Raziskovalci in razvoj - mladi raziskovalci

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Ob stalnih analizah in reorganizacijah slovenske znanosti, se ne izboljšuje niti njena organizacijska struktura, način organiziranosti in deleži raziskovalcev v tako imenovanem vladnem in gospodarskem sektorju. Mnenja so, da je izključna težava slovenske znanosti na področju tehniških ved in da je težava industrijske nekonkurenčnosti izključno in samo pri inženirjih. Pregled podatkov o izdatkih (delež BDP za RR) oziroma vlaganjih v znanost in pa podatki o številu mladih raziskovalcev pa kažejo:

- *Lizbonska strategija vsebuje prave cilje, jasne mehanizme, zaškripa pa pri instrumentih in koordinaciji za njihovo uresničevanje.*
- *Slovenija se mora zgledovati po novih članicah, ki so že uvedle svoje proračunsko podprte cilje Lizbonske strategije.*
- *V Sloveniji ne uspemo doseči konsenza nosilcev politične moči od nastanka nove države, kakšna naj bo vloga znanosti (predvsem raziskav in razvoja) in kakšna naj bo povezanost univerz in gospodarstva.*

Lizbonska strategije (LS) daje odgovor na vprašanje, kako je lahko EU dolgoročno konkurenčna, s tem da ohrani evropski model življenja z ravnotežjem med ekonomskimi, socialnimi in okoljskimi cilji. Prvi pogoj za ohranjanje socialne vzdržnosti in okoljske prijaznosti pa je gospodarska rast.

Ključne besede: *Lizbonska strategija, raziskave in razvoj, delež BDP, mladi raziskovalci.*

Researchers and Development - Young Researches

Although Slovenian science is permanently subject of analysis and reorganization, there are no evident improvements of its organizational structure or the way it is organize and share of researchers in so called governmental and economic sector. There are opinions that the key problems of Slovenian science are in the field of technical sciences; that the cause of industrial non-competitiveness are engineers. The search of data of expenses (share of GDP for R&D) respectively investments in science and based on the data of number of young researchers in Slovenia show:

- *Lisbon strategy incorporate right goals, clear mechanisms – the critical points are instruments and coordination for achieving these goals*
- *As s model Slovenia has to take new members, which already introduce their own, with budget supported goals of Lisbon strategy;*
- *Ever since the establishment of new country Slovenia we are not able to reach consensus among all the pillars of political power and decide what should the role of science (primarily of R & D) in what should be relation between universities and economy.*

Lisbon strategy gives us the answers to the question how EU can be competitive in long term and at the same time preserve European model of life; that means a balance between economical, social and environmental goals. The first condition for maintenance of social sustainability and kindness towards an environment is economical growth.

***Key words**: Lisbon strategy, research and development, share of GDP, young researchers*

1 INTRODUCTION

The summary of tasks from the report by the PHARE project (A Science and Technology…), which can be understood as instructions for changes in measures in current science and technology policies (ZTP), must be divided up into measures taken by the government and measures taken by the public ministries (MZT).

As a result of measures taken in the form of laws, decrees etc. the government should have created a suitable environment that (Černetič 1999, 274-275):

- Is stimulating for the development of proprietorship and innovation,
- Is stimulating for industrial development, especially in sectors that show competitive advantage,
- Is stimulating for technological innovation and the transfer of technologies, especially from abroad.
- Is stimulating for scientific – research work, whereby the needs of the state in different areas (economic development, education, natural and cultural heritage, national identity etc.) should be taken into consideration.

The MTZ should also probably change its evaluation regarding the management of current medium-term science and technology policies, which have also been identified by the PHARE report (not only PHARE but also many domestic experts) as generic problems of the ZT sector:

- The connectedness between the ZT sectors (and also inside this sector) and the end-user is weak,
- The absence of a system of priorities,
- Mobility is poor for researchers,
- An insufficient amount of R&D activities in industries,
- Deficiencies in the technological transfer system,
- Researchers lack certain experience, which is important for successful R&D,
- The lack of stimulation for the flow of (young) researchers in industry and other sectors,
- Low levels of motivation in researchers for useful research.

The above-mentioned discoveries about the weaknesses of science and technology policies in Slovenia are also current issues, even though in the meantime the new state of Slovenia had been established, the ministries had been restructured, social and state responsibility had taken on new political option (government), etc. Slovenia is incapable of achieving consensus within society about the vision and aims of development and furthermore making them operational (Sočan, Bučar 2003, 118-120). Today, a Europe with "many gears" is already a reality. The following paragraph contains some data and evaluations, regarding questions relating to the title of this paper.

2 NEW TIES, NEW GOVERNMENT – OLD PROBLEMS

In the last few months there have been many conferences regarding the theme of new scientific and technological policies in Slovenia relating to the Lisbon strategy, which define that the EU is going to be the most competitive economy in 2010. These conferences were made by the European Commission in Slovenia, the newspaper Finance and the Slovenian Chamber of Commerce (GZS). Let us mention a few reasons why the Slovenian sciences have not been achieving the desired objectives and expected progress:

- On explanation states that Slovenia still has a great concentration of research and researches in big research organizations.
- The second explanation states that we lag behind in the share of investment for R&D
- The third explanation, which deals with the decrease in the competitiveness of the Slovenian economy, emphasizes that there is an insufficient amount of researchers and developers in the (FTE) economy.
- The fifth explanation states that there are not enough young researchers in the technical sciences.
- The fifth explanation talks about the failures in implementing R&D that are found in the deficiencies in managing the sciences at the national level (within individual national economies and the EU level, in which amongst all others "Lisbon" and cohesive funds etc. are also available

2.1 Science at the State Level in the Market

Recently, the Minister for Higher Education and Science answered the question how to increase the participation between science and the economy in the following manner: companies should find out what kind of R&D projects they need, unite and then inform the ministry. Then a tender would be published, whereby scientific research organizations would apply who would also then carry out these projects. The minister's commentary shows that it would be necessary to notify him, for a while now we have not had a system of central planning and his appeal for a national program that would organize the disharmony in developmental policies does not mean anything but an appeal for the strengthening of an already strong sentiment of economic totalitarianism. Why? (Pezdir, Finance no. 43/05)

The conditions within the institutional framework of the Slovenian economy are therefore, according to the central plan to monitor the economy, crushing. What kinds of opportunities are given to companies that would like to become more innovated in the institutional framework of Slovenian science as suggested by the minister? If the minister's statement is a central moment for the future mechanism in increasing the innovation potential of the Slovenian economy, we can expect that the process of increasing collaboration between science and the economy will take place according to the scenario, which is quite unusual for a market economy. As we already know in the first place, there will be companies only because they exist, they will be forced to join the "fraternity", which is known to always confiscate a part of their revenues and assign them to the financing the process of finding ways for individual groups of rent seekers, which are lead through the Chamber of Commerce straight to the carries of economic policies. They will in turn proclaim them as national champions (as a rule, the strongest group of rent seekers), who will unite at individual projects and notify the authorized ministries about them. The notified ministry will then carry out a tender, in which the needs of the national champions will be serviced by pre-transitional

research and development organizations financed by the national budget. These types of projects will only be able to be financed by the taxes paid by proprietors that did have any luck in becoming the national champions. In other words – unprivileged companies, who had already paid taxes into the Chamber of Commerce for the transformation of rent seekers into national champions, will pay again – whether it is for achieving the aims of rent seekers or for creating an illusion that the economic policies stimulate collaboration between science and the economy. What does it really stimulate? (Pezdir, Finance no. 43/05). Above all things, within the system of legalized rent seeking it stimulates a competition amongst rent seekers for the best starting point in getting a share of the national budget, the state financed sciences, which is a big slice and the competition for access to the largest possible number of state financed projects for rent seekers (Pezdir, Finance št. 43/05).

2.2 A Weak Point – Management and Funds for R&D

In realizing the Lisbon strategy, each country must also take into consideration specific national objectives and the main problem of the strategy is in its weak management and co-ordination between the EU and member states. All foundations for the documents have been implemented and now it is important to better comprehend the meaning of partnership in the realization of the Lisbon strategy. One of the important instruments for its realization is also the EU's budget in which the "Lisbon" and "cohesive" funds are available. There is a catch that exits in that the first part of the funds are going to be distributed according to excellence, which for the most part means ending up in the developed members and the rest for lesser developed states. At this point, smaller EU member states emphasize the need for the restructuring of the European budget.

2.3 Germany and France Should Not Be Our Role Models

The main problem of the EU is in its heterogeneity and Slovenia should not model themselves after the traditional EU members (France and Germany) as much, which have been plagued with small growth in GDP and a high rate of unemployment. We should look at new member states (Slovakia, Latvia), which are more ambitious in development, more decisive and have already introduced their own budget supported goals of the Lisbon strategy. As a result, they have already organized three areas: a friendlier business environment (tax and other reforms), the liberalisation of the labour market, intend more funds fir subsidising technological development and finding synergy between universities, the area of research and the economy. In the opinions of some, this is the right path for realizing the Lisbon strategy.

2.4 Expenditures of EU Members for Research and Development

In 2002, 25 of the EU members assigned an average of 1.93% of GDP for R&D in comparison to 1.82 % of GDP in 1998 according to Eurostat (Kenda, Finance, no. 40/05). They have also published data for EFTA members, candidates China, Japan and the USA so that international comparisons could easily be made. Once again, Sweden assigned the most followed by Holland and The UK. On the other hand, Luxembourg assigned the greatest expenditure in the private sector for total R&D

expenditure. As a result, the % in Luxembourg was 90% followed by Sweden, Finland, Ireland and Germany. According to this information Slovenia assigned 1.53 % of GDP in 2003 and 67% of this in the private sector of total expenditure for R&D in 2002.

3 intolerable effortless planning

3.1 Bureaucracy Cannot Direct Development

We are moving into an "economy driven by intelligence" (Kos, Finance, no. 33/05). However, who will be the one to surpass the incapability of the economic elite and the government? Writers in this area also do not have the knowledge about innovative mechanisms and creative people. We cannot expect technological progress to come from universities and institutes because someone must direct their research into a team that works in this area.

Jobs are disappearing in our economy. However, the state bureaucracy will not solve anything with its ideas but will only intensify the crisis. An individual with their ideas is needed, who also takes responsibility for their actions. However, within a thousand ideas only one can succeed and therefore it is necessary to divide up the state funds accordingly and weed out the bad ideas before time and money is wasted on them. This is how the founders of innovative companies abroad operate and it is hard to find them at home.

We have tenders, whereby regional developmental agencies participate and there is no individual who would take responsibility for their ideas. These are bureaucratic efforts in obtaining funds for some common goals, which are organized in a general way and are in no way productive for creating new jobs. They are just new public administration sectors that are going to use up the state budget.

Some even support the idea for a central distribution of funds. This is nothing other than just transferring the competencies to the state level, where the funds will be distributed even more inefficiently.

The foundation of every strategy for creating new jobs must be proprietor-individual, who has a developed idea about the product. This is an alternative to unemployment regarding sectors that have been written off.

3.2 The Minister of Technology on Inheritance Mines

Slovenian science and its influence on the competitiveness of companies, has decreased by four or more places on international lists after the departure of the former government, which is a somewhat poor inheritance for the new Minister of Science and Technology. The government only invested in well-established research spheres and not in the economy. Investments into the economy had decreased from 9% to 5%, which is in contrast to the operations of EU governments that have been incorporating innovations into the economy more and more, which is the foundation of the Lisbon strategy.

This is why reforms on developmental policies are necessary. Measures must be taken in two areas (Kos, Finance no. 33/05):

First of all, financing must originate from research and development projects. Program financing is abolished. State intuitions have battled for "program financing", which does not demand the selection of project topics regarding innovation and that is why the orders in the economy have been cut. State institutions can do whatever they like, which is very irresponsible of the government and at the same time it does not bring any progress to the innovativeness of Slovenia.

Secondly, there is restructuring. The percentage of institutes, which are only mainly research-oriented, should fall under universities and the other part should be in the ownership of companies as industry institutes. This is how we shall develop strong universities, which would otherwise weaken and also a strong science economy with research capable of progress in innovation.

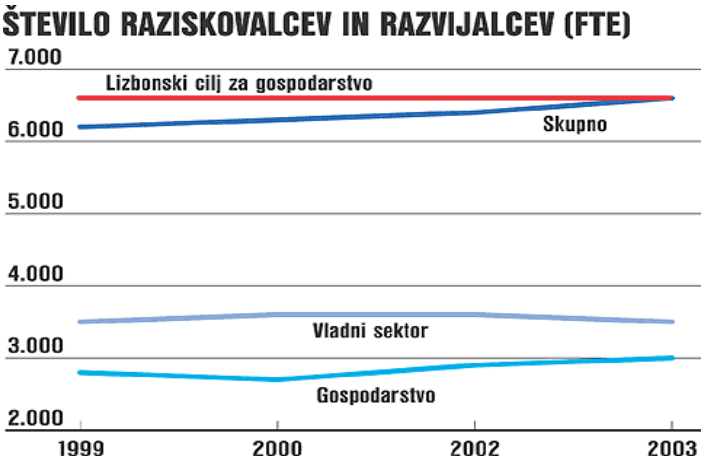
3.3 Decreased Competitiveness in the Slovenian Economy

Graduates of post-graduate and graduate studies will not achieve the Lisbon strategy, only the engineers of technical natural sciences will. Our planners (for achieving the Lisbon strategy) are still far from reality. Great numbers of sociologists, humanists and people in the legal profession cannot at the least influence product innovation of, exporting and GDP. Innovations are the fruit of talented engineers that work in companies, even though there are many who only have a BA or a secondary technical school diploma. Researchers in the government sector have not yet developed and manufactured no new product (Kos, Finance, no. 175/04).

Unfortunately, only 27% of all 23.691 engineering graduates work in industry, others are in the service sector (24%), public administration (10%) and in education, where innovation is lost.

As a result, we are a country lagging behind in innovation. As a result of no aid from the government and thousands of companies not investing a single tolar in innovation low-quality exports, no new jobs and a social crisis has resulted.

Even a quick glance of the graph (Graph 1) shows us that it is impossible to reach 2% of GDP for achieving the Lisbon strategy through a natural process, without radical measures taken by the state, which will at least triple the flow of engineers and kick-start innovation. However, we are not capable of doing this because there is a blockade of lobbies that have special interests.



Graph 1: Number of researchers and developers (Source: Kos, Finance, no. 175/04)

4 WHERE IS THE KNOWLEDGE – IN COMPANIES, UNIVERSITIES OR INSTITUTES?

4.1 Young Researchers

One of the instruments for the scientific policy of research agencies is financing post-graduate studies and research training for young researchers. The program has been successfully operating since 1985 and has additionally contributed to the increase in the amount of research and adding young minds to research groups. As a result of the program's success, a large part of the agency's budget funds are intended for human resource training. Until now, 5347 young researchers have been part of the program.

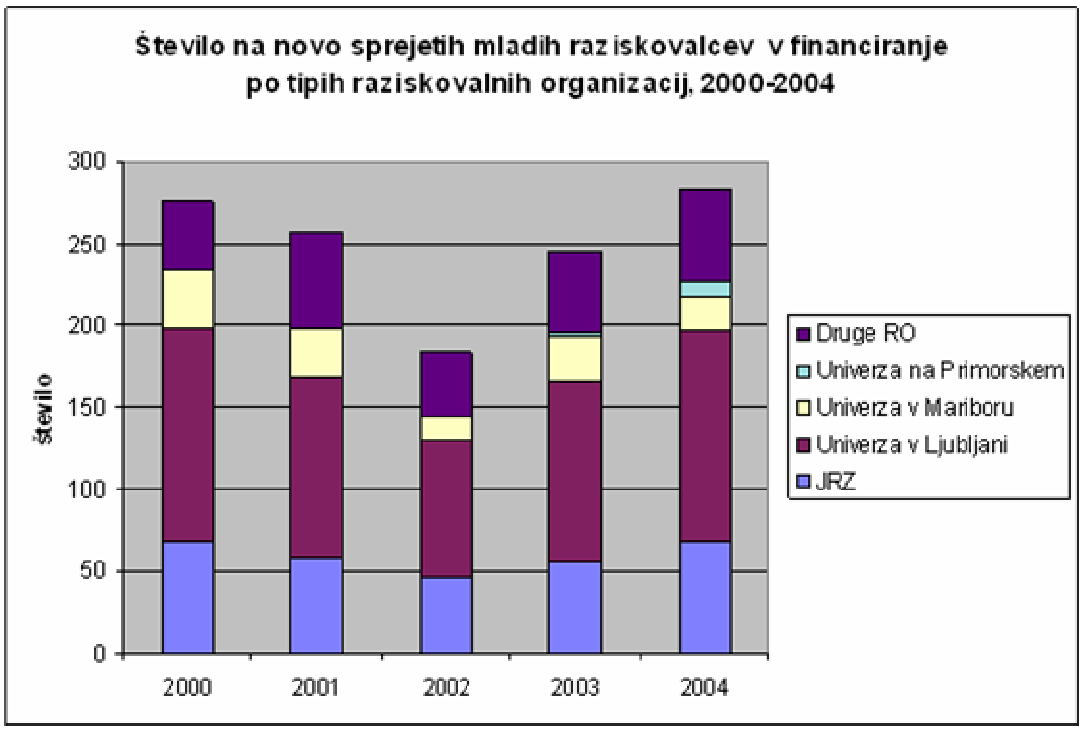
Characteristics of the young researchers program(http://www.arrs.gov.si):

- During their post-graduate studies young researchers do research on fundamental or research-development application projects,
- They have a fixed employment contract,
- The ministry ensures funds for their salaries, contributions, material and non-material expenses for their research work and post-graduate studies.

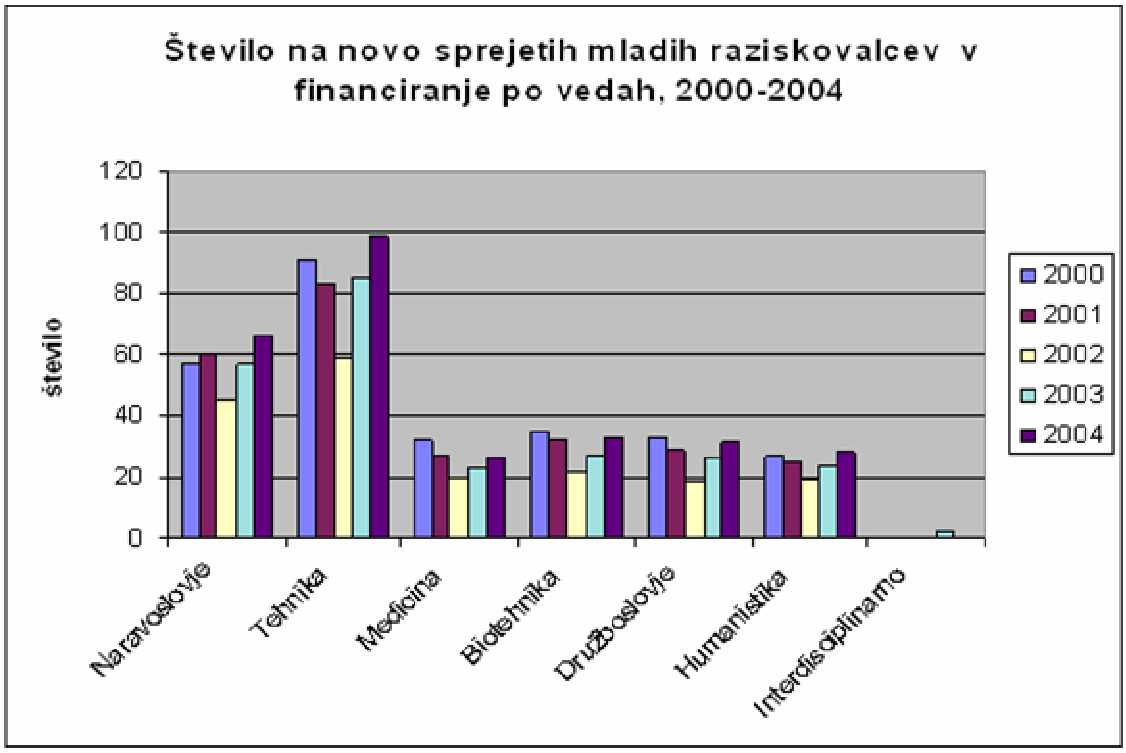
Scholarships for training young researchers are given for a certain period of time, which includes four years and six months at most for a PhD. On average, 6.6 million tolars is needed to finance a young researcher yearly.

The size and structure for financing

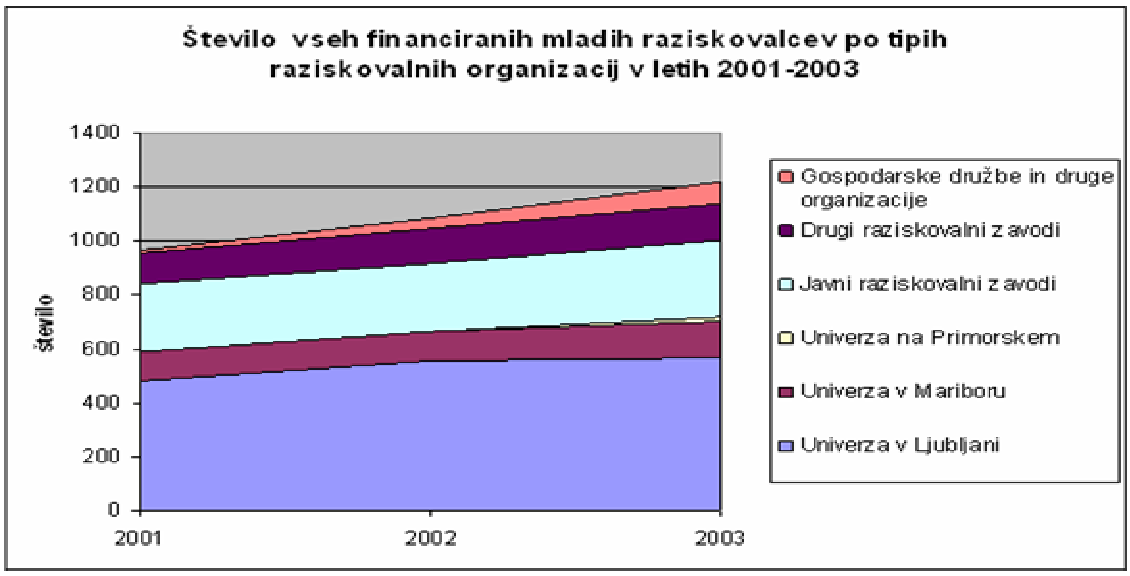
Every year, the agency finances about 1200 young researchers, which represents about the equivalent of 850 to 900 fully paid young researchers. Every year, 200 to 250 young researchers complete the training program, which is the same amount that is financed once again.



Graph 2: The number of newly accepted young researchers according to the type of research organization.



Graph 3: Number of newly accepted young researchers according to the disciplines



Graph 4: Total number of financially supported young researchers according to the type of research organization.

4.2 The Number of Young Researchers and ZTP Direction

After constant analyses of Slovenian science, its reflection in companies, development and influence of high technology sometimes bear negative thoughts and energy by researchers who participate with

companies. As a result of these analyses a doubt arises in researchers in the area of technical sciences in that they are being constantly dealt with as the only ones, to whom the fault can be attributed to in Slovenia for the slow (too slow) development of the nation. That is to say that the problem in Slovenian science is exclusively in the area of technical science and that the problems in the lack of competitiveness industry are exclusively because of engineers. (Duhovnik, Finance, št. 226/04).

This had been established in 2004 at the business conference in Portorož, which is organized by the daily Finance. There were discussion on innovation processes with domestic and foreign consultants and some new ones, who had mad contributions about how to teach Slovenian development engineers so that they could understand the new technology. This transfer of knowledge should be made by those who manage business systems. Members of management boards for development in multinationals or of famous consulting companies also had lectures. There was also special emphasis put on investing in science. It is difficult to understand that within such an elite group of speakers, a domestic scientist in the technical field is not allowed to (or better yet it would not be suitable to) make a commentary. (Duhovnik, Finance, št. 226/04). Even more so, if they are employed at any institute or technical faculty and do not deal with "management" but does research and development, even having patents in certain areas.

Graph 5: Number of young researchers in technical science (Source: Duhovnik, Finance no. 226/04)

Therefore, if we take a look at the programs for young researchers in the area of science, we can establish that we have six areas: natural-mathematical, technical, medical, biotechnical, social sciences and humanities. There could only be four areas with a rough division: natural-mathematical, technical, medical/biotechnical and social sciences with humanities. Older researchers and responsible employees in companies are familiar with the infamous project 2000 MR, which had been introduced to the Slovenian public by Dr. Boris Frlec. It was accepted with enthusiasm and thus in was continued. One year it was a little better and in others it was not as successful. It is understandable that it cannot be totally successful. In comparison with the entire period it had a success rate of 75%. If we take a look at only the last few years or the years after 1990, we can see an exceptional success rate of 97%. First of all we can evaluate the success rate with a formally obtained academic title, with a doctorate in the last little while. An important fact is that in the last few years 420 to 500 candidates who have all the credentials have appeared and only 180 to 280 are rightfully selected. In some areas, the quality of the candidature of young researchers is so high that young researchers who only have an average mark of nine are cut. The prerequisite for each candidate is their average grade for the university program. This already shows the disproportion of grades in the programs that are only four years or those that are six. As a result an expert system has been implemented, however with a cut-off rate (50 %) of a limited

number of accepted young researchers, which is almost a disgrace for evaluators who see a young researcher with exceptional potential in front of their eyes. (Duhovnik, Finance, št. 226/04).

4.3 The Project of Young Researchers and Domestic Consulters

Let us take a look at how they decided on making an investment in the project for young researchers from 1985 onwards. If we imagine that as a rule young researchers in companies are not going to introduce high technology but are going to design a product, which is going to use the functions of high technology then we can probably expect them to be from the area of technical science. From the diagram, we can clearly see the relation between young researchers in the area of technical science and the total number of accepted young researchers. That is why it would be proper that the investment analysts for science understand investment in science at all level, which the state must harbour or it is already defined in their development strategy.

From 1997 onwards, a levelling of wages in the placing of funds has been used for the different sciences. This means that a development strategy for a certain science had not been even used. Even what is more alarming is that nothing has changed amongst young talented engineers in Slovenia. There has been no change in the growth of talents. Impossible! It can be achieved with the use of hard policies!

In the upcoming years we will have to increase GDP intensely. That is why above all other things it will be very important, how the knowledge of young researchers will be directly used. What will be the answer from the Slovenian business world? Will anyone conjure to say that our young researchers are incapable, in light of the data on average grades? The question arises: Have we opened the doors for employment for theses exclusive young researchers? Or will they rather return to projects using high technology for the manufacturing of products as R&D engineers in multinational corporations? I doubt that foreign lecturers are going to be able to respond in a strategic way to such a question at Slovenian business conferences. I shall be especially satisfied (Duhovnik, Finance, št. 226/04), if they could respond to one more important question: Can a modern state without its own products, which means industrial ownership collect enough money from taxes and contributions that it could cover all the costs pertaining to the public administration, a normal pension fund and finally a good healthcare system? For future business conferences it is important to invite domestic experts of acclamation, who also know how to take on the responsibility of technological development in Slovenian companies. Therefore, domestic lectures need to be invited to these conferences. Only these people would be able to explain what exactly could be done regarding the situation of industrial ownership in Slovenia.

5 CONCLUSION

The Lisbon strategy incorporates the right goals and clear mechanisms, although the critical points are instruments and coordination for achieving these goals. Representatives of the European Commission in Slovenia on the Lisbon strategy stated that the newcomers have been especially successful.

The Lisbon strategy gives us the answers to the question how the EU can be competitive in the long run and at the same time preserve the European model of life with a balance in economical, social and environmental goals. The first condition for the maintenance of social sustainability and kindness towards an environment is economical growth.

In realizing the Lisbon strategy, each country must also take into consideration specific national objectives and the main problem of the strategy is in its weak management and co-ordination between the EU and member states. All foundations for the documents have been implemented and now it is important to better comprehend the meaning of partnership in the realization of the Lisbon strategy.

One of the important instruments for its realization is also the EU's budget in which the "Lisbon" and "cohesive" funds are available. There is a catch that exits in that the first part of the funds are going to be distributed according to excellence, which for the most part means ending up in the developed members and the rest for lesser developed states. At this point, smaller EU member states emphasize the need for the restructuring of the European budget. Evidently, there are still three problems regarding expenditures for R&D (Černetič, 2003, 16):

- Lack of vision or consensus in development
- The creation of a list of priorities, which should be able to strengthen the gathering of funds fore R&D
- How to create an environment of innovation intended for most small and medium-sized companies with the measures and instruments of current economic policies.

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