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FURTHER DEVELOPMENT OF ROMANIAN RESEARCH OPPORTUNITIES BY EUROPEAN COOPERATION USING THE POTENTIAL OF YOUNG RESEARCHERS

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ABSTRACT

In the present paper the general Romanian situation regarding research activities in universities and existing frameworks with regard to European cooperations as well as the role of young researchers will be debated. After a short introduction regarding present frameworks of European cooperations, the Romanian research state and research problematique will be discussed.
Personal experiences of the author with the German and Romanian university systems will play an important role possibly making the presentation a little bit subjective. As example for new possible research cooperations the issue of sustainable development in Europe is selected, which is nowadays one of the principal interests of the European Commission.
This theme will be exemplified by the EU research project "TERRA 2000", as well as by a Club of Rome international research project. From the presentation several problems concerning Romanian present research frameworks will be concluded, but also several chances and new opportunities for the further development of the Romanian research potentials in the near future will be drawn up. Special emphasis will be put on the potential of young researchers to develop new European research cooperations.

KEYWORDS:
Romanian research, European cooperation, research frameworks, sustainable development, young researchers

1. FRAMEWORKS FOR EUROPEAN COOPERATION WITH REGARD TO RESEARCH ACTIVITIES

It is a known situation in Europe that nowadays research cooperations exist especially among Western and Northern European research institutions and/or universities. These cooperations are carried out on different levels and on different forms of research activities depending on defined goals and financial means.

To be fair it should be mentioned that there are of course a lot of cooperations also among Western and Eastern European universities and research institutions having especially the goal of research staff and students mobility, as for instance by SOKRATES/TEMPUS - Programme. However in the most of the cases these collaborations do not have as goals common research activities with a concrete final result (as for instance designing a new plant or developing new scientific methods by "research cooperation"). Mobility programmes are very important because they mean the possibility to building valuable connections to other famous EU-universities that could be further used for developing research cooperations.

In most of the cases successful research cooperation between universities or research institutions (other than as a collaboration with the goal of student or research staff mobility) bases on a connection of many years and work together of singular researchers from the respective institutions. Institutionalised research cooperation is a result of long-time cooperation on individual level of singular researchers, who know each other very well as well as their research fields and research interests. This is a slow and laboured process but characteristically for starting real research cooperations, because before common research goals can be found, researchers have to know very well their research activities and interests.

Furthermore personal contacts and experiences of researchers in other countries play a very important role. The most difficult step is in my opinion the phase of defining common goals in the planed research activity in a research consortium. In this context I want to mention that from my experience the more partners are in a consortium, the more difficult is to find common goals, with which all partners are satisfied. Thus when goals have been defined and all partners are satisfied with them, then a very important step for a successful cooperation has been passed. It follows the agreement on the cooperation form and the search for potential financing institutions or sponsors.

Frequently research consortia try to cooperate in the context of EU-research projects, now in the 6th Framework Programme or in the context of so-called „EU-Awards", that are conferred in a committed way either to researchers, researcher groups or to institutions. Research institutions that are working for industrial applications and developing immediately applicable solutions have the nice possibility to begin collaborations with important corporate groups. When big projects are in discussion, then usually partners from several countries in the context of "joint ventures" are preferred.

In Western Europe but especially in the United States foundations are very important sponsors of interdisciplinary research activities. Foundations are running different programmes, which are covering large fields of possible research themes. New research activities are started nowadays by carrying out at first so-*called pilot projects* financed by foundations. Special programmes of famous foundations are assuring directed financing support aimed at helping young researchers by carrying

out their research projects, as for instance the Alexander von Humboldt-Foundation from Germany (www.avh.de). By developing their own research groups young researchers have the possibility to begin cooperation with other institutions on their research projects. For exemplification I would like to mention the relatively new programme of the Alexander von Humboldt - Foundation „Sofja-Kovalevskaja- Prize" (www.avh.de). National Sponsors of research activities, like for instance DAAD in Germany, are contributing a lot to emerging research cooperations and their long-time existence.

In the meantime there are European institutions, their existence is basing exclusively on European co-operations. It is worth to mention here the Joint Research Centres (JRC), like the Institute for Prospective Technology Studies (IPTS) in Sevilla, Spain (www.jrc.cec.eu.int). This is an institution of the European Commission that has as a goal to bring together excellent researchers from all EU-countries in order to allow them to know each other and to work together for a while, being a base for developing future successful research cooperations. Another relevant example is the Sustainable Europe Research Institute (SERI), (www.seri.at) in Vienna. This Institute exists especially because of Marie Curie - Fellowships of the European Commission.

Regarding teaching cooperations in universities one could give a lot of examples, but this is not the frame and goal of this paper. In my opinion in this field as well is very important that reciprocal interests of the teaching staff and universities are fulfilled. Only then a started cooperation can become durable and can be developed successfully.

2. ROMANIAN RESEARCH SCENE AND FRAMEWORKS

The research scene in Romania is not yet as "coloured" regarding activities and sponsors in comparison to Western European countries. The most important sponsor of research activities in Romania is the National University Research Council, CNCSIS (www.cncsis.ro) in Bucharest. CNCSIS, founded 1994, made in the last years a lot of progress to more transparency of internal procedures and more openness to the scientific circles in Romania. It is to be mentioned in this context that the Internet is the medium used in order to foster more transparency and to facilitate informing interested people, but having of course Internet access.

CNCSIS can support financially research activities only in some research directions that are valid as priorities for a time period. In the year 2004, for instance, following research directions have been announced as priorities: Engineer sciences and nano-technologies; Molecular biology; Sustainable development, ecological systems and global change; Information- and Communication Technologies; Dynamics of social systems; Healthy alimentation; Romania's integration in the NATO-Structures; Arts and Culture. Researchers, who are working in fields that are not stated in this list, do not have many possibilities: they either have to adapt their research interests or to search for other financing sources. Another research financing possibility is represented by the

Programmes of the "National Research Plan" (Planul National de Cercetare) of the Ministry for Education and Research.

One of the most favoured financing possibilities in Western Europe especially for engineers is represented by the direct cooperation with companies because of the low bureaucracy level. This system is awfully nowadays not really functioning in our country. On the one side there is little interest from the side of the state companies to assign research contracts for solving their concrete technical problems. On the other side private business companies are not yet very well established, so that they can afford to assign important research contracts. Thus, they often prefer to use day by day older methods, methodologies, processes or devices instead of investing money in research contracts.

Concerning state (governmental) companies not rarely the situation has been registered, that in the process of deciding the assignment of research contracts not only performance criteria have been taken into account, but other interests have played important roles as well. As a result, often less competent researchers receive contracts, which probably can not solve completely the problems assigned by contract, but only partially. So that the little amount of money spent for improving or optimising a process is at the end not spent successfully. Dissatisfaction from the side of the company and waste of financial means could be then the result, without actually solving the real problems of the interested company. Thus, the trust in the scientific potential of researchers is decreasing in this way and the companies do not believe anymore that researchers can solve their scientific problems. In this context, young researchers without connections to "important persons" have difficulties in getting research contracts by offering on the table their knowledge and in this way in making themselves known in the Romanian scientific circle and winning recognition.

No doubt that there are researchers, who are working in scientific fields being very motivated and active. The deficiencies regarding the general infrastructure and specific research devices and installations determine hard and difficult work conditions and frameworks for researchers. It is known that it is not possible to achieve high performance in research without having appropriate technical infrastructure. Especially in engineering sciences, in medical sciences, in genetic sciences special laboratory apparatus and equipment are of crucial importance in order to get exceptional results.

The credibility of researchers decrease in the eyes of potential industrial partners, when they can not demonstrate having appropriate laboratory equipment to carry out successfully research projects. Frustration arises because of the feeling of not being able to carry out successful research activity, although the single researcher does not have possibilities to change the situation. This is very dangerous because of probably pushing researchers in a zone of "I do not mind anymore". Frustration is the bigger, the younger researchers are, because they would like to work actively, but they do not achieve the wanted and motivating results.

Each of us have had once the situation of paying from the own pocket certain important laboratory equipment only for the sake of becoming credible in the eyes of potential industrial partners or foreign scientific partners and creating a small chance for a research partnership. In my opinion there is a lot to be done in the field of improving the existing research infrastructure. This depends in a decisive way on the increase of transparency in management and decision making processes in research institutions and universities with regard to the way of allocating and using existing financial means.

"A flower alone in desert can not grow up and flourish", told once an Arab thinker. In the same way single researchers can not lead alone by themselves a fulfilled scientific life without cooperation and opinion exchange with other colleagues. Nowadays, more than in the past, is crucially important that researchers communicate with each other and work together. The lack on exchange among scientists on national level has a negative impact on the Romanian research situation. There are often situations that Romanian scientists better know colleagues from abroad than from the home country. There are several reasons for that situation as for instance lack of trust that common research results will not be used only by one side and that copyright protection regulations will be neglected.

In my opinion in our country there is not enough cooperation and exchange among scientists and public ministerial officers with regard to establishing research priorities and financing frameworks. If we take the German example, once in a year in Germany common workshops among scientists and ministerial officers take place, having as a result common understanding and common establishing of research priorities and national financing programmes. Young researchers, especially those who experienced several years abroad, are invited to these workshops in order to spread out their new ideas and their innovation potential and to be integrated in this process.

3. ROMANIAN RESEARCH COOPERATION IN THE CONTEXT OF EUROPEAN FRAMEWORKS

Coming now to European financing frameworks we can state that Romanian researchers are active, but they did not succeed until now using the whole EU-research financing potential. One of the most important explanations in my opinion is that information about EU-research framework programmes is not well known.

On a national level, the Ministry of Education and Research and CNCSIS succeeded in improving their procedures regarding information of researchers about EU research frameworks. But on the local level very often the information flow in universities and research institutions is not properly functioning because the university research management is not best organised:

- With regard to EU-research framework programmes often not experienced staff occupies key positions in the universities; this is

possible because there are no clear minimum criteria for occupying these positions;

- In universities information workshops about EU - research financing possibilities are rarely organised;
- The university staff responsible for assuring the frameworks for further developing the potential of the European research financing possibilities would have also the responsibility to keep living contacts with already existing and with probable partners. But often there are language barriers which make this impossible, especially when these positions are occupied with staff not having had experience in research abroad;
- Internalisation of universities is possible only with personnel having had experience and being successful with European and international projects;
- Young researchers, who collected experience abroad and who have knowledge about EU-financing possibilities, are rarely recognised by offering them a responsible position in the university decision making process and rarely financially motivated to bring their knowledge potential;
- The lack on technical and general information and communication infrastructure contribute to making more difficult the communication with partners abroad, and not rarely important deadlines for research work are not respected, which decreases the trust on being credible as serious partners in the European competition.

The field of promoting and encouraging young researchers in Romania is in the beginnings. Nevertheless it is to be mentioned that CNCSIS made a lot of progress in this direction. For instance each year the research performances of successful young scientists are recognised and acknowledged by receiving national famous prizes (www.cncsis.ro). This is an important step on national level, but on local level there is still a lack of flexible systems to appreciate and accentuate the performances in European competition of young successful scientists and to integrate them in important decision making processes or in research management.

Young scientists, who gained experience in research activities abroad, are not rarely pushed outside from decision making processes in research management, although together with older experienced scientists from home country they could contribute a lot for the strategic development of the universities concerning research activities. Having appropriate frameworks, these young motivated people together with older experienced colleagues could do a lot for gaining European research projects and thus for improving the universities financial situation. Neglecting and not considering the potential of young researchers lead to decreasing their motivation and they start to search better recognition abroad. Brain drain is an important phenomenon in Romania nowadays.

In order to carry out research on highest level the human capital is of crucial importance. Romania looses every day valuable human capital (brain drain) because of lack of strategies (and maybe real desire) to keep here good people.

There is a known situation that Romanian researchers noticed always exceptional results in international competition. But one can see that nowadays rarely there are research fields not relevant anymore for European or international research interests. There are new times requesting new ideas, coming from new modern research fields.

New research fields are arising nowadays world-wide connected with information and communication technologies, energy supply and distribution, environmental engineering, systems engineering, technology assessment and innovation, sustainability research etc. In this context multidisciplinarity and systemic thinking are very important, like the Club of Rome, a world-wide famous institution (www.clubofrome.org), is requesting from years. Romania, being in a transition phase and strong development phase, has now the chance to start with new modern research fields, so that world-wide interesting solutions can be delivered (for instance in energy or environmental engineering fields).

For establishing new globally interesting research fields young researchers could be of a great help not at least because of their more modern background. Beside of experienced older scientists also young researchers, with experiences abroad, can play an important role in developing new research fields. This means that appropriate frameworks will be created and programmes will be started to help them to develop new research groups. With this process is not at least connected the simplification of the approval procedure of diploma and doctorate get abroad.

The themes treated in these works could be starting points for new research fields in the home country. A debate has to be started regarding the modus operandi of how to integrate young researchers, who come back from abroad, in important decision making processes with regard to research activities. On this issue in October 2004 will take place a conference in Sinaia, that will be organised by the Institutul Cultural Roman (www.icr.ro). And on this issue the present symposium for young researchers in Timisoara will contribute to the national debate.

4. SUSTAINABLE EUROPEAN INFORMATION SOCIETY - FIRST EU RESEARCH PRIORITY

The Information Society Technologies (IST) Programme of the European Commission seeks to accelerate the emergence of an information society based on the needs of individuals and enterprises (IST 2000). The IST - Programme is structured around four Key Actions (KA):

- KA 1: Systems and Services for the Citizen
- KA 2: New Methods of Work and Electronic Commerce
- KA 3: Multimedia Content and Tools
- KA 4: Essential Technologies and Infrastructures

Beside these actions, the Action Plan *eEurope* has been developed (http://europa.eu.int/comm/information_society/eeurope), which is clustered around three main objectives:

- A cheaper, faster, secure Internet

- Investing in people and skills
- Stimulate the use of the Internet

By these programmes the general use of Information and Communication Technologies (ICT) is stimulated in European regions. The effective use of these technologies is depending on the personal skills to use these. The European Commission recognised the multitude of possibilities given especially by IT-applications. In the field of e-working the Information Society Directorate-General carried out studies and delivered information in form of Status Reports about the situation in Europe for several years, like for 2001 (IST, eWork 2001). The goal is "to make Europe the most competitive and dynamic knowledge-based economy, capable to sustained economic growth with more and better jobs and greater social cohesion" (cited from the Foreword of P. Johnston and J. Nolan, (IST, eWork 2001), p. 3). This should happen by Realising an Information Society for All (IST 2000) in the own and specific way i.e. "The European Way" (FIS 2000).

The emergence and use of ICT have impacts in all human activity fields. There are in the moment a lot of projects dealing with questions related to the use of ICT. For instance for the field of digital divide currently about 528 projects are to be found in the Digital Dividend project clearinghouse database. The Digital Dividend Initiative (www.digitaldividend.org) is an initiative of the World Resource Institute (http://www.wri.org/) and covers the whole world. From the 40 European projects 12 are located in Eastern Europe and 29 in the western part, including obviously some mixture. This relation is somewhat surprising, as the needs for development are clearly bigger on the side of the Eastern European countries. Also the absolute number of projects in Eastern Europe seems small in comparison to those in other regions considering the respective populations and number of countries. A closer analysis of the 12 Eastern European projects shows the activities education application (6), youth (4), e-governance application (3) and portal (3) as most frequent (2-3 activities are assigned per project). E-commerce systems are mentioned twice, enabling technology and equipment recycling have one occurrence. Topics like e-working do not appear in the specific projects in Eastern Europe.

The comprehensive question with which the projects in the ICT-field are dealing can be formulated like: Does the Information Society assure per se the sustainability of our society? What are the sensible factors, which will play an important role in this context? There are a lot of impact fields of ICT, but one of the most important, which has been a little bit neglected in the last time is the environmental one. Radermacher stated some years ago that an increase in the efficiency of technological applications does not implicitly lead to a decrease of energy use and of environmental stress because of changes in human lifestyles. It has been demonstrated that so called "rebound-effects" do over-compensate the effects of efficiency increase by giving more and more possibilities to spend free time in a very energy intensive way (Radermacher 1998).

The EU-project "TERRA-2000" started 2001 for a time of three years is broadly concerned with understanding changes associated with the Networked Society and particularly their medium-term sustainability implications (www.terra-2000.org). The overall objective is to seize the moment before Networked Society opportunities slip away and issues are resolved in ways that undercut European values, institutions and interests. This is related in four general questions:

- Will the Networked Society changes lead to a genuine new area around the world, or will its effects prove merely quantitative or short-lived?
- Will the technology-assisted explosion in communication lead to a more inclusive, efficient and egalitarian society, or will the Digital Divide harden into increasing inequality?
- Will the technical possibility to substitute flows of information for physical flows increase the efficiency and reduce the overall consumption of natural resources (including environmental commons), or will it increase resource use by stimulating consumption?
- What values – and consequent policies – can help the (environmental, economic, socio-political and cultural) sustainability of the Information Society?

In order to get answers to the specific question regarding environmental impacts, different ICT-applications have to be considered and analysed by taking into account their impact on environment during the whole life cycle, as usual in the context of life cycle assessments. For this goal there is a need to build a connection among so-called "old" indicators like energy consumption, paper consumption or pollutant emissions and "new" indicators related to IT-based applications, like infrastructure for the use of IT-applications and effective use of IT-application. The conditions in which rebound-effects do appear have to be researched by developing and evaluating different scenarios, for instance.

In the context of this project the author is involved as well together with other partners from more than 10 countries especially with regard to developing scenarios concerning environmental impacts of the use of ICT (Tulbure/Berg/Jischa 2001).

Related to sustainability the problem of evaluation is a very important one. Criteria chosen for evaluation have to refer in a way or another global issues, but on a regional or local level. In our dynamically changing society a comprehensive evaluation is very difficult. It is necessary to develop new methods for evaluation especially related to technology assessment. These methods have to enable dynamic evaluations, when evaluation criteria change in time. The methods should be transparent and robust. In this field there is a lot of research potential.

The accelerated strong development of ICT in the reach world brings the increase of discrepancy between the developed and developing countries. The population in the third world do not have access to digital information remaining more and more behind the newest developments. *Digital Divide* is a relatively new phenomenon. There is a certain digital divide also between Eastern- and Western European countries. The

question is how can be overcome this divide, so that all people in the world have equal chances in accessing information?

For the practical use of ICT especially three elements are needed:

- technical infrastructure ("Access")
- a certain education for using ICT ("Ability to use")
- effective use ("Affording to use")

When all three conditions are fulfilled then we can discuss about an effective use of ICT. And now it should be clear enough why developing countries do not afford themselves to participate in the newest technical and technological developments. In order to think about strategies to overcome Divides first of all the present situation has to be analysed and understood. This is the theme and goal of the research project "Overcoming Technological Divides" of the international think tank tt30 of the Club of Rome (www.clubofrome.org/tt30) (Tulbure 2003). The project started 2001 with the goal to evaluate the present world-wide situation in the field of Divides and to bring out possible strategies to overcome these divides.

5. REALITY AND CHANCES FOR THE FUTURE

Research results obtained for years in Romania demonstrate that in our country there are researchers and scientists of highest quality and that they know well using scientific methods and methodologies. Do we actually know our goals as individuals and as research consortia? What do we, Romanian scientists, expect from our activities as researchers? In my opinion, in the Romanian research scene, we have to newly define our goals!

Nowadays there are a lot of chances in new research fields. For the further development of modern promising research fields there is a need for searching in a goal-orientated way for national or European sponsors in the context of cooperations and consortia. In order to successfully build up new cooperations, beside older experienced scientists young motivated and dynamic researchers are needed. In this context the process of acknowledging and recognising young successful scientists should be more taken into consideration in the future by using not only financial means but also by offering them responsible positions in the university research management and in decision making structures.

There is a need to discuss about potentially starting pilot projects regarding special programmes to acknowledge and integrate young scientists, who have worked successfully in research institutions abroad and who want to come back to the home country. They would not need first of all money in their own pockets, but urgently appropriate technical infrastructure and human capital in order to continue in Romania the research activities started abroad. In other words they would need conditions to be able to work and bring projects and thus finances and money for the institutions, where they are working. As simple the theory is, as complicated and difficult is applying this into practice.

Establishing quality management systems in universities and research institutions is a necessary measure in my opinion in order to modernising research management procedures and to evaluate this management in an appropriate way. Modern management methods require decentralisation and a horizontal construction of university leading structures. In this regard transparency, openness, cooperation, communication and strategic thinking are playing an important role.

Romania can take a leading role in several research fields beside other countries, if the right strategies for developing new and relevant research fields will be implemented. The potential of young researchers is (still) available; it depends on more or less bureaucratic procedures, if the new chances will be successfully used.

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