

THE PROBLEMS IN THE EVALUATION THE RISKS ON INVESTMENTS OF INNOVATION PROCESS OF REPUBLIC OF MOLDOVA

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Abstract.

An innovative activity in the economy is the most important element of economic growth. This article is dedicated to research of the role of investment risk and implements innovations. It is well known that the interdependence between risk and profit, but there is a strong interrelationship between the risk of investment and innovative development of the country. In this article, the most important features of innovation for economic growth, as well as the direction of its investment, both from the government and from foreign investors and the private individuals are discussed. Based on this purpose have been characterized elements of investment risk has been made an investment risk analysis, innovation process and performance indicators. In that article presents a vision of innovation and investment activity in Moldova.

Key words: *Innovation, Investment, Economic growth, Research and development, investment risk, risk of innovation.*

INTRODUCTION

Innovation brings risk with it. This process largely depends on the investment risk. It is well known that investment in research generates the quality economic development of the country. Innovation imposes an eloquent rule: “if there is no risk, then there is nothing new” – innovation as a means of global competition is meaningless.

Actually, the realization in good conditions of the economical increasing programs in the world depends on the development of the investments. The implementation of innovator process generates an adjacent demand for investments. This condition arguments directly the correlation between the innovations and investment activity.

This is why studying the risk of a knowledge-based economy, particularly in the context of innovative development, acquires a large valence.

POLITICS IN THE PROMOTING OF THE INNOVATIONS

The intellectual resources represent the innovated generators that appear in the process of the goods production or various services. The products generated by the science are orientated to the modernization of the production processes in all economical arias. Thus, the innovation is an economical, social, ecological and military necessity realized via the market demands. The innovations characterize a crossing from the idea to the product and as scope have the competitiveness increasing of the goods and services that represent the stimulants for the new innovations.

In order to ensure an effective economical development, which involves a process of continuous modernization, based on the assimilation of innovation; it is necessary to create a favorable environment for the development of innovative processes. In this way the state must be entrusted with a direct and active role which by promoting its policies will create economic, organizational conditions truly necessary for the conduct of science and innovation, to stimulate innovative processes by increasing public efforts for funding the scientific researches, and facilitate the process of attracting investments of economic, foreign investors and other sources and contribute to the efficient use of technical and scientific results and achieve other objectives of social and economic development.

State policy in science and innovation need to be geared towards stimulating innovation and creating a climate for innovative processes, so that the system of measures taken by state bodies to be effectively crossing bridge from the technical activities – academic scientific to the sphere of production itself.

The main strands of the state in order to develop and amplify the activities of innovation research at a national level include:

- the extension of financing to stimulate public and private investments in innovative companies, the creation of investment funds with mixed capital and the partnership between public and private sectors;
- the adoption of policies to encourage private sector involvement in research – development activities which would lead to activation of innovative processes;
- the fostering of international partnership in science and innovation, and creating favorable conditions for attracting foreign investors [3].

The distribution of budget allocations and funding (co-financing) activities in science and innovation from the state budget is conducted by programs based on strategic directions, etc., and it is performed by organizations with any type of ownership and legal form of organization, accredited in the way established in order to ensure the development of science, sustainable economy, increasing prosperity and quality of life and creating a favorable environment for absorbing innovations.

FUNDAMENTS OF THE EVALUATION OF THE RISK IN INNOVATION INVESTMENTS

The risk in the context of innovative development relates to funding and application of scientific and technical innovations.

Because the costs and the results of scientific and technical progress are expanded and distanced in time, they can be provided only in certain limits (usually very large). So, innovation risk is the probability of the losses appeared at the entrepreneurial company investment of means to produce new goods and services, which possibly will not find (in short time or never) the expected market request.

Any innovative risk is complex and represents a multitude of elements and risks construction. Thus, the innovative risk represents a system of factors which act like complex risks, individual for each project participant in quantitative and qualitative relations.

So, the significance of each risk is individual for each participant, but the common risk of innovative process represents for everyone a coherent system of particular risks containing multiple links.

The risk in innovation process is interpreted as objective and inevitable reality. Thus, international experience denotes that the share of obtaining the expected results at the basic stage of the research usually exceeds 10%.

The share of the applied scientific elaborations is 80%. Preventively it is assumed that even at a strict selection, during which 80-90% of proposals are rejected, however, among the projects that were financed from innovation funds, up to 10-30% of these can be completed with failure. But obtaining a negative however shows a result [4].

Investors prefer projects with a higher expected return (higher average) instead of projects with lower expected return and if the return is same they prefer the project with the lower risk.

Regarding the risk analysis to compare the priority of investment projects in innovation, it is used the graph which presents the correlation between the relation cost/effect and expected risk. [6]

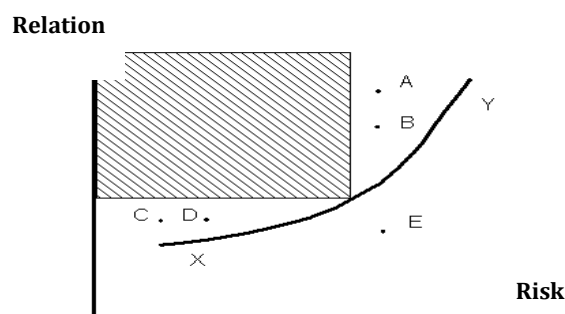


Figure 1. Evaluation of the risk in innovation investments

Based on **Figure 1** it can be appreciated the following:

- project A is more acceptable than project B due to higher efficiency at the same risk level;
- project C is more acceptable than project D due to a low risk level;
- Curve XY is the acceptable limit of the conditions to which should correspond the accepted projected.
- The shaded area shows the acceptable correlation between return and risk for investors.

This method doesn't have accuracy, thus the investment projects in innovation can only be classified according to criterion of correlation between return and risk level.

According to neoclassical risk theory, whose theses were elaborated by A. Marshall and developed by A. C. Pigou – the fundamental thesis is “for a higher expected return, the investor is ready to accept a higher risk”.

The link between income and risk is the basic position of the investment. Each investment of means has a certain risk level which is named innovation risk. This risk can be characterized as the risk of the total or partial loss of the deposited funds or the risk of not obtaining the expected incomes. If the investor takes a more serious risk than the expected income from his investment is considered to be bigger. This income is the motivation of the entire investment.

The problem is that the innovative entrepreneurship requires essential investments in the initial phase of development and the projects have a high risk. Thus in the investment chain exists “a weak link” – the projects at initiation phase¹, when the gains can’t be known yet.

This is why in the West free donations to scientific institutions are practiced and venture companies, involved in the assimilation experience of the new technologies have tax facilitation and they are supported by the government.

This is the main paradox of the innovation development – it is not possible to predict how fast will be felt the results of research funding? This can’t be known by anybody.

In the real economy sector the long terms to achieve projects, the insufficient volume of investment, the low circulation and recovery of means, a relative low level of economic knowledge of the administrative staff restrain the objective evaluation of privileges conception of risk reduction in the company’s activity and creates a psychological barrier of distrust related to economic science recommendation to minimize the risks.

In reality the financial-economic activity of the company is effectuated in condition of uncertainty. The choice of one or another development strategy can lead to the increase or the loss of the invested funds. In conditions of uncertainty there are always a multitude of alternatives to adopt decisions.

The probability to realize with success (to obtain maximal incomes with minimal losses) of any of them depends on the essential number of internal and external factors that influence the company. These realities reflect integrally the essence and the notion of risk.

Risk level depends on expected losses size ration to the patrimony volume of the entrepreneurial company, as the probability of appearance of such losses.

One of the main rules of the financial-economic activity says: “Do not avoid the risk, but prevent it, trying to reduce it to the lowest possible level” [7], and for this it is necessary to manage correctly the entrepreneurial risks.

To accept or not the risk especially in innovational activity it is necessary to delimit it.

From statistical point of view the risk can be measured both in *absolute expression* (where the risk can be determined through the size of possible losses in material or value expression), and in *relative expression* – the last being much ampler because the risk is determined as the size of possible losses related to some basis which can be the patrimonial situation of the company or the total expenditures of resources for the respective type of entrepreneurial activity, or the expected income (return).

Then will be considered losses the random deviations of profit, income, return to reduction, in comparison with expected sizes.

Depending on the size of possible losses it is reasonable to divide them into three groups:

1. *Admissible risks*– losses, which sizes don’t exceed the calculated profit;
2. *Critical risks* - losses , which sizes is bigger than the calculated profit; these losses are necessary to be returned from entrepreneur’s funds;
3. *Catastrophic risks* – the most dangerous in which the entrepreneur risks to support losses which exceed the patrimony.

In terms of evaluation the risk is defined in a certain manner: it expresses the expected change of the investment return. In terms of statistics and mathematics, it can be expressed as a standard deviation of the returns.

Although the effectuated calculations are very laborious, their accuracy is only apparent. It is created the impression that were taken in account all the aspects related to possible returns and these cannot be situated outside of the predicted interval.

In fact, the realized calculations to determine the risk were based on estimations and cannot be correct only in the case that the forecasts were good.

Based on the fact that in the conditions of a knowledge-based economy the applicative scientific researches funding depends on the economic factor, a groundless decision or risk avoid influence negatively on the quality of the outcome, this is why the elaboration and the adoption of the optimal decision is the main condition to prevent the risk. One of the main reasons to manage investment risks in an innovative economy is the lack of distinct methodological basis of this process. Analyses of risks manage principles reveals their inconsistency and the few attempts to systematize them led to multiple contestable moments. However, analyses in the field of risks manage methodology taking in account the demands of contemporary economy allows to create the principles system of risks management:

- Decision, related to risk, is necessary to be correct economically and to not influence negatively on the results of the financial-economic activity of the company;
- Risks management must be effectuated within corporative strategy of the company;
- At risk management the adopted decisions should be based on the required volume of veridical;
- In the process of risks management the taken decision must take into account the objective characteristics of the environment in which operates the company;
- Risks management must have a systematic character;
- Risks management should involve the current analysis of the effectiveness of taken decisions and the operative correction of the set of principles and methods used by the risks management [8].

In these conditions it is necessary to put the risk under control, or to be systemically approached and on certain technologies. In this context it is obvious that the problem of investment risk in a knowledge-based economy, with the acceleration of innovation requires a systematical approach because their correct evaluation will allow us to attract the necessary investments. The problem is that with the exhaustion of the life duration of technical apparatus from many companies, the reduced volume of investments and the vicious management of the depreciation funds, will generate in the future a destructive blockade for the society. It should not be neglected nor the consumers attitude in the preferential utilization of import products, in the conditions when the domestic market is relatively narrow due to the real incomes of the population, which are modest in comparison with those realised in other developed countries.

The problem referred to the diminution and the prevention of the negative effects of investment risk materialization in terms of creating an innovation economy lies in choosing the measures of an adequate management which will offer a maximum protection and minimum costs. At macroeconomic level, it should not be ignored the risk generated by corruption, by excessive bureaucracy and instable legal framework, facts what can reduce the interest of potential investors, especially foreign.

RISKS ON INVESTMENTS OF INNOVATION PROCESS OF REPUBLIC OF MOLDOVA

The problem of investment risks in the innovative development of the Republic of Moldova has gained a negative connotation in the last years. First due to the fact that the minimum of investment in the sector of research and development which is necessary to insure an economic growth is considered at the level of 1% of GDP, but for a qualitative growth it is necessary to reach the level of 2%. But even these investments depend on the GDP of each country. As comparison, Moldova spends in R&D sector 0,55% of GDP (24 million dollars) while Poland with the same investment as share of GDP invests 100 times more, and Russia invests only 1% of GDP which consists 20 millions USD.

In this case (Table 1) clearly shows that the share of expenditure from GDP is not a comparable indicator because the value of GDP is very varied.

Table 1. Expenses for research and development in some countries

Countries	Expenses for R & D, million USD	Share from GDP, %
Poland	2424,3	0,57
Ukraine	1241,65	0,87
Romania	914,2	0,54
Belarus	439,17	0,97
Republic of Slovenia	387,5	0,46
Kazakhstan	220,19	0,21
Bulgaria	202,1	0,48
Azerbaijan	59,488	0,18
Republic of Moldova	24,2	0,55
Armenia	19,33	0,21
Kyrgyzstan	9,5	0,25

Source: calculated using the information published on [11,12]

Ranking of countries by level of funding (like the share % from GDP) spent for R & D in the last years (în ultimii ani), is as follows: first place does Israel (4,2%), second - Sweden (3,8%) three - Finland (3,5%), four - Japan (3,4%), five - Iceland (3,1%), six - the United States of America (2,8%), seven - Germany (2,6%), ten - France (2,1%), eighteen - England (1,9%), twenty-one - China (1,5%), twenty-five - Russia (1,3%), India (1,0%).

These countries are in the richest countries in the world. So you can see the direct link between these indicators: the more a country spends on research - development, the higher is the level of economic development and living standards. A weak development of R & D sector, which absorbs less than 2% of GDP, is characteristic for the countries exporting raw materials. Proceeding from this fact, UE member's countries recommended that the level of investment in research and development should not be less 2,5% from GDP.

This indicator reflects the correct emerging balance of national economy. This indicator mainly changes slowly, only in case of force majeure. Every tenth or hundredth of a percent is very important because of the value of GDP.

Situation of the Republic of Moldova after year 90 is characterized by different periods.

- Early 1990 - a drastic reduction (from 1,57% to 0,58%) to finance scientific research as a result of the influence of the deepest crises and the most radical changes in economic and fiscal system of the country.
- After 2000 another reduction in spending on research and development up to 2001 (from 0,58% to 0,18%)
- 2002 -2004 share for scientific research funding is growing very slowly (from 0,18% - 0,22%).
- 2005-2008 increased funding for science and innovation, but only on the level of 2000s. This can characterize the level of adaptation to the new economic sector.
- After the year 2008 another reduction of R&D funding influenced by economic and political crisis in the country.

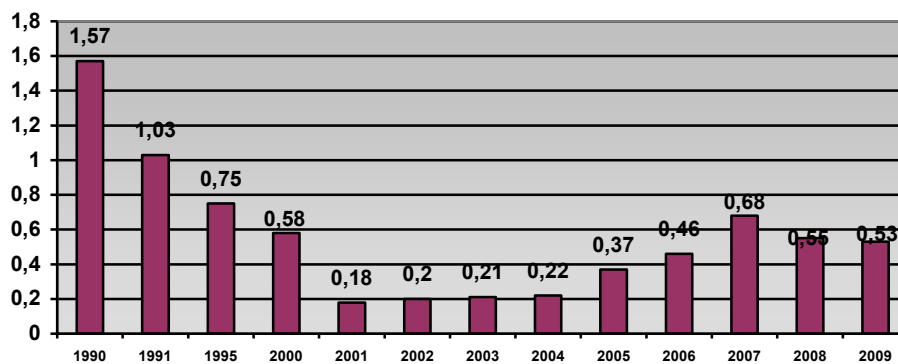


Figure 2. Research and development expenses in the years 1990-2009.

Source: Calculated by author based on data from the ASM and NBS [2].

It is known that the risk reduction investment in RD lowers innovational process.

So if we spend very little scientific research, we cannot expect in this case improving the performance and national completeness. Through increased imports policy, we will not achieve the expected goals. And in the situation when either investment is not rushing to run in country what's the path to prosperity? China's miracle economy overwhelms us. But today China attracting 60 billion dollars FDI, a new Republic of Moldova, at this chapter is not among the leaders. Taking into account that foreign investment per capita in Republic of Moldova is not sufficient for a qualitative improvement the question is where will we get and which will be the future of our country?

It is well known that efficient worldwide scientific apparatus costs very expensive. And for Moldova, where prices are higher than in many European countries, decrease spending for research, on the one hand and on the other hand, taking into account, that at this chapter foreign investment per capita Moldova is among the countries with the lowest investments, we can ask how is shown economic development on long term of our country.

The main objective of improvement of the science funding system in terms of reform scientific-technical sphere is to ensure that restructuring and development of this would be made in conditions of limited financial resources. Fiscal policy should include target meeting of state needs and society in this area. Improvement significantly of financial situation in science field can be realized through redistribution and concentration of budget on priority areas, selective support of industry research organizations, and attracting the extra-budgetary sources of private equity funds.

All system of public funding of organization of research and development must be "transparent" to avoid the excess use and for ensure efficient use of budgets funds.

Innovation activity in Moldova is still viewed very narrow and closely related to activities in scientific research. Our country, which has the lowest value of innovative performance compared to other states, requires consolidation of a innovative performance compared to innovation, notably by improving the dialogue between academia and business, promoting innovation and application of innovation results.

Innovation process, being interdependent of the process of research must develop alongside the production of knowledge and be treated as a new field; being the result of a research and innovation, and

having a market value, where the knowledge like any economic good can be traded on the market. As a buyer can be both the state as representative of the interests and social needs, but especially private companies.

Currently insufficient contribution of their personal activities of research – development – innovation, slow renewal of technological base, poor quality of infrastructure, low competitive performance of products and services offered on the market, insufficient capacity to adapt to global market requirements remain the main causes that adversely affect both productivity and efficiency of resource use [9].

However we note that economic agents are not interested to invest in research and innovation, because of the high value of financial risk. On the one hand we are faced with a rather high degree of risk from the implementation to the process of marketing the new product obtained, on the other hand, in our opinion the business environment in our country is not encouraged to implement local innovations. Despite some obvious advantages such as tax exemptions, labor quite well prepared, companies are not rushing to invest in innovation or in general to open production capacity and new branches in the Republic of Moldova.

In scientific and innovative spheres the intellectual potential (researches, inventors, engineers, employees of patent services, etc.) is not used when necessary, which is leading to its rapid degradation.

The development and adoption of a national plan for innovation, the country's innovative development strategy could lead to increased capacity of innovation, technology development and uptake of research results into production, in order to improve national economic competitiveness and quality of life. Supporting innovation in the private sector, scientific research and the dialogue between them in both directions towards the establishment of common interest and co-financing will have a positive impact on all areas of activity [3].

Moldova needs to establish a favorable business environment for innovation and a clear and realistic policy in the field. It needs a systemic approach to innovation, in the context of interests and relationships of all participants in this process: universities, research institutions, donors and the state.

The innovation activity is supported by the state according to the Government Decision no. 24 from 22 January 2009 that describes a partnership agreement between the Government and the Academy of Sciences of Moldova via the Agency for Innovation and Technological Transfer of the Academy of Sciences of Moldova [1].

The distribution of the public resources for financing of the organizations from science and innovation is realized in accord with the Framework of financing of the activities from science and innovation sector, approved by Government Decision no. 27 from 22 January 2009, with recent changes, based on the partnership agreement between the Government and the Academy of Sciences of Moldova via Supreme Council for Science and Technological Development as executive body of the Academy of Moldova.

During the 2005-2011 period, vs. the priority directions of the science development approved by the Parliament Decision no. 1401-XV from 24 October 2002 “For approving of the priority direction list of the investigations and developments for 2003-2010 years, supported by the state budget”, the financing of the innovational activities were realized based on the projects for technological transfer, selected via a strict selection.

Examination activity for seven years of the Agency for Innovation and Technological Transfer, gives that the researcher interest on the applicative innovator instruments and the business environment increase. During this period of activity the Agency for Innovation and Technological Transfer has realized and coordinated about 206 projects, financed from the budget and co financed from the business [2].

In 2011 year for these services from the state budget were allocated seven million three hundred and fifty thousand leis, but the co financing from private sources was of seven million eight hundred nineteen thousand leis (fig. 3).

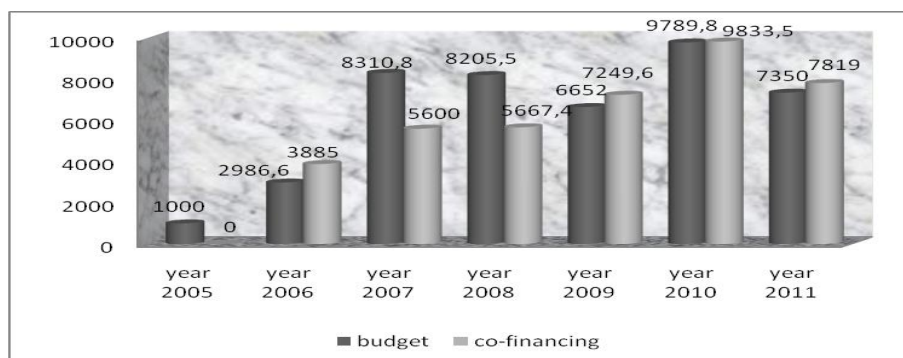


Figure 3. The financial dynamics of the projects for innovation and technological transfer in the period 2005-2011. [2]

The project of innovations and technological transfer are realized by two scientifically and technological parks of the Agency for Innovation and Technological Transfer: “Academica”, “Inagro” and one innovator incubator “Inovatorul”. These were selected based on a competition and were approved by the Supreme Council for Science and Technological Development of the Academy of Sciences of Moldova. The projects are from various fields as: energetic; nanotechnologies; the collection, sorting and processing of industrial and agricultural wastes; technologies for purification of potable water; ecological and agricultural technologies; medical plants; traditional medicine [2].

In the period of 2005-2011 years, the effort of the institutions from science and innovation area, business environment together with the Agency for Innovation and Technological Transfer started to give real results. In accord with the obtained indicators, a view on the innovational production volume registered via the projects for innovation and technological transfer was constructed.

In the next we present the diagram of the innovational production volume (thousand lei) obtained in the realization of the projects for innovation and technological transfer in the period of the 2005-2011 years.

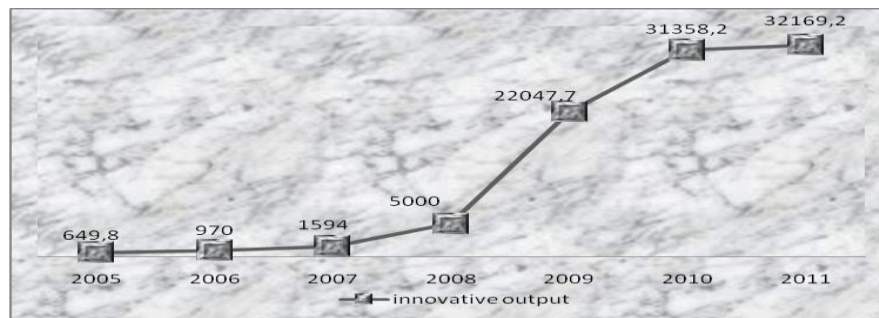


Figura 4. The innovational production volume (in thousand leis), obtained in the realization of the projects for innovation and technological transfer in the 2005-2011 years. [2]

In accord with the presented results, the innovational production volume obtained in the period 2005-2011 is increasing with various economical indexes.

Starting with the 2005 year, the innovational production volume represented approximately 649.8 thousands leis, but in 2007 this index was increased at 1594,0 thousands leis (increased 2,45 times more compared with 2005). In 2008 the innovational production volume was estimated at 5 million leis, with 3 times more vs. the innovational product obtained in 2008 year.

The maxim rate compared with the past years was achieved in 2011, when the total value of the innovational product was of thirty-two millions one hundred sixty-nine thousand leis.

The innovational role in the development of national economy that makes the economical effects obtained with the same efforts to be significantly, establish the innovational investigation necessity as an important factor of investments.

The innovation represents a good approach for estimation of the investments in the innovational process. Most of these are based on the increasing of the innovational efficiency, implemented in the economical activity as a consequence of interdependence formation between the national economical branches.

We can live certainly, and without science, using result of research from other countries. But in this case, without scientific and technological capabilities in our country will be impossible to build a economy of XX century. It is well known that the countries with a strong scientific basis determine that will be the quality of life and of technology in future.

Therefore, to obtain a situation qualitatively new in science is necessary simultaneous solving of two problems: increasing the share allocations for research and development in GDP and creating entrepreneurial sector in science field.

CONCLUSIONS AND SUGGESTIONS

The Republic of Moldova in the last years traverses an extra complicated way from political, social and economical point of view. It is happened because of multiple risks connected with the crossing from one to another government and as result of the economical and global financial crisis from the last years. Thus, the economy of the country is weak developed, non-completely and non attractive, is dependent on the external factors and the business domain is developed without the arrangements and state supporting or with the minimal utilization of the scientific innovations.

At this time, the risks investments for innovational activity in the Republic of Moldova are:

- 1) the absence of economical mechanism for financing of the innovational activities, i.e. the allocations and budgetary and extra budgetary supports, attracted and loaned funds;
- 2) low innovational potential of the economical agents, the reduced correlations between the enterprises and innovation, the insufficiently of the staff and financial own resources;

- 3) the absence and low capacity of the national innovational market;
- 4) high values and long term for investments recovery;
- 5) high economical risk;
- 6) the unperfected legislation base especially of the juridical and normative acts that depict the innovational process in ensemble [9].

In order to reduce investment risk in the innovational activity of Republic of Moldova the following steps can be proposed:

- 1) the modification of the national legislation that inhibits the innovational and investments growth; the political correlations of the state in accord with its necessities and objectives; to clarify all stimulants and priorities necessary for the innovators;

- 2) systematical approach of the innovational process; the construction and efficiency connections between the scientifically investigations and industry, as a results of the increasing of the innovative potential; the implementation of some programs to develop the innovational character, the encouragement and development of the capital risks, and others modern financials methods;

- 3) in order to have a competitive advantage on the European research market we have to give the priority of the local economy's branches where would be possible to do the investigations and researches;

- 4) the investment of allocations in the innovation and in the principal areas of national economy based on a strict selection of the innovational projects with a good improving of economical efficiency;

- 5) the orientation to the innovation and technological transfer in order to transform rapidly the scientifically results in market goods.

In this context it is obvious that the problem of innovation risk in a knowledge-based economy, with the acceleration of innovation, requires a systematical approach because their correct evaluation will allow us to attract the necessary investments.

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