

## The Human Resources and Financing for Science in Latvia, 2001 – 2012

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### Summary

*Development of science in Latvia over last decade was lagging behind in comparison with other European Union countries and significantly lagging behind in comparison to neighboring countries Estonia and Lithuania. Number of researchers has experienced a slow growth and in-depth analysis of researcher employment trends over past decade shows decline in full time employment – most of the researchers are involved in science on a temporary project basis. Especially unstable conditions for research are in a private sector, where multiple fold fluctuations can be observed on annual basis in contrast with neighboring country Estonia, where number of researchers employed in a private sector is on a steady upward trend. Author considers the structure of financing as one of the core causes for instability of researchers employment – majority of financing is being attracted through the EU support mechanisms, mainly targeted at short term activities. Statistical data confirms the deficiency of a private sector undertaking a significant role in investing in long term research, while fragmented involvement of public financing has not been sufficient for ensuring a long term development.*

**Key Words:** Researcher, employment, private sector, financing

Developed society cannot do without science. Scientific achievements have shaped the development trends in the world since medieval ages. Firstly, the military interventions in the former countries and continents were empowered by technological advancement, followed by the shift of battlefield to the field of economics. Nowadays competitiveness and welfare of a country even more depend upon scientifically created technologies. The politicians are aware of the positive externalities of a science, therefore significant amounts of investment is being allocated in order to ensure sustainability and development in the long term. This principle has been clearly acknowledged by the European Union, where a strong priority has been given to research and development. The EU Framework Programme for Research and Innovation Horizon 2020 determines the goal of 3% of the GDP investment in research and innovation in 2020<sup>1</sup>.

In the scope of territory and the number of inhabitants Latvia is a small country and a full member of the EU, which has overcome 50 years of Soviet Occupation and together with Lithuania and Estonia has regained national independence at the beginning of 1990ies.

During Soviet rule the economy of Latvia was profoundly integrated into the economic system of the Soviet Union, with numerous production lines and factories allocated to meeting the needs for military supplies. Also, agricultural production was controlled by the state, with sizeable proportion of output being exported to other USSR districts. Total output in the industry and the agriculture was remarkable, placing Latvia in one of the leading positions among USSR republics. Unfortunately, after the collapse of the USSR and breakdown of its markets, Latvian industry could not fully adjust to the new challenges of western markets and disaggregated. The country was facing enormous challenges of restructuring and determining its positions in the international markets.

Since 1990ies Latvia had made deliberate steps towards joining the EU, at the beginning of 21<sup>st</sup> century becoming a full member of the EU and followed by joining Euro zone in 2014.

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In comparison with other EU countries performance of Latvia in the field of science and innovation is not outstanding. The aim of this research is to identify the main factors behind hindering development of a science field in Latvia. Accordingly, the following tasks are set – to analyse development trends of the human resources and financing in the field of science.

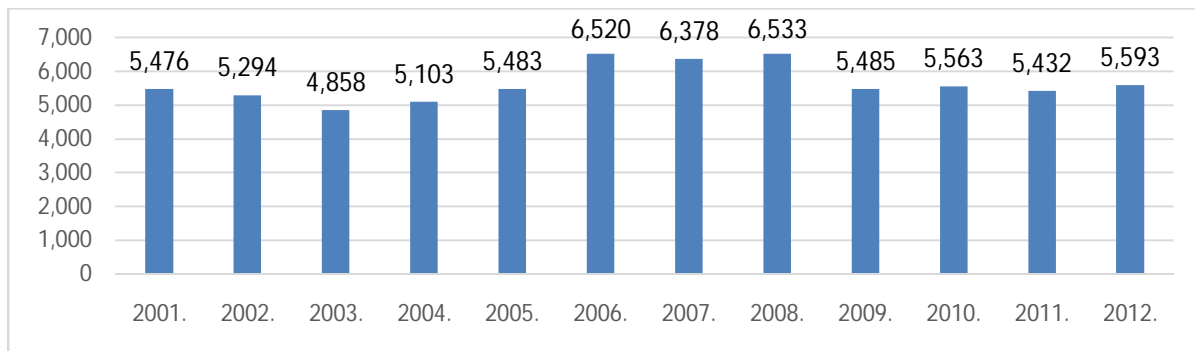
**1. The Number and Workload of Researchers**

1.1. One of the most essential preconditions for the development of a country and also a science are human resources. Increasingly, there is an international competition on attracting scientists, especially new ones. Countries are aware of the potential impact a research can generate on creating value added in economics, therefore are offering attractive grants and various post graduate programmes in order to keep new talents from brain drain and also attracting foreign researchers.

Total number of people employed in science<sup>2</sup> in the EU during years 2002 – 2011 has grown significantly – from approximately three to four million, or by 33 per cent. In some countries the number of people employed in science has increased more rapidly, for example in Austria an increase of 65 per cent can be observed. Also, in the neighbouring countries – Lithuania and Estonia a remarkable increase can be observed– 65 and 46 per cent accordingly, while increase in Latvia is slower – just ten per cent<sup>3</sup>. The number of researchers in the EU during years 2002 – 2011 also is on a rising trend – by 40 per cent in the EU average, 50 per cent in Estonia and 82 per cent in Lithuania.<sup>4</sup> Simultaneously, the number of researchers has grown only by 20 per cent in Latvia.

1.2. In addition to number of researchers an important indicator is their actual engagement ratio in research and development. On average in the EU and in Estonia the actual engagement ratio of researchers has grown correspondingly to the number of researchers, while in Latvia and Lithuania actual engagement of researchers has increased faster than actual engagement<sup>5</sup>. This implies more resilient increase of the number of researchers engaged in research and development on a part time basis. This aspect is especially evident in Latvian data.

The data on full-time equivalent (FTE)<sup>6</sup> indicate, that actual engagement in research and development during last twelve years has remained at the same levels. Increase in actual engagement in research and development on FTE basis can be observed during 2006 – 2008, followed by a sharp decline till 2001 level.



**Figure1. Number of Researchers in Latvia, FTE, 2001 - 2012<sup>7</sup>**

<sup>2</sup> Including technical assistance and related personnel.

<sup>3</sup> <http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do> (data from internet, 2013.12.26.)

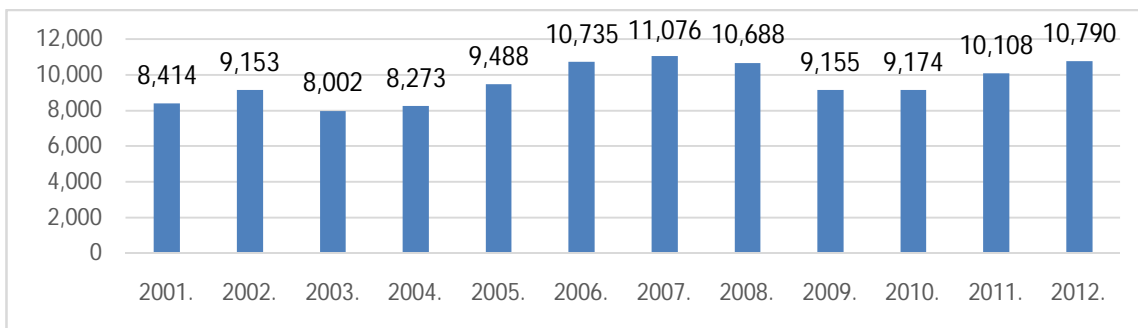
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<sup>5</sup> <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tsc00004&plugin=1> (data from internet, 2013.12.26.)

<sup>6</sup> Full time equivalent or FTE – methodology for calculation the actual engagement in research and development on a full time workload basis.

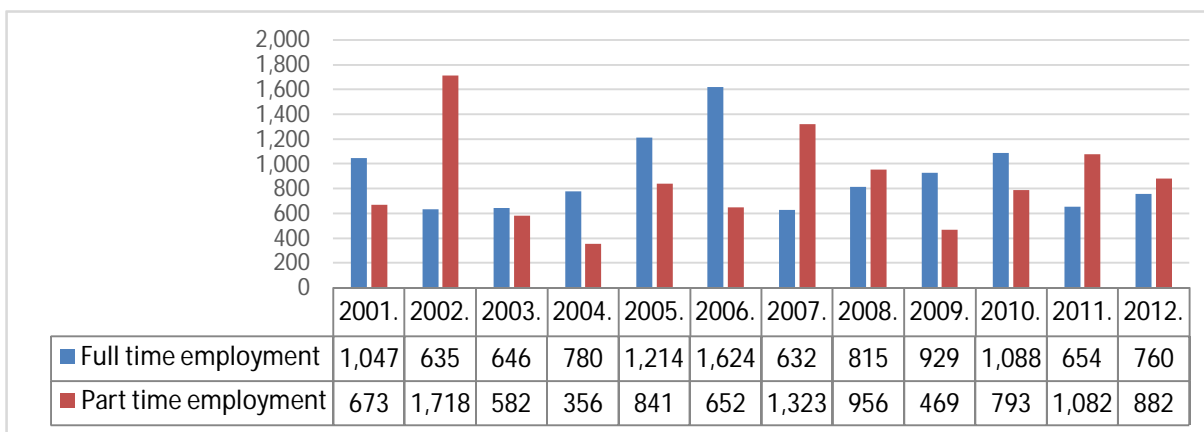
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Regardless the unchanged capacity of scientific workload, the number of researchers in Latvia has increased, mainly due to increase in numbers of researchers engaged in research and development on a part time basis.



**Figure2. Total Number of Researchers in Latvia, 2001 – 2012.<sup>8</sup>**

Statistical data analysis clearly outlines the decreasing trend in the number of researchers engaged in research and development on a full time basis during the last twelve years.



**Figure3. Number of Full Time and Part Time Employed Researchers in Latvia, 2001 - 2012<sup>9</sup>**

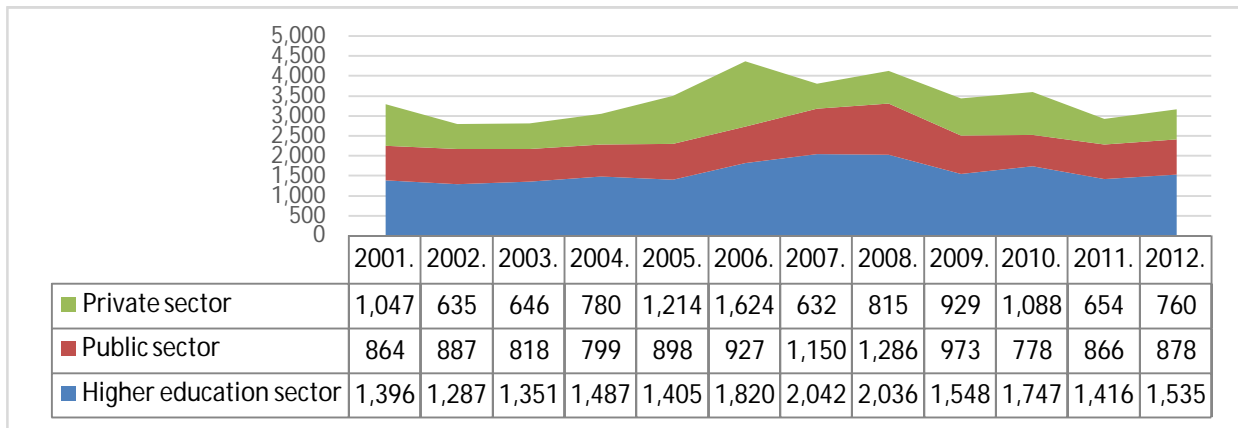
## 2. Researchers Employed by Economic Sectors

2.1. Another important aspect in addition to the number of researchers and their actual engagement ratio in research and development is distribution by the sectors of economy, which is closely linked to the sources of financing and transposition the results of research and development into economics.

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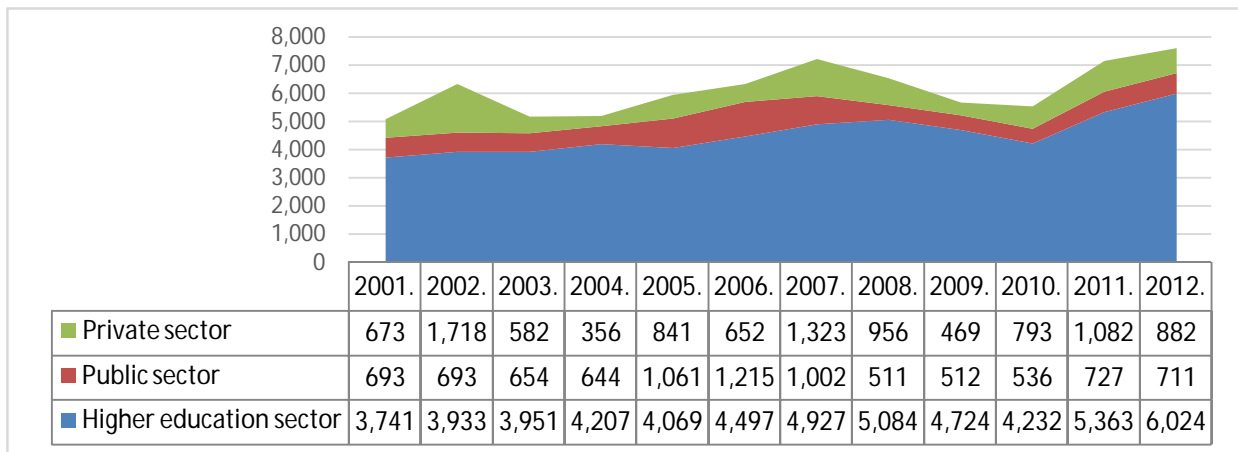
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**Figure 4. Number of Researchers Employed Full Time by the Sectors of Economy in Latvia, 2001 – 2012<sup>10</sup>**

Public governance and higher education are the dominant employers of full time researchers. The clear line between these two sectors cannot be drawn as most of research institutes are subordinates of universities and other higher education establishments. Similar trends with even more increasing role of universities and other higher education establishments can be observed in analysing part time employment of researchers. Majority of the researchers employed part time are lecturers in the universities who occasionally are involved in research projects in university related research institutes.



**Figure 5. Part Time Employed Researchers by the Sectors of Economy, 2001 – 2012<sup>11</sup>**

2.2. In comparison to Western Europe, significantly smaller number of researchers is employed by private sector. In some of the EU countries like Germany, France, Finland and Sweden most researchers are employed by private sector, 44 per cent of researchers being employed by private sector on average in the EU<sup>12</sup>.

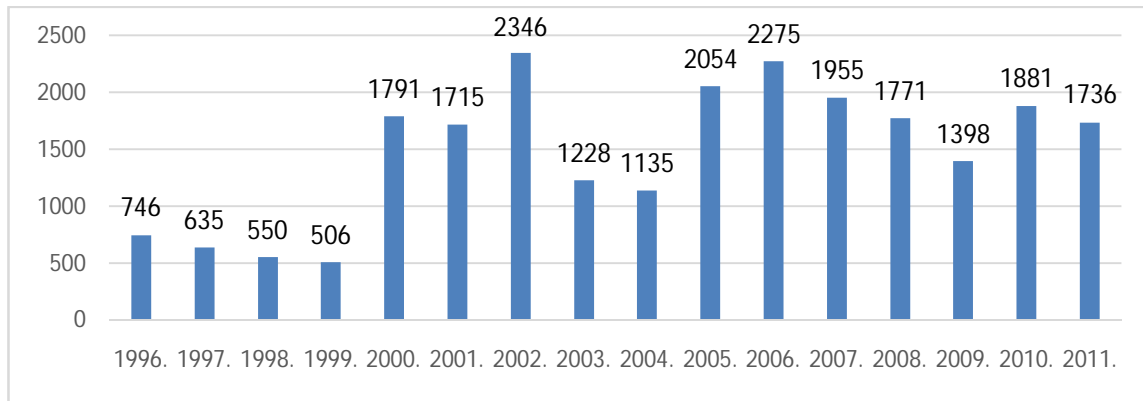
A nation specific characteristic of cooperation between science and private sector is instability. The number of researchers employed in private sector is prone to wide fluctuations, with possibility to double or halve the employed researchers within a single year.

<sup>10</sup>

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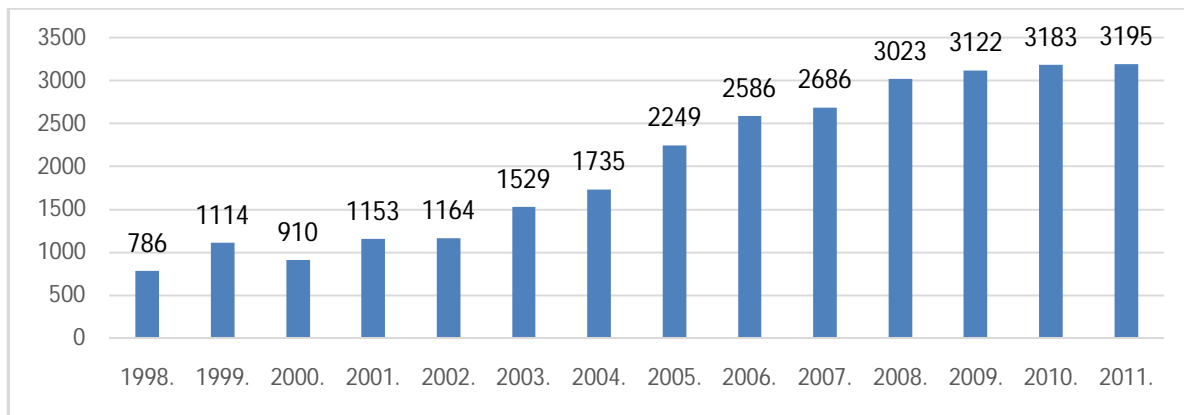
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<sup>12</sup> <http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do> (data from internet, 2013.12.26.)



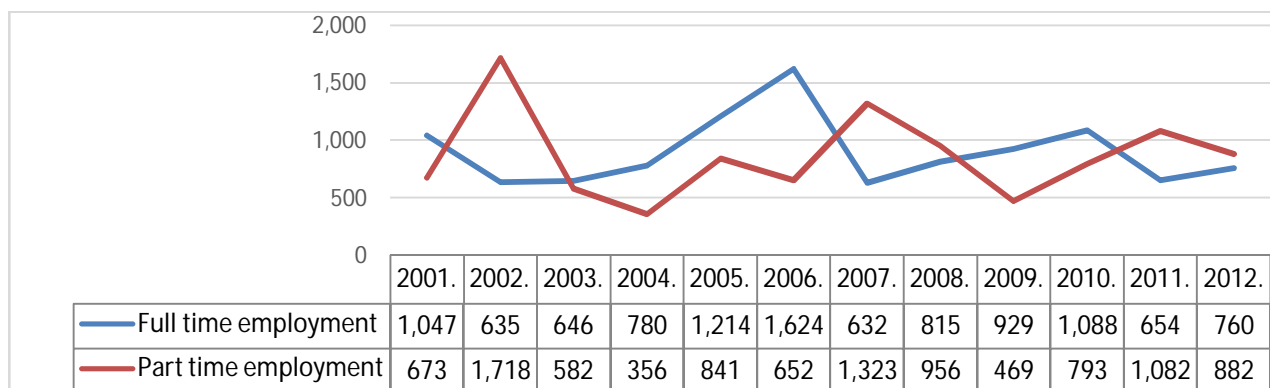
**Figure 6. Number of Researchers Employed in the Private Sector in Latvia, 1996 – 2011.<sup>13</sup>**

2.3. Unlike situation can be observed in Estonia where the number of researchers employed by the private sector has been on an upward trend over the past decade.



**Figure 7. Number of Researchers Employed by Private Sector in Estonia, 1998 – 2011<sup>14</sup>**

Estonia has less territory and smaller number of inhabitants in, even though it manages to employ twice as much researchers in the private sector in comparison to Latvia. It must be noted that the number of researchers employed in Estonia did not experience a decrease even during the years of crisis 2008 – 2009. The form of employment for researchers in a private sector is also unstable.



**Figure 8. The form of Employment for Researchers in a Private Sector<sup>15</sup>**

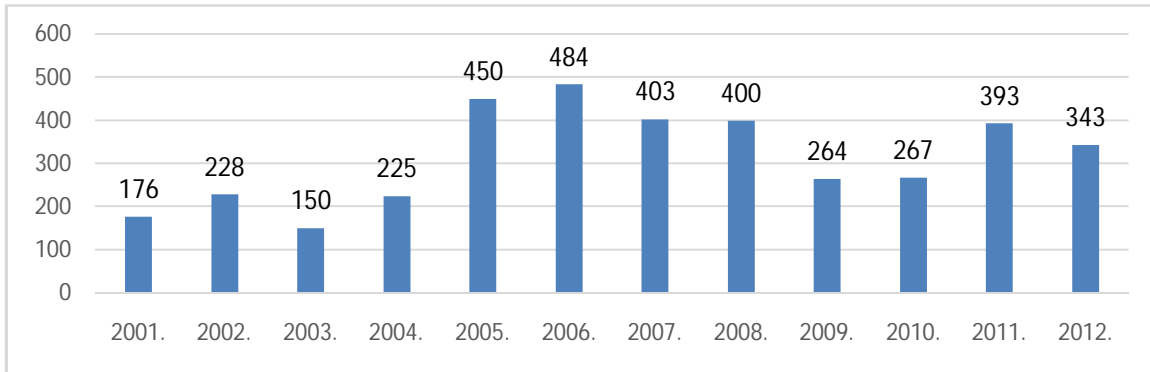
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<sup>14</sup> <http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do> (data from internet, 2013.12.26.)

In recent years employment of the researchers in private sector largely depend upon availability of the European Structural Funds, where some of activities are targeted towards promoting cooperation between scientists and private sector. Taking into consideration the fluctuations in dynamics of employment, one might doubt the sustainability and long term positive impacts of recent cooperation.

Low levels of researchers employed in private sector might indicate low capacity and low potential of the private sector to create new technologies and high value added products in a foreseeable future. Field studies from Europe and the world indicate that main employers of researchers in the private sector are large scale industrial enterprises<sup>16</sup>. The number of such enterprises in Latvia is relatively small and even fewer are capable of investments in research and development and are ready to undertake the costs of research.

2.4. Likewise, rapid changes can be observed in the number of private enterprises employing researchers.

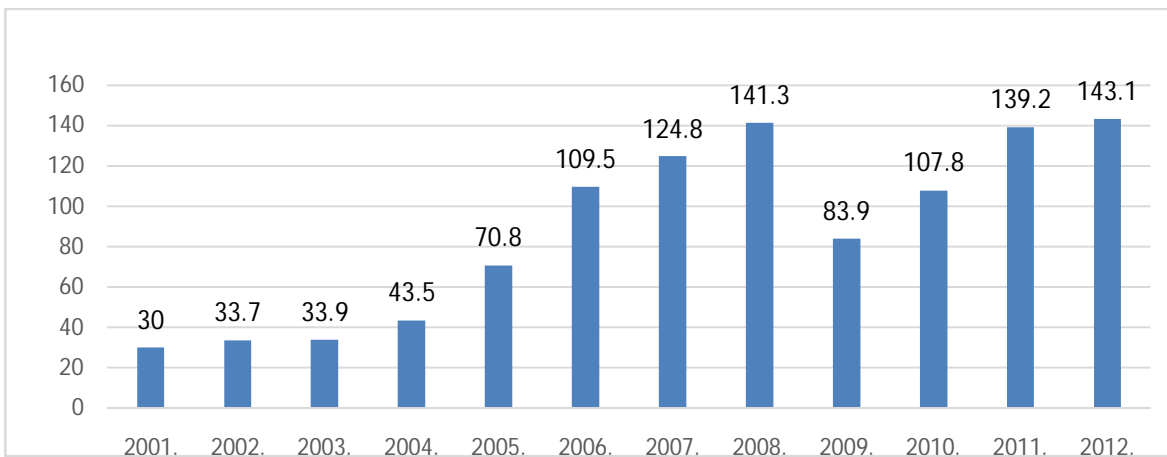


**Figure 9. Number of Enterprises Undertaking Research, 2001 – 2012.**<sup>17</sup>

This inconsistency to a greater extent can be explained by analysis of research and development financing.

### 3. Financing of Research and Development

3.1. There has been an astonishing fivefold increase in total financing for research and development over the past ten years. The pace of increase at first seems stable and uniform, a slight draw back had occurred only during the economic and financial crisis, in 2011 and 2012 reaching pre-crisis levels.



**Figure10. Financing for Research and Development in Latvia, 2001 – 2012, Million Euro**<sup>18</sup>

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<sup>16</sup> [http://ec.europa.eu/invest-in-research/pdf/download\\_en/psi\\_countryprofile\\_sweden.pdf](http://ec.europa.eu/invest-in-research/pdf/download_en/psi_countryprofile_sweden.pdf) (data from internet, 2013.12.26.)

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3.2. Financing for science has regained pre-crisis levels, however a significant change in structure must be noted. There has been a significant increase in foreign financing, i.e. financing from the EU Structural Funds.

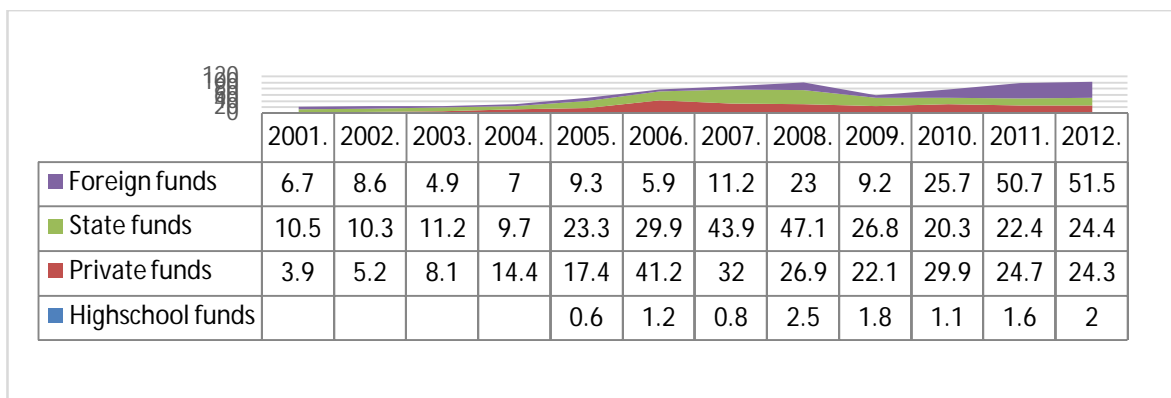


Figure 11.<sup>19</sup> The Structure of financing of Research and Development in Latvia, 2001 – 2012

Over past ten years the EU financing for science has increased more than tenfold, in last two years contributing to more than a half of total financing for science in Latvia. Foreign investment in science during economic crisis is a positive response, while one could argue that financing from structural funds should not be seen as a long term solution and policy makers are strongly advised to revise state financing for science, also expected by national laws.

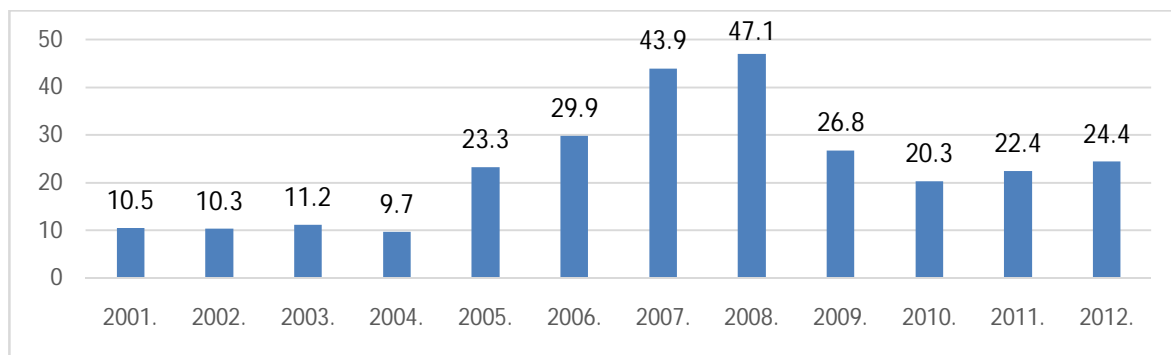


Figure 12. State Financing for Research and Development in Latvia, Million Euros, 2001 – 2012<sup>20</sup>

3.3. Unfortunately the private sector over the past few years has significantly decreased financing for science and at the moment reversal of this trend is not observed.

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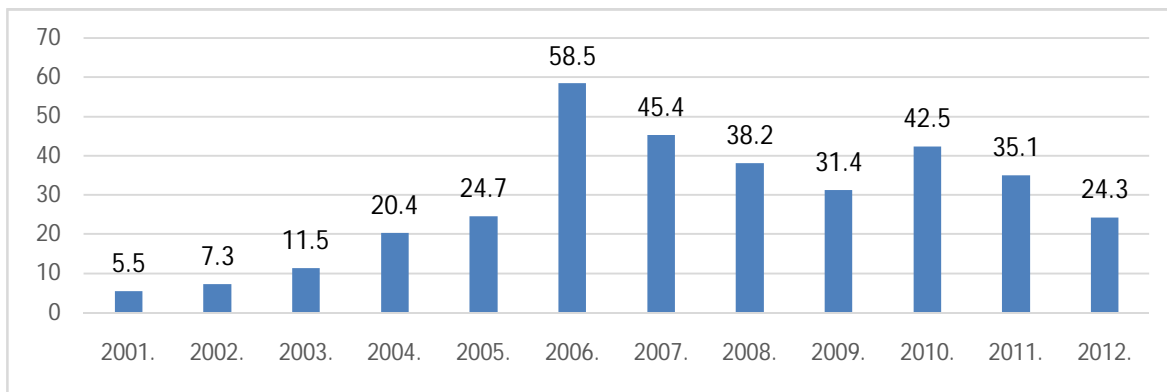
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**Figure 13. Private Sector Financing for Research and Development, Million Euros 2001 - 2012<sup>21</sup>**

### Conclusions

1. Science development in Latvia over past ten years is significantly lagging behind the EU average, especially in comparison with neighbouring countries Estonia and Lithuania.
2. Multiple indicators show inconsistencies in the science policy – increasing number of scientists being employed on a part time basis, decline in private sector financing, fluctuations in numbers of researchers employed by the private sector, very volatile number of private enterprises employing researchers.
3. Financing for Latvian science is fragmented – over past few years the majority of financing comes from the EU structural funds, supporting short term activities, while state financing for science has decreased significantly.
4. Factors mentioned above are not in favour for long term development of science in Latvia as researchers are in an unstable position constantly looking for jobs and financial sources, as well as getting involved in short term projects.
5. Currently the business environment in Latvia is not ready to undertake a significant role in investing in long term research. There is a strong correlation between number of enterprises employing researchers and availability of the EU structural funds, implying that this cooperation is based on dotation rather than being born as a result of natural necessity as it is the practice in Western European countries.
6. In order to ensure the long term development of science in Latvia, a shift from short term problem solutions to long term goal achievement as well as wider and more sustainable involvement of private sector in science would be appreciated.