounds. When the activities of an organization and the social relations established by it acquire state importance, they are regulated by law. The organizations that acquire state importance or have national or supranational interest are legally recognized as institutions.

University is a fundamental scientific and educational institution of a state. Organizations have a social profile not because of the accomplishment of “specific objectives,” as S.P. Robbins, D. A. DeCenzo and M. Coulter deem (2010), but due to the problems they solve. In our opinion, the role of the organization as an intelligent operator is to perform activities that solve problems.

III. University as a system. Axis 3

3.1. A third axis of comprehension is to address the university as a system. As shown by Yasuhito Takahara, “An organizational system is a complex of interconnected human and nonliving machines” (2004, p. 3).

As a system, the organization has inputs and outputs. The inputs would be of two kinds: “The first type is a resource input such as personnel, material, money, energy, and information. The second is external managerial information related to customer demands, consumer behaviors, marketing conditions, economic

situations, etc.“ (Takahara Y., 2004, p. 4). The organizational mechanism “transforms the resource inputs into products or services and transmits them to environments as an output” (Takahara Y., 2004, p. 4). The Japanese specialist understands the organization as being “formed for a purpose” (Takahara Y., 2004, p. 3) and as performing activities in this regard. About the transformation of input resources into output products or services is stated: “The transformation, which usually requires support of a specific technology, is the primary activity of an organization” (Takahara Y., 2004, p. 4). The professors Constantin Brătianu, Simona Vasilache and Ionela Jianu conceive the organization similarly. They emphasize that any organization is made up of “resources,” “processes” and “products” (Brătianu C., S. Vasilache, Jianu I., 2006). In a later article, Constantin Brătianu highlights: “In any organization all activities can be grouped together in two basic processes: the production process and the management process” (2007, p. 376). The production process (technological process) leads to achieving tangible final results of the organization that can be “objects or services” (as Y. Takahara asserted in 2004). The organizational system develops management activities as well: “management activity is to control the primary activity of transformation so that the organizational goal is realized” (Takahara Y., 2004, p. 4). The management process is connected with the production process and together they made up a systemic unit. It is focused on ensuring the production performing “effectively and efficiently”: the fulfillment of tasks correctly and obtaining products with a minimum allocation of resources and execution of those activities that lead to achieving goals. In the same context, Professor Constantin Brătianu explains: “The process of management can be performed through its main functions: planning, organizing, leading and controlling” (2007, p. 376).

3.2. Topologically, the organization as a system is defined by several modules. The above mentioned specialists identify the input, the output and the processes (Constantin Brătianu) or the transformation (Yasuhito Takahara). Collaterally, in order to designate activities performed between the input module and the output module we will use the concept of throughput. David Besanko, David Dranove, Mark Stanley and Scott Schaefer use the term “throughput” to conceptualize a phenomenon that conditions the successful businesses. Throughput is “the movement of inputs and outputs through the production process” (2010, p. 100).

So by throughput it is understood the module of activities which ensures the conversion of input (resources) to output (products and/or services).

3.3. Besides the topological coordinate the system has two more coordinates: the structural and the functional.

The entirety, the “multitude of elements” of a system with the connections, the “relations between them” “form the system structure” (Dima I.C. Cucui I.,

Petrescu M., Stegăroiu I., Năbârjoiu N., 2007, p. 11). The structure is emerging as a configuration of the moment. The system has potential for structural changes. It remains valid even when structural changes occur. In this coordinate, the system seems to be capable of allowing the evolution of elements and relationships, of components. At one point, the system has a structure, a state and a set of possibilities for transformation and development. The structure is the specific internal way of organizing the system elements. It is a configuration currently stable and qualitatively determined of the connections between elements.

3.4. The functional coordinate of the system is inextricably linked to the structural coordinate. Between the system structure and the functions performed by the system, a strong connection exists. The structure determines the function and the functioning modifies the structure. As the functioning is the prerogative of managers, it is at the same time, subjected to the power of the management strategies. As Peter F. Drucker shows, “structure follows strategy” (2010, p. 94). The functional connections, on the other hand, determine in time the variations in input and output. The state system is a functional problem. It appears as a constant of the connection’s parameters within certain time. State is the measure of the system characteristics of the moment. The functional coordinate consists of the processes by which the system performs its functions. The transition from one functional state to another is the transformation.

The components of an organization are employees, managers, leaders, clients, beneficiaries etc. This is the structural capital of the organization. Systemic social connections appear as relations. In its relational capital, a system may include relationships of cooperation, collaboration, exchange, determination, influence, and communication. They may be hierarchical, vertical, horizontal, etc. Relations are those that ensure the system stability and allow its operation and adaptation to internal and external environments (natural, social, financial, economic, strategic, etc.). Relationships vary in time and give the dynamic character of the system. Effective systems seek to maintain stability. In general, however, systems have a strong inertia. As S.P. Robbins argues, “Organizations, by their very nature, are conservative” (2008, p. 187).

Structural-functional internal stability can be maintained in two ways. Adapting to the environment, systems tend to preserve internal steady states and perform its functions. First of all, W. R. Ashby states, the actions of the system “as varied as they are have one goal, to maintain constant conditions in the internal environment” (1958, p. 121). The more structurally elements are more independent of each other the more each one develops a greater capability to adapt. A better flexibility of the elements, namely a lower interdependence, is a premise for higher functional stability of the system. The second manner that the system preserves its stability in is feedback. Yasuhito Takahara speaks of two types of stability:

“behavior stability and structural stability” (2004, p. 4). “Behavior stability” is achieved through “feedback mechanism” and “structural stability” (or “the practice of keeping characteristic parameters of an organization constant”) is achieved ”by higher level management activities” (2004, p. 4).

In the article “Interactions among components of the university system,” Mihaela Păun (from Louisiana Tech University) and Miltiade Stanciu (from ASE Bucharest) start from the assumption of the university as system and institution. Zetetic stake is finding a revealing answer to the question: “Which is the most important component/resource in a university?” (2008, p. 94). Research is moving toward the components/resources of the university. The perspective is, implicitly, topological, structural and functional. The referred components are students, teachers and infrastructure. Resources are put into the equation to conclude about an intangible resultant. The unknown is defined: the human components (students, teachers) and the infrastructure are crucial in the university performance and competitiveness. They are equally important. From other perspective, we mention that there are “teaching oriented” universities and “researching oriented” universities. It is also recalled the existence of components of “teaching” and “researching” in most universities (Păun M., Stanciu M., 2008, p. 98).

Students and teachers appear to be defining systemic academic components (M. Trow, 1975). Professor Constantin Brătianu considers that “professors and students represent the most important resources” (2009, p.67). In higher education, teachers and students are defined as actors who have specific functions. Social actors exercising functions become system factors. Functional actors, ontological factors of the university, are the students and teachers (including teachers who have managerial responsibilities). They are engaged in an academic contract of didactic communication. The rights and obligations of the academic actors bear the mark of university functions. In turn, academic institution exists through its factors and through didactic teaching and research actions carried out in the university.

IV. The four institutionalized functions of the university

4.1. The first functions: “Teaching-learning” and “Researching.”

Generations of universities, the Humboldtian university paradigm:

Today, university is at the end of an evolution and in a transformation process that takes into account the forecasting, the foresight and the normative future. The functioning of the system means conducting specific activities. This happens within some processes. As Yasuhito Takahara (2004), Constantin Brătianu, S. Vasilache and Ionela Jianu (2006) argue, any organization runs two

types of processes: processes of production (or technology) and management processes. The set of academic technological processes is subsumed to some functions undertaken by the university institutions. On the other hand, an effective university management process will be in line with technological processes, first of all and defining, regarding the functions of the university system. This university management process is supported by a structure with a clear profile, which Yuko Harayama and René Carraz would call “the university management structure” (2008, p. 93).

In 2003, Parliament of Australia retained that the “core functions of university” are “teaching, learning, and research” (2003, p. 21440). The one who diachronically has implemented this academic and functional model was Wilhelm von Humboldt, founder of the University of Berlin. “His university model,” professor Gerd Hohendorf (Hohendorf G., 1993, pp. 617-618) argues, “is characterized by the unity of teaching and research. It was to be a special feature of the higher science establishments that they treated science as a problem which is never completely solved and therefore engaged in constant research.”

Professor Constantin Brătianu and professor Yuko Harayama agree with the idea that Wilhelm von Humboldt introduced a “new university paradigm” (incidentally in Greek “paradigm” meant “modeled”). In addition, the Romanian specialist found that the two functions were also complementary. “The new university paradigm... is founded on the unity and the complementarity of the functions of teaching and research” (Brătianu C., 2009, p. 63).

The core of the functional Humboldtian model is that scientific issues are never “completely solved” and that, therefore, the university must remain “engaged in constant research.” Understanding the Humboldtian model as a third generation of universities, Yuko Harayama emphasizes that within it the situation of the academic subjects is a situation of constant discovery. This means that “the teaching and learning process” occurs through “research activities” (Harayama Y., 1997, p. 13). In other words, the discoveries occur in university; possibly even in the teaching process. To reach this stage, the university has gone through, Yuko Harayama asserts, two models.

The first of university system emerges in the eleventh century and the twelfth century. Its elements are the teachers and students. The function of the system is one of knowledge transfer (knowledge is validated and scientific information is consecrated and preserved). The teachers do not create, do not innovate, do not discover. They take knowledge and new knowledge elements and they teach them. The new elements of knowledge are generated outside academia. The function of this university is one of “teaching.”

A second generation of universities, according to Professor Yuko Harayama, keeps the non-investigative character and guides the teaching act only toward the

elites of the religious and political spectrum. We would say that this model is focused on “teaching” too, its characteristic being the limitation induced by the religious or political pressures.

The third model, introduced by Wilhelm von Humboldt, is bi-functional: “teaching and research.”

Today the university model is based on the Humboldtian model. The technological university process is essentially a “teaching-learning process.” Over time this process has always been the focus of academic management in order to increase its efficiency and effectiveness. On the other hand, he was doubled at a time by the research process. The opinion of Professor Constantin Brătianu is similar: “The fundamental competences of a generic university are: teaching, learning and research. All of these are knowledge dynamic processes”(2009, p. 69). These two key functions have been multiplied in the policies developed in universities. Thus the universities are no longer limited today to the two functions. As Howard Newby argues “Today's universities are expected to engage in lifelong learning (not just teaching), research, knowledge transfer, social inclusion (via widening participation or access for non-traditional students), local and regional economic development, citizenship training and much more”(2008, pp. 57-58).

4.2. The third function: utility and social engagement

During the early twentieth century, the external environment required that universities have a stronger orientation toward utility. University transfer generates a system of high education that should acquire a more remarkable social, economic, financial and moral utility. He who brings in this practical necessity is John Henry Cardinal Newman. In his “The Idea of University,” he considers theology as a “branch of knowledge” (1999, p. 19) and militates for “useful knowledge” and for “usefulness” (1999, pp. 102-109). Through the knowledge provided, the university must exercise a function of utility and social involvement, locally, regionally or nationally. The transferred knowledge is required to acquire utility and practical involvement.

4.3. Entrepreneurial function. Entrepreneurial Paradigm

The functional development of the university has as its main purpose the performance and the competitiveness. Modern and post-modern universities are financed either by public funds or private funds and sometimes have a double funding. Private universities were the first who raised the question of self-financing. Related, the research function included an economic efficiency criterion. Therefore, having at least this double causality, the commercial, and economic

entrepreneurial function has enforced in the set of functions. This remodeled the principal functions too, the ones of “teaching, learning and researching.” High education institutions have also assumed the entrepreneurial task function. In 1983, in the article “Entrepreneurial Scientists and Entrepreneurial Universities in American Academic Science,” Henry Etzkowitz launched the concept of “entrepreneurial university.” He argued that Thorstein Veblen had admitted at the beginning of the twentieth-century the possibility “that American universities would increasingly take on commercial characteristics.” Then, Henry Etzkowitz noted that “universities... are considering the possibilities of new sources of funds to come from patenting the discoveries made by holding academic appointments from the sale of knowledge gained by research done under the contract with commercial firms, and from entry into partnerships with private business enterprises” (1983, p. 198). A university exerting such an entrepreneurial function is an entrepreneurial university. In 2000, Henry Etzkowitz and his colleagues would find that “entrepreneurial university is a global phenomenon” and understand that it was “the triple helix model of academic-industry-government relations.” They speak, in this case, of the “entrepreneurial paradigm” (H. Etzkowitz, A. Webster, C. Gebhardt, Cantisano, Terra BR, 2000, p. 313). The concept of “entrepreneurial university” was considered lucrative and was developed so that, in 2007, David Woollard, Oswald Jones and Michael Zhang realized that this feature (generally accepted as a function) is, along with “teaching and researching the third mission” (2007, p. 1), meaning “commercialization of science .”

However, the concept also keeps a dose of lack of understanding and a dose of misunderstanding (Stanciu. Șt., 2008, pp. 130-134). However, in Romania the concern for an entrepreneurial university is already solid. Since 1998, professor Panaite Nica has taken scientifically into account the entrepreneurial function. Subsequently, Professor Valentin Mureșan (2002) brought in convergence opinions of university entrepreneurial specialists from France, England and Romania. For now, the concept of “Entrepreneurial University is still fuzzy and culturally dependent” (Brătianu C., Stanciu Șt., 2010, p. 133).

V. Collaborative-Communications Paradigm, the fifth function: function of communication, collaboration-integration

The functions of the university system are related to the mending demands required by the internal environment and by the needs to adapt to the external environment. These functions are initially mission assumed by the management structure. Once proven, the practical validity and the mission effectiveness, for a longer period and in several universities, it becomes a function of the global

university system.

Functions are ways of permanent structural changing-transforming of the university system in relation to the internal requirements and external needs. As specified by Andrei Marga, university functions in society and fulfills “functions which develop along with the changes around them” (2009, p. 152). Following the same line of ideas, Andrei Marga takes into account “the multiple functions of university” (2004, p. 13). In exercising these functions, the university is presented “as a powerful scientific research center... for acquiring and applying knowledge,” and “as a source of technological innovation, as an intellectual authority in critically examining situations; as a space for commitment to civil rights, social justice and reforms“ (Marga A., 2004, p. 13).

Functions are, in general, “institutionalized” by the laws that give the university the character of institution. Thus, for example, social utility missions or entrepreneurial plans that were undertaken by some universities 25 years ago are now a function of the university system in general. Moreover, supranational authorities currently allow future university functions.

“The Bologna Declaration” (1999) mentions many of the functions of the university, teaching, research and a predicted communication-dissemination function. “The University functions in the societies having differing organization being the consequence of different geographical and historical conditions, and represents an institute that critically interprets and disseminates culture by the way of research and teaching.”

Nowadays, the environment university develops is one it has contributed to. This environment is not one in which the university decides. It must adapt to it.

The globalization of economic, financial, social phenomena is, on the one hand, the result of knowledge development, of creativity and innovation, and on the other, of their putting into practice. The world is in the Information Age. There has been a digital revolution that has succeeded everywhere. Interaction, networking, connectivity that is always the engine of society acquires new values in the new context. Social relations are digitally imprinted. Some of them even develop completely or partially, as mediated by computers. Many social relations have a virtual component.

The Information Age began after 1970 with the first personal computers, expanded after 1990 with the introduction of the Internet and strengthened after 2000 with the generalization of the Internet, with its use widely and globally.

In his trilogy, *Information Age* (1996, 1997, 1998, second edition 2000, 2001, 2004), Manuel Castells states: “Toward the end of second millenium of the christian era several events of historical significance transformed the social landscape of human life. A technological revolution, centered around information technologies, began to reshape, at accelerated pace, the material basis of society.

People increasingly organize their meaning not around what they do but on the basis of what they are. Meanwhile, on the other hand, global networks of instrumental exchanges selectively switch on and off individuals, groups, regions and even countries. “Our societies are increasingly structured around a bipolar opposition between the Net and the Self” (Castells M., 1996, p. 1 p. 2 and p. 3). Taking ideas expressed in the late 1980s, Manuel Castells formulates and sets in trilogy the concept of the “Information Age.” “Prologue: the Net and the Self” opens the first volume “The Rise of the Network Society.” Here with the idea of the Information Age, two more ideas are displayed, that of the “network society” and that of the opposition between “Net” and “Self.” Later, in his book, *Communication Power* (2009), Manuel Castells will talk about the Information Age as the “digital age” or “network age.” The Information Age is the era of information society, information economy, information policy, etc. It is not a change of vision, but a transformation of substance, a historic turning point transformation. There is the digitization, globalization and putting in interaction to the components of the global social system.

Illustrating for the practical impact of digitization is the banks case. The globalization and interdependence brought by digitization went beyond any boundaries. They induced significant changes, major changes, namely functional changes. Banks, like all other operators, actors, and factors of the social, economic, and political systems, found themselves confronted with their own limits: some uncontrollable limits. In this respect, Lloyd Darlington points out: “For the first time in 300 years, the very nature of banking has changed. We still handle money, but information, not money, is now the lifeblood of our industry. From what was essentially a transaction-based business, where customers come to you (or didn’t), banking has to make the leap into what is essentially a sale-and-marketing culture” (1998, p. 115).

The Information era has induced significant changes in the internal environment and external environment of the university system. It has generated changes in the way the system should respond to the challenges and opportunities generated by the digital revolution, the technological revolution. The university system must adapt to external processes. To the external environmental changes, the university management must respond adaptively. The technological revolution has brought not only the transformation of the external environment, but it has also brought new tools for the university system to adapt. The challenge is primarily one of the university system functioning as a management coordinate and, secondly, in its “production” coordinate. The vision, missions and academic values are going through changes. In their content, strategic management includes adaptive tasks to respond to exogenous factors induced by digitization: extended or sometimes generalized computing and Internet communication, as well as rapid

globalization of knowledge, discoveries, innovations, etc.

University is becoming more and more a place for creative knowledge. In visions, missions and values, functional commitments begin to transpire. In other words, on their own some universities assume new functions. In time, through their inter-university resonance, similar commitments in visions, mission and values go national. They are institutionalized and become functions of any university system.

For example, in his strategic document, Oxford Brooks University mentions the traditional, modern and postmodern functions and it involves performing activities we think will become functions specific to the Information Age. In “Our strategy for 2020,” Oxford Brooks University stated: “Oxford Brooks University occupies a strong position in UK higher education. We have a sound and growing international reputation for the quality of our teaching, learning and research and we are a vital part of and contributor to the local and national economy and society.”

Remain fundamental nuclear functions of the university: “teaching, learning and researching.”

Public interest and entrepreneurial functions were institutionalized: “we are a vital part of and contributor to the local and national economy and society.” The strategy states: “We also need to ensure that our organizational structures support staff and students in their activities, that they facilitate the integration of research and teaching and promote inter-disciplinarity and diversity. We are international in our orientation: in our curriculum, our staff, our student body and our increasingly interdependent world partnership in an increasingly interdependent world. We aspire to be a university which makes a commitment to an educational culture where mentorship is valued and teaching is integrated with both research and cutting-edge practice from the professions.”

In the space it exists, the university must place itself as the main generator and supplier of knowledge. The relevant context of the current university system is structured mainly by the action of three factors. These factors-buoys of the context are:

a) Computing, technology, rapid innovation (prefigured by and currently under development by Gordon Moore's law: “the computing power of microchips doubles every 18 months”);

b) Accelerated extension of the information-communication systems, (categories of users increase, diversify and amplify their importance: according to Robert Metcalfe's postulate: “a network's value grows proportionally with the numbers of users” and according to George Gilder's law “the total bandwidth of communication systems triple every 12 months”);

c) Development and accreditation of a collaborative and disseminating academic environment (the transition from unilateral projects to international and

multilateral projects, the application of the principle of “shared knowledge,” the liberalization of flows of knowledge and the setting of new dissemination channels).

The fundamental phenomena taking place in the internal environment are a permissive-adaptive and intelligent replication of those from the external environment: tech-digitization, globalization and interdependence. They have a direct impact on the activities carried out in the university and indirectly (mediated by management) on the functions of the university system.

According to the strategy Oxford - 2020, management assures (“ensure”) in connection with the involvement in reforming the functions of “teaching” and “research”: “facilitate the integration of research and reaching” and “commitment to”... “teaching integrated with both research and cutting-edge practice.”

Related, we mention a commitment to “promote inter-disciplinarity and diversity.” A direction with a functional touch is the decision that the university should be “international in our orientation: in our curriculum, our staff, our student body and our partnership.” If at first already accredited four functions are mentioned, this latter functional commitment is specific to the Information Age world: “an increasingly interdependent world.”

Manuel Castells considers “globalisation and digitization” as “the two most profound social and economic trends of our age” (2009, p. 70). The main feature of globalization is reflected in the fulminant emergence of networks. A “Global Network Society” emerges. “Network society is to the Information Age,” Castells states, “what the industrial society was to the Industrial Age” (2009, p. 12). In the “Global Network Society” image, universities are characterized as academic institutions with a recognizable profile. They “are at the cutting edge of research and teaching on the global network society.” Keeping in mind two of the functions of the university “teaching” and “research,” we may notice the acceptance of a commitment project: “project of situation the university within the technological and intellectual conditions of the Information Age” (Castells M., 2009, p. 3). Manuel Castells is not concerned with how the university should develop in the Information Age.

Our thesis is that in the context of the “Digital Age,” the university system must assume new functions adaptively. These functions are not surprising occurrences. They have been preliminarily mentioned in the university strategies, either incidentally as vision, mission and values or as precise missions. In the context of separation of functions the university system had to institutionalize, we mention Professor Andrei Marga’s point of view. He has argued that the twenty-first century university is forced to face many challenges, listing ten: “the implementation of the Bologna Declaration (1999), globalization, the sustainability and the identity of a university, the autonomy, the quality assurance, the

Phenomenon of “brain drain,” the issue of multiculturalism of leadership, the climate of change, the overcoming of relativism, and the recuperation of the vision based on knowledge “(Marga A., 2008).

Smart organizations are characterized, among other things, by flexibility, learning and a high potential for change. As the most important pole of knowledge and as a decisive development pole, the university is among the most intelligent organizations. Therefore, we anticipate that university systems will even take on new functions according to the Digital Age opportunities. They will not expect that from opportunities, the challenges should become necessities. The new paradigm of a pure specificity for the Information Age will be a collaborative-communicational paradigm.

We predict that the current university system will connect into a single network under a title like “Universities Global Network.” It is already mentioned, as Professor Adrian Ghicov does, about the “matching network” for an “efficient learning” (2008, p. 29) and about the “idea of integration and completeness” (Callo T., 2005, p. 49). Following the same line of ideas, Bogdan Danciu, Margaret Dinca and Valeria Savu consider communication and collaboration as concepts of adaptation in the “academic field” (2010, p. 87).

University collaborative platforms will be open in areas and disciplines. Yuko Harayama and René Carraz count on “scientific collaboration,” a feature found in the Japanese university system; see Harayama Y., R. Carraz, 2008.) Thus, “teaching” and “researching” could be carried out in the network. In this respect, Ilie Bădescu, Radu Baltasiu and Cristian Bădescu talk about “research networks” (2011, p. 248). IT infrastructure will enable the exchange of lectures held by teachers, live, interactively, in the videoconferencing system. Teachers specialize in certain subjects or who have important contributions on specific topics will be able to teach, using computer highways, the students from other universities in different regions or even other continents. As Ana Maria Marhan argues, cognitive players have not only become users of information technology, but they have mentally adjusted with the computer tools for learning, research, knowledge: a lucrative relationship between man and computer has been established (2007, pp. 12-14). Moreover, the teaching-learning in the network will capitalize improving the effect of “social facilitation” discovered by Robert B. Zajonc; “the mere presence of others” improves performance (1965, p. 274). The presence of students and teachers from other universities in videoconferencing will enhance the performance of teaching-learning knowledge and information. Students, as stated by Gheorghe Iosif, Ștefan Trăușan-Matu, Ana-Maria Marhan, Ion Juvină și Gheorghe Marius (2001), will be involved in designing cooperatively, with teachers, educational objectives; the training-educational process will be accomplished in relation to the “learning needs” and the “learning tasks,” using

computer technology, especially the Internet.

The integration of university research will start by regional, national projects and will expand globally. Collaborative platforms will allow the dissemination and unification of knowledge in areas and disciplines. In this manner, a knowledge base will arise for each discipline to avoid knowledge, research, parallel investigation or discovery in some places of old discoveries made in other units of knowledge. On the platforms, virtual research teams may rise which can synthesize all relevant knowledge on a specific subject and to continue research on behalf of the entire community of specialists. Researchers from different universities will work on joint projects in virtual teams in collaboration platforms. Interdependence of the world will be so fully visible regarding the interdependence of research and learning too. Research will be better and more equitable and professional and student performance indicators will gain a unique and relevant basis for reporting and evaluation. At this moment it has already achieved the digitization of some of the activities induced by the use and occurrence in university of the traditional university-canonical function. Decisive steps were taken to implement computer strategies concerning the “learning-teaching” function. Well-known Australian specialist, Som Naidu, notes that today student should learn in a new context, one “of e-learning; open, distant, and flexible learning environments” (2003, p. 362). Naidu says that “In the midst of all this interest in the proliferation of e-learning, there is a great deal of variability in the quality of e-learning and teaching.” (2003, p. 354). On this basis and related, the professor at the University of Melbourne develops a guide of principles and procedures. The study requires the idea of digitization by “e-learning and teaching” and other processes undertaken by the university system (S. Naidu, 2003).

We value and fight for strengthening and developing the communicative-collaborative-integrative functions of the global university system. If the Digital Age brings, however, globalization and interdependence, we should not expect that they be imposed, but we should welcome them. It is good to settle all opportunities from challenges. It would be a beneficial and wonderful feed-forward response. In fact, some steps toward this emerging fifth function have already been taken.

Finally, it is arguable that it is about a global e-university in a global e-system and that e-communication and collaboration function applies not only to universities, but to all institutions, and even to individuals entering the electronic global communication system.

Bibliography

1. Ashby W. R., *L'Homeostasia în Enciclopedie des sciences modernes*, t. VIII, Geneva, 1958.
2. Bădescu Ilie, Baltasiu Radu, Bădescu Cristian, *Sociologia și economia problemelor sociale*, București, Editura Mica Valahie, 2011.
3. Besanko D., Dranove D., Stanley M., Schaefer S., *Economics of Strategy*, 5th edition, John Wiley and Sons, 2010.
4. Brătianu C., *Reengineering the Romanian universities*, Journal of University Development and Academic Management, vol. 2, nr. 3-4, 2005, pp. 43-55.
5. Brătianu C., *The Learning Paradox of University*, Journal of Applied Quantitative methods, 2007, pp. 375-386.
6. Brătianu C., *The Intellectual Capital of Universities*, Annals of Faculty of Economics, vol. 1, Issue 1, 2009, pp. 63-70.
7. Brătianu C., Stanciu Șt., *An Overview of Present Research Related to Entrepreneurial University*, Management & Marketing, vol. 5, No. 2, 2010, pp. 117-134.
8. Brătianu C., Vasilache S., Jianu I., *Business Management*, Bucharest, Editura ASE, 2006.
9. Callo Tatiana, *O secvență experimentală a resortului de integralitate*, Didactica Pro, nr. 5-6(33-34), 2005, pp. 49-52, ISSN 1810-6455.
10. Castells M., *Communication Power*, Oxford University Press, 2009.
11. Castells M., *The Rise of Network Society*, Oxford, Blackwell, 1996.
12. Darlington L., *Banking Without Boundaries: the banking industry is transforming itself for the Digital Age*” în Tapscott D., Lowy A., Ticoll D., (eds.), *Blueprint for the Digital Economy. Creating Wealth in the Era of e-Business*, New York, McGraw Hill, 1998.
13. Dima I. C., Cucui I., Petrescu M., Stegăroiu I., Năbârjoiu N., *Econometrie managerială*, București, Editura Universității Naționale de Apărare „Carol I,” 2007.
14. Dincă M., Danciu B., Savu V., *Concepte definatorii pentru adaptare*, în Dincă M. (coord.), *Câmpul universitar. O cultură a provocărilor*, București, Editura Universitară, 2010.
15. Drucker P. F., *Toward the next Economics*, Boston, Harvard Business School Publishing Corporation, 2010.
16. Etzkowitz H., *Entrepreneurial Scientists and Entrepreneurial Universities in American Academic Science*, Minerva, vol. 21, No. 2-3, 1983, pp. 198-233.

17. Etzkowitz H., Webster A., Gebhardt C., Cantisano, Terra B.R., *The future of university and the university of future: evolution of ivory tower to entrepreneurial paradigm*, Research Policy, 29, 2000, pp. 313-330.
18. Gheorghe Iosif, Ștefan Trăușan-Matu, Ana-Maria Marhan, Ion Juvină, Gheorghe Marius, *Proiectarea cooperativă a unui sistem inteligent de instruire pe web*, Revista de Psihologie a Academiei Române, Tomul 47, Nr. 1-2, 2001.
19. Ghicov Adrian, *Corelarea în rețea ca premisă a învățării performante*, Didactica Pro, nr. 6 (52), 2008, pp. 29-31, ISSN 1810-6455.
20. Goodman N., *Introducere în sociologie*, București, Editura Lider, 1998.
21. Harayama Y., Carraz R., *Japanese University Reform seen through Bureaucratic Reform and Changes in Patterns of Scientific Collaboration* în Weber L. E., Duderstadt J.J. (eds.), *The globalization of higher education*, London, Economica, 2008.
22. Hohendorf G., *Wilhelm von Humboldt*, Prospects: the quarterly review of comparative education, (Paris, UNESCO: International Bureau of Education), vol. XXIII, no. 3-4, 1993, pp. 613-623.
23. Marga A., *The University of the 21-st century. Challenges*, Journal of University Development and Academic Management, Year V, no. 9-10, 2008.
24. Marga A., *Values of University*, în Sodlak J., Hüfner K., Pricopie R., Grunberg L., *UNESCO Forum on Higher Education in the Europe Region*, București, Comunicare.ro, 2009.
25. Marhan A. M., *Psihologia utilizării noilor tehnologii*, Iași, Editura Institutul European, 2007.
26. Mureșan V., *Manifest pentru o universitate antreprenorială*, București, Editura Punct, 2002.
27. Naidu S., *Design Instruction for e-Learning Environments*, in Moore M. G., Anderson B. G. (eds.), *Handbook of Distance Education*, London, Lawrence Earlbaum Associates Publishers, 2003.
28. Naidu S., *E-Learning: a Guidebook of Principles, Procedures and Practices*, New Delhi, Commonwealth Educational Media Center for Asia (CEMCA), and the Commonwealth of Learning, 2003.
29. Newby H., *The Challenge of European Universities in the Emerging Global Marketplace* în Weber L. E., Duderstadt J.J., (eds.), *The globalization of higher education*, London, Economica, 2008.
30. Newman J.H.C., *The Idea of a University*, Washington, Regnery Publishing Inc., 1999.
31. Nica P., *Implicații manageriale ale trecerii la finanțarea globală a universităților*, Iași, Editura Multiprint, 1998.

32. Păun M., Stanciu M., *Interactions among components of a university system*, Management & Marketing, vol. 3, No. 4, 2008, pp. 93-104.
33. Robbins S. P., *The truth about managing people*, 2nd edition, New Jersey, FT Press Upper Sadle River, 2008.
34. Robbins S. P., DeCenzo D. A., Coulter M., *Fundamentals of Management: Essential Concepts and Applications*, 7th edition, London, Prentice Hall, 2010.
35. Robbins S. P., Judge T., *Essentials of organizational behavior*, 10th edition, London, Prentice Hall, 2010.
36. Smarandache, F., *A Unifying Field i Logics, Neutrosophic Logic. Neutrosophy, Neutrosophic Set, Neutrosophic Probability and Statistics*, A> Res. Press, rehoboth, 1998.
37. Stanciu Șt., *The entrepreneurial culture in Romanian universities, a misunderstood concept*, Review of Management and Economical Engineering, vol. 7, no. 7, 2008, pp. 130-134.
38. Takahara Y., *A Formal Model of Organization* in Takahashi S., Kijima K., Sato R. (eds.), *Applied General Systems Research on Organizations*, Tokyo-Berlin, Springer-Verlag, 2004.
39. Trow M., *Teachers and students*, New York, McGraw-Hill, 1975.
40. Woollard D., Zhang M., Jones O., *Creating Entrepreneurial University: Insights from a new university business school*, Institute for Small Business & Entrepreneurship, 2007.
41. Zajonc R. B., *Social facilitation*, Science, New series, vol. 149, No. 3861, Jul. 16, 1965, pp. 269-274.