

Scientific research in Romania and international partnership: Necessity, challenges and difficulties ahead

Nicolae Constantin

University "Politehnica" of Bucharest
Department of Strength of Materials

Scientific research has to be a priority in Romania for some reasons. These reasons were not properly considered yet.

Firstly are the industry needs. It is not yet fully accepted that the apparent "boom" in Romanian industrialization in the seventies and eighties was not so much a consequence of sound research work, but in many cases on assimilation of projects made abroad and adapted by different teams of research and engineering institutes as "original Romanian designs". In most cases, the design was not accompanied by adequate research and did not take into consideration various aspects that occurred especially during service life. The design work was slow and this, in addition to the fact that the assimilated designs were quite old, was the reason why the final product was obsolete from the start. It was also "benefiting" from a lack of logistic for maintenance. This situation led naturally to economic difficulties, which became a main cause for the collapse of many industrial enterprises. The big research institutes working for megalomaniac projects almost completely neglecting economic efficiency had a similar trajectory.

The restructuring of the industry must be accompanied by restructuring of research activity. It is clear that, besides a limited number of research institutes under the umbrella of the Romanian Academy performing mainly fundamental research and some national institutes for research and engineering which could and have to be backed by powerful and active industrial fields, the research activity has to follow two paths in order to become efficient and really help the development and modernization of Romanian economy and society, in every aspect of it:

- Small teams within the frame of industrial enterprises or industrial groups, focused mainly on design work;
- Specialized or multidisciplinary teams in universities, dealing mainly with research work.

Close co-operation will be needed between industrial and academic research teams in viable, realistic research projects ending in competitive products as a general target. Taking into consideration that many industrial players will be involved, in a way or another, in international partnership, this co-operation will run, in most of the cases, in such an environment.

Academic research will have to strongly expand in order to counterbalance the drop of pure teaching and training activities, an unavoidable consequence of the severe reduction in the number of students due to the demographic tendencies after 1990. Research activity in universities, for which international partnership is even stronger recommended and possible, will have two main benefits: enhance their poor financing and improve training for staff and students. A number of research dedicated students will be able to make connections with research partners and get financial aid during studies and/or finding a job when graduating.

For both industrial and academic research teams, international partnership will bring some important advantages:

- Improvement in working mentality: clear and realistic definition of targets to follow, strict observation of schedules, more attention paid to details aimed at insuring final fulfillment of project goals;
- Better and sounder financing;
- Better information;
- Creation of multi-partner team working environment;
- Increase in mobility and intercultural exchanges.

The challenges involved in the development of scientific research under international partnership are more or less related to the aspects mentioned above. The Romanian research teams must keep themselves informed on main research priorities and potential partners. They have to make themselves attractive by continuously upgrading their skills in the proposed area of research and by learning to give a good presentation of their competencies and research interests and relevant project proposals. The proposals submitted for financing under international programs are benefiting a more objective trial than in domestic panels, so the previously mentioned conditions are obligatory. Good balancing in the list of costs is needed to assure enough money for obtaining or upgrading equipment, cover the consumable needs, motivate the research team with fair personnel expenditure and use some funds for knowledge dissemination: papers, books, conferences. Careful selection of partners and members of their research teams is needed to assure an effective cooperation in the consortium. Personal contacts are desired in this matter.

Speaking about difficulties, the lack of new research equipment and trained people to use it is obvious. Modeling and use of recent software tools is easily available, but experimental work is vital and warmly welcomed for performing really competitive research work in an international consortium. Unfortunately, the lack of funds in post 1990 national budgets for research was accompanied by a waste of already existing rather new equipment which was abandoned or even destroyed and by atomizing funds in new established state universities or split institutes where staff members surpassed the number of researchers. Even in big universities some newly acquired and rather expensive equipment is very little used because the project directors had enough influence to get the money but not enough competence and good will to invest it in some really needed machines or to conduct sustained research. The bad or inexistent co-operation with various present or potential partners is also a cause for these unforgivable extravagances.

Another quite annoying difficulty in building a good, active research team, able to carry out medium or long term research projects is the migration of young researchers. The poor wages and lack of basic social needs push most of them in finding much better positions in Romania and mainly abroad. The project director has to be very clever in order to avoid these defections.

The huge bureaucracy in making all needed expenses, especially when the new law of public acquisitions is accompanied by the will of the Ministry of Finances to impose a centralistic administration of funds with socialist roots, while big money are manipulated by an increasing number of national and international rogues with the "kind" assistance of corrupted members of the administration, is another hurdle in the good running of research projects.

The *Laboratory for evaluation of structural integrity of composite structures* in Department of Strength of Materials of University "Politehnica" of Bucharest was actively involved in some research projects carried out under the auspices of British Council and NATO Scientific and Environmental Affairs Division. Shortly, a new research project will start in one of the last calls made under FFP. This CRAFT project, with about 10 partners from UK, Germany, Austria, Finland and Romania will deal with manufacturing and evaluation of structural performances of extruded members made of Al alloys reinforced with ceramic particles. FP 6 will certainly give us other opportunities to develop challenging research projects with European partners for our mutual benefit and in the perspective of a unified Europe.