Strategy for the development of research and innovation 2020:

Knowledge Moldova

24/10/2012

CONTENTS

I. INTRODUCTION

Implementation in the Republic of Moldova of the components of the "knowledge triangle" – education-research-innovation is an imperative for the country's development process.

Given that education has been declared as a national priority, it is necessary to fortify the role of research and innovation and to develop a strategic vision regarding production and application of knowledge. Thus, research-innovation becomes an instrument for long lasting economic growth and a mechanism for social cohesion and population prosperity.

The European strategic framework - "Europe 20202" regards research and innovation as a pillar for economic development and competitiveness of the European economies. The same idea can be found in national strategic documents of the EU member states. Allocation by the European Commission, in July 2012, of a record budget of 80 billion euros for research activities, within the framework of EU's FP7 for science, technological development and demonstrative activities, proves the commitment of EU institutions as well as of the member states regarding the economic revival and creation of new jobs based on research and innovation activities.

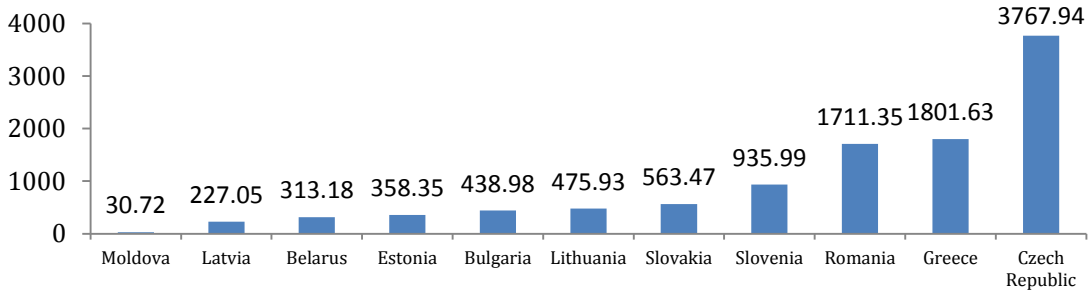


Figure 1. Financing of research and innovation (in comparison with other states, 2011)

Research and innovation (RI) in the Republic of Moldova is challenged by the problem of efficient application of some austere budgetary resources in order to ensure excellence based research processes, which are integrated in the international research circuit and focused on satisfying the ever growing demands of society and national economy.

The development and implementation of this Strategy has the goal to create an appropriate environment for proper activities of science and innovation in the real sector of the economy. This environment is the key-element in building of a veritable society and knowledge based economy in Moldova.

The following ***principles*** are to be applied in the process of Strategy implementation:

- Consolidation of RI infrastructure and efficient development of organizations from the RI domain by applying a proactive approach,
- Concentration of resources and public investments in priority domains of research,
- Stimulation of private investment in RI activities,
- Interconnections of RI policies with those from related domains,
- Mutual responsibility of researchers and beneficiaries oriented toward results and continuous dialog among RI actors,
- Proportional relation between performance and institutional financing,
- Competitive selection and promotion of RI staff based on professional performance criteria.

The priority domains for RI development will be established on: strategic development directions for the RI domain, European thematic priorities, evaluation of the existing scientific potential as well as on economic analysis.

The strategy is based on an extensive Foresight FOR MOLDOVA exercise, which was carried out in 2011-2012, with the participation of national and international experts, which had the objective to work out the concept of development for research until 2020.

As a result, the Vision of the strategy was developed and was subject to public debates within 7 workshops which were attended by XXXXXX individuals.

In order to develop the strategy, in 2010-2011, an ample analysis of the current state of play of the RI system of the Republic of Moldova was carried out by a team of experts from abroad, within the INCONET EECA project.

The strategy was developed taking into account the complementarities, the synergy and close connection of national policy papers such as MOLDOVA 2020 –National development strategy: 7 solutions for economic growth and poverty reduction, Working Program of the Government and sector strategies.

1. CURRENT STATE OF PLAY

The level of development of a society is determined, to a large extent, by the performance of RI. Highly qualified human resources, creativity, knowledge production and capitalization have proven, in time, to be determining factors of highly developed states. Moreover, the summary analysis of the economic situation of Moldova has shown that the

economy is constrained by the national capacity to limited production; demand is satisfied by the import of goods and services. The current economic growth model based on remittances and consumption has proven to be unfavorable for the sustainable development of the country. The new economic model, undertaken by the Government of Moldova through the 2011-2014 Activity Programme: European Integration: Liberty, Democracy, Welfare, implies the substitution of the development paradigm from a country with an economy based on consumption to an economy based on investment, innovation and competition as well as society, in whole, and each individual, in part, must benefit from the effects of a robust, organic and balanced economic growth[1]. Achieving this objective implies the increase of the share of **science-intensive** products, obtained by means of RI.

In the last decade, RI State policies have evolved, being more coherent and complex, with new strategies, situated at the interference of different authorities. Internationally, after the adoption of the EU Lisbon Strategy, that specific timeframe is characterized by political activities in which reforms where enacted in order to promote excellence in public sector research. These reforms include evolutions at national level, as well as organizational, and are: introduction of legislative amendments in order to create more autonomous research organizations, with a higher degree of managerial autonomy and a reduced centralized administration; introduction of national research policies with specific themes and explicit strategies as well as a commitment to raise social and economic benefits; introduction of more competitive financing models and shifting the financing balance towards performance based allocations and funds, directed toward specific targets.

Given international best practices, and the level of development of Moldova, establishing national development priorities will have an impact not only on the processes of economic development, but also on welfare.

Since independence, Moldova's, science and innovation infrastructure system experienced a deep crisis caused by financial instability, the deterioration of material, technical and scientific resources, which caused massive exodus of human potential.

During the first transitional period (1990-1999), Moldova's GDP fell by 64%. This economic involution marginalized RI by 2004, funding for this period was at the limit. Public funding for RI decreased significantly from 0.73% of GDP in 1990 to 0.22% in 2004

[1] Activity Program of the Government of Moldova 2011-2014: Liberty, Democracy and Welfare, p. 6

(exacerbated by a sharp drop in GDP). Funding returned to 0.7% in 2008 and decreased to 0.4% in 2011.

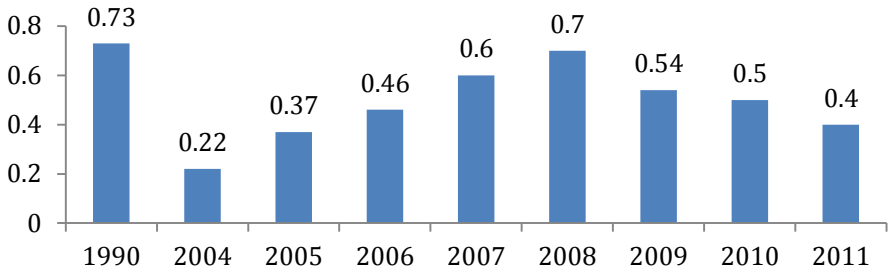


Figure 2: Allocations for RI 1990-2011 (% of GDP)

In 2004, the legal framework for RI was revised; the Code on Science and Innovation was enacted. After, the Partnership Agreement between the Government of Moldova and ASM has been drafted and enacted. This led to the concentration of prerogatives in elaboration and implementation of research policy in the ASM and a significant increase in RI funding. Premises were created for strengthening the scientific community based on strategic research directions. Following these reforms, the system acquired a positive dynamic of development, attested by international assessments, performed since 2007.[2]

The reform introduced new democratic elements into the RI system, also RI administration of Moldova was managed by the scientific community representative bodies – Assembly of ASM, Supreme Council for Science and Technological Development (SCSTD).

In 2006, as a result of the adoption of the Law on scientific-technological parks and innovation incubators no. 138-XVI from 21.06.2007, the Agency for Innovation and Technology Transfer (AITT) has been created and later, scientific-technological parks and innovation incubators.[3]

In order to increase the efficiency of financial resource management mechanism, in June 2012, the Center for Fundamental and Applied Research Funding was created, which has an autonomous status and organizes, in terms of transparency and openness to all stakeholders, calls on programmes and projects of fundamental and applied research.

In 2004-2008, a significant increase in public funding for RI was enacted. This trend was reversed and since 2009 funding was reduced not only as a share of GDP, but also in

[2] Report of the International Federation of the Academies if Sciences, presented at the Conference of the Academies of Sciences from East and South-East Europe entitled: Global and National Policies: The roles of Academies, 4-5 may 2007.
[3] Official Monitor of Moldova nr.107-111/476 of 27.07.2007.

absolute numbers. At the operational level, in recent years, many instruments have been introduced in order to stimulate **competitive funding** (State Programs, Institutional Projects, Technology Transfer Projects, Projects for Young Researchers, Research Infrastructure Projects, Projects for organizing scientific events).

Most of the RI is done in the public sector. ASM, along with 19 research institutes, is the leading research organization in the country and the largest research institution in the government sector. In 2009, the government sector accounted for 77.1% of its performance on GERD (72.8% in 2005).Performance of research and innovation of the ***private sector (business)*** is quite low, statistics in this regard are not nationally relevant.

Although ASM has taken several steps to strengthen human resources, education and research still show an insufficient connection between them.

With the diminishing of finance for RI, the number of researcher's has decreased simultaneously increasing average researcher age. Low level of interest toward research led to loss of quality of human potential and made it **difficult** to attract young researchers in this area.

Special attention is required on the matter of personnel training, in order to bring it in line with the needs of the national economy, especially in exact specialties, in the field of intellectual property rights, innovations and other important areas. Training and quality of scientific results is influenced by updating knowledge and continuous training of human potential, which is carried nationally at a low level.

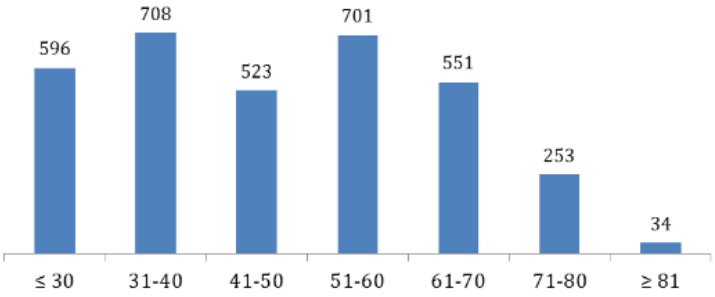
It should be noted that Moldova has implemented incentives to attract **young researchers.** This helps counteract the ageing trend of RI staff. The issue of the attractiveness of the researcher career requires a comprehensive approach, through a series of measures taken at the national level. **Doctoral programs** should be less bureaucratic and grading system should be changed (without lowering requirements) in order to enhance the attractiveness of obtaining a higher scientific degree.

Year	2001	2,002	2,003	2,004	2005	2006	2007	2010	2009	2010	2,011
Habilitate Doctors (total)	162	169	176	180	244	342	420	405	418	450	441
Doctors (total)	576	560	554	540	722	1,095	1,300	1,356	1,398	1,453	1,450

With regard to age distribution, the share of researchers aged over 65 years increased from 4.8% in 1999 to 14.2% in 2010 or 3 times, while the share of researchers aged 35-45 years decreased significantly from 26.5% in 1999 to 15% in 2010, or 1.8 times. In other words, about one fourth of researchers are of retirement age. At the same time, the share of habilitate doctors aged over 65 years increased from 27.1% in 1999 to 45.5% in 2010, and the number of researchers aged between 36-45 years and 46-55 years decreased 2.5 times and 1.7 times accordingly. The share of PhDs over 65 years increased from 6.5% in 1999 to 16.9% in 2010, or 2.6 times, and the share of PhDs aged 36 - 45 years and 46-55 years decreased 1.2 times.[4]

Figure 4: Distribution of scientists by age

(Source: SCSTD report for 2011)



Share of new equipment is 38%. However, the share of equipment over 10 years remains significant; it still constitutes about 42%, so it is necessary to continue efforts towards renewal. A relatively small proportion of infrastructure is of age 6-10 years (20%) which indicates a low level of investment in equipment, made in the period before the implementation of the Code on Science and Innovation. However, there are significant differences between the RI organizations, institutions with a profile on biology, chemistry, physics and engineering.

[4] Some aspects of the human capital of Moldova. Comparative Study, PhD. A. Rotaru, R. Cujba, Dr. S. Alexeeva, in Akademos no. 1 (24), March 2012, pp.32-36.

Figure 5: Percentage scientific equipment

(Source: SCSTD report for 2011)

Due to multiple uses, personal computers are indispensable in research in all fields of science. Currently, according to reports from RI organizations, scientific activities in Moldova use around 2000 computers. In most organizations, a researcher assigned to 0.8 of equipment. About 72% of these computers are connected to the Internet.

Most computers (40%) have up to 3 years, followed by those aged over 5 years (32%), the rest (28%) having 3 to 5 years. These indicators are distinguished by fields of science, observing better insurance with computers in life sciences.

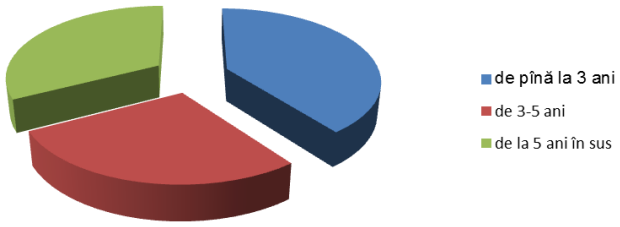


Figure 6: Percentage of computers

(Source: SCSTD report for 2011)

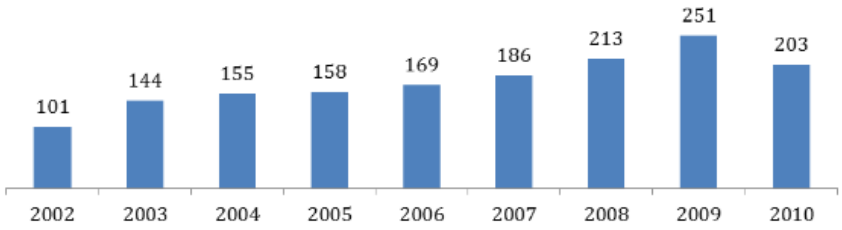
From the perspective of strengthening competitiveness RI personnel must keep in mind that Moldova also has **a scientific diaspora**, which should be drawn to the country by travel grants. These persons must participate in joint research projects.

Due to actions taken by the RI administrative authorities, substantial performance was achieved in terms of ***international cooperation.*** Since 1 January 2012, Moldova became the first country associated to FP7 of the EU. However, in recent years similar programs were launched, which connect to bilateral agreements in Belarus, Germany, Russian Federation, Romania, Italy, Ukraine.

Although RI organizations have produced substantial results, one of the main issues pertains to the efficiency of implementation of scientific results in the real sector of the economy. Although the number of patents registered by local scientists is growing, turning to the business sector is far from on par. Only a small percentage (2-3%) of the total number of patents is filed by companies and businesses. Interest is reduced to

international patents. Non-technological innovations (marketing, organization and so on) should be considered, especially in the service sector.

Figure 5: Number of patents - progress by year



Currently in Moldova's economy the innovation application rate is reduced, which generates low collaboration between research and business. Initial incentives are insufficient, existing innovative business tools are used inappropriately.

There is a need to ensure a favorable economic environment for innovation, to provide creative and educated human capital, able to innovate, who would operate in an open and attractive for research and development companies with a high degree of flexibility, high technological standards and ability to penetrate international markets.

Although under current legal framework incentives and tax benefits are provided, technical and scientific parks residents lack the effectiveness of the tools aforementioned above. Ties for innovation activities, legislative reforms should provide researchers the ability to create spin-off companies or start-up of research organizations. In terms of weaknesses, the lack of venture capitals is crucial. This instrument would stimulate innovative activities in private affairs. In addition, lack of incentives to create new innovative business and to stimulate innovation activities in already operational enterprises, particularly in sectors that have the potential to penetrate international niche markets.

Since 2004, some mechanisms have been put in place for **performance measurement of the RI system and its results,** for example by ASM, CNAA, the Court of Auditors and independent evaluations. Culture of evaluation and impact assessment needs to be improved further and be oriented towards the funding of programs and policies, research organizations and research infrastructure. The system requires a stronger focus on quality and excellence in scientific results of individual research groups. Quantitative measurement of results should be complemented with qualitative assessments, such as publications in international journals, citations, implementation of research results (i.e. use of patents), cooperation with business, results of technology transfer projects etc.

In general, the RI system problems identified can be grouped into several categories: regulatory framework need to adjust to new realities, increasing the amount of funding and access to, management issues, issues related to technology transfer and innovations, and issues concerning quality and promotion of local scientific results.

There are also general economic problems, such as:

- Inappropriate development and operation of real economic sector;
- Low share of industry in the GDP;
- Lack of specialization global economy;
- Uncoordinated export labor;
- Inefficient and wasteful use of renewable energy.

The social aspect indicates that Moldova is affected by demographic issues, low birth rates, migration excessive population and lack of mechanisms for preserving national heritage identity in the globalized world.

2. RESEARCH AND INNOVATION INSTITUTIONAL FRAMEWORK

The analysis of the actors interested in the field has the goal of identifying the main actors as well as their interests, in order to aggregate these interests in the subsequent process of elaboration of Strategy and identification of the strategic research domains.

The Science and Innovation Code has introduced a new model of RI administration and self-administration, which involves entities with divers tasks.

2.1. Structures with competences in science administration

The Parliament of the Republic of Moldova. The Parliament of the Republic of Moldova adopts legislative acts which regulate the organization and functioning of the RI; approves the strategic directions of the RI's activity and the volume of its financing; ratifies the international treaties regarding cooperation in the field of research and innovation.

The government of the Republic of Moldova. The operational activity of the research and innovation system is supposed to interact with the Government. As a corporate body, within the framework of which the scientific community is represented by the President of the Academy of Sciences, the Government approves by its decrees the policies in this domain. The Government signs a Partnership Agreement with the Academy of Sciences by which the Academy of Sciences of Moldova is enabled to implement the state policy in the field of research and innovation. Simultaneously, the Agreement stipulates: the strategic

directions of the activity in the RI field, the financing quantum, in accordance with the budget law of the country.

The Academy of Sciences of Moldova. The Academy of Sciences of Moldova is the only national interest institution in the field of RI. It is a plenipotentiary coordinator of the science and innovation activity. It is the highest scientific forum of the country and the scientific advisor of the public authorities of the Republic of Moldova. The ASM executes the competences of the Government in the research field, as well as the role of coordinator in promoting innovations and technology transfer. The Academy implements the state policy and carries out conceptual activities in RI filed, identifies the RI's strategic directions; distributes the budget allocations, carries out project contests, ensures scientific and methodical operation and coordination of the activity of the RI related entities; organizes and carries out fundamental and applied scientific researches, develops advanced technologies, develops concepts, state projects and policies in the economic, social, humanitarian fields; submits to the Government notifications regarding the situation in the RI filed as well as recommendations for the stimulation of the innovation and technology transfer spheres; develops the synthesis regarding the current trends in the social, economic, technological and human development of the country; stimulates the scientific and cultural creativity by organizing contests and applying a new and efficient reward system; establishes the partners and the efficient forms of cooperation with the national and foreign institutions in the RI field.

Assembly of the Academy of Sciences of Moldova. The Assembly of the Academy of Sciences of Moldova approves the Partnership Agreement between the ASM and the Government, the ASM's policy, elects the representatives of the scientific community, including those of the high education institutions, to the Supreme Council for Science and Technological Development, examines the annual report regarding the results of activity on the field of RI, identifies the strategic directions of the RI.

The Supreme Council for Science and Technological Development. The Supreme Council for Science and Technological Development is the executive body of the ASM's Assembly. The Supreme Council consists of 17 members. The Supreme council includes the following members: the President of the Academy of Sciences, the first deputy-president, 2 deputy-presidents, and the scientific secretary general of the ASM, ex officio, 6 representatives of the scientific community, including the representatives of the high

education institutions and of the State Agency on Intellectual Property, all elected by the Assembly for a 4 years term.

The representativeness of the SCSTD and its importance in organizing the current activity of the RI filed are essential for the national RI system. In terms of vulnerabilities, we can mention that the representatives of business and of civil society are not included in the SCSTD.

The Ministries and other authorities of central public administration. Participate in promotion of the state policy in the RI filed, work out proposals regarding strategic directions of RI activity and the state programs. The Ministries are similar when it comes to the competences and interests since they are bureaucratic institutions, which first of all belong to certain sectors connected to the political zone, they are closed entities and have their own point of view. The depth of the research domain is different, but the behavior is mainly similar.

The National Council for Accreditation and Attestation. It is responsible for the evaluation and accreditation of the organization from the RI domain, as well as for attestation of the high qualification scientific and science-teaching staff.

The State Agency on Intellectual Property. It organizes and carries out the juridical protection of the intellectual property under the form of industrial property, copyrights and connected laws on the territory of the Republic of Moldova, has the statute of a public enterprise and acts basing on the principles of self-management and self-financing.

Local public administration authorities. The international practice provides example of successful financing of infrastructure modernization by the LPA or involvement of research institutions in solving of the local problems.

2.2 Structures and components of the self-administration in science

The science Sections of the Academy of Sciences of Moldova

They are responsible of the level of development of the RI in the coordinated field.

The Council of Rectors is a body with advisory functions, at the national level, established under the provision of art. 48 paragraph (6) of the Education Law nr. 547 from 21.07.95.

The main responsibilities of the CR are: to formulate the proposals regarding the strategy of development of the high education; to formulate the proposals to the Parliament, Government and other authorities involved in the high education issues etc.

The universities' Senates. The proper functioning of the high education institutions is regulated by the University's Chart, approved by the senate of the university.

The scientific Councils of the research institutions. They establish the strategic and perspective directions in the field of RI; organize evaluation of the organization's activity, of the results obtained by subdivisions and temporary scientific groups, by each and every scientific researcher, approve the activity report of the organization; in the case of a public law organization, they elect on a contest basis the heads of units and the scientific researchers of the later, in accordance with the present code and with the chart of the organization; develop and approve the plans in RI depending on the national strategic directions and the current trends of development of the world science.

2.3. Executive structures of the activity in RI domain

2.3.1. Public law organization in the field of RI

Scientific research institutions. The scientific research institutions are methodically and scientifically subordinated to the academy of Sciences and are integrally financed from the state budget, on a contest basis, for fundamental and applied researches.

High Education Institutions. They are very important for the field, first of all from the perspective of educating highly qualified specialists and involving them in research process. Secondly, from the point of view of applying the research results in the process of education. At the same time, the insufficient development of the technical and material basis of the later, as well as overcharging of the researchers from the universities with teaching tasks has been mentioned. In terms of lower interests, the lack of will to finance the research from own funds and pleading for differentiated financing specific for infrastructure was mentioned. For the non-accredited universities the impossibility to participate in the national contests for the RI projects has been mentioned.

2.3.2. Private law organizations in the field of RI

Private high education institutions. They benefit, on a contest basis, of the right to be financed from the state budget in a proportion of up to 40% of the cost of the project in the field of scienc and innovation, on the condition of cofinancig.

Private scientific research institutions, including those whose juridical organizational form is that of a state enterprise.

Technological and scientific parks. They capitalize the scientific results and the innovations through economic activity;

Innovation incubators. They capitalize the scientific results and innovations from one or more technological and scientific domains through innovation and technological transfer activities and carry out researches in order to grant a scientific support to the mentioned activities;

Scientific and technological stations

2.3.3. Auxiliary organization on the RI domain

The scientific libraries of the organizations from the field of RI

The Center for Financing of the Fundamental and Applied projects.

The Center applies the state policies in the creation-innovation field by ensuring financing to the fundamental and applied research projects, according to the priorities set under objective and transparent conditions.

The Consultative Council for Expertise. Its goal is to analyze and evaluate the activities in the fields of science and innovation, the executioners and the results of scientific research, formulate scientifically grounded conclusions regarding the rationality and opportunity of performing this works at the expense of the state budget funds and from other sources of financing.

The State Agency for Innovation and Technology Transfer is the administrative authority if the field of RI, which provides administration to innovation and technology transfer activities. The AITT is an autonomous public institution, it has the stats of juridical person with public rights, which operates on the basis of a chart that has been approved by the Government at the proposal of SCSTD.

The Center for International Projects is an administrative body in the field of RI, with a financial autonomy, created to administer and promote European and international projects in the field of RI.

2.3.4. Other entities

The business environment. Cooperation with business community has a very big potential for development. However, currently we observe a lack of involvement of the business community in financing such kind of activities, or activities of importing new technologies from abroad. In Moldova, the expenditures of the companies for the RI field are much lower, even inexistent. Even if the statistics does not provide data regarding the private sources for financing of the RI, the WEF score for the expenditures of the companies for the RI domain places the Republic of Moldova far behind the EU member states and CIS countries as well.

The NGOs. The NGOs which activate as **think-tanks** are important when t comes to elaboration of certain studies of the issues of major importance for the society. Their cooperation with research institutions and universities is reduced to co-opting the personnel of the later as independent experts. We underline hereby the need to develop a set of conditions for accreditation of NGOs so that they could participate in national contests.

3. PREMISES OF THE ELABORATION OF THE STRATEGY

The existence of certain views and of clear objectives for the development of RI field is imperative. They are the essence of the Strategy and the solution for solving the identified problems, and provide a significant contribution to the social, economic and cultural development of the Republic of Moldova.

National policy papers such as The National Development Strategy "Moldova 2020" and the Action Plan of the Government which established the general directions of the country's development serve as a starting point.

In the context of European integration of the Republic of Moldova, the presence of the Strategy ensures harmonization, coherence and complementarity of the national policies with those of the community, with the "Europe 2020" Strategy and the documents regarding the development of the RI sector "Horizons 2020", taking into consideration the national peculiarities of the activities in the RI domain.

II. THE GLOBAL TRENDS IN RESEARCH GOVERNING

1. GENERAL TRENDS IN RESEARCH AND INNOVATION

During the last decade, the national policies of the states in the domain of RI have been evolving towards mixing the more coherent and more complex policies with the new

strategies situated at the interference of the activity of different ministers and towards operating changes in the institutional framework for RI administration. In the period of time that passé after the adoption of the Lisboan strategy of the European Union is described as a period of political activity oriented on implementation of reforms regarding promotion of excellence in the public research sector. These reforms included developments on both the national and organizational level, such as:

- Operation of legislative changes in order to create more autonomous research organizations, with a larger management autonomy and a reduces centralized state run management;
- Introduction of national research policies on explicit procedural topics and strategies and of the engagement to increase the social and economic benefits;
- Introduction of more competitive financing models and moving the financial equilibrium in favor of the performance based allocations and of the funds oriented to achieve the concrete goals.

At the same time, the national governments do not deny their responsibilities or their ability to influence public research. They apply new methods such as performance contracts, in order to guide the public basis of the research and to harmonize it with the political priorities. The EU member states, for instance, exhibit an increased interest in evaluation and performance monitoring, which is a collateral effect of the increase in the public research organizations' autonomy and of the necessity that the budgetary funds recipients to be able to exhibit an efficient and productive application of the public funds.

The EU member states adopted a complex policy in order to encourage the public sector to invest in the RI field. Due to the high level of immediate costs and of the long term reimbursement of investment, the firms are willing to invest relatively low money in RI field. Although there is a long tradition of public policy intervention, in order to deal with/solve this market miss-functioning a change is expected to happen in this domain soon: the relative share of the public funds for the business sphere's expenditures in the RI was constantly decreasing, and the state financing of the private RI activities is currently done through indirect measures, such as fiscal incentives.

Generally, the business sector can be engaged in different forms of cooperation with public research institutions, such as recruitment of researchers, purchase of the research results, nominating of the representatives of the business sphere in the administrative bodies of

the universities, supply of equipment for the research institutions, projects of the students within the companies et.

There is a continuous debate regarding the most efficient political instruments which can boost private investment in RI domain.

As a rule, these include direct financing of the collaborative programs together with the business community, as well as stimulating programs for public research organizations in order to cooperate with the private sector, fiscal and other financial incentives for the private sector research activities, such as tax facilities for the researchers employed by this sector:

- Direct financial measures for RI: include all the private sector's direct financial transfers that support RI in the public sector, by subventions and call loans;
- Indirect fiscal measures for RI: these include all forms of tax reduction for the companies involved in supporting the RI domain;
- Catalyzing financial measures: these include all the measures that allow and/or facilitate the access to external financial resources for the companies involved in RI, usually in the form of risk capital or loans and financial grants.

The fact that the RI field play a prominent role in the integrated directorial lines for economic growth and job places of the Lisbon Strategy, proves, on one side, the expectations of the member states, while on the other side, puts the pressure on the later, in order to convert the beliefs into actions. The integrated directorial line has confirmed that a 3% GDP quota for RI, with an adequate distribution between private and public investments, was a global objective to be achieved in 2010. But the reality proved that this objective was impossible to achieve, so it was reiterated in the "Europe 2020" strategy.

According to this directorial line, specific intermediary levels will be defined, and a combination of adequate measures to promote RI will be adopted further on, especially those in the business sector by, improving the framework conditions and ensuring that the companies perform their activity in a sufficiently attractive and competitive environment, by providing a more efficient management of the public expenditures for RI and by developing public and private partnerships (PPP), by developing and consolidating the excellence centers in the educational and research institutions in the member states, as well as by creating of new ones where it will be necessary, and by improving cooperation and technological transfer between the public research institutions and private

enterprises, by developing and better applying of the incentives for carrying out private research and development activity; by modernizing the management of the research institutions and universities, by providing a sufficient number of high skilled researchers, by attracting more students to scientific, engineering and technical disciplines and by consolidating the development perspectives for career in research field, as well as by inter-sector European and international mobility of the researchers and the personnel from the developing domains.

2. GLOBAL RESEARCH CONTEXT IN THE REPUBLIC OF MOLDOVA

The RI system has always been an important internationalization component in the Republic of Moldova. Due to the relatively small size of the scientific community, and of cultural confluence with different areas, international scientific relations have become a priority for the overall scope of the domain as well as for the individual players. More recently, the Republic of Moldova became the first country in the Eastern Partnership and the second country in the European Neighborhood Policy which associated to the 7th EU Framework Program for science and technological development. This provides new opportunities for participation in the European Research Area, but at the same time it implies a priory adoption of the European principles of the RI management. In this context, it is necessary to perform an analysis of global trends, especially those of European policymaking in public research and innovation, identifying the concepts and mechanisms which are underlying the construction of these categories of public policies.

In particular, the public policies related to the RI field are connected to the role of the public authorities in organization and financing of RI, covering all stages of research processes which is influenced directly or indirectly by public decision at a national, regional or international level. "The Science policy" - is a conventional term denoting this category of public policies – includes the public funding mechanisms, regulations (including legislation), planning strategic priorities identification mechanism, action plans and budgets construction, operation of governmental structures), evaluation mechanisms, development of human resources.

The field of the report also includes the public policies aimed at creation of environments that promote innovation. The report also outlines the mechanisms of strategic intervention, the link between the innovation programs of the government and the private initiatives, consolidation of partnerships between industry and university, sustainability of innovative mechanisms for economic development.

At the global level, for different domains of research and innovation, specific trends which are defined by the problems that challenge the humanity have taken shape. Formulating of a strategy cannot be performed without taking into consideration the aspects that are related to the main domains of the research and innovation at the global level.

1 Health, demographic changes and welfare. Efficient promotion of healthcare based on a solid and reliable data, prevents diseases, ameliorates the welfare and presents a positive efficiency/cost ratio. Healthcare promotion and diseases prevention also depend on understanding the determinant factors of health, on the efficient prevention instruments which are to be applied, as well as or the vaccines, on an efficient supervision and training in the healthcare and diseases filed, as well as on efficient programs of disease diagnosis.

The success regarding prevention, management, treatment and curing of the diseases, invalidity and reduced functionality are supported by a better understanding of their fundamental causes, of the processes of their impacts, as well as of the factors which determine a better health and welfare condition. The efficient exchange of data and the connection of these data with the studies on the real cohorts on a large scale are as essential as the clinical implementation of the research results, especially by carrying out clinical investigations.

2 Food security, durable agriculture, marine research and bioeconomy. A proper level of knowledge, instruments, services and innovations are necessary to support the agriculture and more resistant and productive forestry systems, from the point of view of resources application, which will supply a sufficient quantity of food, nutrition for animals, biomass, and other prime materials, as well as ecosystem services, contributing at the same time to the prosperity of the rural communities. The research and innovation will offer opportunities to integrate the agronomic and environment objectives into the durable production, thus they will provide: a growth in productivity and efficiency of the agricultural resources; reduction of emission of the gases with the effect of serum (SEG), reduction of leakage of nutrients from the cultivated plots into the terrestrial and aquatic environments; reduction of dependence on the imports of proteins of vegetal origin to (from) Europe; increase of the level of biodiversity in the primary production systems.

3 Secure, ecologic, and efficient energy sources. The energy sources and the consuming habits of the European industries, the means of transport, the cities and municipalities are in principle unsustainable, which makes a significant impact on the environment and the

climate changes. Development of buildings with emissions close to zero, of a very efficient industry of mass application by enterprises, physical persons, communities and cities/municipalities of the new solutions for the energy efficiency will require not only a technological progress, but also solutions of non-technological nature, such as consulting, financing and demand managing services. Thus, the energy efficiency can provide one of the most rentable ways of reduction of energy demand, increasing by this security of the energy supply, reduction the impact on the environment and on the climate and stimulating competitiveness.

4 Intelligent, ecologic and integrated means of transport. The research and innovation will contribute substantially to the development and adoption of the necessary solutions which will help to drastically reduce the emissions generated by the means of transport, through all means, and which are harmful for the environment, in order to reduce the impact of the transport on the biodiversity and to preserve natural resources.

5. Combating the climate changes, efficient use of resources and raw materials. The actual concentrations of CO2 in atmosphere are nearly 40% higher now than at the beginning of the industrial revolution and have reached the highest level ever registered in the last 2mln years. The gases with the effect of serum, others than the CO2 are also responsible for the climatic changes and play a more and more important role in this. Without decisive measures, the climate changes could cost at least 5% of the GDP per year, or even 20% according to some scenarios. In turn, the preventive efficient measures will allow limiting the net costs to approximately 1% of the GDP per year. In order to attain this 2% goal and to avoid, by this way, the most poisonous effects of the climate change the developed countries will have to reduce emission of the gases with the effect of serum up to 80-95% by 1050, in comparison to the levels of 1990.

The objective of this activity is to develop and evaluate innovative, rentable and sustainable measures of adaption to the climate changes as well as measures of attenuation of their effects, through which to target both the CO2 and the gases with the serum effect, others than CO2, and to highlight the ecologic, technological and non-technological solutions by generating reasons, which will allow taking efficient and information measures, on time, and placing necessary competences into the network.

6 A society favorable for the innovative and firm inclusion. The actual trends in the European societies provide opportunities for building of a more united Europe, but they

also generate some risks. These risks and opportunities have to be understood and anticipated in order to provide an European evolution with an adequate level of solidarity and cooperation in social political, economic and cultural issue taking into a count the constantly increasing level of interconnectivity.

On this context, the goal is to facilitate the social, economic and political inclusion in order to combat poverty, to consolidate human rights, to provide for the digital inclusion, equality, solidarity and intercultural dynamics by supporting interdisciplinary researches, indicator of the technological progress, organizational solutions and new forms of cooperation and co-creation. The research, among other activities, supports implementation of the Europe 2020 strategy, as well as of other external policies of the EU. Research in humanity sciences could have an important role in this context. Definition, monitoring and evaluating of the European objectives, strategies and policies will require research activities focused on high quality statistic data systems, and on development of the adapted instruments which will allow the decision factors to evaluate the impact and the efficiency of the foreseen measures, especially those in favor of social inclusion.

At the national level, in order to synchronize the national research documents with the international ones, the scientific community will identify in a transparent manner, by consulting the opinion of the relevant central bodies of the public administration, the new strategic directions until 2020, which will be included in the future partnership agreements, submitted for approval to the Government and Parliament.

III. STRATEGIC VISION ON REASEARCH AND INNOVATION

The vision of the present Strategy consists in elaboration of a system capable of creating an efficient scientific knowledge in the view of increasing the competitiveness of the national economy and the degree of the welfare of the population.

By 2020 the innovation and science domains of the Republic of Moldova will have a research priorities management focused on establishing of an efficient interaction with the society and the business community, and on result implementation and knowledge dissemination, while the internationalization of the research process and integration in the European research space will become a priority for the administrative policy of the research, which by that moment will be focused on performance and excellence with adequate human, institutional and infrastructural capacities.

1. CURRENT EVOLUTIONS IN SCIENCE AND INNOVATION GOVERNING

The nature of the research processes is subject to transformations, and these transformations contain many connected elements. In the context of developing of a new vision for the research and innovation system of the Republic of Moldova, these elements have been synthesized in three "key trends":

1. Orientation of research priorities;
2. Commercializing if the research results;
3. Evaluation of the research and innovation activities.

Orientation of research priorities

The first element is the desire for transformative guides research priorities. This trend acts on three levels:

Supranational level. European Commission Framework Programmes are the best example. These programs have attempted to model research priorities and develop research capacity to respond to economic and social needs. And the academic community to keep up the effort, since programs cover a wide range and provide additional resources valuable.

National level. Although research programs with clearly defined objectives existed, there was a trend in the development of dedicated research programs. Such programs try to focus on short-term research and priorities at the same time, to develop a long-term research agenda. In this context a tendency appeared to develop foresight exercises, which initially tried to predict the research needs for the future. Emphasis should be placed on identifying areas of excellence and areas where research is insufficient to support competitiveness.

System level. In several countries, the bodies responsible for managing RI began to adopt pro-active agenda and priorities, rather than reactive policies based on a peer-review system. Emphasis is on thematic programs is a compromise between political objectives and promising scientific results and existing capacitor. Similarly, research institutes, universities and other entities ties have begun to identify and manage research priorities.

Commercialization of research results

The second element related to marketing research. This takes two forms. First, in the absence of adequate public funding countries turn increasingly to alternative sources of

finance. Second, research institutes, universities and other entities ties are becoming increasingly aware of the value of intellectual property they generate.

Funding of research was always done from a plurality of sources, which contributed to increasing diversity and the research. What is new is the trend of governments to define their role in financing in terms of quasi-commercial research. These attempts to align public policy priorities in science policy and ties to markets, creating public-private partnerships *in fact,* is unlikely to reduce the diversity and creativity.

The second aspect, namely the concern for the exploitation of intellectual property causes greater concern. In a context of scarce public funding for country research institutes and universities, these were encouraged to develop alternative sources of funding so that the products of knowledge are evaluated in terms of market value, rather than long-term. Attempts to exploit intellectual property have two outcomes. The first related to the entity's organizational transformation of research, the question arises regarding the holder of various intellectual property components (researcher, team, group, institute) and negotiating the value of those components. The idea that research results are public goods, even in a case that is not compromised by the researcher, team or institution holds the ownership of a patent which the price can be negotiated with business representatives. Patent appearance was preceded by previous publications in specialized periodicals and presented at national or international scientific conferences. Entrepreneurs by purchasing the patent from the research can become monopoly on the domestic market in the production of a good or a service until another such good or service will not appear on the market. The problem is that the value of research is determined by the examination of the academic community and this process is affected by restricting circulation of results.

Evaluation of research and innovation

The third element is the growing importance of research management and, in particular, efforts to evaluate the effectiveness and quality of thereof. Trends are illustrated by the increasing number of Research Assessment Exercises (EEC). In practice, the evaluation criteria cannot be completely neutral in all areas there are preferred themes, concepts and methodologies. But such exercises include and evaluate all areas of research, taking a very broad approach to research. The entire process is transparent, evaluation criteria and evaluators are known.

2. PRINCIPLES FOR GOVERNANCE OF SCIENCE AND INNOVATION IN MOLDOVA

Building a strategic vision for the future of scientific research and innovation in Moldova led to the identification of a set of principles that government should consider for this system.

RI field autonomy and auto-administration

Performance and excellence in RI

Continuous prioritization of research infrastructures

Research infrastructures play a role in developing the essence of knowledge and new technologies. They are crucial in mobilizing a variety of stakeholders and finding solutions to many problems that society faces today. This establishes unique research infrastructures of very different users; attract young people to shape research and scientific communities.

New knowledge and, in particular, innovation can arise only if there is good quality and affordable research infrastructure. Research infrastructures enable the creation of new environments in which different researchers can access any facilities. Therefore, research infrastructures are at the center of gravity of a triangle of knowledge which consists of research, education and innovation.

Increasing the role of the basic researcher in research institutions

In a competitive environment the researcher is free and is in a friendly environment to submit and implement research projects. Also, the researcher participates in this context in the decision making processes within research institutions. In the new context of the research institutions for effective management focus on research to increase the efficiency of actual research and provide a professional space attractive for specialists. Finally, new research environments enable, encourage and rewards the development of interdisciplinary research teams.

Equally, one of the priorities of the national government R&D is the implementation of strict criteria for hiring researchers to ensure quality specific to the activities and results.

By creating targeted public facilities in private sector, public investment in research will help increase the number of researchers in business.

Valorization of research results in all areas of interest

On the one hand, the results of research projects are in a high proportion oriented toward national socio-economic problems (in national terms), with significant results in major demographic and social problems and increasing social cohesion in the Moldovan society. On the other hand, by fostering public-private partnerships in the development of research projects ensures scientific infusion goods and services to markets, focusing on the internationalization of science and national economic competitiveness.

The research focused on utilizing the results lead to long-term development of organizations such as technology parks and business incubators. In these environments research results are tested experimentally, applied to goods and services and lead to the increased quantity and quality of human resources to keep professional scientific research.

Implementation of innovative technologies, which are fundamental to increase the overall competitiveness of Moldova

Innovation offers real benefits for citizens, consumers and active people. Innovative technologies develop, produce and access new products, industrial processes and services. Development and implementation of innovative technologies is the key to creating new jobs, sustainable green building societies and quality of life, while ensuring Moldova's competitiveness globally.

To achieve these goals it is necessary to improve the research and innovation capacity of Moldova, to transform scientific research into products, services and innovative technologies. Moldova will have to allocate a greater portion of GDP to research and create an environment favorable to innovation.

Concern for national innovative product development

Innovation is the best way to help restore the competitiveness of Moldova’s economy and find the solutions to societal challenges in the global economy. A desirable future for the research and innovation system, is that it will become the engine of economic recovery, majoring the ability to turn knowledge into skills and competence in innovation. Local innovative product development and, mostly, adopting border products and services, are a way for a country to avoid the deficit of mineral resources and considerable population.

The Innovation Imperative enjoys strong support from diverse groups and stakeholders: academia, business and civil society.

IV. RESEARCH AND INNOVATION SECTOR DEVELOPMENT OBJECTIVES

1. GENERAL OBJECTIVES

1. Efficient management of research processes - innovation by improvement of the quality of human capital and principles of professional ethics

In the development of an innovative economy, human capital is the driving force of development. For this reason, the main effort should be made fully to create education able to generate ideas, absorb new knowledge. Currently, in Moldova there is a discrepancy between the demands of the labor market and training of specialists in universities. The goal of the higher education system is to develop individual completeness for graduates, so that the latter can recover investments in education after graduation relatively quickly through employment. The current situation shows that not all graduates continue their activity in the specialty they have received. Labor market changes constantly occur, which creates new demands from employers, especially newly formed companies that operate in new areas. Due to the small number of Moldova's population, it is necessary for universities to contribute to the continuous training of citizens.

The regulatory will make structural changes in education to develop higher applied education, enhance the quality of education at all levels. In college, students will attend management of intellectual property and innovation classes that will allow them to further exploit these assets. Creativity and innovation will be the basis of education.

2. Implementation of innovative technologies, which are fundamental for increasing the competitiveness of Moldova

Research institutes and universities will become proactive players in promoting research to business and start-up creation (including spin-offs) - an important indicator of outcome.

Public research infrastructure will be open to businesses (especially large companies) and small businesses will have access to research through research programs for the benefit of SMEs. In general, access to research will become very easy, and research within companies will be stimulated.

There will be a better management of intellectual property developed that will ensure recovery of patents, and adequate protection of intellectual property.

Research environment will be characterized by a good integration with the business, but also with the international research environment.

On the background of performance, research can become attractive both for people who want to commit scientific research and business, which will show willingness to invest. Thus, attractive research environments for society will be demonstrated when the number of young people coming in research is steadily growing, and businesses will invest both in applied research and technology transfer. Research institutions will develop links toward innovation (scientific research and experimental development, pre-competitive research) and establish links with companies to develop the final stages of the innovation chain (product development, production, product launch and marketing).

Innovations, even non-technological ones, are based on fundamental and applied research. Developing a knowledge-based economy cannot take place without a well-developed and efficient research system. One of the most important indicators of any research system is the number of researchers employed in Moldova which is significantly lower than in the countries of the region and the EU.

At the same time, generating innovations can take place both in research institutes, universities and companies. Technological innovations are indispensable for research and generation of new knowledge, which can then be transformed into technologies and products. Non-technological innovation can occur spontaneously even in firms without prior interest in research. However, it is necessary to have the capacity to innovate both technologically and non-technologically.

3. Synergy between research and education

Research and innovation governance system in Moldova will have to strengthen the close connection between education and research. Training of human resources for research should begin as early as pre-university education system. Learning is usually focused on science (science and humanities) and therefore learning activity is of the same nature as that of scientific research. An indispensable specialist school teacher-researcher is forming, in turn, research skills for students - future professionals who will integrate more successfully into society.

Preparing human resources for research should continue in the first academic cycle.

In the context of the Knowledge Society research plays a key role in the training of new specialists.

4. Creating, promoting and stimulating innovative activities (favorable conditions) in business environments.

Currently, most businesses in Moldova are working in sectors with low added value, mostly in services and in manufacturing mainly in agriculture, which is observed in exports. One of the main objectives of this Strategy is to assure the development of innovative and competitive companies in global markets. To ensure these qualities, it is necessary that companies can respond quickly and flexibly to changing local and global economy. At the same time, companies must be able to quickly absorb new technologies and to launch production of new products and services. Absorption capacities to innovations do not occur by themself, but must be developed and trained. Thus, as a first step, companies can absorb existing technologies, train specialists in areas already known, limited to the long-term, continuing technology development, design and production of new products. It was noted, in fact, that it is best when innovation absorption capacity grows first by implementing organizational and non-technological innovations, thus developing the culture of innovation, with a further advancement in technology, which requires the greatest competence.

Method for developing high-tech companies must be some size: support and stimulate the increase staff competence, implementation of new technologies (both imported and domestic) business development in global markets. Special attention must be paid to the environmental aspect of products, which will ensure continued sustainability.

At the same time, it is necessary to support and stimulate cooperation between research institutions and companies, which will also have a positive impact on firms, sanitation efforts and implementation of research results. However, only in cooperation with producers they can be transformed into technologies, products and services. Even if there is (and it is difficult to create) absorption capabilities, research findings will be sold, and investment recovered. Marketing knowledge created is an important task that must be considered in the development of the knowledge economy.

Companies with a high technological capability must be supported at all stages of product development innovation - from research and design stage up to the production and

marketing. Moreover, innovative system must be capable of dynamically adapt to changes taking place and to give them firm support.

Business will be focused on internationalization and exports - as growth options while acting locally to use existing opportunities in Moldova.

5. Improving and adjusting the legal framework of RI to the rigors in the domain and filling existing lapses

6. Creating synergy between business and the RI

7. Strengthening existing research infrastructure

For good conduct of the RI it is necessary to have an adequate infrastructure. However, research infrastructure is a crucial element in attracting young researchers. It is necessary to strengthen the capacity of existing ties.

8. Internationalization of research, integration into the European Research Area and increase of international visibility

2. SPECIFIC OBJECTIVES

A. Training and development of human capital in research and innovation

B. Providing quality research and innovation

C. Creating, promoting and stimulating activities (favorable conditions) innovative business environment

D. Internationalization of research, integration into the European Research Area and increase of international visibility:

E. Developing and implementing effective governance model R&D oriented performance and excellence

A. Training and development of human capital in research and innovation:

- Increasing number of young people aged 20-24 years who received at least secondary level education to at least 78% (currently - 60%)
- Increase the share of population aged 30-34 years who have received tertiary education to a level of at least 32% (currently - about 20%)
- Number of PhD students will increase substantially, especially in engineering specialties, reaching the average EU27.

- Increasing the number of employees involved in training throughout life to at least 15 of 100 employees.
- Entrepreneurial culture and innovation.

B. Providing quality research and innovation:

- Substantial increase in the number of scientific publications with at least one co-author of firms.
- Increasing the number of doctoral students from abroad, but also those who are PhD abroad;
- Increasing the number of foreign researchers attracted to develop research in Moldova.
- Universities will develop active partnerships with companies.
- Increasing the number of young researchers to at least 40% of the total number of researchers.

C. Creating, promoting and stimulating innovative activities (favorable conditions) in business environment:

- Develop a national communication methodology of science, in order (1) to prepare human resources for research (2) research priorities adjustment to societal needs and (3) empowering the society to the results of research and innovation.
- Development of specific tools to support the activities of science, science shop type activities, science days.
- Developing a methodology for prospective foresight type social problems at the local, regional and national level (as produced by RI).

D. Internationalization of research, integration into the European Research Area and to increase the international visibility

- Development of specific instruments to finance research projects involving complex international national consortia (default methodology for evaluating projects involving foreign evaluators).
- Development of specific tools to encourage participation of researchers in international projects.
- Constant adaptation evaluation indicators at all levels of activity in order to ensure visibility of science and innovation system in RM, the inter-operability with other systems to achieve national and international benchmarking study type.

- Stimulation journals in the fields of R&D and develop a uniform evaluation methodology (including the use of criteria of professional promotion of researchers and teachers).
- Developing a database of scientific journals of RM, with standard functions of peer-review, citation, editing, publishing, and monitoring and evaluation (including national and international conferences on topics RI).

E. Developing and implementing an effective governance model R&D-oriented performance and excellence:

- Introducing a funding model that would foster competition, development and application of scientific results in economy and society.
- Increase financing for the RI sector by 2020 to 1.5% of GDP.
- Increasing transparency administrative functions of the central government in science and innovation policy making processes and the processes of submission and evaluation of R&D projects.
- Development of a unified system for submission and evaluation of CDI (and related methodology) as part of a Strategic Information System for Science and Innovation System (default feature data collection and benchmarking).
- Identification of foresight exercises distinct class of system-level priorities.
- Introduction assessment of research activities. International evaluation of research institutions, criteria for program monitoring and scientific results, defining internal evaluation system RI organizations based on clear criteria and long-term.
- Setting premises (negotiation institutional positions - possibly by actor-actor analysis, actor-objectives) to develop an area of public-private dialogue on science and innovation.

3. INSTITUTIONAL FRAMEWORK BY 2020

Parliament adopts legislation governing the organization and functioning RI, approves strategic direction and amount of funding for RI, ratifies international treaties on cooperation aimed at research and innovation

Government. Signs the Partnership Agreement with the Academy of Sciences of Moldova. ASM is empowered to make state policy in the field of RI. Simultaneously, the Agreement provides: strategic directions of activity of the RI, the amount of funding, according to state budget law.

RI Advisory Board is an advisory body of the Government, which provides communication and cooperation between the main actors in the government, entrepreneurship and scientific community in developing and implementing RI policies.

Academy of Sciences of Moldova. Public institution of national interest in RI, the country's highest scientific coordinator of scientific activity and innovation and scientific advisor of the government of the Republic of Moldova, autonomous public institution that operates on the principles of auto-administration. The Academy of Sciences organizes and conducts basic and applied scientific research, develops advanced technology, develops concepts, projects and state programs, advises public authorities on the strategic directions of the state policy in the economic, social and humanitarian situation in the Government advice on the CI and recommendations for stimulating sphere of innovation and technology transfer activities organized to develop syntheses of socio-economic trends, technological and human resources of the country; stimulate scientific and cultural creativity by organizing competitions and applying an effective system of awards, determines partners and effective forms of cooperation with domestic and foreign institutions and organizations of the RI.

Scientists from Moldova Assembly is the supreme authority of auto-administration of the scientific community in Moldova made up of full members and corresponding members of the Academy of Sciences, of the directors of accredited organizations. The Assembly shall consider and approve the state policy in the field of RI, strategies, programs related to RI, identify strategic directions, approving once in 4 years the Partnership Agreement with the Government, Assembly approves statuses, examines and decides on the annual report on results of the RI in the country, forms the National Agency for Research and Innovation and Expertise Advisory Board.

General meeting of the Academy of Sciences of Moldova. The supreme governing body of the Academy of Sciences is the General Assembly of the Academy of Sciences (hereinafter - the General Assembly), consisting of: full members and corresponding members of the Academy of Sciences, 78 PhDs and doctors, elected by Departments of the ASM, for a period of 4 years (but not more than for two consecutive mandates) in the proportional representation (each 13 researchers from each section).

National Agency for Research and Innovation (ANCI) is the central administrative authority in science and innovation. ANCI leadership consists of 9 people, executives

confirmed by Assembly, at most, for two consecutive terms: 5 people in office: President of the Academy of Sciences, Chairman of Rectors, Director General of National Agency for Quality Assurance in Higher Education and Research (ANACÎSC), Director General of Intellectual Property Agency (Agency), President of the Chamber of Commerce in Moldova, one public representative from organizations of RI (agriculture and medicine) and private RI organizations as designated by the scientific community in relevant fields, a representative of the NGO sector, submitted by the Association for NGOs in Moldova.

ANCI is an autonomous public institution with legal personality under public law operating under Assembly. ANCI current activity is led by Executive Director of ANCI, designated according by contest, for a term of three years, by a majority of executives of ANCI.

National Agency for Quality Assurance in Higher Education and Research (ANACISC). The central administrative authority for the assessment and accreditation of organizations in RI, assessment and accreditation of higher education institutions and attestation of scientific and scientific-pedagogical personnel of higher qualification. ANACISC is an autonomous public institution with legal personality under public law, which operates under statute approved by Assembly, the proposal for nominations are, preapproved by Government.

Center for Fundamental and Applied Project Financing (CFPFA) is the administrative authority of the RI, which manages programs/projects of national fundamental and applied scientific research from funds allocated from the state budget. CFPFA is an autonomous public institution with legal personality under public law, which operates under the statute approved by government, proposed by the ANCI.

Expert Advisory Board is the administrative authority of the RI, which holds expertise and transparent evaluation of research and innovation projects by independent experts, local and foreign, including scientist's from the Moldovan diaspora. Expert Advisory Board is an autonomous public institution, operating under the statute approved by government, proposed by ANCI.

Agency for Innovation and Technology Transfer (AITT) is the administrative authority of the EI, which provides management of innovation and technology transfer. AITT is an autonomous public institution with legal personality under public law, which operates under the statute approved by government, proposed by ANCI.

International Projects Centre (IPC) is the administrative authority of the RI, with financial autonomy, created to administer and promote European and international projects in the field of RI.

State Agency for Intellectual Property. Central administrative authority, carrying out state policy in the field of legal protection of intellectual property in Moldova, as industrial property, copyright and related rights. State Agency has the status of an autonomous public institution is independent in taking decisions on the legal protection of intellectual property rights.

Ministries and other central public administration authorities. Participate in state policy promoting RI and develop proposals on strategic directions in RI and state programs. Ministries are similar in terms of skills and interests that are institutions, primarily belonging to certain sectors related to the politics.

Autonomous structures of science

Sections of the Academy of Sciences. Sections are responsible for the development and coordination of research. Each section promotes composition of the Academy of Sciences Assembly members, members and doctors correspondents, elected by the doctors and doctors of sciences of the section.

Sections are headed by an office, by a coordinator being a full member or corresponding member, and a Scientific Secretary, with the title of member, corresponding member or a PhD degree or doctor habilitate.

Rectors of Moldova (CRM) is a body established under art. 48 paragraph. (6) of the Education Law no. 547 of 21.07.95.

The main tasks of CRM are: formulating proposals on higher education development strategy, formulating proposals to the Parliament, the Government and other authorities involved in higher education issues etc.

University senates. Functioning of higher education institutions is governed by the University Charter, adopted by the senate.

Scientific boards of research institutes. Set strategic directions and future in RI organizes thematic assessment of the organization's activities, results of the work of subdivisions and temporary scientific teams, each researcher, approve the work of the

organization, to the organization of public law, choice based, contest, heads for subdivisions and scientists, in accordance with this Code and the Statute of the organization, develop and approve plans but on national strategic directions and tendencies of development of world science.

Scientific centers. Science and innovation organization or subdivision of such an organization that conducts research and development of their specific scientific profile.

Scientific laboratories. Subdivision organizations in science and innovation, including scientific centers that conduct research and development of their specific scientific profile. Laboratories may have the status of science and innovation organization that conducts research and development of their specific scientific profile.

Groups (teams) for temporary research. Created for the execution of programs and projects in science and innovation and concrete works.

V. INTERNATIONALIZATION AND REGIONAL COOPERATION

Since 1 January 2012, Moldova became a country associated to FP7 of the European Union (EU FP7). This status gives Moldova the right to initiate research and create European consortia, to participate in all offers of funding, to appoint representatives in management committees and working groups of FP7 and the European Research Area, to receive Commission support its network of FP7 National Contact Points, participate in research initiatives falling under Articles 169 and 171 of the Treaty establishing the European Community, having the same rights and obligations as Member States.

At the same time, unlimited access to the European Research Area in the field of research involves the Moldovan access to research infrastructure performance, attract additional funding of interdisciplinary research, benefiting from expertise in areas where we do not have sufficient critical mass, mobility of researchers in both directions and reintegration in their country of origin, the implementation of European and international standards in science and innovation in the country, the opportunities for participation of researchers and organizations RI international grant programs, ensuring mobility of scientists, amplification domestic science abroad visibility by creating international partnerships, solving problems of national interest by attracting external expertise, including local scientific research in regional and global issues, local scientific infrastructure integration in the academic world, increasing local scientific articles in journals with impact and awareness of the role of knowledge in society as a driving force for development.

Moldova's **strategic objectives** in the process of integration into the European Research Area for the period of 2012-2020 are:

a) Integrating scientific community of Moldova in the European networks of scientists, businesses and policy makers that set objectives and priorities of European research and innovation;
b) Encouraging and assisting researchers in Moldova for their participation on an equal footing in all EU Framework Programs research and innovation;
c) Potential benefit of European scientific excellence to solve internal problems of the Republic of Moldova;
d) Attract European investments in scientific research and innovation, as well as in the implementation of indigenous innovation products and services;
e) Promotion and protection abroad of domestic intellectual activity results;
f) Facilitating scientific mobility and access to European research infrastructure;
g) Hiring the Moldovan scientific diaspora in research and innovation processes in Moldova;
h) Strengthening traditional relations with partners and use existing partnerships to develop project proposals for submission to contests PC EU.

1. Deepening cooperation with EU research and innovation, external priority direction in RI efforts aimed at enhancing the scientific community association to research policies and full participation in the EU Framework Programmes (FP7, Horizon 2020, etc.) In this context, it should:

a) Promoting European advantages and remarkable results by research teams in the Republic of Moldova;
b) Capacity building for participation of researchers from Moldova in Framework Programmes (FPs) of the EU;
c) Recovery partnerships / projects of national and international bilateral and multilateral development projects for EU;
d) Hiring members of the Moldovan scientific diaspora research and innovation in the country;
e) Increased mobility of researchers through Marie Curie Programme of FP7 actions;
f) Research and innovation infrastructure connecting national to European networks;
g) Strengthening FP7 National Contact Point network;
h) Cohesion of internal financial procedures for the proper management of FP7 projects;

i) Initiate collaboration with research centers of pan-European level;
j) Promoting Moldova as a coordinating partner in FP, including coordinating projects such as IncoNet.

2. Amplification of regional cooperation within the Community of Independent States (CIS), the Organization for Democracy and Economic Development GUAM, Network of Central and Eastern Europe (CEENet), Central European Initiative (CEI), Cooperation Process in South East (SEECP) Black Sea Economic Cooperation Organization (BSEC), the Regional Cooperation Council (RCC) and other regional organizations in the field will be achieved by:

a) Capitalization traditional partnerships with CIS and examining new opportunities for regional cooperation and exploiting the advantages of Moldova as a bridge between the CIS and the EU;
b) Deepening multilateral cooperation within the International Association of Academies of Sciences (MAAH) and the Dubna Joint Institute;
c) Reinforcing cooperation with regional organizations: Network of Central and Eastern Europe (CEENet), Central European Initiative (CEI), Cooperation Process in South East (SEECP), the Black Sea Economic Cooperation (BSEC), the Council Regional Cooperation (CRC).

VI. SCIENCE AND SOCIETY

Possibility of dissemination and communication of research results to the whole society is a priority for research - innovation. National framework for funding these activities will include in all its programs specific component of dissemination (including free access to research results to end-users, citizens, business sector, civil society organizations and policy makers.

Their communication activities aimed at raising awareness on the importance of research and innovation in the overall development process.

Thus, the importance given to communicating the results of scientific activities and ensuring a continuous dialogue between science and society should be a fundamental principle in the governance of research and innovation system in Moldova. The role of science in society is changing, the function generator's input for policy formulation rational being particularly important. This transformation is realized in need for “democratization of science”, a participatory understanding of knowledge and analysis. In a knowledge

society in which positions are challenged and knowledge is distributed, it becomes obvious need to leave public information strategies and adopt strategies for mutual exchange of knowledge and values, i.e. dialogue between science and society actors.

Dialogue between science and society goes beyond traditional approaches of unidirectional communication, involving the participation of a wide audience. In this framework, a simple public information and visibility of research is considered a lower level of dialogue, relevant only in certain situations. At the top of the dialogue between science and society are found processes involving stakeholders in defining directions that will develop scientific research and innovation in Moldova. Deepening the dialogue between science and society will increase social cohesion, better management of uncertainty and social inclusion in areas dominated by elites. To ensure this strategic objective will be responsible for promoting the research and innovation. The successes of science have always been the company. But funding research and promoting innovation requires making decisions about priorities. Not all projects can be funded, not all innovations deserve promotion. Research and innovation should be done responsibly. This includes three main aspects:

- Ethical acceptability;
- Benefit of society;
- Management of risks.

Accountability is related to all relevant levels: government, research institutions, and individual researchers. Elements that characterize responsible research and innovation are:

1. All social actors (civil society, political strata, business, researchers) are engaged in research and innovation, increasing the quality, relevance, acceptability and sustainability of the innovation process by integrating expectations, interests and values of society;

2. A well-educated society, responsible and creative is powered by:
    - Appropriate methods of science education in schools;
    - Training programs and continuous researchers (especially young people) in ethical issues, economic and legal researches;
    - Exchange of views on the concerns of public research and innovation;

3. Gender equality is promoted at all levels and is integrated in the context of research and innovation;

4. Research funded from public sources is freely accessible not only to researchers, but all parts of society;
5. The ethical aspect is incorporated at an early stage of the processes and products;
6. Rules for governing are adjusted to promote the launch of the items mentioned above.

Finally, following this approach entire society is responsible for planning, implementation and effectiveness of research and innovation.

In promoting responsible research and innovation a major goal is to identify and engage all stakeholders in setting research priorities. It is important to channel efforts to segregate companies with interests converged to establish a dialogue with them and to identify the basis of relevant scientific priorities. In order to deepen the relationship between science and society, strengthening public confidence in science should encourage transparent engagement of citizens and civil society on issues of research and innovation by promoting science education by facilitating access to scientific knowledge by developing research agendas and innovation to meet the concerns and expectations of responsible civil society and citizens, as well as concerted activities for disseminating research results.

Using research findings in education will contribute to a well-trained human capital in conformance with this. Involvement of researchers in the educational process will be conducted primarily in higher education, by including undergraduate, postgraduate and doctoral students in the research process. On the other hand, lies in the awareness of the role of education in shaping human potential in research that will later access and quality of training of which is decisive for the quality of future research and innovation processes.

Promoting dual training systems will lead to future specialists' alike, educational institutions and business units, financing practical composition studies (laboratory work, workshop activities, production internships etc.) will be performed under economic sources, and theoretical components - from the state budget or contracts. For all businesses involved in developing dual training future specialists will be provided for tax relief. In addition, all of these businesses will be able to complete staff of specialists among the best graduates of these schools.

In accordance with the postulates of the dual system of training future specialists, school and business environment become equal partners, their overall responsibility for accounting for the formation of high-quality professionals.

Partnership between education and economic environment is a strategic priority and implemented based on:

a) Social dialogue and consultations;
b) Collective bargaining and collective agreement;
c) Social consultation and participation in decisions.
Partnership between education and economic environment also requires:
a) Creating distribution centers graduates in employment;
b) Providing places for practice;
c) Organizing job fairs;
d) Establishment of sectorial committees on economic fields;
e) Other activities and legal actions.

Economic sectors for which are sectorial committees are established by the Government.

Cooperation between science and business will help increase the variety and quality of scientometric products and services. This will require the establishment of incentive measures for creating new businesses and stimulate innovation of this kind in existing businesses.

Authorities responsible for administration of RI are to ensure a strategic alliance between science and business to achieve competitive advantages on national and international markets.

Connection between science and culture tends to develop a sustainable relationship between these areas. Both areas tend to seek answers to various questions related to a common research area. Research and culture go beyond the cultural context of scientific investigations and contribute to the consolidation of both.

In this sense, culture promotes a greater understanding of the point of view of society on science, different forms of existing management in various companies, the role of science in cultural life. There is a broad recognition of the interconnection and complementarity between science and culture.

Science will develop not only its own training culture, but also by interacting with the material and spiritual culture with other phenomena and processes in society and nature.

Scientific work, especially on the socio-humanities will have an important impact on the enhancement of the national heritage material and immaterial. Providing scientific advice

on issues related to national culture values will be one of the desirable outcomes of research.

It is important to channel efforts to segregate society with converged interests to establish a dialogue with them and to identify the basis of relevant scientific priorities. In order to deepen the relationship between science and society, strengthening public confidence in science should encourage transparent engagement of citizens and civil society on issues of research and innovation by promoting science education by facilitating access to scientific knowledge by developing research agendas and innovation to meet the concerns and expectations of responsible civil society and citizens, as well as concerted activities for disseminating research results.

Research and innovation has a widely recognized impact on areas such as business, health and environmental protection. All these areas will be included as priority action areas for various applied research programs, but also fundamental.

VII. MEASURES TO ACHIEVE SPECIFIC OBJECTIVES

1. TRAINING AND DEVELOPMENT OF HUMAN CAPITAL RESEARCH AND INNOVATION

Necessary measures to be taken to achieve this objective are:

1. Make the transition to the use of methods and technologies aimed at sustainable development and improving creativity and innovation knowledge
2. Update the content of educational programs of vocational, general and supplementary, given the level of scientific knowledge and technological world, especially in engineering and innovation technologies
3. Participation of representatives of high-tech businesses, researchers, innovators in the formation and implementation of educational programs for higher education
4. Organizing and stimulating internships abroad for training specialists and retrieval performance experiences.
5. Increase motivation of researchers and innovators by creating mechanisms to stimulate them.

2. QUALITY ASSURANCE OF RESEARCH AND INNOVATION

Necessary measures to be taken to achieve this objective are:

1. The development of research programs according to the needs and benefit of firms

2. Facilitating access to public funds for research for companies and in companies
3. Promoting collaborative research with researchers from other countries
4. The development of international exchange of students and researchers
5. Developing relationships with scientific diaspora
6. Modernization of research infrastructure
7. Capacity development and to stimulate applied research both in universities and institutes and in companies.
8. Facilitating and stimulating the international integration of national research, including through association to FP7
9. Increase research funding to have a high quality of research
10. Improving expertise and evaluation of projects in science and innovation
11. Improving conditions of employment of researchers, including from international research programs
12. Implement a system of social support researchers
13. Diversification opportunities to participate in international projects
14. Popularization of research, in particular the results obtained

3 CREATING, PROMOTING AND STIMULATING INNOVATIVE ACTIVITIES (FAVORABLE CONDITIONS) IN BUSINESS ENVIRONMENTS.

Necessary measures to be taken to achieve this objective are:

1. Removing barriers to innovation activities of enterprises and the expansion of modern technology innovation in the economy
2. Strengthen incentives to work at the company constant innovation and development of new technologies for business competitiveness
3. Improving management skills through support companies to implement new forms of management and non-technological innovations
4. Creating mechanisms to support and stimulate Moldovan companies to import advanced production technologies
5. Facilitate access to finance
6. Implementation tools access to research infrastructure
7. Stimulate the development of research in firms, especially large
8. Stimulate the implementation of non-technological innovation
9. Develop mechanisms to promote: marketing innovation, internationalization, innovation brokerage

10. Introducing innovation as a priority in national programs to support entrepreneurship

4. INTERNATIONALIZATION RESEARCH, INTEGRATION INTO THE EUROPEAN RESEARCH AREA AND INCREASE OF INTERNATIONAL VISIBILITY

Necessary measures to be taken to achieve this objective are:

1. Integration into the international research
2. Participation in international research projects
3. Obtaining research funds from international funds
4. Increase international visibility
5. Commercialization of scientific results on the international market

VIII. IMPLEMENTATION, MONITORING AND EVALUATION

RI strategy implementation domain will be provided by a complex mechanism involving many actors. The role of each actor is determined by the means and instruments of action at its disposal.

Implementation of the strategy will follow the main principles according to the strategy objectives and will be achieved by:

1. Action Plan, the main instrument for the implementation of RI Strategy
2.Transparency, public access to information about policies, instruments and results obtained access to information on funding opportunities for RDI public funds, including the development of e-government in R & D, simplicity and clarity of procedures for obtaining public funding of CDI;
3. Performance, evaluating the achievement of objectives in relation to the investment made. The action plan will include several stages of the Strategy.

Actions foreseen under goals will include all the research and innovation system, from preventive legal framework to assessment of the need for fundamental and applied research topics for society.

Monitoring, evaluation and correction mechanism will ensure resilience of the strategy based on national and international developments.

Monitoring and evaluation of the strategy will be based on performance indicators and implementation plans on all RI indicators, corresponding to the specific objectives of the

Strategy. A report will be developed and published annually that will track progress on objectives. Correction of the strategy will be based on the assessment results, assessment system and prospective elements related to developments in science and technology.

Evaluation will be independent, preferably international. Impact assessment of the strategy implementation will provide information necessary for future policy formulation.

Strategy implementation will be done by involving the concerned ministries and organizations, with the approval of the partnership agreement between the Government and ASM.

1. IMPLEMENTATION PHASES

Stage		**Responsible**	**Grades**
Strategic planning	Setting goals by National Research Council dialogue with society	National Research Council, Assembly scientists in the field of RI Primary Entities	
	Defining action strategy	National Research Council	
Implementation of strategy	Adequate resources for RI	RI Advisory Committee	
	Course of action by defining and managing priority projects	Funding Center Fundamental and applied research	
	Expertise and evaluation of proposals	Advisory Expertise	
	Defining actions in institutional projects	Primary entities of the RI	
	Implementation of actions by executing projects on a competitive basis and the institutional	Primary entities of the RI	

	Annual reporting of implementation progress	Primary entities of the RI	
Assessment of implementation	Frontal annual evaluation	Primary entities of the RI	
	Periodic evaluation of projects through competition	Funding Center for Fundamental and Applied Research	
	Assessment of the contest theme projects	National Research Council, Center for Financing Fundamental and Applied Research	
	Statistical analysis of assessment results	Advisory Expertise	
	Reporting on performance criteria, local and international	Advisory Expertise	
	Analyze the impact of implementing the macro-and micro-level	Advisory Expertise	
Remedies	Confirmation or adjustment of strategic actions	National Research Council	
	Operational planning management actions	Primary entities of the RI	
	Action planning domain structural adjustment	National Research Council	

2. ACTORS INVOLVED AND BY 2020

Parliament of the Republic of Moldova. National legislative body. Committee of the Parliament (Committee on Culture, Education, Research, Youth, Sports and Media) maintains communication with the scientific community and the government for this

purpose. Based on this communication, entities forward legislative proposals to Parliament for approval.

Government of the Republic of Moldova. National executive body. Provides resources for R&D activities and policies promoted at the governmental level correlate with the scientific community through CI Advisory Committee which is a platform for dialogue between the scientific community and the executive.

Scientists Assembly (AOS). Is a national representative body that includes members of from the RI entities, business and civil society. Leadership is ensured by rotation. Delegates or members of the National Research Council.

National Research Council (NRC). It is headed by a president elected by member. Drafts policy documents based on study of R&D of all stakeholders. Share institutional funding entities R&D state fund institutions based projects focusing on national research priorities.

Center for Funding Fundamental and Applied Research (CFCFA). Defines the themes of national projects, priorities and terms of reference. Announces national competitions for RI projects and performs project selection based on the findings of independent expertise. Allocate funds for R&D projects and performs their current monitoring.

Advisory Council of Experts (CCE). Through a network of national and international experts, executes the expertise of project proposals in the field of RI. Manages databases of experts defines evaluation criteria and provides results for financing expertise centers.

Primary entities of the RI (EPRI). Include research institutes, universities, research centers and laboratories where research and innovation is carried out. EPRI receive institutional funding. Attract resources through participation in competitions of projects and the results of research funding bodies. Are accredited by the CNAA periodically according to defined criteria.

National Council for Accreditation and Attestation (CNAA). Controls the primary accrediting entities R&D. Establishes criteria for awarding scientific and educational degrees. Validates decisions of specialized scientific councils for awarding scientific and educational degrees. Manages the database of highly qualified scientific personnel.

Intellectual Property Protection Agency (AGEPI). Examines and confirms the applications for protection of intellectual property ensuring intellectual property rights.

Agency for Innovation and Technology Transfer (AITT). Establish partnerships between stakeholders in promotion, marketing and implementation of scientific results.

International Projects Centre (IPC). Manages and promotes European and international projects in the field of RI.

Third entities (ET). Represent private companies. Participate in R&D activities through its network of collective funding RI or other entity independent of the RI.

International Scientific Community (CSI). Participate indirectly in the process of evaluating the results of RI of Moldova expressed in global scientometric indicators.

3. IMPLEMENTATION AND EVALUATION MECHANISM

Defining the structure of RI and its reflection in the legal framework.

1. Inventory of entire capacity (legal, human resources, heritage, research infrastructure, relationships, achievements, performance, etc.). National RI system will be optimized and improved efficiency will be attained through SWOT (strengths - weaknesses yield). Adjustment to EU standards to promote management positions in a competitive IC (up to 2 terms until retirement age, cumulating of management, etc.).

2. **Distinct delimitation of the domain of policy drafting and policy implementation, monitoring.**

3. Develop and implement legal acts (regulations, agreements (responsibilities, rights)) distinct actors (departments, institutions, leaders and so on) of the driving RI. Respect for the principle of autonomy.

4. Openness and transparency in the development, adjustment of the legal framework of the RI. Promoting unique rules for all. Popularization and continuous coverage of the role, place in society of RI (scientific community, business, civil society). Promoting best practices.

5. Promoting EU funding principles of the RI structures. Application of the share of funds for institutions that administer managed funds.

6. Orientation of strategic priorities. Linking strategic research directions aimed to develop research capacity to address social economic needs of national and international level. Taking in this sense practices applied within the EU Framework Programmes. Consultation with research priorities in the academic community, universities, civil society, SMEs etc.

7. Accountable research. Develop and implement criteria (performance indicators) research efficiency.

Preparation of amendments to legislation

1. Equal access on a competitive basis to fund of the budget of all stakeholders in research and innovation - research institutes, higher education institutions, SMEs, NGOs, etc. Integrating research with business. Developing partnerships and networks in the rI.
2. Develop incentives, development of standards for research funding by business (facilities fees, VAT and so on). Commercialization of research results through AITT. Popularization of intellectual property.
3. Develop and implement programs that foster research. Implementation of research programs according to research programs implemented in EU countries (ideas - supporting basic research capabilities - support and development of research infrastructure, human resources - to promote youth mobility and so on). Cover these types of programs through adequate funding of public funds and their allocation on a competitive basis.
4. Develop the legal framework for business partnerships, and appropriate financial coverage. Implementation according to EU practices incentive program partnerships through the legal rules of eligibility (at least one partner research institutions, a partner (research entity) and partner universities - trader).

Strengthen relations between educational institutions and research institutions.

Increasing role in the governance of Research and Innovation. E-Government

1. Promoting legal norms that academic community, is involved mandatory in solving socio-economic problems of national level. Promoting a dialogue between science and society, visibility and publicity. Promoting innovative products and services purchased by public authorities.
2. Combining research with educational processes.
3. Development of new technologies, globally and nationally competitive.

Mechanism for monitoring and evaluation of the implementation of the strategy

Research is complex; evaluation cannot be performed in a simple, straight manner. There is a need for complex procedures for monitoring and reporting developments to national and international standards. Specific aspects of this work are related to certain requirements.

1. In evaluating research a differential approach should be promoted to various research areas. This is necessary for several reasons. First, the impact of research results in manifests differently in different fields, both in time and in form and content. Also, under

the circumstances objective or subjective, some research areas can be disadvantaged. Ignoring them through our revitalization would lead to the total disappearance of field research.

2. Evaluation of a homogeneous community of researchers can be performed based on several quantifiable criteria, including:

- Academic performance
- Performance teaching / staff training
- Financial resources attracted in research
- Collaborations: national and international
- Social impact and visibility of research.

Because these criteria are quantified differently, evaluation must be done separately for each of them.

3. Performance evaluation mechanism should include quantitative assessment of researchers/institutes according to criteria defined above. Each criterion can be used and applied in tiers and a specific relative share. Tiers and relative shares of criteria are established depending on your current priorities and multi-annual statistics.

4. Adjustment processes require time monitoring, which necessarily involves using statistical techniques.

Therefore, to have a true view on the effectiveness of R&D strategy, evaluation activities should have a multidimensional aspect.

Evaluation of the micro-level

Activities:

- Segregation of entities RDI according to similar impact in research areas;
- Evaluation of entities from defined domains in separate areas, according to approved criteria;
- Statistical processing of evaluation results;
- Reporting assessment results to national and international standards.

Assessing at the macro-level

Action: Annual assessment evaluation criteria below

No	*Purpose of Assessment*	*Source*

1	R&D allocations as share of GDP;	National Research Council
2	Share allocations from private sector RI;	Center for fundamental and applied research funding, Primary entities of R&D
3	Investments in research infrastructure;	Primary entities of R&D
4	Impact scientific publications	Thomson Reuters ISI, Scopus, SCImago, ScholarGoogle
5	Training of highly qualified personnel	Ministry of Education National Council for Accreditation and Attestation
6	Activities of patent and intellectual property protection	Intellectual Property Protection Agency
7	Innovative sector share in the economy	R&D Advisory Committee

Following the evaluation corrective actions will be initiated which necessarily include all possible ways of stimulating R&D entities that are successful.

IX. RISKS AND SECURITY MEASURES

Implementation of the strategy is influenced by many internal and external factors. The strategy is crucial for successful **growth / decline of the economy,** conditions of crisis / recovery, development trends, the dominance of certain sectors.

Indicators	EU		Moldova	
	Value 2008	Objective 2020	Value 2008	Objective 2020
RI	1.9	3.0	0.6	1.5

Investment,% of GDP				

Fig. Investment in RI,% GDP compared with the EU

Years	2,004	2005	2006	2007	2008	2009	2010	2,011	2012
Total expenditure RI,% GDP	0.25	0.37	0.46	0.58	0.63	0.59	0.49	0.41	0.4

Fig. Evolution RI expenditure,% GDP

Specific policy knowledge triangle: Code on Science and Innovation, Education Code; related science and innovation policies, long-term national / sectorial development strategies (Research and Innovation Strategy 2020: Knowledge Moldova and others)

- Capacity human, institutional and infrastructure building;
- Defining, identifying and managing research priorities;
- Establish effective interaction with society, implementation results and disseminating knowledge;
- Internationalization of research, integration into the European Research Area and increase international visibility;
- Developing and implementing an effective governance model CDI-oriented performance and excellence.

Investment in science and innovation,% GDP	2013	2014	2015	2020
Optimistic scenario	1.0	1.0	1.0	2.0
Realistic scenario	0.39	0.5	0.7	1.5
Pessimistic scenario	0.39	0.38	0.37	0.7

Fig. Indicators projections / scenarios for the evolution of the field of RI

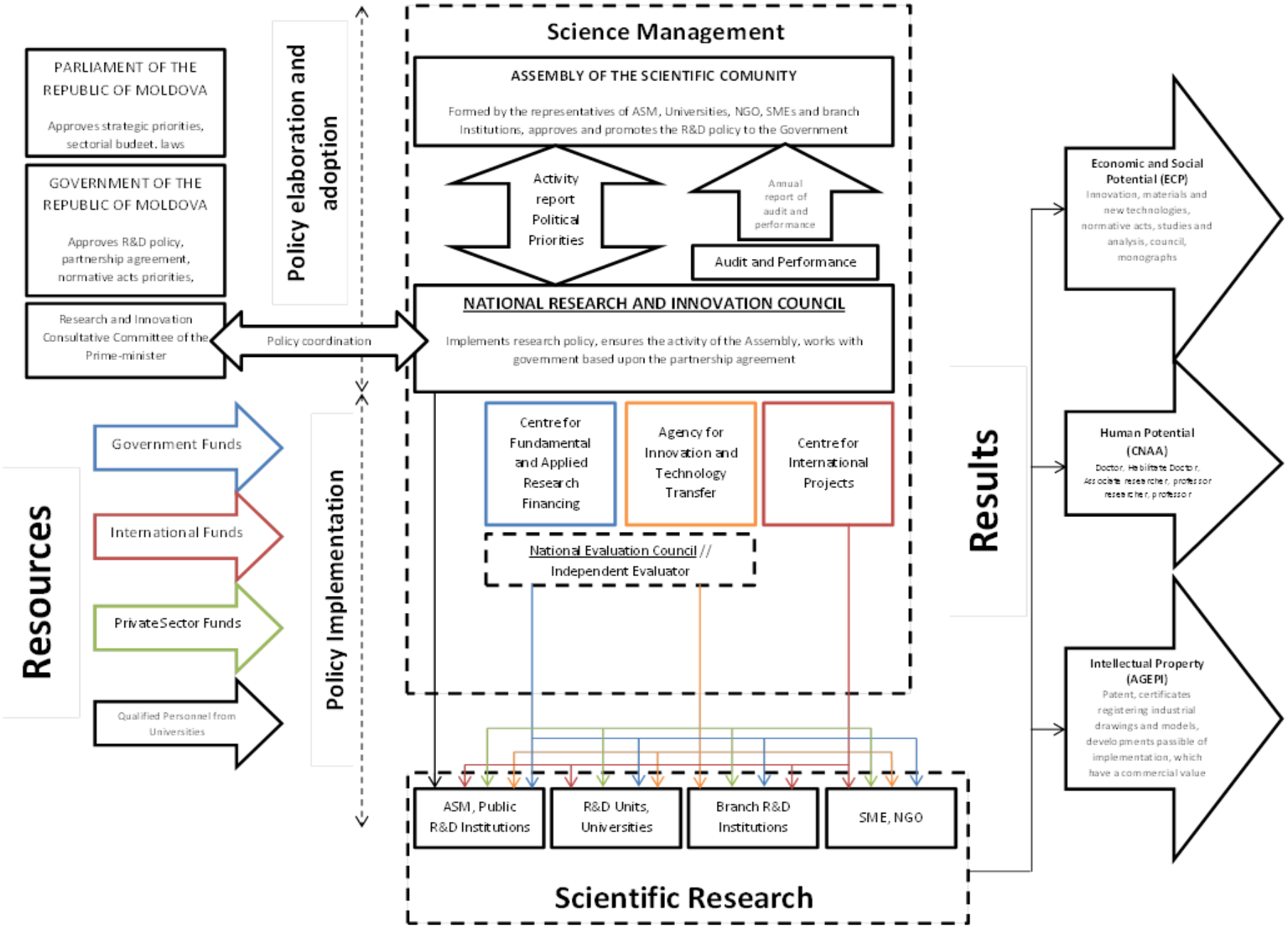
Risks:

1. Inconsideration of RI as a national development priority;
2. Maintaining austere financing activities for RI;
3. Unattractive career in research and education, exodus of qualified personnel;
4. Carrying out reforms without prior analysis of the impact;
5. Poor quality of project proposals submitted to competitions, funds and other international funding;
6. Failure to apply professional qualifications obtained through international mobility;
7. Poorly managed researcher mobility, phenomenon of brain drain; degradation of research infrastructure and lack of investment for its modernization;
8. Failure in conducting research due to defective and counterproductive mechanism of equipment procurement system.
9. Incompatibility of the offer made by the R&D and demand of the real sector of economy and business in this regard.

Measures	Financial Resources			Sources
	2011-2013	**2014-2015**	**2016-2020**	
Strengthening the capacity and performance of science and innovation **for improving socio-economic situation:** - Development of technical and material research. Providing organizations in science and innovation with modern scientific equipment.	15000	25000	45000	**Budget**
- Increase the volume, quality and visibility of scientific production. Implementation of scientific results, inventions, new technologies, equipment, varieties, hybrids, pharmaceuticals and other intellectual property objects made on a competitive basis in the form of	4,721	7,444	14888 8,444	**Budget** **Private Sector**

programs and projects of innovation and technology transfer.				
- Qualitative development of human resources for research (doctoral schools, including cooperation with foreign universities, research integration diaspora). Efficient organization of the training of highly qualified scientific staff of doctor habilitate. Channeling process of preparing scientific and scientific-educational staff toward basic directions of the national economy and development of science in the world.	29503	29503	29503	**Budget**
- Administrative capacity building on the development, analysis and evaluation of policies.	29892	28566	42849	**Budget**
- Accreditation of organizations in science and innovation and organization of management of assessment and attestation of science and innovation institutions.	12237	9,400	14100	**Budget**
- Organizing, conducting and evaluating expertise of programs, projects and grants in science and innovation, competitions and scientific events, such as their executors and research results.	1,289	1,100	1,650	**Budget**
- Providing information in the field of RI to organizations	23470	331467	49720	**Budget** **Private Sector**

			10000	
Development of innovative infrastructure supporting Parks and Incubators	27000.0	20000.0	30000.0	**Budget**
Active participation of Moldova in the European Union 7th Framework Programme.	**23702.6**	**36849.5**	**45000.0**	**Budget**


Science Management
PARLIAMENT OF THE REPUBLIC OF MOLDOVA
Approves strategic priorities, sectorial budeet. laws
GOVERNMENT OF THE REPUBLIC OF MOLDOVA
Approves R&D policy, partnership agreement, normative acts priorities,
Research and Innovation Consultative Committee of the Prime-minister
Policy elaboration and adoption
ASSEMBLY OF THE SCIENTIFIC COMUNITY
Formed by the representatives of ASM, Universities, NGO, SMEs and branch Institutions, approves and promotes the R&D policy to the Government
Activity report Political Priorities
Annual report of audit and performance
Audit and Performance
Policy coordination
NATIONAL RESEARCH AND INNOVATION COUNCIL
Implements research policy, ensures the activity of the Assembly, works with government based upon the partnership agreement
Centre for Fundamental and Applied Research Financing
Agency for Innovation and Technology Transfer
Centre for International Projects
National Evaluation Council // Independent Evaluator
Resources
Government Funds
International Funds
PrivateSector Funds
Qualified Personnel from Universities
Policy Implementation
ASM, Public R&D Institutions
R&D Units, Universities
Branch R&D Institutions
SME, NGO
Scientific Research
Results
Economic and Social Potential (ECP)
Innovation, materials and new technologies, normative acts, studies and analysis, council, monographs
Human Potential (CNAA)
Doctor, Habilitate Doctor, Associate researcher, professor researcher, professor
Intellectual Property (AGEPI)
Patent, certificates registering industrial drawings and models, developments passible of implementation, which have a commercial value