

# THE INTERACTION OF POLICY-MIX INSTRUMENTS CONDUCTIVE TO INCREASING R&D INVESTMENT IN ROMANIA

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**ABSTRACT:** *The “policy-mix” is a relative new concept in research-development and innovation literature and policy. It has been introduced some years ago, as a new model of resources mobilization through the coordination of different policies, having in view the accomplishment of the objective of allotting 3% of GDP for research and development (R&D) in the European Union countries. This concept refers to R&D (research programs, grant schemes or human resources programs) and non-R&D (legal, fiscal, monetary incentives) “packaged” instruments conducive to increasing investments in research and development activity.*

*Adjusting the R&D agenda to the requirements of integration in European Research Area, Romania adopted during 2005-2007, a “package” of instruments and policies that have had a beneficial effect on the R&D and innovation activities, especially in terms of increasing the public R&D financing.*

*In view of the present context of the big challenges of Lisbon Agenda 2020 and the recent budgetary restriction in Romania, this paper is a pleading for re-setting the “policy-mix” among the priorities of different policies, as a main solution for increasing R&D investment. The analysis of how the different sectoral policies and instruments should interact in order to reach the main objective of the policy mix is another aim of this paper.*

**KEYWORDS:** *R&D policy-mix, interrelated R&D instruments, R&D policy improvement, 3% of GDP objective*

**JEL CLASSIFICATION:** *K 33, K 34*

## 1. THE THEORETICAL BACKGROUND OF THE “POLICY-MIX” CONCEPT

The “Policy- mix” concept has been introduced in the literature and policies of the European countries starting with 2006, when the European Commission initiated and supported a special program aiming to provide policy makers a framework, best practices

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and policy tips and hints on how to create and implement an efficient policy mix for R&D<sup>1</sup>.

During 2006-2009 have been carried out, by a partnership of six research organizations specialized in science, technology and innovation policy studies, two types of studies: theoretical and conceptual analysis of the policy mix (Methodology development, Policy Mix Key Questions, Policy Mix Themes) and Investigation and Analysis of policy mixes experiences in more than 30 countries: country reviews for all EU-27 Member States, the United States, Canada, Japan and South Korea and case studies in selected countries, regions and sectors.

The novelty of the policy mix concept is that it relies on the idea that the combination of policy instruments interacting each other could have deeper influences on R&D investment rather than instruments taken in isolation. The other key idea is that R&D is not only influenced by policies from its own sphere (such as direct funding or fiscal incentives, etc.) but that it is also influenced by policies from other domains<sup>2</sup>.

A general definition of the policy mix is “a combination of policy instruments from different fields, which interact and influence the quantity and quality of R&D investments in public and private sectors”. This concept refers to the well balanced packaged of R&D and non R&D interrelated and conditioned instruments, crossing different governance boundaries that work in a coherent way as a tool for increasing R&D investments<sup>3</sup>.

Policy instruments are broadly defined as “all programmes, organizations, rules and regulations with an active involvement of the public sector, which intentionally or unintentionally affect R&D investments’. Interactions are referring to the “the influence of one policy instrument is modified by the co-existence of other policy instruments”.

Nowadays, the issue of the *policy-mix* for research, development and innovation (RDI) will turn into a major concern for the central, as well as local, public administration in Romania, as the new Lisbon 2020 target – to reach to 3% of GDP for research and development until 2020- will not be attainable without serious and committed involvement of the stockholders at the level of the central and local institutions of public administration.

The policy-mix for research, development and innovation sector integrates two distinct groups of policies:

(1) *R&D policies and instruments that* have direct impact on the level of investment in research and development activities. These policies are specifically designed to induce a more creative and innovative behaviour to the actors of the RDI system and consequently to increase the scientific and technological performance of R&D units and socio-economic relevance of their research output. The policies at the frontier between innovation and research-development, such as the legal provisions for the Intellectual Property Rights (IPR) and the policy instruments for the transfer of research results belong also to this group.

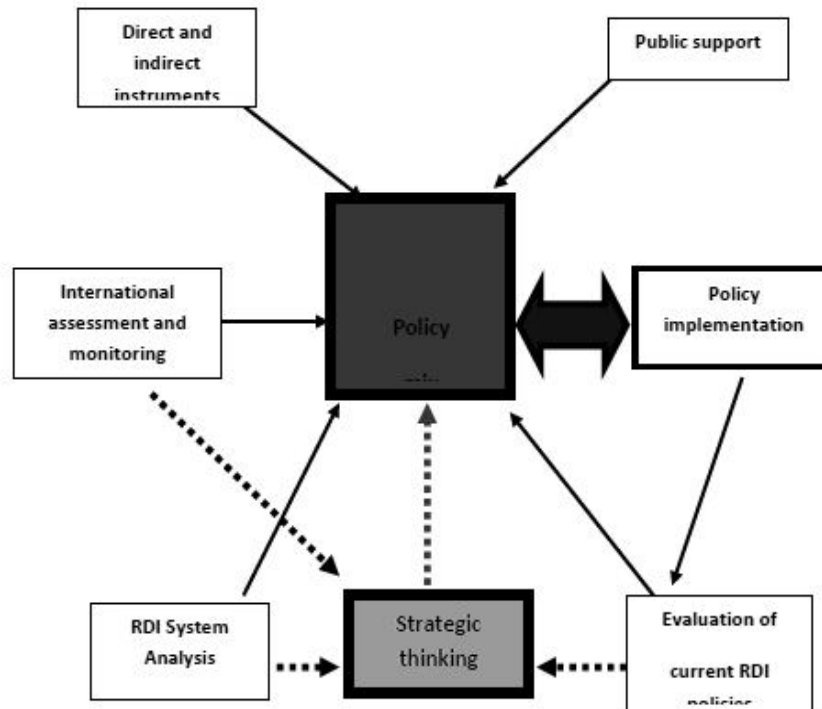
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<sup>1</sup> European Commission : Monitoring and Analysis of policies and public instruments conducive to higher level of R&D investments. The Policy Mix Project

<sup>2</sup> UNU-MERIT(2009): Policy Mix for R&D in Europe. A study Commissioned by the European Commission, Directorate General for Research.

<sup>3</sup> Patries Bockholt (2007): Monitoring and Analysis of policies and public instruments conducive to higher level of R&D investments. The Policy Mix Project, Thematic Report Mini-Mixes, January 2007.

Figure 1. The determinants of the “policy-mix” architecture



Source: Policy Mix Project Team (2006), “Methodological Report”, Report to DG RTD, <http://ec.europa.eu/research/policymix/>

(2) *Non-R&D policies, that indirectly affect research-development and innovation*, as they address public funding, human capital, fiscal policy, competitiveness, strengthening cohesion, national security, environmental protection, quality standards etc interact and have a direct or indirect influence on the R&D policy.

The impact and effectiveness of the various policies related to research, development and innovation depend also on the factors external to the RDI system, but, often, with decisive influence on it: the legal, economic, business environment, culture, industry structure, the openness of the economy, etc. These determinants should be considered when are evaluated the opportunities and threats of the RDI investment model implementation.

An important aspect of policy mix design in Romania is to ensure closer linkages between research sector and industry, through setting and enhancing formal or informal channels for communication and knowledge transfer. Increasing the contribution of the private sector in financing research, development and innovation activities needs new and

stronger incentives, mainly fiscal ones, for companies to engage themselves in RDI activities.

The Romanian policy-mix architecture should capitalize upon the interaction among strategies, plans, programmes, institutions and legislation and provide the support that the RDI system need in order to face the challenges to the current economic context.

While designing the policy mix, the policy makers have to evaluate *ex-ante* its impact on S&T base, stimulation of the innovation and entrepreneurship in the business sector, strengthening of the linkages between research and industry, providing the high qualified personnel and improving the system management.

The specialized literature<sup>4</sup> is focused on assessing the coherence and level of interaction between the RDI policy and other sectoral policies (industrial, agricultural, trading, fiscal, educational, financial, SME policies), with emphasis on its positive, negative or neutral impact, as well as on evaluating the capacity of the policy-mix to meet the socio-economic challenges and to be congruent with the priorities and objectives of the RDI policy.

A policy-mix model is dependent on its specific context and consequently it is not transferable. The starting point should be the overall assessment of the national research and innovation system and evaluation of the relative efficiency of each current policy instruments designed to sustain R&D activities.

It is worth to mention, also, that the *policy-mix* is a dynamic concept, as the National Innovation System – to whom research-development belong, is under continuous transformation and asks for properly adjusted policies.

The influence of the different policies and instruments on raising the investment in R&D might be *ex-ante* assessed, under various forms, according to the time-horizon, growth rates of GDP or of other economic indicators, forecasted trends of different economic sectors or of external relationships, the degree of integration within the European Research Area and European economy.

The interplay between the policies affecting the research, development and innovation area may be assessed according to an analytic model helping evaluator to identify the different types of potential inter-relations among the various policy instruments. The general public economic and social objectives and the policy targets outside the R&D area but interfering with it (such as competitiveness growth, environment protection, higher social cohesion, decrease of energetic dependence, preservation of national defence, high level of social protection) have to be correlated to the specific R&D objectives. Thus, the public financial support for research is justified, the economic and social efficiency of the funds allotted to RDI activities may be proved, and could rise the rate of research results transfer and implementation in economy and society.

Proper policy-mix governance is the critical point of the whole process efficiency. Good governance identifies in due time potential obstacles and finds the right solutions

<sup>4</sup> CREST-OMC, Policy Mix Group: Method of Coordination for the Implementation of the 3% Action Plan, Report prepared for the CREST Policy Mix Working Group by Ken Guy, Wise Guys Ltd., in conjunction with IPTS march 2006; S.Sandu, M. Dinges : Impact of policies and public financing instruments on R&D investments, in Romanian Journal of Economics, 2007, volume 24, Issue 1(33), Ken Guy, Patries Boekholt, Paul Cunningham, Reinhold Hofer, Claire Nauwelaers, Christian Rammer: Designing Policy Mixes, Enhancing Innovation System Performance and R&D Investment Levels, Methodology Deliverable, Task 3 March 2009.

for their elimination. Bad governance jeopardise efficiency of implementation even of a very good policy mix.

The policy-mix might be the result of an ex-ante designed project of the governmental representatives who have intentionally built a combination of correlated political instruments, aiming at the optimisation of the synergic impact. But, the policy mix may also be the outcome of unintentionally interacting different in function policy instruments and their efficiency and impact could be observe ex-post.

Unfortunately, it seems that the Romanian policy-mix is still more of an ex-post policy-making product than an ex-ante project. That is why the present paper pleads for a strategic thinking on an ex-ante designed policy mix, whose elements and interactions must be elaborated and monitored having in view to maximize the synergic effect of the all instruments portfolio that influence the rising of investment in research and development field.

The literature as well as the experience of developed countries, attests that there is no consensus on the measurement of the relative importance of each instrument of the policy-mix portfolio. For example, it is rather difficult to assess the impact of public financing, because of the inherent hindrances of the evaluation process emerging from data fluctuation and non-harmonisation, from incongruous evaluation methods, etc.

Subjective evaluation undertaken either by implementing factors or by the potential beneficiaries are not reliable enough, due to the high costs of systematic, proper investigation. The analysis of political strategic documents lacks consistency, given the frequent contradiction between the politic rhetoric and reality. Therefore, it is consigned to the experts' evaluation the task of analysing the level and direction of the impact of the different policies, as well as the importance that should be associated with the various instruments of the policy-mix portfolio.

## **2.DESIGN OF THE POLICY MIX IN ROMANIA**

The Romanian pattern of policy - mix is very complex, as the responsibility to elaborate, monitor, implement and evaluate the RDI policy is shared among many governmental institutions. The functions, attributes, policies, instruments that together make up the national policy-mix may be found at the level of most of the actors of the research and innovation system, from the special commissions established in the two Chambers of the Romanian Parliament, to the governmental institutions and academies of sciences- which set up the general policies for research, development and innovation, to the network of national institutes for R&D, research centres within universities, private research centres and institutes – which perform the national, regional, sectoral research programmes and projects.

The complex relationships between the different ministries responsible for education, science, industry and trade make more problematic the distribution and division of their R&D responsibilities. An operational policy mix needs a careful consideration to their specific mod of governance, to setting up of the efficient communication canals, and a mutual commitment to collaboration and joint action.

Moreover, R&D and non-R&D instruments do not automatically increase the performance and efficiency of research and innovation activity. Also, the quality of R&D

does not naturally increase due to the implementation of the incentives schemes. The management and monitoring of so many interrelated schemes is not an easy task. Consequently, the overlap of governmental efforts is very likely to occur. This might hamper the return on public investments made to foster RDI. The efficiency of the Government funds allotted to RDI might be diminished due to the difficulty of management and coordination during implementation.

The main body responsible with architecture and correlation of the different policies remains the National Agency for Scientific Research (NASR) within the Ministry for Education, Research, Youth and Sport (MERYS), which cooperates with other Ministries concerned with related specific policy fields, such as the Ministry of Economy, Trade and Business Environment (METB), and Ministry of Public Finance (MPF) which has a major stake in implementing such policies. According to the R&D and Innovation Law 57/2003, the interplay among policy instruments at a higher policy level is in the responsibility of the Inter-Ministerial Council for Science, Technology and Innovation, which should provide a framework for an inter-ministerial policy dialogue on R&D, ensure the compatibility of R&D and innovation policies with other social and economic policies and develop the legislative framework for implementing R&D and innovation activities.

NASR is commissioned to draw the policy for RDI, to monitor its implementation and to assess its impact on the research field, as well as on other socio-economic areas. It advances and promotes the RDI strategies intended to give optimal answers to the need for higher scientific prestige of the Romanian RDI system, and for more significant contribution to the economic and social development. The NASR is responsible with institutional and human resources for research and innovation, strengthening the capacity of research results valorisation, improving the innovative climate and the absorptive capacity of external funds.

Given the numerous institutions involved in the policy for RDI, it is rather difficult to evaluate how much NASR can effectively carry out the coordination role at the national level. It is also challenging to understand and assess how much the other ministries or institutions truly undertake their responsibilities, as their competences and tasks are overlapping or complementary to each other.

### **3. THE IMPLEMENTATION OF THE “POLICY-MIX” IN ROMANIA**

Designing a proper “policy-mix” should be based on the reorganization and restructuring of the R&D institutional system according to a strategic vision. A successful policy mix implementation depends on a establishment of an institutional framework that will monitor, analyze and synchronize all the component policies. In all countries with recent good R&D performance, concerted measures have been taken by all decision makers and, in most cases, some government-monitored centralized system was established.

In Romania, there is a need for a clear medium-to-long-term vision regarding who and how should manage R&D resources. Two restructuring objectives can be identified: at a horizontal level, there is a need to connect resource allocation according to monitored results and priorities of R&D priorities, within the framework of non-hierarchical collaboration; on a vertical level, there is a need to gradually elimination of the redundant steps in financing the system, ensuring more efficiency and flexibility.

In the context of R&D restructuring in Romania, implementing a modern management of R&D units, based on economic and competitive principles, would be a measure with positive effect on the fund saving..

*The increasing absorption rate of the European structural funds*, especially those designed to develop human resources and support innovation and regional development (areas where links with R&D activities is direct) is a good opportunity to increase R&D financing. Allocation of structural funds is under the jurisdiction of a number of ministries, who must actively collaborate in choosing of common priorities for R&D funds allocation. An actor that must be better involved in all such efforts is the Ministry of Public Finance.

State aid policy for R&D, according to European permissions, may have, also, a positive effect on R&D intensity if we can attract the different actors into the collaborative circuit.

The opportunities associated to the integration in the European Research Area (ERA) should be turn to good advantage. At the same time, it is important to find the balance between the following two alternative for investing in R&D: to massively invest in costly infrastructure, or in mechanisms and programs that will facilitate the access to similar infrastructure already existing at the regional or European level.

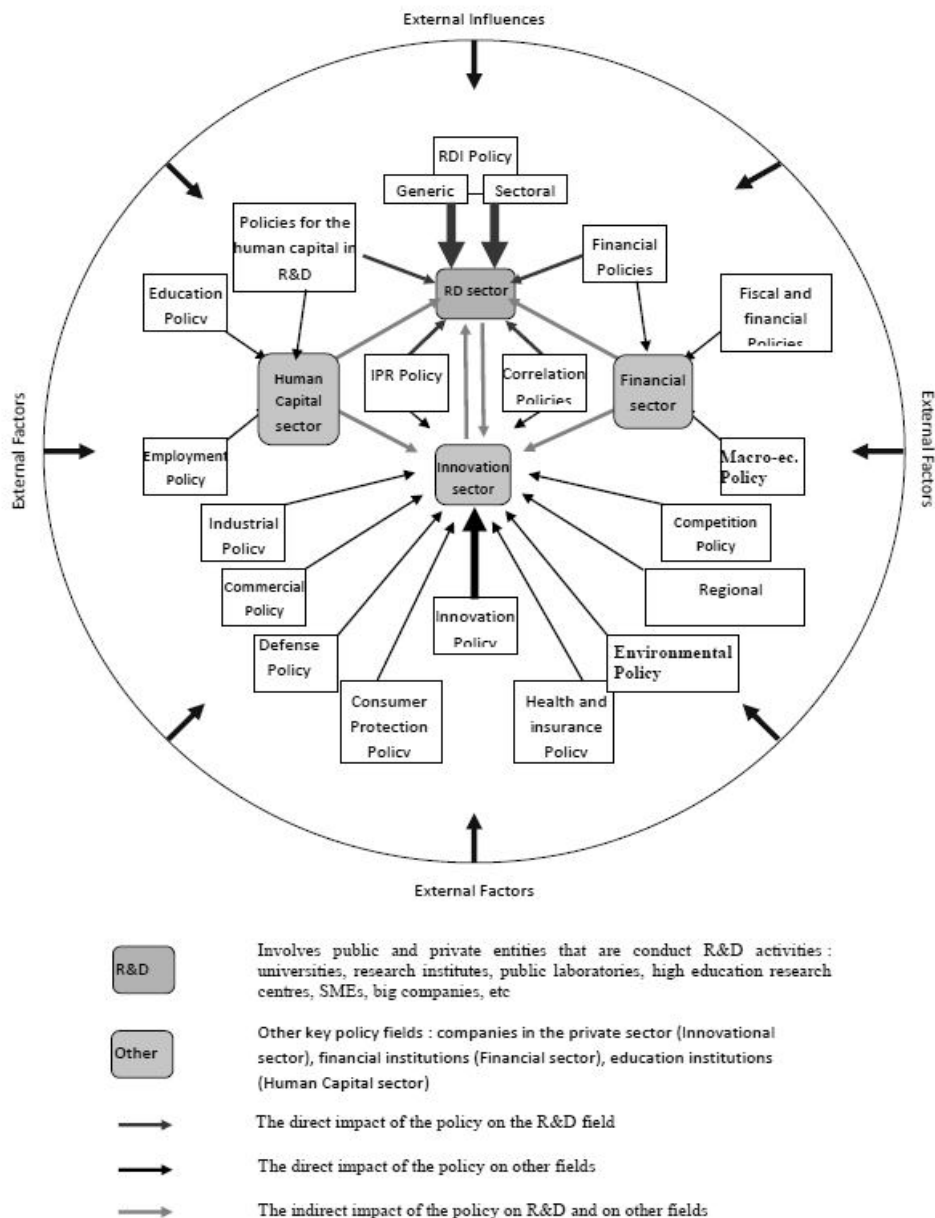
*Structural Funds*, as well as other similar EU financing programs, support also projects that encourage, technology and know-how absorption by SMEs in all industries. As far as Romania accomplished all European convergence objectives, considerable community non-reimbursable funds are available.

*Increasing economic competitiveness* is a priority with strong direct impact on R&D systems. In order to effectively and positively affect the innovation infrastructure, structural funds, generously allotted to competitiveness growth (POS Competitiveness) have to be headed towards projects congruent with the objectives of the strategy for regional development. Therefore, within the framework of the Competitiveness Sectoral Operational Program, priorities, measures and actions have been identified that will lead to increased competitiveness: supporting the application of R&D in the manufacturing industry by marketing improvement; stimulating investments in R&D infrastructure; strengthening cooperation between universities, research institutions and the industry in performing common research projects; supporting the use of information technology; developing and increasing the efficiency of modern electronic public services (e-Government, e-Education and e-Health); promoting e-business.

In order to increase business performance, to hold or improve their market share, the manager of the firms should be preoccupied by the technology gap reduction in order to maintain their market position. Ensuring access to technology and knowledge represents a major challenge for most of the Romanian company, and especially for the innovative SMEs which ask for financial resources. Supporting this aim, NASR and representatives from the Ministry of Economy and Trade, the National Agency for SME, and other economic ministries, actively involved in setting up the Document and Action Plan for *Romania's Industrial Policy* for 2005-2008. Correlated with the other policies and strategies of the national economy, Romania's industrial policy has the objective of increasing the role of research, development and innovation. According to the industrial strategy, industrial policies will continue to focus on consolidating and encouraging factors that lead to higher

industrial competitiveness, such as human capital, research, innovation and entrepreneurship.

Special attention has been given to the R&D as an important source of the competitive advantages and of decreasing the gaps between Romania and EU regions development. Although some measures have been planned to increase R&D and innovation activities in industry, the low performance of enterprises in the industrial sectors relieve a poor





Involves public and private entities that are conduct R&D activities : universities, research institutes, public laboratories, high education research centres, SMEs, big companies, etc

Other key policy fields : companies in the private sector (Innovational sector), financial institutions (Financial sector), education institutions (Human Capital sector)

An expression of a formal correlation between R&D policy and export policy is the special chapter devoted to R&D in the *National Export Strategy (SNE)* (2005-2009).

Increasing the contribution of R&D to the serving exporters interest is inserted among strategic line of this document. Therefore, research and innovation activates could play a critical role in the aligning the quality and competitiveness of Romanian products to European standards through modernizing technologies, or introducing new ones. This issue should be nowadays a priority for an export strategy.

The R&D have, also, a special place in the *Regional Development Strategy*. In order to ensure sustainability of regional development, the strategy includes a series of measure related to R&D field.

Another highly relevant indirect RDI instrument with potential positive impact on the research and development budgetary funds and also on the private RDI intensity is the *Fiscal Code*. In 2003, it introduced the flat tax rate of 16% on profits and revenues (from 25%-45% in 2004), and also stipulated the progressively decrease of the social insurances burden on the labor market (from 49.5% in 2004 to 42% in 2013).

Given the strategic role of RDI in business development and support, it is high time, now, that companies fighting for cutting costs make strategic and rational decisions towards allotting part of their available funds to investment in research and innovation, instead of sacrificing it. This would ensure a fast economic recovery and a fundament for future development. The new fiscal incentives for the RDI activities performed by the business sector, effective since January 2009, may have positive impact to this end, as they stipulate that that 20% of the eligible research and innovation expenditures are deductible from taxable profit. Moreover, innovative companies are allowed to use the accelerated depreciation method for the equipment and devices for research and innovation activities.

As a member of EU market, a major objective for Romania is to focus on the development of a more dynamic and competitive economic environment, able to assimilate and develop high technology domains and to respond to strategic demands for long-term development. Romania should orient its strengths towards the SME development public policies that gathers the direct and indirect RDI instruments and enhances them in order to increase the SME competitiveness and the export capacity of the Romanian business environment.

Despite the recent difficulties of exporters, some positive outcomes are evident in terms of bridging the technological and competitiveness gaps and in terms of higher exports value-added trough direct support to enterprises for introducing and applying good managerial practices for technological development and innovation activities, support for the development of a structured network of national and regional providers (infrastructures and services) specialized in technology transfer and innovation services, including scientific and technical information and assistance, as well as R&D projects.

The crucial role of supporting the RDI field is mentioned and set as objective not only in the R&D policy; it is also included as strategic objective in many non R&D policy

documents such as the Export Strategy, the Regional Development Program, the Sectoral Operational Programs” Human Resource Development” and “Competitiveness Operational Program”, the Environmental Policy, the Fiscal Code, etc.

Through various strategies, the Romanian Government has acknowledged the mission to bring the economy into the path of a technologically- led future and to establish new R&D intensive industries. In the context of current picture of the Romanian economy, the fulfillment of the mission is still uncertain. Many of the research projects financed with public funds have been suspended due to shortage of budgetary resources.

Romanian policy makers should answer the current crisis challenges through a policy-mix that brings together instruments specific both to the RDI field as to complement policy sectors. How fast and to what degree the current low to medium-tech structure of Romania’s industry will change, in the forthcoming years, is still difficult to determine, as the majority of new policy instruments have been introduced parallel to Romania’s EU accession in 2007<sup>5</sup>.

#### 4. CONCLUSIONS

This paper has highlighted the urgent need to re-activate the Romanian policy-mix for research, development and innovation, whose foundation has already been laid, before the accession to the European Union. Initiated and supported by responsible institutions of the European Commission, many analyses and scenarios have been carried out, demonstrating that the various policies and instruments for the field of research and innovation, interacting and acting together, may lead to the increase of public and private investment in R&D, much more than they, isolated would.

The policy mix, a relatively new concept in the literature and practice of the European Union countries, capitalizes upon the synergetic effect that a set of congruent policies and instruments may have on the volume and structure of the resources for scientific research and technologic development.

In Romania, the policy-mix has concerned the policy makers for the R&D field mainly after 2005, when, benefiting of international expertise and of cooperation with specialists from within many Romanian public institutions, a package of policies and instruments was designed by NASR that would effectively increase the expenditure for research, development and innovation up to 3% of the GDP, until 2010. Several positive effects followed, as the share of the gross expenditure for R&D in GDP rose, from 0,41% in 2005 to 0,58% in 2008, on the background of favourable macroeconomic trends, of fiscal relaxation and of various reforms on taxation, of high influx of foreign direct investment, of improved business environment.

Unfortunately, there have been some policies with either neutral, or even negative impact on R&D intensity. We may say that the industrial policy, the regional policy and the policy for SMEs had neutral effects, while the slow privatisation pace, the reform on education, the policies for human resources had negative impact. Unfavourable

<sup>5</sup> Ken Guy, Patries Boekholt, Paul Cunningham, Reinhold Hofer, Claire Nauwelaers, Christian Rammer: Designing Policy Mixes, Enhancing Innovation System Performance and R&D Investment Levels Methodology Deliverable, Task 3 March 2009.

consequences for research, development and innovation are also associated with the delay of many RDI measures, the allotment of public funds without regard to the real performance of beneficiaries, the low relevance to the economic and social priorities, deficiencies of R&D project management, the absence of impact analyses on socio-economic efficiency of the money spent for R&D, the weak cooperation between research and industry, etc.

The current Romanian policy-mix seems to be a mosaic of arbitrary ensemble of complementary or overlapping instruments, derived from ad-hoc policies, without clearly specifying the implementation methods or the volume and source of needed funding. In our view, there is still an offset between the official documents, with good intentions regarding the policy mix, drawn from the EU recommendations or practices on one hand, and, the institutional and managerial capacity needed for their effective implementation, on the other hand. Even if most of the governmental strategies and programmes refer to research, development and innovation objectives, they are weakly coordinated and the cooperation between various public institutions, for increasing R&D investment, is not evident.

The instruments of R&D or non-R&D policies cannot automatically increase the investment level in research and development. It is thus necessary to ensure their interplay and interdependence within a functional scheme specifically designed for this aim.

Responsible elaboration of the policy-mix may help the government avoid double financial effort that frequently occur, and save the insufficient public resources. Even if necessary funding should be available, a defective policy mix would hamper the efficiency of public money spending for the implementation of R&D policy instruments.

This paper has displayed an overview on the main challenges that face the Romanian decision makers regarding the design and implementation of the policy-mix elements that would answer the convergence requirements and the recent Lisbon Agenda 2020 objectives.

The bi-directional connection between the R&D system performance and its internal or external environment is strongly marked by the correlation of all policies directly or indirectly related to research and innovation. On one hand, the system may be favourably affected by the quality and quantity of the human and the public or private financial inputs. On the other hand, the optimum of investment in Romania has to be identified through collective thinking of the representatives of all the institutional actors involved in the design, implementation and monitoring the policy-mix. Therefore, this set of public policies can become an important tool for identifying and collecting the needed funds to support the research and development field.

Without the specific contribution of research, development and innovation activities, it would be unlikely to overcome the current crisis difficulties, to surpass the economic recession and to find the best solutions for a sustainable growth. Improving the industrial competitiveness, diminishing the technologic gap between the Romanian and developed countries industries may be accomplished through consistent congruency between the RDI policy and those of other economic sectors or of the macroeconomic policy.

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