

THE R&D AND THE INTERNATIONALIZATION OF BUSINESS ORGANIZATIONS. THE CASE OF PHARMACEUTICAL COMPANIES

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Abstract:

Research and development represents one of the key activities of the business environment which shows company's ability of continuous development. The interest in research and development can be observed in the global companies goals of being innovative by the goods and products offered. Combing these two elements helps improving company's competitiveness which has a major contribution in the development of some strategic arias like health, energy or industry.

The level of development of a company and the degree of diversification of the products and services offered is different from company to company, which highlights the fact that in the process of internationalization companies need to be focused to work on their advantages in order to keep the competition away. In these sort of cases companies decide to pay a particular attention in assigning resources for specific activities of research and development.

The success of the pharmaceutical companies depends of the of research and development activity which objectives is to encourage creativity and innovation regarding the development of new medicines or other pharmaceutical products. The pharmaceutical industry would not be able to evolve without massive investments in research and development which is the base of the evolution of the company. On the other hand, the more they invest in research and development, the companies tend to expand their activity abroad in order to promote the comparative advantages obtained by the activity of research.

Key words: abroad expanding, multinational companies, development, innovation

JEL classification: F23, M16, O30

1. INTRODUCTION

Today's business environment is constantly changing mostly due to technological progress. Technology development generally entails a series of solutions that economic actors are forced to take into consideration in order to be able to compete and achieve performance. Directing the resources in order to improve the material basis of the company by supplying mainly tangible assets is one of the most important strategies for company's business expansion beyond national borders, in areas where they hold a competitive advantage. Thus the main actors on the international market become the multinational companies, which represent one of the pillars of globalization with international banks and financial institutions worldwide.

Investments in research and development are actually one of the pillars of the knowledge economy, whose importance increases, taking into account their impact on overcoming moments of decline that the world economy must transcend. The education and the research aren't activities themselves no matter how noble they may be. They represent means used to build a certain kind of society and the knowledge appears as a catalyzer that accelerates the support for technologic progress and increases the efficiency of any human activity. In a world that is continuously changing there are necessary some means in order to identify the elements that can decrease the differences between the more and more diverse and complex needs of the consumers. So the strategies of the actors on the world market must be focused on the orientation of the financial resources to key area of development.

2. METHODOLOGY

Health is a vital aspect of human development and economic growth of a nation. Investments in this sector are a catalyst for improving quality of life; they not only involve performing hospitals and satisfactory salaries for medical staff, but also the discovery of new drugs, biotechnologies and other tools that can improve quality of life at local, regional or global scale.

The purpose of this study is to analyze the way that increasing research and development expenditure emphasizes the internationalizations trend of pharmaceutical companies. In order to achieve this there were studied the most important pharmaceutical companies worldwide (Pfizer, Novartis, GSK, Roche Group, Sanofi, Merck Co, AstraZeneca, Johnson & Johnson). The criteria of this selection was based on the UNCTAD ranking regarding the degree of internationalization of the non-financial companies.

The analyzed variables were the R&D expenditure of the selected companies and also the Transnationality Index and its components (the abroad assets, the abroad employees and the abroad turnover). Taking into consideration these variables we have tested the hypothesis of the existence of some correlations between the studied indicators using SPSS for Windows.

3. THE INTERNATIONALIZATION OF BUSINESS ORGANIZATIONS ACTIVITY

Expanding businesses on the international market is one of the major objective in the existence of an economic entity, regardless of their size or the sector in which it conducts productive operations. The meaning of this purpose can be found in company's motivation of deciding to have activities on other markets than the local market. The decision of expanding is motivated by company's objective of raising their revenue and to conquer new markets or to improve the current position on the international market. The existent competition at national level can also represent one of the reason that strengthen firm's motivation. Expanding the activity at international level reveals a way out when the national market is over saturate. Albaum (2002) emphasizes the fact the companies motivation of expanding abroad can be reactive (the proximity to clients, the overproduction) and proactive (the access to resources, the decrease of the costs, the technological advance).

The complexity of the operations in each area of activity requires the measurement of the internationalizations of businesses using some specific indicators. Certain studies that have been made show that there are some particular criteria which are used in order to measure the degree of internationalization of the companies' operations. So, the degree of internalization from the activity conducted of the economic entity (Dunning and Lundan, 2008) can be measured by: the number of subsidiaries, the size of the companies that are controlled; the number of countries where the companies have activity or control the activity that provide high added value; the asset share abroad, the revenue share abroad, the profit share abroad, the employees share abroad held by the subsidiaries; the degree of internalization of the management; the degree of internationalization of activity with high added value (e.g. research and development activity), the complexity of the systematic advantages provided by the efficiency of the network, the degree of taking financial decisions at the subsidiaries level.

The methodology proposed by UNCTAD to calculate the degree of involvement of a company on world's markets of goods and services refers to the Transnationality Index. This index is the result of an average between the abroad assets, the abroad employee and the abroad turnover.

4. THE DEVELOPMENT OF PHARMACEUTICAL INDUSTRY THROUGH RESEARCH AND DEVELOPMENT

The progress in science and technology has influenced a lot the pharmaceutical industry because has allowed it to gain a significant take off regarding the discovering of new ways to treat the diseases that influence the health of the people. The access to performant equipment and appropriate trained employees ensures the bases of the research and development activity in order to get innovative solutions to the current issues. So the pharmaceutical industry is an innovative one and its major objective is progress in reaching to efficient treatments and to increase people access to it.

Taking in consideration the fact that pharmaceutical companies aim to grow the access to their products (this implies finding new markets for the products) can be observed that the major objective is actually to expand research and development activity abroad. Knowing the great meaning of the progress in this industry for the promoting of new medicines with high impact on health and people's quality of life, the pharmaceutical industry focus on research and development becomes one of the key sectors of the world economy.

According to EU R&D Scoreboard 2014, the industries can be grouped by the intensity of research and development expenditure (share of the turnover): industries with high intensity of research and development expenditure: the share of the research and development expenditure in the turnover is about 3% (Pharmaceutical Industry, Biotechnology, Medical equipment); industries with medium intensity of research and development expenditure: the share of the research and development expenditure in the turnover is about 2-5% (Automotive, The Chemical and Household Goods Industry); industries with reduced medium intensity of research and development expenditure: the share of the research and development expenditure in the turnover is about 1-2% (Food Industry); industries with reduced intensity of research and development expenditure: the share of the research and development expenditure in the turnover is under 1%.

Therefore, the research and development activity cannot be analyzed without taking in consideration the contribution of the human capital in all the initiated studies, regardless the financial capacity of the business organizations. The human capital that works in the pharmaceutical industry can be considered an expert if we take in consideration that "an expert knows increasingly more of what is less" (Nicolae, 2013), highlighting the importance of their knowledge. So the pharmaceutical companies need to take into account the need of highly qualified human resources that have knowledge and also the capacity of creating it.

There is no doubt that the pharmaceutical companies are the biggest spenders regarding the budgets assigned for research and development activity, even more that the automotive sector or computing and electronics industry. In Global Innovation 1000 Study it is presented a ranking of the companies that spend the highest budgets on research and development and innovation also in 2015. According to the ranking it can be observed that of the 20 companies that were the subject of the study 8 are pharmaceutical companies, 5 belong to automotive industry, 4 are involved in activities that concern computing and electronics and 3 of them are focused on software an internet. The pharmaceutical companies are in the top of the ranking as respects the presence.

In order to highlight the position held by the analyzed companies as far as that goes the assigned budget is given the following figure:

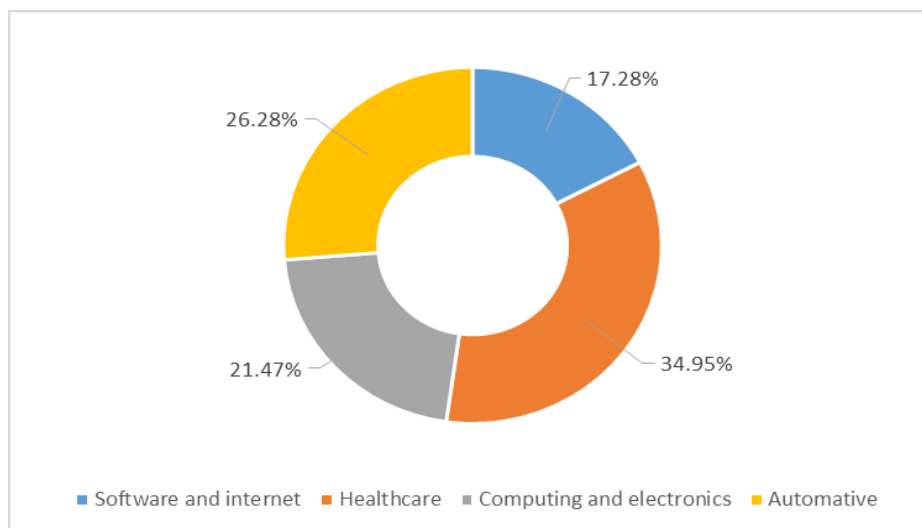


Figure 1. The share of the R&D budget of each industry in the Global Innovation 1000 Ranking

Source: <http://www.strategyand.pwc.com/global/home/what-we-think/innovation1000/top-innovators-spenders>, author’s calculations

The total budget for research and development assigned in 2015 by the analyzed companies was of \$176, 5 billion. The highest share in this budget was held by the pharmaceutical companies’ resources, the second place being occupied by the automotive industry. What needs to be highlighted is the fact that the pharmaceutical industry evolves through the research and development activity, fact that can be noticed in the large budgets for this practice.

The research and development activity in pharmaceutical industry requires significant financial resources in a process that lasts many years. This facts shows that this activity is expensive, risky and its results may appear or not, after a long period of time. The European Federation of the Pharmaceutical Industry shows in the report regarding the evolution of the pharmaceutical domain that a medicine will get on market after 12-13 years since the first synthesis of the discovered active substance, the cost of the research and development of a new biological or chemical unit was estimated at 1, 172 million euros in 2012 and in an amount of 10.000 synthesized substances in laboratory only one or two will pass all the development stages in order to become a medicine that can be sold.

Actually the pharmaceutical industry couldn’t survive without research and development. The reputation of pharmaceutical companies is straightened by the high budgets for research and development because their operating activity requires financial resources in order to obtain solution that can solve people’s health problems. The below table shows the amount of money granted for research and development by the most important pharmaceutical companies. This data is necessary for revealing the importance given to that activity.

Table 1. The expenditure on research and development of the most important pharmaceutical companies

No.	Company	The expenditure on research and development									The annual average amount spent (\$bn)
		2007	2008	2009	2010	2011	2012	2013	2014	2015	
1	Pfizer	7.6	8.1	7.9	7.8	9.4	9.1	7.9	6.7	8.4	8.10
2	Johnson&Johnson	7.1	7.7	7.6	7	6.8	7.5	7.7	8.2	8.5	7.57
3	GSK	6.4	6.7	6.7	6.4	6.9	6.4	6.3	6.1	5.7	6.40
4	Sanofi	5.6	6.2	6.7	6.4	5.8	6.7	6.3	6.3	6.4	6.27
5	Novartis	5.3	6.4	7.2	7.5	9.1	9.6	9.3	9.9	9.1	8.16
6	Roche Group	5.3	7	8.2	9.1	9.6	9.4	10.2	10	10.8	8.60
7	Merck Co	4.8	4.9	-	5.8	8.6	8.5	8.2	7.5	7.2	6.94
8	AstraZeneca	-	5.2	5.2	-	5.4	5.5	-	-	5.6	5.38

Source: <http://www.strategyand.pwc.com/global/home/what-we-think/innovation1000/top-20-rd-spenders-2015>

According to the table no.1 the biggest spender in research and development is Roche Group, being followed closely by Novartis and Pfizer. The budget on research and development is influenced by the turnover of the companies registered every year. In the figure below it is presented the evolution of the share of expenditure on research and development in the turnover of the analyzed companies:

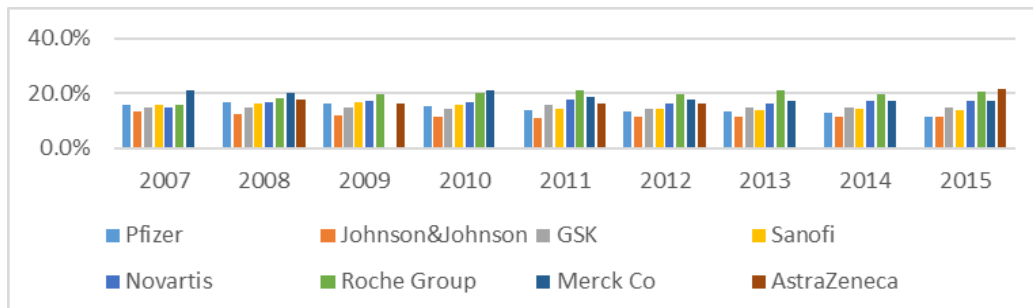


Figure 2. The evolution of the share of expenditure on research and development in the turnover of the most important pharmaceutical companies

Source: <http://www.strategyand.pwc.com/global/home/what-we-think/innovation1000/top-20-rd-spenders-2015>, author's calculation

The data from figure 2 shows that the highest shares of research and development expenditure in the turnover was registered in the case of AstraZeneca and Roche Group in the year 2015. It can also be noticed that on the entire period the highest values were registered in the case of Merck and Roche Group. Although the shares in the case of Merck were lower than the one of Roche Group, there may be observed a higher interest on research in the case of Merck beside Roche Group. This observation is based on the share of research and development expenditure in the total turnover.

If we take into consideration the ranking realized by the EU R&D Scoreboard 2014 about the intensity of the research and development as a share of the turnover we can observe that the analyzed companies are occupying the place specific to pharmaceutical industry. All the firms from the study are assigning a budget of more than 10% of the turnover.

The high budgets that are necessary for the research in this industry are justified by the major impact that the favorable results from this sector may have on people, their health and their wellbeing. Although in terms of investment it is recommended an increasing resource allocation, because the amount spent remains blocked until the medicines get on the market. This situation is specific to Roche Group and Novartis; in the table no.1 it is shown that these two companies have been assigning increasing budgets for research and development for the last few years.

5. PERSPECTIVES ON PHARMACEUTICAL COMPANIES INTERNATIONALIZATION

Companies take into account that their strategies focused on obtaining innovative products need highly qualified human resources. So in the process of expanding abroad they are focused also on the human capital because the pharmaceutical industry requires human resources with a high level of experience and knowledge. Opening new production and research units in other countries makes necessary hiring new people.

In the moment of relocating the production, companies invest a lot in infrastructure in order to develop their activity. In this situation it can be observed an increase on the total assets because the assets of the parent company are completed by those from the country where company's subsidiaries are. In order to highlight the involvement of the business organizations in abroad activities that are very complex like the research and development one it is necessary an analysis of the abroad assets. The investments made create new jobs and support the growth of the economy and also provide the access to a wide range of medicines.

In this context it is required overview on the assets held by the major pharmaceutical companies outside the national state therefor in the figure below it is presented an analysis of this index during the period 2007-2013:

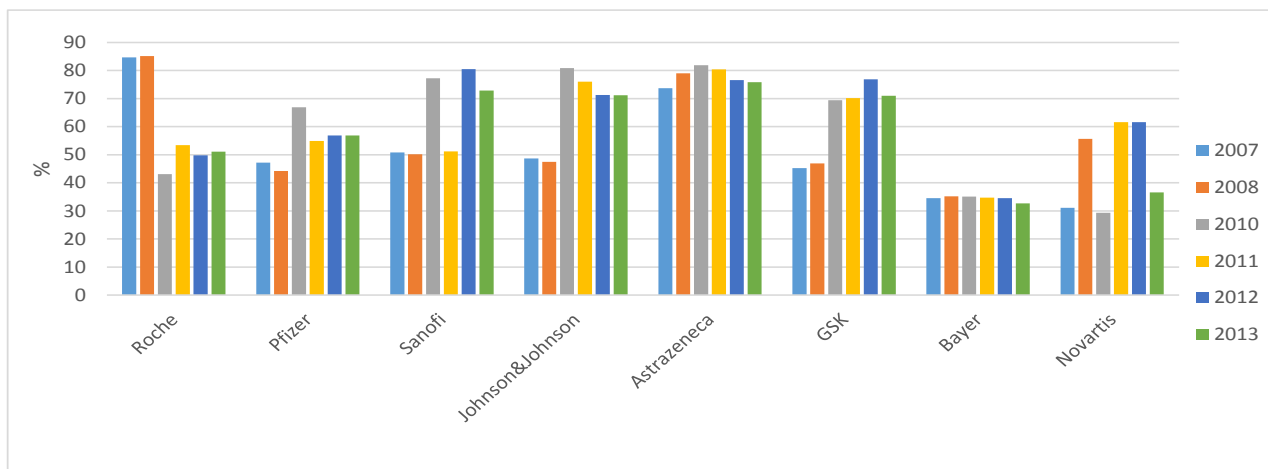


Figure 3. The share of the abroad assets of the biggest pharmaceutical companies
Source: WIR 2007-2014 UNCTAD

According to the data presented in the table above it can be observed that the biggest share of the abroad assets was registered in the case of Roche Group in 2008. In the same year the abroad assets of Roche Group represented almost 85% of the total assets. The dominant trend of the analyzed period was characterized by the increasing of the abroad assets during the year 2013 comparative with 2007, being noticed also a significant decrease at the assets of Roche Group and a major growth at the assets of Sanofi.

Once that the companies expand their activity abroad they create new jobs so it is necessary to analyze the employees of the company that work abroad. In the figure below it is given the evolution of share of the employees that are working subsidiaries abroad.

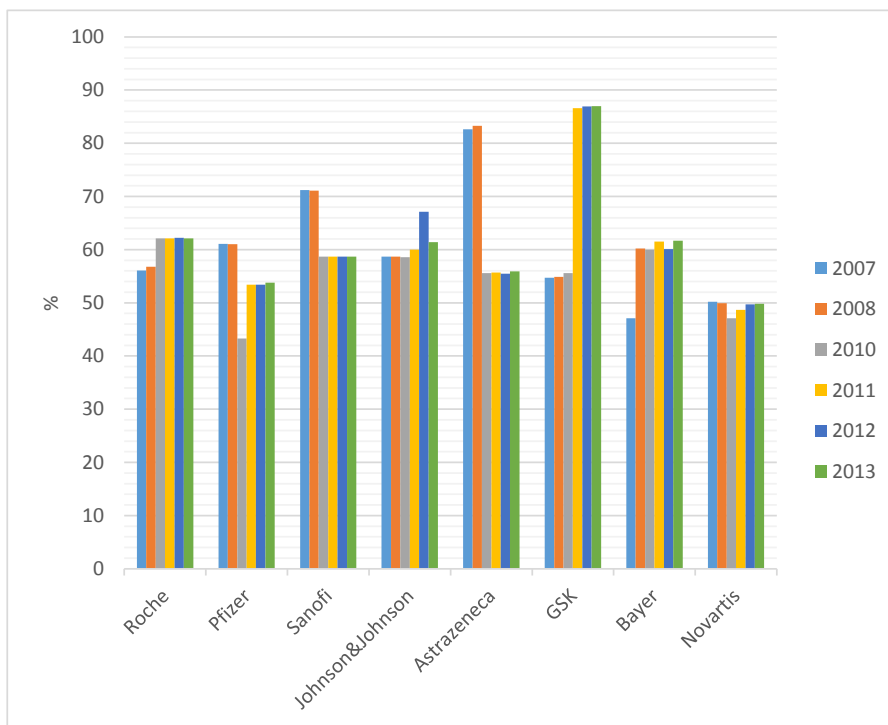


Figure 4. The share of the abroad employees of the biggest pharmaceutical companies
Source: Created by the author using data from: WIR 2007-2014 UNCTAD

Regarding the abroad labor force of the analyzed companies can be observed that the the dominant is an increasing one in 2013, comparative with 2007 (Roche, AstraZeneca, GSK, Bayer, Novartis). Although the highest number of employees that are working abroad are the one that worked for Bayer in 2011 (76.000 of abroad employees) the highest index is registered in the case of GSK (2013). Therefore we conclude by mentioning that the internationalization level is higher for GSK given the abroad human resources.

The companies that have activity abroad, have employees abroad and have also turnover abroad. In order to evaluate companies' internationality it is necessary an analysis of the share of the abroad turnover in the total turnover that can be observed in the figure below:

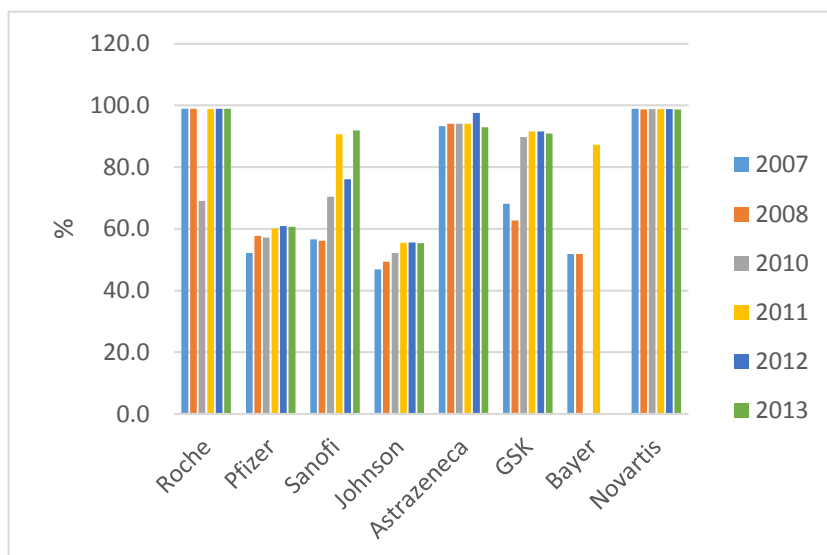


Figure 5. The share of the abroad turnover of the biggest pharmaceutical companies

Source: Created by the author using data from: WIR 2007-2014 UNCTAD

The degree of internationalization of a company can be evaluate by using an index named Transnationality Index that uses the abroad assets, the abroad labor force and the abroad turnover in order to present company's activity in a country that is different from the one where the parent company is. The figure below offers some indications about the position of this index in the case of pharmaceutical companies.

The highest value of the Transnationality Index was registered by GSK during the year of 2012. According to the date presented in the table below we can observe that most of the companies have values of over 50% of the analyzed index which shows that more than half of firms' activity takes place abroad. So the activity of the pharmaceutical companies is intensive oriented to foreign markets which shows a strategy focused on significant budgets for investments.

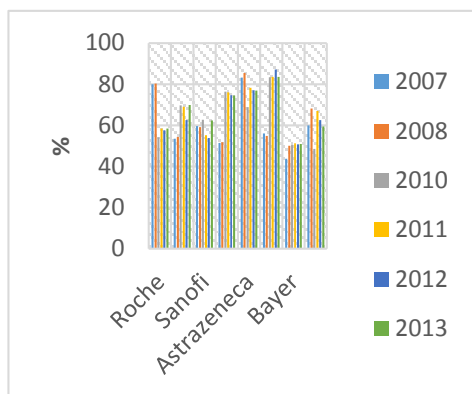


Figure 6. The evolution of the Transnationality Index during 2007-2013

Source: created by the author using data from: WIR 2007-2010 UNCTAD

6. THE CORRELATION BETWEEN RESEARCH AND DEVELOPMENT AND THE INTERNATIONAL EXPANDING OF THE PHARMACEUTICAL COMPANIE

The business environment is becoming more risky and more expansive in the context of increasing global competition in matters of innovation. The corporate activities based on knowledge including research and development have an essential role for the success of global corporation. In the knowledge based economy, the companies are relocating more often the research and development activity in other countries in order to identify or to improve the opportunities on the international market but also for having access at human capital and intangible assets that are necessary for the increasing of the competitiveness. Generally, the internationalization of a firm assumes important benefits (improving profitability, increasing the learning potential), but in the same time may bring serious challenges for certain countries that need to ensure an attractive business environment for these companies.

The simplest form of internationalizing of companies (usually the one preferred by companies in their early explorations of the external market) is the export which represents an important factor in priming the economic growth. In the case of big corporations the most preferred forms of internationalization are the mergers and the acquisitions because of their advantages; in industry and pharmaceutical domain these forms are often used in order to internationalize the activity of research and development of the specific companies.

What about the connection between research and development and internationalization? According to the economic literature the productivity of a company has a major role in increasing the profitability and the exports too. The productivity on its one is influenced by the activity of research and development which is considered the engine of productivity growth. The performance of a company depends on the way of performing the operations in terms of allocation and use of the resources. So it is obvious that the companies are expanding worldwide by permanent investments and the complex needs of the consumers has entailed the outsourcing of the research and development activities.

The major objective of each multinational company is to expand its activity continuously. This fact can be observed in the high shares of the research and development expenses in the total turnover. The obtained result are first distributed on national market. After a time the company takes into consideration an international expanding which requires the relocation of the production and founding subsidiaries in other countries. The big companies' strategies aim to increase the international activity, fact that can be observed from the large budgets in research and development.

The research and development activity entails high financial resources which shows that the budgets for research and development are influenced by the level of the turnover. Therefore a high level of the turnover entail a high level of the research and development budgets. When a company will have in mind to expand on other markets it will assign financial resources to the most performant areas. Regarding to this aspect can be mentioned the fact that most of the analyzed companies have founded research laboratories in other countries.

Pfizer, a pharmaceutical company that has the headquarters in USA, has research laboratories in Great Britain and China. GSK, a British pharmaceutical company, has much many research centers in countries like Spain, Belgium, France, Germany, USA, Canada, China and Singapore. Novartis, a pharmaceutical company with the headquarters in Switzerland, has research laboratories in USA, China, Singapore, India and Japan.

According to this information we may observe that the pharmaceutical companies oriented their research activity in the developed countries. The particularity of this domain is given by companies' option of creation high quality products. Therefore all the companies resources are used in order to bring value by creating innovative products and to expand on foreign markets. So the financial and human resources are combined in an effective way in order to face the complex challenges from the pharmaceutical industry. This fact emphasizes the strengthening of the research and development laboratories and entails the interest on improving the production flow in order to obtain high quality medicines and performants technology.

The activity of research and development is focused on producing new active substances that have a significant impact on improving the quality of life of those who have certain health problems. The high level of innovation and the internationalization of the activity by identifying new markets influence the performance of the company. Taking into consideration the fact that one of the major objectives of the pharmaceutical companies is to insure access to high quality products the business organizations choose the internationalization way.

Considering the presented data we have tested the hypothesis of 0 correlation between the investments in research and development (as an independent variable) and the trend of internationalization (as a dependent variable) using SPSS for Windows. We have chosen Pfizer and Johnson & Johnson because their assets have the highest value (Pfizer - \$ 172.101 billion and Johnson & Johnson \$ 132.683 billion) and also the highest share of the abroad assets in the total assets (Pfizer - \$ 90.403 billion and Johnson & Johnson \$ 96.803 billion).

Table 2. The results of the correlation analysis between the investments in research and development and the transnationality index

Company	Pearson coefficient	The determination coefficient
Pfizer	0.711	0.505
Johnson	0.755	0.57

Source: WIR 2010-2014, UNCTAD, author's calculations

The value of the Pearson coefficient in the case of those two companies allows us to conclude that the formulated hypothesis is checked. The determination coefficients emphasizes the fact that the internationalization trend influenced the expanding more than 50% of the interest/expenses in research and development in the case of both companies, the result being the result of the action of a many factors. The pharmaceutical domain is itself a knowledge intensive one within which the research and development component is becoming more and more important; those two companies have relocated an important share of this component in the developed countries which ensures the facile access to infrastructure and human capital.

7. CONCLUSIONS

In order to identify the connection between research and development and the internationalization of the pharmaceutical companies we have analyzed two significant indicators, namely the investments in research and development and the Transnationality Index for the most developed pharmaceutical companies. In order to get to this we have also analyzed the evolution of their budgets for research and development and the evolution of the components of Transnationality Index.

Firstly we have studied the position of the pharmaceutical companies worldwide regarding the expenses with research and development and we could notice that this industry is assigning the highest budgets for the named activity. Besides that it was observed that this companies allocates a large share of their turnover for research. So it was shown that the research has a major role in the evolution of a pharmaceutical company. Secondly we analyzed the perspectives on the internationalization of their activity by highlighting the share of their abroad assets in the total assets, abroad employee in the total employee and abroad turnover in total turnover. After testing the correlation between the investments in research and development and the Transnationality Index at the selected companies it was observed that internationalization of the pharmaceutical companies is influenced by the investments in research and development.

The results of this research are focused on the pharmaceutical industry, fact that emphasizes the necessity of a more complex analysis, on other sectors with high level of research and development investments. Therefore, it is considered that a bigger picture of the correlation between the level of internationalization and the research and development investments will be observed by increasing the research area of the future studies.

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