



**GOVERNMENT OF ROMANIA**

MINISTRY OF EDUCATION AND RESEARCH

NATIONAL AUTHORITY FOR SCIENTIFIC RESEARCH

**THE NATIONAL PLAN FOR RESEARCH,  
DEVELOPMENT AND INNOVATION  
FOR THE PERIOD 2007-2013**



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\* Text in conformity with Annexes 1, 2 and 3 of the Government Decision no. 475/ 2007 for approving the National Plan for RDI for 2007 - 2013

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1. The Plan has a main objective for the period 2014-2020: to become a leading country in research, development and innovation

2. The main objectives of the National Plan II:

1. HUMAN RESOURCES

2. CAPACITIES

3. IDEAS

4. PARTNERSHIPS IN PRIORITY S&T DOMAINS

5. INNOVATION

6. SUSTAINING INSTITUTIONAL PERFORMANCE

7. SUPPORTING

8. SUPPORTING

9. SUPPORTING

## 1.1 Orienting the National Plan in accordance with the general purpose and the strategic objectives of the Research, Development and Innovation (RDI) System

### 1.1 Orienting the National Plan in accordance with the general purpose and the strategic objectives of the Research, Development and Innovation (RDI) System

The National Research, Development and Innovation Plan for the period 2007-2013, hereinafter referred to as the National Plan II – NP II, is the main instrument by which the National Authority for Scientific Research (NASR) is implementing the National Strategy for RDI.

In order to conceive the NP II, there has been taken into consideration the role of the National Research, Development and Innovation System, namely to develop science and technology in order to increase the economic competitiveness, to improve social quality and to enhance the knowledge with potential to be valorized and to sustain further expansion of the horizon of action.

NP II aims at achieving the three strategic objectives of the National RDI System, namely:

1. Creating knowledge, in the sense of achieving leading edge scientific and technological results, competitive at global level, in order to increase the international visibility of the Romanian research and to subsequently transfer the results in the socio-economic practice.
2. Increasing the competitiveness of the Romanian economy by innovation, with impact at the level of companies and by transferring knowledge in the economic practice.
3. Increasing the social quality, namely finding technical and scientific methods which support the social development and improve its human dimension.

Aiming at achieving these three general objectives shall be performed according to a long term vision regarding the National RDI System and its role in society.

Therefore, the RDI system can become the engine for the development of knowledge environment in Romania, being able to sustain the performance by innovation in all domains contributing to citizens' welfare and in the same time to achieve scientific excellence recognized worldwide.

In order to meet these challenges, the RDI system shall be characterized by its opening, firstly towards Romanian companies, then towards the international scientific environment, society's needs and educational system.

#### 1.2 The general principles on which the NP II is grounded

For the construction of the NP II, there have been taken into account the results obtained upon analyzing the current status of the national economy and of the research, development and innovation system, the strategic objectives formulated by the National Strategic Reference Framework for the period 2007 – 2013, the international conditions, as well as the perspective of Romanian integration into European Union. There has also been taken into account the experience accumulated through organizing and carrying out RDI activities during the development of the National Plan for RDI for 1999 –2006, the Programme of grants for scientific research in the period 1995-2006, the Research of Excellence Programme (CEEX) during the period 2005 – 2006, as well as the results obtained upon the wide consultation of the national and foreign scientific community, carried out during the period 2005 –2006, within the first large scale national foresight exercise in science and technology.

The NP II is grounded on the following principles:

- I. Transforming the RDI public expenses into investments for RDI, namely:
  1. The aim is to correlate the objectives related to strategy-programmes-instruments, including at the level of monitoring indicators.
  2. Allocation and re-allocation of resources to each programme is achieved on the basis of an investment model, which implies ex-ante evaluation, monitoring, ex-post evaluation and rectifications during the development of the NP II. The concrete application of the investment model comes within the jurisdiction of NASR, and the specific methodologies are approved by a Decision of the President of NASR.
  3. For evaluating the management of institutions implementing programmes and projects, the professionalism and transparency shall be considered as key elements for their success.
  4. NP II aims at simplifying the financing and reimbursement procedures for activities developed within projects.
  5. NP II programmes shall be assessed every two years as part of assessing its implementation. The assessment of the implementation of NP II shall be preferably performed internationally, the evaluation report being made public.
  6. Allocation of funds by NP II programmes is based on competition. The specific criteria for assessing the projects are stated in the information packages of the programmes and are approved by the Decision of the President of NASR.
- II. Focusing the public investment in RDI, that is:
  7. Assigning public resources for RDI projects has the following purposes:
    - domains related to knowledge, where Romania has resources or results or which must support the priorities of applicative research;
    - RDI priorities issued by the national foresight exercise;
    - Supporting innovation.
  8. The sustainability of the development of RDI system is ensured by the investment in the development of human resources and , of research infrastructure and by an increased degree of international opening of the system.
- III. Involving the private sector
  9. The economic sector shall always be consulted in order to determine its development requirements.
  10. The public investment in RDI shall stimulate the interest of the economic sector concerning the RDI activity, its participation to partnerships with public entities, having consequences on the increase of private investments in RDI.
  11. The development of technology transfer infrastructure and services shall also be supported in view of a better valorization of RDI results in the economic environment, while observing the protection of intellectual property.
- IV. Wide access and accurate evaluation
  12. The access to financing by the National Plan II shall be achieved in an indiscriminating manner, by fair competition.
  13. It shall be given access to foreign researchers to take part in national projects.
  14. It shall be insured the large scale access of innovative firms to the financing for RDI projects, especially in collaboration with academic research and institutes' research.
  15. Procedures related to competition shall be simplified.
  16. The continuous monitoring of projects shall be ensured, final reports being made public. Any failure exceeding the risks accepted by research contracts fall in the responsibility of the project team.
- V. The regional aspects of the NP II are complementary to instruments using structural funds for RDI

17. Approaching the regional dimensions of RDI objectives takes into account the complementarity with structural funds, focusing on encouraging the identification of RDI demand at the regional level, stimulating the development of human resources and of research abilities at regional level and promoting the regional collaboration.

## 2. The Programmes of the National Plan II

In establishing the programmes of the NP II there has been taken into account the fact that concrete actions must be primarily undertaken in order to increase the number of researchers, to improve their performances and increase the attractiveness of the research career. For this purpose, there has been set up the Human Resources Programme.

In order to give researchers the possibility to work using performant equipment, to benefit of an adequate management and to be permanently connected to socio-economic requirements, the Capacities programme has been set up.

Taking into account the importance of basic research in developing knowledge and that it provides a solid base for applied research and technological development, through ideas, but also due to the capacity of training the highly skilled personnel necessary for these activities, the Plan includes a programme called Ideas. Even though for this programme there have been no specific priority domains established, and the emphasis is on international excellence and visibility, on research at the boundary of knowledge, on interdisciplinarity and complex research in frontier domains and the participation in international networks of excellence research, there are several basic research areas of special interest, with potential in Romania, which are presented in Table 1. By concentrating the investment in these areas, the programme supports also new areas, where research teams from Romania are already collaborating internationally.

The programme, called Partnerships in S&T priority areas, which is the largest programme in the Plan, focuses on creating conditions for a better collaboration between the different RDI entities, companies and/ or public administration units, in order to offer solutions for issues within research areas, identified as a result of the wide consultation performed during the foresight exercise carried out during the period September 2005 – May 2006. Most of the priorities of public investment in research & development are of interest also for basic research areas. Public investment aims at developing knowledge motivated by strategic socio-economic requirements, and the research is assessed according its innovative potential.

The programme Innovation was included in the Plan taking into account the importance of finalizing research activities by practical results, related to technical and technological developments. This programme will support pre-competitive and competitive research projects, as well as projects for the development of the innovation infrastructure.

The programme "Support for institutional performance" establishes institutional financing mechanisms based on competition, which enable performant research entities, whether public or non-profit, to implement their own development strategies in accordance with the National Strategy for RDI. The assessment of institutional performances will be done internationally, every 3-5 years. This programme shall ensure the concentration of resources, as well as the institutional development necessary to obtain international performances.

Instructions specific to programmes and details of implementation will be approved by Decision of the President of NASR.

The description of the six programmes presents their general and specific objectives, the course of action and the specific indicators, as follows:



<b>Name of the programme: 1. HUMAN RESOURCES</b>		
<b>Objective</b>	Increasing the number of researchers and their professional performances	
<b>Derived objectives</b>	1. Increasing the number of PhD candidates and postdoctoral researchers. 2. Increasing the attractiveness of the research career, especially for eminent academic graduates. 3. Attracting performant Romanian researchers from abroad. 4. Setting up excellence centers around scientific personalities known and recognized internationally. 5. Increasing researchers' national and international mobility 6. Stimulating the setting up of excellence centers 7. Improving the management of RDI units	
<b>Courses of action</b>	1. Training and specialization of researchers by doctoral and post-doctoral training programmes. 2. Financing projects for the integration of foreign researchers into the Romanian RDI system. 3. Encouraging excellence for researchers and research schools having international scientific performances. 4. Financing domestic and international mobilities for researchers 5. Training in the field of management of research and innovation 6. Awarding outstanding results in research.	
<b>Participants</b>	- Research and development personnel - RDI entities	
<b>Results indicators</b>	<b>Name of indicators</b>	<b>Um/year</b>
	1. Number of PhD students financed by research projects, out of which in joint (Romanian and foreign) tutorship	No.
	2. Share of doctor's degrees obtained on time, out of the total financed	%
	3. Number of articles, based on doctoral projects and accepted to be published, out of which: - in ISI indexed journals - in journals indexed in other worldwide recognized data bases	No.

<b>Results indicators</b>		
4. Number of articles issued on the basis of doctoral projects of which: - in ISI indexed journals - in journals indexed in other worldwide recognized data bases	No.	No.
5. Number of postdoctoral researchers financed by research projects	No.	No.
6. Number of scientific articles which have been published or have been accepted to be published in the ISI journals on the basis of projects for postdoctoral researchers	No.	No.
7. Number of foreign researchers integrated into the RDI system	No.	No.
8. Training stages, out of which: - internal intrasectoral - internal intersectoral - international	man x months	No.
9. Number of participations in international conferences financed	No.	No.
10. Number of financed excellence schools	No.	No.
11. Number of PhD students in the doctoral schools supported by the programme	No.	No.
12. Number of postdoctoral researchers in the postdoctoral schools supported by the programme	No.	No.
13. Number of persons who have attended training courses in the field of management of research and/or innovation.	No.	No.

<b>Name of the programme: 2. CAPACITIES</b>	
<b>Objective</b>	Developing the research capacities and opening the RDI system to the international scientific environment and national socio-economic environment.
<b>Derived objectives</b>	<ol style="list-style-type: none"> <li>1. Increasing the degree of utilization of the research infrastructure.</li> <li>2. Development of the research infrastructure</li> <li>3. Development of the information and scientific documentation infrastructure</li> <li>4. Development of the potentials and RDI RDI resources and at regional level</li> <li>5. Encouraging the science-society dialogue</li> <li>6. Participation of RDI entities to domestic and foreign scientific organizations</li> <li>7. Participation of RDI entities to international research programmes.</li> </ol>
<b>Courses of action</b>	<ol style="list-style-type: none"> <li>1. Creating and supporting research infrastructures of national interest.</li> <li>2. Providing funds for stopping and conserving national complex facilities</li> <li>3. Consolidating research infrastructure with multiple users</li> <li>4. Consolidating the capacity to supply and use "experimental services"</li> <li>5. Improving the quality of scientific journals, especially by supporting the co-editing with large international publishing houses.</li> <li>6. Supporting scientific events and exhibitions</li> <li>7. Improving and expanding the infrastructure and services of communication for research.</li> <li>8. Developing and purchasing data bases specific to the RDI system.</li> <li>9. Developing the access to on-line documentation resources.</li> <li>10. Promoting communication and consolidating the role of science in the society.</li> <li>11. Elaborating prospective studies in science and society.</li> <li>12. Preparing and stimulating the participation to international research programmes.</li> <li>13. Supporting the attendance of RDI entities to international research organizations and programmes.</li> <li>14. Launching joint thematic calls in collaboration with other countries.</li> <li>15. Supporting the representation of Romania in international research organizations and programmes</li> <li>16. Ensuring consultancy and assistance activities for the state research authority</li> </ol>

<b>Participants</b>	<ol style="list-style-type: none"> <li>1. RDI entities</li> <li>2. RDI entities consortia</li> <li>3. Companies with their own RDI activity</li> </ol>	
<b>Result indicators</b>	<b>Name of indicators</b>	<b>Um/year</b>
	1. New investments in RDI infrastructure	Thousands of RON
	2. Average degree of utilization of RDI equipment	%
	3. Number of entities sustained for increasing the capacity to supply experimental services	No.
	4. Number of financed journals, out of which: - internationally co-edited - ISI indexed - Included in other internationally recognized data bases	No.
	5. Books, atlases, dictionaries and other scientific publications issued annually (in the country and abroad)	No.
	6. Number of organized conferences, of which international ones.	No.
	7. Number of financed expositions	No.
	8. Value of investment in communication infrastructure and services.	man x months
	9. Share of researchers who can use online scientific information resources.	No.
	10. Number of journals dedicated to the wide dissemination of science	No.
	11. Number of science-society communication projects	No.
	12. Number of prospective studies projects	No.
	13. Number of project of preparation for participating in international programmes	No.
	14. Number of participations in financed international projects	No.
15. Value of thematic calls jointly launched with other countries	Thousands of RON	

<b>Name of the programme: 3.IDEAS</b>		
<b>Objective</b>	Obtaining outstanding scientific and technological results, comparable to the ones obtained at the European level, reflected by the increase in international visibility and recognition of Romania's research.	
<b>Derived objectives</b>	<ol style="list-style-type: none"> <li>1. Permanent improvement of scientific performances visible at international level in the fields where Romania has a potential of research and where the results obtained are comparable to the one of EU countries.</li> <li>2. Developing those fields where Romania is interested in developing scientific research activities with effective contributions to the increase of the quality of knowledge, to technical and technological development and to improving the quality of life.</li> </ol>	
<b>Courses of action</b>	<ol style="list-style-type: none"> <li>1. Supporting basic research, frontier and exploratory</li> <li>2. Organizing "exploratory workshops" with the purpose of identifying the unexplored knowledge niches.</li> <li>3. Launching calls for international collaborations for basic research, frontier and exploratory</li> </ol>	
<b>Participants</b>	<ol style="list-style-type: none"> <li>1. R&amp;D personnel</li> <li>2. RDI entities</li> <li>3. RDI entities consortia</li> </ol>	
<b>Results indicators</b>	<b>Name of indicators</b>	<b>Um/year</b>
	1. Number of articles which have been accepted to be published as a result of the projects, out of which: - in ISI indexed journals - in journals indexed in recognized international data bases	No.
	2. Number of articles which have published as a result of the projects, out of which:  - in ISI indexed journals - in journals indexed in recognized international data bases	%
	3. Number of submitted patent applications (as a result of projects), out of which - National - EPO - USPTO - Triadic	No.

<b>Results indicators</b>	4. Number of accepted patents (as a result of projects), out of which - National - EPO - USPTO - Triadic	No.
	5. Number of exploratory workshops	No.
	6. Value of international collaboration projects	Thousands of RON
	7. Success rate of financing applications for international research projects	%



**Table 1. Basic research fields having potential, in Romania**

<b>1</b>	<b>Basic research – sciences, frontier sciences, knowledge development</b>	
<b>1.1</b>	<b>Biology, genetics and medicine</b>	<ol style="list-style-type: none"> <li>1. Molecular investigations of viruses and bacteria with a major impact on health</li> <li>2. Molecular mechanisms of immunogenetics and histocompatibility in transplants of solid organs and stem cells.</li> <li>3. Major diseases of populations: cardiovascular diseases, cancer, diabetes, obesity, degenerative diseases; basic and clinic research</li> <li>4. Biodiversity and biotechnology</li> <li>5. Genetics and physiology of the resistance of organisms to biotic and abiotic stress.</li> <li>6. Genomics, transcriptomics, proteomics and metabolomics in regular and pathologic biological processes.</li> </ol>
<b>1.2</b>	<b>Chemistry, environment and materials science</b>	<ol style="list-style-type: none"> <li>1. Science of nanosubstances, nanomaterials and applications in nanotechnology.</li> <li>2. Chemistry of food, food quality and safety.</li> <li>3. Medicines, beauty products, colorants</li> <li>4. Biomaterials and biocomposites</li> <li>5. Environment quality and safety, geochemistry of lithospheric processes.</li> <li>6. Pollution processes, catalysis, catalysts and depolluting techniques</li> <li>7. Detecting and identifying hazardous materials; high resolution sensors</li> <li>8. Technologies for of reducing and eliminating the contamination with CBRN agents, explosive devices and heavy metals</li> </ol>
<b>1.3</b>	<b>Mathematics</b>	<ol style="list-style-type: none"> <li>1. Combinational logics, theoretical informatics, commutative and noncommutative algebra, categories, number theory, representations of groups and algebras</li> <li>2. Algebraic and differential geometry and topology, complex geometry</li> <li>3. Real and complex functions, measure and integrals, potential, functional analysis and operators, numeric analysis</li> <li>4. Differential equations with partial derivatives, control and optimization, nonlinear analysis</li> <li>5. Mathematical models of mechanics, thermodynamics, astronomy and theory of particles and fields systems; biomathematics</li> <li>6. Probabilities, stochastic processes, mathematical statistics, operational research and mathematics in economy.</li> </ol>

<b>1.4</b>	<b>Physics and technological physics</b>	<ol style="list-style-type: none"> <li>1. Atomic core physics, hadronic matter and nuclear astrophysics</li> <li>2. Atomic, molecular and bio-molecular processes, stable and radioactive isotopes</li> <li>3. Photonics, optics</li> <li>4. Physical processes and phenomena in condensed matter</li> <li>5. Quantum fields and elementary particles</li> <li>6. Interaction of particles and of radiation with substance</li> <li>7. Physics of ionized media, of plasmas and nuclear fusion</li> <li>8. Mathematical physics, information physics and quantum correlations, nonlinear phenomena and chaos</li> </ol>
<b>1.5</b>	<b>Geology and atmosphere physics</b>	<ol style="list-style-type: none"> <li>1. Mineral systems and models, petrogenetic, metalogenetic and paleontologic</li> <li>2. Structure, dynamics and evolution of lithosphere; continents, seas and oceans</li> <li>3. Climatology, paleoclimatology and geochronology</li> </ol>
<b>1.6</b>	<b>Border domains</b>	<ol style="list-style-type: none"> <li>1. Shaping physical, chemical, biologic and geological processes</li> <li>2. Nanocomposites</li> <li>3. Physics of the interior of the earth, of the environment and of cosmic space</li> <li>4. Knowledge based economy</li> </ol>

<b>Name of the programme: 4. PARTNERSHIPS IN PRIORITY S&amp;T DOMAINS</b>	
<b>Objective</b>	Increasing R&D competitiveness by stimulating partnerships in the main S&T domains, concretized in innovative technologies, products and services in order to solve complex problems and to create implementation mechanisms
<b>Derived objectives</b>	<ul style="list-style-type: none"> <li>- Increasing the Information and Communication Technology capacity in the RDI sector for in view of supporting the knowledge based society and economy</li> <li>- Increasing technological competence and promoting the transfer of knowledge and technologies in the field of energetic, in conditions of quality and safety, and respecting the sustainable development principle</li> <li>- Creating clean products, processes and technologies and valorization of waste</li> <li>- Scientific grounding and development of technologies in order to preserve, rebuild and consolidate biological and ecological diversity</li> <li>- Developing knowledge in the field of land management in a sustainable manner</li> <li>- Optimizing the methods of disease prevention, developing of medical therapies and making efficient the public health system</li> <li>- Promoting sustainable agriculture, increase of food and food products safety.</li> <li>- Developing biotechnologies with an impact over the quality of life and the development of the economy</li> <li>- Developing new materials, products and processes with high added value</li> <li>- Increasing the competitiveness of Romania in the field of spatial research and technology</li> <li>- Identifying and solving the main social issued related to education, dwelling and occupation in view of local, regional and national development.</li> <li>- Increasing the competitiveness and the creativity, the development of organizational culture in the systems of the economy, of public administration, of education and research, in the sanitary and the military systems.</li> <li>- Valorization and and development of the national cultural patrimony</li> <li>- Diminishing the socio-human inequalities and the regional disparities.</li> </ul>
<b>Courses of action</b>	<ol style="list-style-type: none"> <li>1. Supporting RDI projects classified by thematic directions</li> <li>2. Supporting RDI projects classified by main themes established on a consulting basis</li> <li>3. Supporting research networks</li> </ol>
<b>Participants</b>	<ol style="list-style-type: none"> <li>1. RDI consortia</li> <li>2. RDI entities consortia, companies, local or central public administration units</li> <li>3. Companies or local or central public administration units in partnership with RDI entities.</li> </ol>

<b>Result indicators</b>	<b>Name of indicators</b>	<b>UM/year</b>
	1. Number of products and technologies resulting from research activity, based on patents, homologations or innovations.	No.
	2. Number of submitted patent applications (as a result of projects) out of which <ul style="list-style-type: none"> <li>- National</li> <li>- EPO (Europe)</li> <li>- USPTO (USA)</li> <li>- Triadic (Europe, USA, Japan)</li> </ul>	No.
	3. Number of accepted patents (as a result of projects) out of which <ul style="list-style-type: none"> <li>- National</li> <li>- EPO</li> <li>- USPTO</li> <li>- Triadic</li> </ul>	No.
	4. Number of articles which have published as a result of the projects, out of which: <ul style="list-style-type: none"> <li>- in ISI indexed journals</li> <li>- in journals indexed in recognized international data bases</li> </ul>	No.
	5. Number of articles which have been accepted to be published as a result of the projects out of which: <ul style="list-style-type: none"> <li>- in ISI indexed journals</li> <li>- in journals indexed in recognized international data bases</li> </ul>	No.
	6. Number of transferable products	No.
	7. Number of studies of public interest of which <ul style="list-style-type: none"> <li>- of national interest</li> <li>- of regional interest</li> <li>- of local interest</li> </ul>	No.
	8. Number of SME participants	%
	9. Share of private financial contribution per projects <ul style="list-style-type: none"> <li>- of which direct financial contribution</li> </ul>	%
	10. Average number of equivalent full time positions per project, of which: <ul style="list-style-type: none"> <li>- PhD candidates</li> <li>- postdoctoral researchers</li> </ul>	No.
	11. Mobilities, out of which international	Month x person
	12. Value of investments in equipment for projects	Thousands of RON
	13. Success rate of projects applications	%
	14. Number of sustained research networks	No.

	Line of research	Research theme
<b>1</b>	<b>Communication and information Technology</b>	
<b>1.1</b>	<b>Theoretical informatics and computer science</b>	<ol style="list-style-type: none"> <li>1. Grammar networks, evolutionist calculus, DNA calculus, molecular calculus</li> <li>2. Mathematical models for network calculus ("global computing") and the development of performant algorithms for network operation and analyzing their complexity.</li> <li>3. Algebraic specifications and applications for the development of software for object oriented systems</li> <li>4. Algebraic study of distributed concurrent mobile networks and processes</li> <li>5. Specification and validation of programmes; "model checking" techniques</li> <li>6. Study of the semantics of programming languages, emphasizing concurrence and mobility</li> <li>7. Mathematical models for data and computer security</li> <li>8. Mathematical models of real concurrence: Petri networks, data flow networks etc.</li> <li>9. Formal Logics models for multi-agent systems</li> </ol>
<b>1.2</b>	<b>Advanced Computer systems for e-services</b>	<ol style="list-style-type: none"> <li>1. Advanced computer systems for education (e-learning)</li> <li>2. Computer systems for health and environment (e-health)</li> <li>3. Systems and technologies for business development (e-business)</li> <li>4. Financing and banking electronic systems, technologies and services (e-banking, m-banking, e-auction)</li> <li>5. Advanced systems and technologies for electronic government and services for the citizen (e-government, e-citizen)</li> <li>6. Computer systems for the development and management interactive digital content (e-content)</li> <li>7. Computer systems for risk management</li> </ol>
<b>1.3</b>	<b>Communication technologies, systems and infrastructures</b>	<ol style="list-style-type: none"> <li>1. Algorithms, processing methods/technologies and systems in information and signals communication systems (voice, audio, video/ images, data, multimedia) for producing, processing, long distance transportation and delivery of informational content</li> <li>2. Algorithms and adaptable/intelligent systems in communication infrastructures</li> <li>3. Broadband access and transport technologies and systems including terrestrial and satellite networks on varied transmission media</li> <li>4. Devices, circuits, communication subsystems and wireless networks.</li> </ol>

<b>1.3</b>	<b>Communication technologies, systems and infrastructures</b>	<ol style="list-style-type: none"> <li>5. Architectures and infrastructures (networks) convergent from the point of view of high level communication services, allowing, in the same time, a technological diversity of communication solutions</li> <li>6. Algorithms, simulating methods of complex telecommunication systems for evaluating performances and planning networks</li> <li>7. Specification, validation, implementation of communication protocols beginning with the physical level up to the application levels.</li> <li>8. Flexible and re-configurable integrated applications and services, in multiple packages offered to users in an universal manner, with quality guarantees for varied services</li> <li>9. Methods and software for service and resources management in complex communication services</li> <li>10. Functional and performance testing technologies and systems for telecommunication systems</li> <li>11. Security of communication systems and infrastructures</li> <li>12. Strategies for developing the domain, standards and regulations, technical, economic, legal and social aspects</li> </ol>
<b>1.4</b>	<b>Artificial intelligence, robotics and advanced autonomous systems</b>	<ol style="list-style-type: none"> <li>1. Developing new representation methods for presenting multimedia content (new media paradigms, new (nonlinear) digital content forms etc.)</li> <li>2. Developing systems based on semantics in web space; achieving semantic interoperability between heterogeneous information and services resources, between different types of content, between natural languages</li> <li>3. Automatic translation systems, capable to improve their performances through learning</li> <li>4. Developing infrastructural multimodal and multimedia knowledge basis (domain ontologies, lexical ontologies for languages of interest)</li> <li>5. Developing intelligent agent systems inspired from biology, capable to perceive, to understand, to learn and to evolve, to operate autonomously</li> <li>6. Developing human-computer natural interaction systems which are minimally dependent on the discourse universe</li> <li>7. Developing highly autonomous intelligent systems., including autonomous robots</li> <li>8. Intelligent decision-support systems</li> </ol>

	Line of research	Research theme
1.5	<b>Security and accessibility of computer systems</b>	<ol style="list-style-type: none"> <li>1. Computer safety and risk management</li> <li>2. Interoperable authentication and identification systems, certificates infrastructures</li> <li>3. Protection by security perimeters</li> <li>4. Detecting / preventing / investigating cybernetic attacks</li> <li>5. Security of electronic management / administration applications</li> <li>6. Security of electronic payment and e-banking systems</li> <li>7. Cryptographic algorithms and mechanisms</li> <li>8. Security of distribution systems</li> <li>9. Security of mobile calculus devices</li> </ol>
1.6	<b>Technologies for distributed systems and incorporated systems</b>	<p>Distributed systems</p> <ol style="list-style-type: none"> <li>1. Optimizing the communication between high speed networks for large amounts of data, networks which are part of Grid infrastructure</li> <li>2. Architectures, technologies and tools for collaborative work including for virtual organizations</li> <li>3. Ensuring transparency in case of localization, migration, relocation, replication, competition, breakdown, persistence in peer-to-peer systems and in client-server systems</li> <li>4. Organizing, storing and finding information in large scale distribution systems</li> <li>5. Insuring safety in distribution systems</li> <li>6. Methods, models, instruments for developing distributed applications</li> <li>7. Operating environments (frameworks) of distributed applications for grid and Internet</li> <li>8. Simulating and optimizing methods, models and algorithms for solving complex problems in science, engineering, economy and society</li> </ol> <p>Incorporated systems</p> <ol style="list-style-type: none"> <li>1. Methods and tools for developing incorporated software</li> <li>2. Objective methodologies and technologies, based on components, for incorporated systems</li> <li>3. Intelligent software systems for mobile equipment</li> <li>4. Technologies for context sensitive systems (context - awareness)</li> <li>5. Personalization methods for incorporated systems</li> <li>6. Technologies for integrated systems based on sensor networks</li> </ol>

1.6	<b>Technologies for distributed systems and incorporated systems</b>	<ol style="list-style-type: none"> <li>7. Systems incorporated in real time (for vehicles, aircraft, trains, process control, medical equipment, communications)</li> <li>8. Mobile calculus and ubiquitous systems</li> <li>9. Developing applications for incorporated systems</li> </ol>
1.7	<b>Nanoelectronics, photonics and integrated nanosystems</b>	<p>Nanoelectronics</p> <ol style="list-style-type: none"> <li>1. Experimenting new materials and technologies for nanostructures and integrated circuits at nano scale</li> <li>2. Experimenting new systems architectures for nanoelectronics</li> <li>3. Experimenting new concepts (principles) of nanoelectronic devices</li> <li>4. Transparent electronics</li> </ol> <p>Micro- and nano-systems</p> <ol style="list-style-type: none"> <li>1. Developing components and Microsystems for communication systems; reconfigurable and flexible intelligent Microsystems</li> <li>2. Microfluidic technologies, micro/nano-biosensors, laboratories in one chip, "microarrays", micro - and nanostructures and micro- and nanosystems for medical diagnosis and treatment (including nanomedicine)</li> <li>3. Microsensors and actuators (including 3D)</li> <li>4. Technologies for heterogeneous integration and 3D assembly/encapsulation for allowing the realization of complex systems on one chip</li> <li>5. Convergent technologies: micro-nano-bio-info</li> </ol> <p>Photonics</p> <ol style="list-style-type: none"> <li>1. New photonic materials (artificial materials: photonic crystals, negative refraction index materials etc.)</li> <li>2. Micro/nano-photonic components and interconnection and communication systems</li> <li>3. Optic microsensors for surveillance, monitoring, robotization systems</li> <li>4. New photonic technologies and photonic biosensors for non-intrusive systems of in vivo diagnosis and treatment</li> <li>5. Photonic technologies for advanced manufacturing processes at micro and nano level and for process and quality control</li> </ol>
2	<b>Energy</b>	
2.1	<b>Sustainable energy systems and technologies; energy safety</b>	<ol style="list-style-type: none"> <li>1. Increasing energy supply safety</li> <li>2. Promoting a basic energetic resources structure, with emphasis on the use of coals, of nuclear energy and regenerating sources, proper to increase competitiveness and safety of supply</li> </ol>

	Line of research	Research theme
<b>2.1</b>	<b>Sustainable energy systems and technologies; energy safety</b>	<ol style="list-style-type: none"> <li>Increase of energetic efficiency for the whole energetic string, with a particular stress on the reduction of energy losses in public and residential buildings and in industrial consumers</li> <li>Promoting clean energy technologies, environment protection measures and reduction of gas exhaust with greenhouse effect</li> <li>Founding energy strategies of towns</li> </ol>
<b>3</b>	<b>Environment</b>	
<b>3.1</b>	<b>Modalities and mechanisms for reducing environment pollution</b>	<ol style="list-style-type: none"> <li>Little polluting technologies, especially in transports and energy production</li> <li>Environment friendly products (green chemistry)</li> <li>Economic and social mechanisms for preventing and fighting pollution on the main environment factors</li> </ol>
<b>3.2</b>	<b>Waste management and reutilization systems; analysis of products life-cycle and ecoefficiency</b>	<ol style="list-style-type: none"> <li>Technologies for the energetic valorization of biodegradable waste under the form of inflammable gas or liquids</li> <li>Technologies for valorizing mineral waste from constructions and demolitions</li> <li>Technologies for disassembling complex products and revalorization of components subassemblies</li> <li>Plastic waste selection and separation systems</li> <li>Hazardous waste neutralization technologies</li> <li>Leaches treating technologies</li> </ol>
<b>3.3</b>	<b>Ecological protection and reconstruction of critical areas and protected areas conservation</b>	<ol style="list-style-type: none"> <li>Biological, geological and ecological diversity at local, regional and national level (characterization, identification of control and pressure factors, identification of functions of biologic, geologic and ecologic diversity, social and economic assessment)</li> <li>Monitoring systems of biologic and ecologic diversity dynamics from the structural and the functional point of view</li> <li>Ecologic reconstruction and rehabilitation ecotechnologies; contaminated soils repair technologies</li> <li>Scientific grounding, designing and developing "Nature 2000" protected area, in Romania, as well as of adaptable management plans guaranteeing the preservation of biologic and ecologic diversity</li> <li>Creating georeferential data and meta-data bases, of mathematical models and of decisional cycle infrastructure, for durably preserving, reconstructing and using the components of biologic and ecologic diversity</li> <li>Educating the population on the risk scenarios and on ways of acting</li> <li>Integrated security systems, both fixed and mobile, for strategic importance objectives.</li> </ol>

<b>3.4</b>	<b>Land management, infrastructure and utilities</b>	<ol style="list-style-type: none"> <li>Polycentric and equilibrated development</li> <li>Accessibility</li> <li>Territorial impact of policies and strategies</li> <li>Research/development poles, innovative regions</li> <li>Functional urban regions and economic growth metropolitan areas</li> <li>Natural and technological hazards; researches concerning risk evaluations and impact studies</li> <li>Spatial and urban policies management</li> <li>Space scenarios</li> <li>New tools and techniques in land management</li> <li>Techniques and methods for increasing boundaries security degree</li> </ol>
<b>3.5</b>	<b>Constructions</b>	<ol style="list-style-type: none"> <li>The application of advanced technologies for the development of urban areas while maintaining and preserving the historical buildings (without impairing their structure);</li> <li>The reduction of the negative impact of constructions on the natural environment (during operation and by demolition products);</li> <li>Intelligent tire systems having predictive – reactive features;</li> <li>Constructions industrialization (including the underground ones), reducing costs and time of execution;</li> <li>Drafting and design systems for new buildings with very low energy consumption;</li> <li>Concept for increasing the life span of structures and of growing the resistance to natural or anthropic disasters;</li> <li>Technical solutions for risk reduction – new buildings and post disaster consolidation;</li> <li>Methods for increasing the resistance of buildings to extreme climatic changes;</li> <li>Methods for soils stabilization (biotechnologies);</li> <li>Materials improving the inner microclimate and reducing the energy consumption by using nano-sensors and information technology</li> </ol>
<b>4</b>	<b>Health</b>	
		<ol style="list-style-type: none"> <li>Developing knowledge on integrative biologic systems of human being</li> <li>Mechanisms of adaptation of the human body to the dynamics of biological and psychosocial environment</li> <li>examination and interventional methods based upon molecular and cellular, genomic and proteomic medicine</li> <li>Developing modern therapies oriented towards chemical, genetic and cellular support and their standardization according to bioethical regulations</li> </ol>

	Line of research	Research theme
<b>4</b>	<b>Health</b>	
		<ul style="list-style-type: none"> <li>5. Developing brain- machine interface with the purpose of investigating and recovering from neurological conditions</li> <li>6. Implementing new prevention and interventional methods, at the national level, aligned to the European operation space</li> </ul>
<b>5.</b>	<b>Agriculture, food safety and security</b>	
		<ul style="list-style-type: none"> <li>1. Evaluating, exploiting, protecting and improving natural resources with the purpose of quantitative and qualitative growth in agricultural and food production</li> <li>2. Updating the food production and obtaining products in keeping with durable development principles and food safety</li> <li>3. Increasing technical and economic competitiveness of horticultural viticultural products</li> <li>4. Methods, techniques and technologies for increasing and diversifying animal and fish production, providing sanitary and veterinary protection</li> <li>5. Agricultural and food production management (optimal shaping of agricultural exploitations, integrated systems for providing agricultural and food activities)</li> <li>6. Functional food for maintaining people's health and preventing diseases</li> <li>7. Ecologic agricultural and food products</li> <li>8. Traceability on the food chain</li> <li>9. Diminishing refuse and contaminants in the whole food chain</li> <li>10. Highly accurate, feasible, sensitive, fast methodologies for detecting refuse and contaminants</li> <li>11. New plant varieties</li> <li>12. Preserving the genetic potential of national natural resources and of biodiversity</li> <li>13. Improving, protecting and preserving vegetal and animal genetic resources</li> <li>14. Public veterinarian health, diagnosis, surveillance and control of animal diseases</li> <li>15. Improving the production, protection and social potential of woods</li> <li>16. Protecting and developing genetic and salmonic resources</li> <li>17. Interdisciplinary research on soil, plant, animal, food, human correlations</li> </ul>
<b>6</b>	<b>Biotechnologies</b>	
<b>6.1</b>	<b>Biotechnologies</b>	<ul style="list-style-type: none"> <li>1. Conceiving and developing new medicines with a maximum of efficiency and a minimum of side effects</li> </ul>

<b>6.1</b>	<b>Biotechnologies</b>	<ul style="list-style-type: none"> <li>2. Elaborating certain protocols for diagnosis and medical treatments having an impact on the health conditions and on the increase of life expectancy;</li> <li>3. Creating new technologies for food production with a maximum safety on the human health;</li> <li>4. Conceiving and developing advanced technologies in the field of pharmaceuticals, biocatalytic groups and obtaining new enzymes and microorganisms;</li> <li>5. Research and development of bio-information system for shaping and monitoring cellular activity, information processing mechanisms at biological level, including the cognitive level</li> </ul>
<b>7</b>	<b>Innovative materials, processes and products</b>	
<b>7.1</b>	<b>Advanced materials</b>	<ul style="list-style-type: none"> <li>1. Advanced materials for generating, transporting and using energy</li> <li>2. Advanced materials for infrastructure development</li> <li>3. Materials protecting the environment in processes connected to their production and use</li> <li>4. Advanced materials for export competitive products</li> <li>5. Advanced materials for modern transportation means</li> <li>6. Advanced materials and biomaterials for increasing the quality of life (health, sports, education etc.)</li> <li>7. Advanced materials recycling technologies</li> <li>8. Advanced materials for niche sectors of the economy</li> </ul>
<b>7.2</b>	<b>Advanced Technologies for the management of the industrial processes</b>	<ul style="list-style-type: none"> <li>1. Integrated conception and design of automation processes and systems (IPCD)</li> <li>2. Shaping and identifying great complexity processes</li> <li>3. Nonlinear robust management of processes</li> <li>4. Advanced management techniques</li> <li>5. Management intelligent systems</li> <li>6. Multi-agent oriented management</li> <li>7. new paradigms of manufacturing systems</li> <li>8. Integrated hardware and software systems for management of processes in real time</li> <li>9. Advanced communication systems for industrial processes</li> </ul>
<b>7.3</b>	<b>High precision mechanical technologies and mechatronic systems</b>	<ul style="list-style-type: none"> <li>1. Macro and micro sized transducers and sensors grounded on high precision integrated technologies</li> <li>2. applied mecatronics; intelligent mechatronic products and systems</li> <li>3. Techniques, metrologies and means of high and ultrahigh precision</li> <li>4. Conventional and unconventional automatic operation systems and equipment, with high and ultrahigh precision or angular displacements and positioning</li> </ul>

<b>7.3</b>	<b>High precision mechanical technologies and mechatronic systems</b>	<ol style="list-style-type: none"> <li>5. High precision robotics and microrobotics, with or without autonomous displacements</li> <li>6. Conventional and unconventional high and ultrahigh precision manufacturing technologies</li> <li>7. High precision assembly, microassembly, fast assembly and automatic disassembly technologies</li> <li>8. Equipment of organic prosthesis and medical equipment for examination, diagnosis and computer monitoring</li> <li>9. Optic and optoelectronic advanced equipment and devices</li> <li>10. High precision equipment and devices for testing and controlling environment and basic food products quality parameters</li> <li>11. Micro-electro-mechanical systems (MEMS)</li> </ol>
<b>7.4</b>	<b>Nuclear Technologies</b>	<ol style="list-style-type: none"> <li>1. Obtaining and using stable and radioactive isotopes in industry, agriculture and resources management</li> <li>2. Industrial applications of nuclear technologies</li> <li>3. Medicine applications – radiopharmaceutical products, PET, hadronotherapy</li> <li>4. Advanced energetic technologies, based on fission and nuclear fusion</li> <li>5. Nuclear safety and security, radioecology and radioprotection</li> <li>6. Obtaining new materials by and on behalf of nuclear technologies, 4 AR.</li> <li>7. Technologies for disaffecting nuclear equipment and administering radioactive refuse</li> </ol>
<b>7.5</b>	<b>Innovative products and technologies for transportation and for automotive manufacturing</b>	<ol style="list-style-type: none"> <li>1. Products and technologies increasing the energy efficiency of transportation means and reducing the polluting effects</li> <li>2. Products and technologies form realizing reliable infrastructures (railways, roads, shipping canal, terminals, etc.), with little maintenance requirements and incurring low social costs</li> <li>3. Increasing safety and security of transport</li> <li>4. Products and technologies for vehicle production</li> <li>5. Intermodal transport systems/technologies for limiting external effects of traffic and reducing resources consumption</li> <li>6. Integrated (supply, technological, distribution) logistics and reversed logistics including transport, manipulation, storage/warehousing, conditioning, packing, marketing, manufacturing and recycling technologies</li> <li>7. Transport quality management systems, systems for traffic monitoring and direction</li> <li>8. Solutions for diminishing the congestion in towns agglomerations in correlation with space structuring and life quality increase</li> <li>9. Products and technologies for air transport</li> </ol>

<b>8</b>	<b>Space and security</b>	
<b>8.1</b>	<b>Space explorations</b>	<ol style="list-style-type: none"> <li>1. Taking part in space circumterrestrial and solar system missions</li> <li>2. Researching and obtaining theoretic, experimental and computational models of phenomena, proper to the circumterrestrial environment, to the solar system, to the Universe and to the interactions between them, on the basis of experimental and observational results of space missions</li> <li>3. Microgravitation experiments</li> <li>4. Researching and achieving tools, scientific equipment and flight systems for space platform forms, flight and land experiments</li> <li>5. Microsatellites for exploration and operational uses</li> <li>6. Launching, operating and recovery systems for suborbital flight</li> <li>7. Group flight and network systems</li> <li>8. Management of space information and data</li> <li>9. specific methods and algorithms for data acquisition, processing and analysis: GRID, data mining, data fusion, change detection</li> <li>10. Technologies for measuring and processing multispectral and radar data</li> <li>11. Tangible and intangible space strategy and infrastructure</li> </ol>
<b>8.2</b>	<b>Space applications</b>	<ol style="list-style-type: none"> <li>1. Earth observation from satellites and airspace platforms</li> <li>2. Global satellite navigation and localization systems. GALILEO</li> <li>3. Space communications and related land systems</li> <li>4. Integrated space applications for telemedicine, accurate agriculture, monitoring natural disasters, global information systems</li> <li>5. Geospatial techniques</li> <li>6. Automatic and semiautomatic algorithms for space data</li> <li>7. Global monitoring systems. GMES</li> <li>8. Localization based systems and services</li> <li>9. Systems and platforms for observation and monitoring</li> </ol>
<b>8.3</b>	<b>Airspace technologies and infrastructures</b>	<ol style="list-style-type: none"> <li>1. Aeronautical techniques, flight dynamics, CFD</li> <li>2. Launching, operating and recovery systems for suborbital missions</li> <li>3. Launch and orbiting techniques</li> <li>4. Specialized platforms and flight equipment with or without a pilot</li> <li>5. Research and development of flight and land sensors, systems and equipment, spin-off development of space results</li> <li>6. Advanced methods and techniques of simulation, command and control, of design and manufacture of air, airspace and space flight equipment</li> </ol>

<b>8.3</b>	<b>Airspace technologies and infrastructures</b>	<ol style="list-style-type: none"> <li>7. Systems and methods for the dynamics of airspace flight, the control of platforms behaviour. Optimal control systems. Airspace traffic control and land systems</li> <li>8. Analysis, trial and quality control systems proper to space, airspace and aeronautical domain</li> <li>9. Airspace and space technologies, systems, tools and equipment</li> </ol>
<b>8.4</b>	<b>Security techniques</b>	<ol style="list-style-type: none"> <li>1. Systems, techniques and equipment for detection, localization, positioning, communication, surveillance and identification</li> <li>2. Developing technologies for fighting bioterrorism and CBRN aggressions (Chemical, Biological, Radiological, Nuclear)</li> <li>3. Recognition and surveillance techniques (including IMINT)</li> <li>4. Systems and technologies for the protection against any kind of terrorism</li> <li>5. Using global space infrastructure (communications, positioning, observation) in defence and security applications</li> <li>6. Techniques and technologies for protecting land, water and air boundaries</li> <li>7. Sensors, systems, equipment and techniques for detecting, identifying and neutralizing crisis generator local factors (hazardous substances, chemical and biological agents, mines, arms, explosives, improvised explosive vehicles and devices);</li> <li>8. Methods, systems and technologies for insuring the safety of data and communication management networks (distribution systems, GRID, data mining, local networks, authenticating techniques, encrypting)</li> <li>9. Support techniques for actions and measures of fighting threatenings to security, of fighting organized crime and illegal traffic</li> </ol>
<b>8.5</b>	<b>Security systems and infrastructure</b>	<ol style="list-style-type: none"> <li>1. Achieving interoperable defence and security technologies, systems and technique in keeping with operational requirements of the structures of the national defence and security system</li> <li>2. Systems and equipment for protecting, improving the security and saving the persons, including diagnosis and treatment means.</li> <li>3. Systems for insuring an efficient management of crisis situations and of interventions in case of disasters, detection, prevention and alert systems</li> <li>4. Physical and information infrastructure protection</li> <li>5. System, techniques and methods for restoring from crisis situations integrated security systems, either fixed or mobile, for strategic importance objectives (industrial units, airports, military units, tanks and oil ducts etc)</li> </ol>

<b>8.5</b>	<b>Security systems and infrastructure</b>	<ol style="list-style-type: none"> <li>6. Support for realizing security culture and fighting cultural and social terrorism</li> <li>7. Security strategies and policies at local, European and global level</li> </ol>
<b>9</b>	<b>Socio-economic and humanistic systems</b>	
<b>9.1</b>	<b>New managerial, marketing and business development methods for organizational competitiveness</b>	<ol style="list-style-type: none"> <li>1. Knowledge based management</li> <li>2. Scientific parks and business incubators based on the collaboration between universities – business environment – authorities</li> <li>3. Collaborative mechanisms proper to company networks and clusters</li> <li>4. Managerial and economic organizational systems and mechanisms focused on innovation</li> <li>5. Strategies for establishing and valorizing competitive advantages of companies</li> <li>6. Marketing methods and instruments</li> <li>7. Leadership and social corporative liability during europenization and globalization processes</li> <li>8. Policies and mechanisms proper to SME, for applying innovative strategies</li> <li>9. Modern financing systems (risk capital funds, public - private partnerships etc) for innovative SME</li> <li>10. Organizational culture and innovation management in SME</li> <li>11. Innovation and competitiveness by international transfer of managerial know-how</li> <li>12. Efficient systems and approaches concerning managerial training and consultancy</li> </ol>
<b>9.2</b>	<b>Quality of education</b>	<ol style="list-style-type: none"> <li>1. Assisting decisions for policies providing education quality</li> <li>2. Quality management in education</li> <li>3. Initial and continuous training of human resources from the perspective of quality education and stimulation of creative potential</li> <li>4. Education for research</li> <li>5. Development of business skills</li> <li>6. Development of life skills within the educational system</li> <li>7. Education regarding the observance of intellectual property right</li> <li>8. Civil education</li> <li>9. Creating and correlating the national qualification framework with the international one</li> <li>10. Assessing organizations providing continuous education</li> <li>11. Human resource management in education</li> <li>12. E-Learning and quality of education</li> <li>13. Educational shaping languages</li> <li>14. Correlating the educational system with labour market requirements</li> </ol>



<b>9.3</b>	<b>Quality of occupation</b>	<ol style="list-style-type: none"> <li>1. Inherent quality of work place in Romania</li> <li>2. Qualification, continuous education and career development</li> <li>3. Health and safety in the work place</li> <li>4. Jobs flexibility and security</li> <li>5. Inclusion and access in the work market</li> <li>6. Organizing work and the balance work – leisure</li> <li>7. Social dialogue and workers involvement</li> <li>8. Global economic performance and productivity</li> <li>9. subjective evaluation (work satisfaction) of the quality of occupation, from the point of view of individual workers</li> <li>10. Rural environment occupation</li> <li>11. Occupation in mono-industrial areas</li> <li>13. International circulation of work force</li> </ol>
<b>9.4</b>	<b>Human, cultural and social capital</b>	<ol style="list-style-type: none"> <li>1. Relations between capital forms and social structure</li> <li>2. Conversion rules between different forms of capital</li> <li>3. Forming and delivering educational, occupational and mobility opportunities within the social space</li> <li>4. Effects of social stratification on the chances of social mobility of individuals and on the development</li> <li>5. Effect of social stratification on cultural consumption practices and on civil and political activity</li> <li>6. Generating, evaluating, increasing and protecting the intellectual capital</li> <li>7. Factors and dynamics of the economy based on knowledge</li> </ol>
<b>9.5</b>	<b>Material / non-material patrimony, cultural tourism; creative industries</b>	<ol style="list-style-type: none"> <li>1. Cultural marketing techniques</li> <li>2. Patrimony preserving techniques</li> <li>3. Preserving and restoring the patrimony insuring the community viability</li> <li>4. Macro and micro dynamics of cultural tourism</li> <li>5. Local development and cultural tourism</li> <li>6. New patrimonialization practices</li> <li>7. Cultural production and social dynamics</li> <li>8. Creative industries and intellectual property right</li> <li>9. Evolution of Romanian language during the globalization; communicative performance</li> <li>10. Contributions to philosophic and psychological research</li> <li>11. Evaluating "key periods" in Romania history</li> <li>12. Evaluating trends of modern systems in arts and audiovisual field and their impact on Romanian cultural scenery</li> </ol>
<b>9.6</b>	<b>Socio-human inequalities; regional disparities</b>	<ol style="list-style-type: none"> <li>1. Regional and national socio-human inequalities</li> <li>2. emergence and features of new social classes in post-communist Romania</li> <li>3. Socio-economic characteristics of Romanian regions and of their level of development</li> </ol>

<b>9.6</b>	<b>Socio-human inequalities; regional disparities</b>	<ol style="list-style-type: none"> <li>4. New types of community and regional discrepancies, especially those related to dwelling/ temporary migration abroad</li> <li>5. Options for polycentric development and derived policies which shall eliminate regional disparities</li> </ol>
<b>9.7</b>	<b>Cultural technology, organization and change</b>	<ol style="list-style-type: none"> <li>1. Interaction between individuals and technologies</li> <li>2. Relation between social networks and virtual networks</li> <li>3. Social impact of new technological configurations</li> <li>4. Import and/or emergence of new organizational forms and cultures during the globalization</li> <li>5. Changes in work culture post-privatization</li> <li>6. Relation between the institutional environment and the durability of organizational forms</li> <li>7. Social impact of new organizational forms and cultures</li> <li>8. Effects of the institutionalization of certain specific organizational models at the local level</li> <li>9. Effects of disconnection between the new organizational forms and the pre-existing practices</li> <li>10. Configuring new organizational models for making efficient the local and central public administration</li> <li>11. Analysis of the ratio between the degree of administrative rationalization and the economic growth</li> </ol>
<b>9.8</b>	<b>Dwelling</b>	<ol style="list-style-type: none"> <li>1. Elaborating a coherent typology, defining for the quality of dwelling in Romania</li> <li>2. Vulnerable social categories, great concentration areas of persons/families living in poor conditions</li> <li>3. Grounding policies for preventing and softening poor condition dwelling, in areas where the safety of dwelling is in danger, and there is a change of being evicted from there</li> <li>4. Solutions for increasing the safety degree, dwelling hygiene and comfort conditions and for optimizing the use of resources providing for the quality of dwelling</li> <li>5. Monitoring, timely alert systems and structures in case of chemical, bacteriologic, radiological or nuclear contamination.</li> <li>6. Means and methods of protection against terrorism.</li> </ol>

<b>Name of the programme: 5. INNOVATION</b>	
<b>Overall Objective</b>	Increasing the innovation, technological development and production assimilation capacity of the results of the researchers, in order to improve the competitiveness of the national economy and to improve the quality of life.
<b>Specific objectives</b>	<ol style="list-style-type: none"> <li>1. Strengthening the innovation capacity of enterprises and consolidating their contribution to creating new products and markets based on valorizing the results of knowledge</li> <li>2. Stimulating the partnership between economic agents and research entities.</li> <li>3. Developing the capacity of technological transfer between universities</li> <li>4. Stimulating the absorption capacity of RDI results by SME</li> <li>5. Implementing the strategic agendas elaborated within technological platforms</li> <li>6. Creating and developing the innovation infrastructure</li> <li>7. Developing the quality infrastructure and management</li> </ol>
<b>Courses of action</b>	<ol style="list-style-type: none"> <li>1. Creating products and technologies upon the initiative of economic agents</li> <li>2. Creating and /or developing innovation infrastructure: <ol style="list-style-type: none"> <li>a. scientific and /or technological parks</li> <li>b. technological transfer centers</li> <li>c. brokerage centers, knowledge stores</li> <li>d. technology incubators</li> </ol> </li> <li>3. Supporting service supply for innovations</li> <li>4. Supporting the development of quality certification infrastructure</li> <li>5. Supporting the accreditation of trials and analysis laboratories</li> <li>6. Supporting quality management systems implementation and development</li> <li>7. Supporting the formation and the development of innovative networks</li> <li>8. supporting the activity of technological platforms</li> <li>9. Awards in domains with innovative potential at national level.</li> </ol>
<b>Participants</b>	<ol style="list-style-type: none"> <li>1. Companies in partnership with RDI entities / technology transfer entities</li> <li>2. Local public administration units in partnership with RDI entities / technology transfer entities</li> <li>3. Economic agents /local public administration units / technology transfer entities / RDI entities</li> <li>4. RDI entities in partnership with economic agents / local public administration units / technology transfer entities / RDI entities</li> </ol>

<b>Result indicators</b>	Name of indicators	UM/year
	1. Number of RDI projects financed	No.
	2. Success rate of RDI projects proposals	%
	3. Share of private financial contribution for RDI projects, out of which direct financial contribution	%.
	4. Number of transferable products obtained	No.
	5. Number of patents submitted as a result of projects, out of which - National - EPO (UE) - USPTO (USA) - Triadic (EU, USA, Japan)	No.
	6. Number of patents granted as a result of projects, out of which - National - EPO (UE) - USPTO (USA) - Triadic (EU, USA, Japan)	No.
	7. Number of SMEs taking part in the projects	No.
	8. Number of scientific parks projects	No.
	9. Value of transactions made in the technology transfer centers	Thousands of RON
	10. Number of sustained brokerage centered	No.
	11. Number of sustained technology incubators	No.
	12. Number of sustained innovative networkse	No.
	13. Number of sustained technological platforms	No.
	14. Value of the investment in quality certification infrastructure	Thousands of RON
	15. Number of authorized laboratories for quality certification	No.
	16. Number of RDI units which have implemented quality management systems	No.
	17. Value of RDI projects carried out within national innovation contests	Thousands of RON
	18. Value of awards granted within national innovation contests	Thousands of RON

<b>Name of the programme: 6. SUSTAINING INSTITUTIONAL PERFORMANCE</b>		
<b>Objective</b>	Sustaining institutional performance by ensuring the continuity and the stability of activities carried out by RDI activities, with the purpose of implementing own development strategies, elaborated in line with RDI national strategy	
<b>Derived objectives</b>	<ol style="list-style-type: none"> <li>1. Sustaining the institutional development in order to obtain excellence</li> <li>2. Sustaining the international competitiveness of the Romanian RDI system</li> </ol>	
<b>Actions</b>	Ensuring a multiannual financing, grounded on competition, for non-economic activities, allowing the RDI unit to develop the medium term development plan and achieving a performance level which can contribute to attracting more financing resources.	
<b>Eligible entities</b>	<ol style="list-style-type: none"> <li>1. National Research &amp; Development Institutes</li> <li>2. Higher education institutes</li> <li>3. Other non-profit research units</li> </ol>	
<b>Result indicators</b>	<b>Name of indicators</b>	<b>Urn/year</b>
	1. Share of investment in the total financing obtained by the programme	No.
	2. Share of programme financing in the total budget of financing institutes	%
	3. Share of financing from international programmes in the total budget of financing institutes	%
	4. Share of financing from projects with private economic agents in the total budget of financing institutes	
	5. Share of ISI publications obtained by financed entities in the total of ISI publication on the national level	
	6. Share of publications indexed in other data basis internationally recognized, obtained by the financed entities, in the total publications on the national level	
	7. Share of patent applications obtained by the total financed entities on the national level of which <ul style="list-style-type: none"> <li>- National</li> <li>- EPO (UE)</li> <li>- USPTO (USA)</li> <li>- Triadic (EU, USA, Japan)</li> </ul>	

### 3. Implementation

The implementation of actions provided in the Plan shall be achieved by means of a set of instruments, each having specific activities.

The types of instruments used for implementing NP II are:

I.1 Research-development-innovation projects, consisting of the following categories:

- I.1.1 Exploring research projects
- I.1.2 Complex projects
- I.1.3 Projects for developing the research career
- I.1.4 RDI oriented projects

I.2 Mobilities projects

I.3 Investment projects

I.4 Support projects

I.5 Projects for financing the participation in international projects

I.6 Projects for sustaining the institutional performance

In addition, various action lines in the Plan can be implemented using instruments including awards, scholarships or vouchers.

Describing and detailing of each type of instrument shall be done by the Information Packages which are approved by the Decision of the President of the National Authority for Scientific Research.

#### 3.1. Investment model

The investment model represent the totality of procedures by which the initial level of budgets by programmes of NP II is established and it shall be adjusted during the development of the plan.

The development of the investment programme consists of the following stages:

**Stage 1:** Decision of NASR regarding the distribution of the budget between:

- National Plan II (at least 80%)
- Other expense chapters in the budget of NASR (20% at the most)

**Stage 2:** Decision of NASR regarding the distribution of the Budget of the National Plan II between:

- Programmes 1 – 5 (85 -90 %) and
- Programme 6 (10 – 15 %)

**Stage 3:** Initial sizing (during the first year) of the budgets distributed to each of programmes 1-5, according to provisions stated in Annex 2 of this decision.

**Stage 4:** Assessing programmes 1 – 5 of RDI NP

The assessment shall be performed every two years based on two groups of indicators:

- target indicators for assessing the RDI system (table 2);
- impact indicators for the oRDI systems (table 3).

**Stage 5:** Adjusting the initial distributions for programmes 1-5

The adjustment shall be done every two years depending on:

- a. actual performances of the RDI system;
- b. Romania's economic and social priorities;
- c. Worldwide scientific research trends

Performances of the RDI systems shall be measured by the contribution of programmes to achieving target values set by NASR for indicators stated in table 2 and 3.

Table 2. Assessment indicators of RDI system and target values in 2013

Ctr. No	Name of indicators	UM	Period of Reference	Reference value	2013 targets
1	Scientific papers issued on an annual basis in journals indexed in ISI -WoS systems	no.	Average 1995-2005	1995	+100%*
2	Quotations in Journals indexed in ISI -WoS systems	no.	Average 1995-2005	6898	+120%*
3	Romanian scientific journals indexed ISI	no.	2006	7	15 Journals
4	National patents	No / 1 mil inhab	Average 1996-2003	58	+200%*
5	Submitted international patents (EU, USA, Japan)	no.	Average 2000 - 2004	17,4	+600%*
6	Number of transferable products	no.	-	-	100*
7	Participations to international projects	% of RD public budget	2005	4%	6%*
8	Value of private sector contribution in NP II	% of GDP	-	-	0,75%
9	Number of PH.D. in RD system	no.	2004	8954	+100%
10	International mobilities	Person - month	-	-	5000*
11	National mobilities (intra and inter sectors)	Person - month	-	-	1000*
12	Investments in RDI infrastructure	% in GERD	Average 1998-2003	10%	25%*
13	Number of SME which have contracted funds by RDINP	no.	Average 1999-2006	**	+150%*
14	Number of scientific parks	no.	2006	4	8
15	Value of technology transfers in authorized TT centers	Thousands of RON	2006	**	+100%*

\* average 2007-2013

\*\* the value shall be available in 2007. The proposed growth is correlated with the growth of public budget

Table 3. Impact indicators for RDI system

Ctr. No	Name of indicators	UM	Period of Reference	Reference value	2013 targets
1	Romanian universities in Shanghai classification (Top 500)	no.	2006	0	2
2	Share of companies developing innovation activities (according to Community Innovation Survey)	%	2002-2004	19%	+100%
3	Employees in high-tech domains of the total of processing industry	% of the total employment.	2004	0,4%	+100%
4	Employees in intensive high-tech knowledge services in the total service employment	% of the total employment	2004	1,5%	+75%
5	High-tech products export	% of the total exports	2004	3,8%	+50%

Economic and social priorities of Romania are taken into consideration when establishing the relative importance of the three strategic objectives of RDI system: creating knowledge, economic competitiveness and social quality. The trends of scientific research worldwide are taken into consideration by result indicators of each particular programme. The application of the model will be done on the basis of specific methodology, approved by the Decision of the President of NASR.

### 3.2. Monitoring the NP II

Monitoring the implementation of the NP II is conceived as a process which follows the degree in which the strategic objectives are achieved by the contribution of the programmes.

Accordingly, the types of monitoring indicators are:

- Assessment and impact indicators for the RDI system. The number of these indicators is relatively small, providing a synthetic image on RDI system results and the sustainability (human resources and capacities)
- Results indicators per programmes. All these reflect the direct results of the investment in RDI using different instruments.

Building such indicators shall be based on an electronic integrated and transparent system for gathering information, which shall avoid the double entry of the results and shall clearly state the responsibilities of different actors regarding the veracity of data.

### 3.3. Institutional framework

Pursuant to the principles of National Strategy for RDI, for carrying out the monitoring and assessment of the implementation of the actions provided, the following institutions and organisms shall be set up:

- Romanian Council for Scientific Research
- Romanian Council for Technological Development
- Romanian Council for Innovation

Until the evaluation of necessary legal modifications, the attributions of the Romanian Council for Scientific Research, of the Romanian Council for Technological Development and of the Romanian Council for Innovation shall be temporarily carried out by the existent organisms, set up according to the laws in force (CNCSIS\*, CCCDI\*\*) and the Scientific Council of AMCSIT\*\*\*). The structure and the operation of these institutions and organisms shall be established depending the concrete requirements of the Romanian research, development and innovation system, in keeping up with the international practice.

\*) National Council for Scientific Research in Higher Education Institutions

\*\*) Advisory Board for Research, Development and Innovation

\*\*\*) Scientific Council of the Managerial Agency for Scientific Research, Innovation and Technology Transfer

#### 4. State budget financing of NP II

The total of the National Plan II – 15 000 million lei from the state budget, out of which:

- I) Human resources – 1350 million lei;
- II) Capacities – 2025 million lei;
- III) Deas – 2700 million lei;
- IV) Partnerships in the main domains - 5400 million lei, of which:
  - 1) Information and Communication Technology .....10%
  - 2) Energy .....10%
  - 3) Environment .....14%
  - 4) Health .....14%
  - 5) Agriculture, food safety and security .....12%
  - 6) Biotechnologies .....7%
  - 7) Innovative materials, processes and products .....15%
  - 8) Space and security .....8%
  - 9) Socio-economic and humanistic research .....10%

V) Innovation – 2025 million lei;

VI) Sustaining the institutional performance – 1500 million lei;

Rectifying the budget of the National Plan II per programmes and per instruments shall be done in keeping up with the investment model provided at point 3.1.

## 5 THE CEILINGS

On the basis of which direct salarial costs are calculated, for financing contracts concluded starting with the 1st January 2007, from budgetary funds allocated to the National Plan II,

Ctr. no	Categories of activities	Level of studies	Position / professional degree	Upper limit in euro/person/month
1.	Activities requiring a high level of creativity and / or management experience and skills	Higher	CS I, CS II, IDT I, IDT II, university professor, university lecturer, programme / project manager	4300
2.	Activities requiring advanced knowledge of analysis and synthesis methods as well as application skills	Higher	CS II, IDT III, CS, IDT, university lecturer, university assistant, programme / project manager, project responsible	2900
3.	Activities requiring knowledge of analysis and synthesis methods and research methodologies as well as application skills	Higher	Research assistant, doctor's degree candidate, master's degree candidate	1900
4.	Support activities	Higher or secondary	TI, TII, TIII, TS, other	1000

Note: the upper limit shall include all taxes due by the employee, and shall be applied to the income earned by a person for taking part to one or more projects within the National Plan II.