

Importance of Product in High-Tech Industry

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Abstract

According to our research, world pharmaceutical industry has been changing in the last two decades. We found out that one of the basic and most important factors for strategic success of each pharmaceutical company is a product itself which is a basis for further growth and development of each pharmaceutical company. We found out there is a big lack of new, inventive pharmaceutical products. Pharmaceutical companies look for several ways of searching for new products. There are strategies to make various cooperations among pharmaceutical companies which result in project and strategic alliances, which include merger and acquisition strategies as well which are common in pharmaceutical industry. We conclude that products themselves are strategically the most important factors for pharmaceutical industry and we may foresee even more consolidation processes in the future due to new products need.

Keywords: Pharmaceutical industry, product, strategy, consolidation

1. Introduction

We may define the major characteristics of world pharmaceutical industry as the following:

- increased globalization,
- changing structure of competitors and increased competitiveness,
- lack of new products, despite increased investments into R&D (Research & Development),
- increased importance of regulatory issues (registrations, intellectual property rights, litigations),
- fast consolidation and concentration of world pharmaceutical industry,
- development of new therapeutic fields and technologies (biotechnology, pharmacogenomics),
- ageing of the world population and opening up of new, not yet covered therapeutic fields,
- fast development of world generic markets.

Pharmaceutical industry is still one of the most inventive, innovative and the most lucrative world so called "high-tech" industries, however we might talk at the same time of period of great changes in this industry sector. Pharmaceutical industry today probably unite the biggest of all mankind potentials. The basic activity for each inventive pharmaceutical company is to research and develop new products offering to patients new therapies and to enable covering all medical, not yet properly satisfied needs. There are still many unfulfilled therapeutic fields, like cancer, diabetes, severe diseases like rheumatoid arthritis, psoriasis and rare genetic diseases, just to mention some the most important ones. However, the basic research and development of new product is extremely demanding, comprehensive and expensive task. We can stipulate that basic research and development activities (R&D), together with marketing and sales are two the most important operative and even strategic activities of pharmaceutical companies. In these two activities the biggest investments are definitively put in.

Having analysed these figures, we have found that the biggest, inventive pharmaceutical companies invest on average around 16% of their sales into R&D and even more, around 25% or even more, into marketing and sales activities (Kesic 2006,22). However, these ratios, especially these ones for R&D investments, are even higher with specialists, like biotechnology and pharmacogenomic pharmaceutical companies, and much lower with generic pharmaceutical companies (Kesic 2006,28). World pharmaceutical industry is structurally not unique, as pharmaceutical companies differ according to their basic mission, performance, and strategic development. We could define three different groups of world pharmaceutical companies:

- pharmaceutical companies which primarily work on basic research, development and marketing and sales of brand new, inventive, original pharmaceutical products (so called inventors or originators),

- pharmaceutical companies which primarily work on development and sales of generic products (so called generic or copycat producers),
- pharmaceutical companies which primarily work on basic research and development of biotechnology and pharmacogenomic products and technologies of new delivery systems (so called specialists).

In year 2011, a world pharmaceutical market achieved total sales of 828 billion \$ and growth rate of 4 % (World Review 2012, 8). It is forecasted that world pharmaceutical market will grow by an average 4% CAGR (Compounded Annual Growth Rate) till the year 2018 (Pharma Strategy Group 2009, 52). It is estimated that, due to several factors – the expiration of patent protection for some of world best sold pharmaceutical products in the most developed world markets (major impact is in the USA), the worldwide healthcare cost reduction and restructuring, ageing of population and price pressures – the world generic markets tend to grow even faster by an average 10% CAGR till the year 2018 (Pharma Strategy Group 2009, 65).

Table 1: World pharmaceutical market from 2007-2011

Year	Value in bn \$	Growth in %
2007	684	6.4
2008	715	4.5
2009	750	4.9
2010	796	6.1
2011	828	4.0

Source: adapted from World Review 2012

The leading world pharmaceutical markets in terms of sales and as well of per capita consumption of medicines are the USA, Japan and Germany.

Table 2: Leading world pharmaceutical companies in 2011*

Position	Company	Country of origin	Sales in billion \$	World market share in %
1.	Pfizer	USA	57.7	6.9
2.	Novartis	Switzerland	44.5	5.4
3.	Merck&Co.	USA	41.3	4.9
4.	Roche	Switzerland	41	4.9
5.	Sanofi	France	40.5	4.9
6.	GlaxoSmithKline	UK	34.4	4.2
7.	AstraZeneca	UK	33.6	4.1
8.	Johnson&Johnson	USA	24.4	2.9
9.	E.Lilly	USA	22.6	2.7
10.	Abbott	USA	22.4	2.7

* - according to consolidated sales of pharmaceuticals and vaccines

Source: adapted from the companies official published reports

Leading ten world pharmaceutical companies had close to 44 % market share of the global pharmaceutical market in year 2011. For comparison, this figure was only below 30 % ten years ago. This is a clear sign how intensive market consolidation and concentration of pharmaceutical industry has changed world pharmaceutical market in the last several years.

The world pharmaceutical industry has undergone deep changes in the last two decades. Most notably, the strong process of consolidation and concentration has been going on, numerous mergers and acquisitions have occurred, resulting in the forming of complete new companies, respectively. We would like to mention just a few last ones which were concluded in the year 2009, 2010 and 2011 to illustrate the real market situation for a better understanding (Kesic 2011, 32):

Novartis acquired the USA pharmaceutical company Alcon, American pharmaceutical major Pfizer acquired the USA companies Wyeth and King Pharmaceuticals, the USA Merck&Co. bought American ScheringPlough, and French leading pharmaceutical company Sanofi acquired the USA biotech company Genzyme.

When we analyzed the major strategic issues for all these acquisitions, we found out the most important reason for all these acquisitions are products which taking-over companies got into their portfolio by acquisitions. We may argue that competitiveness in pharmaceutical industry has been increasing tremendously. Hunger for brand new products is reality in today's pharmaceutical industry.

2. Research Objectives

We plan to find out how products influence a business performance and strategy of inventive pharmaceutical companies. We would like to evaluate what kind of influence has a shortage of new, inventive products to operative and strategic orientation of pharmaceutical companies and in which way it influences a strong consolidation process of pharmaceutical industry.

3. Role of Products in Pharmaceutical Industry

Product itself definitively plays the most important role in performance of pharmaceutical industry. It represents the core value of pharmaceutical industry meaning, ethical mission, performance, growth and its development as well. We may stipulate that products are definitively the most important factor and the main drivers for growth and development of pharmaceutical industry. Pharmaceutical companies strongly compete on products' characteristics and tend to invest heavily into marketing activities in endeavour to gain prescribers/patients loyalty and to compete as well directly with other pharmaceutical companies. According to this, it is no surprise that the biggest multinational pharmaceutical companies invest over 25% of their sales into marketing and sales activities in striving to get considerable global market shares.

Table 3: Top world pharmaceutical products in 2011

Position	Product	Company	Sales in billion \$	Indication use
1.	Lipitor (atorvastatin)	Pfizer	9.6	lipid lowering
2.	Plavix (clopidogrel)	Sanofi/BMS	9.1	cardiovascular disorders
3.	Seretide/Advair (fluticasone/salmeterol)	GSK	8.2	asthma
4.	Remicade	Johnson&Johnson/Merck&Co.	8.2	RA, AS, CD, UC
5.	Humira (adalimumab)	Abbott	7.9	RA, PA, AS, CD
6.	Enbrel (etanercept)	Amgen/Pfizer	7.4	RA
7.	Crestor (rosuvastatin)	AstraZeneca	6.6	lipid lowering
8.	Rituxan/MabThera (rituximab)	Roche	6.5	oncology
9.	Avastin (bevacizumab)	Roche	5.8	oncology
10.	Seroquel (quetiapine)	AstraZeneca	5.8	antipsychotic

Source: own estimation, adapted from the companies official published reports

We researched further on to evaluate what importance a sales of leading world pharmaceutical products represent for leading pharmaceutical companies and found out that these products indeed represent a major part of their achieved pharmaceutical sales revenues.

Table 4: Importance of leading pharmaceutical products in relation to companies' total pharmaceutical sales in 2011

Position	Product	Company	Sales in billion \$	% of product sales in total companies pharmaceutical sales revenue
1.	Lipitor (atorvastatin)	Pfizer	9.6	16.6
2.	Plavix (clopidogrel)	Sanofi/BMS	9.1	6.6
3.	Seretide/Advair (fluticasone/salmeterol)	GSK	8.2	23.8
4.	Remicade	Johnson&Johnson/Merck &Co.	8.2	33.6
5.	Humira (adalimumab)	Abbott	7.9	35.3
6.	Enbrel (etanercept)	Amgen/Pfizer	7.4	23.5
7.	Crestor (rosuvastatin)	AstraZeneca	6.6	19.6
8.	Rituxan/MabThera (rituximab)	Roche	6.5	15.9
9.	Avastin (bevacizumab)	Roche	5.8	14.1
10.	Seroquel (quetiapine)	AstraZeneca	5.8	17.3

Source: own estimation, adapted from the companies official published reports

Top 10 pharmaceutical products realised cumulative over 75 bn \$ sales which represents over 9% of whole world pharmaceutical market value in year 2011. Our research shows the ratio between a particular leading pharmaceutical product sales and a pharmaceutical company's total pharmaceutical revenue ranges from 7 till even close to 34% which underlines and supports our research hypothesis that a pharmaceutical product represent the most important asset and value for the analysed leading world pharmaceutical companies. This is the main reason leading pharmaceutical companies strive to search vigorously for new product opportunities.

Development of brand new drug (NAS –New Active Substance) is estimated to need investment over 1.3 billion \$ and takes over 12 years to bring it as a finished, legally registered and approved product to a market place (Pharma Strategy Group 2007,43). This is at the same time very complex, comprehensive and highly risky job with no final guarantee that a new product might succeed onto the market and bring start-up investment and revenues back. We analyzed the number of new products (NAS – New Active Substance) having been launched to world markets for the first time ever in the last five years and we found out the number of new products have not been increasing in correlation with funds invested into basic research and development activities of inventive pharmaceutical industry. We compared directly the number of new product launches with invested funds into basic Research and Development for the leading ten pharmaceutical companies and we found out there is a huge gap between these two compared categories.

Table 5: Overview of new product launches (NAS) from 2007-2011 in relation with R&D spending

Year	New product launches (NAS – New Active Substance)	Cumulative R&D investment of ten leading pharmaceutical companies in billion \$
2007	28	52.1
2008	26	55.4
2009	25	58.7
2010	23	61
2011	23	62.8

Source: IMS 2012 and companies' official data

Leading ten pharmaceutical companies invested cumulative over 71 billion \$ into R&D activities in year 2011 in striving to develop and bring new products to the market; this figure represents 19.6% of their cumulative pharmaceutical sales revenue. We researched as well how much funds a particular pharmaceutical company invested into research and development in year 2011 and what was the number of new products a pharmaceutical company launched in that year.

Table 6: Leading world pharmaceutical companies' investment into R&D in 2011 in relation with new product launches

Position	Company	Country of origin	R&D investment in billion \$	No of NAS launches
1.	Pfizer	USA	9.1	2
2.	Novartis	Switzerland	9.6	2
3.	Merck&Co.	USA	8.4	/
4.	Roche	Switzerland	9.2	2
5.	Sanofi	France	6.3	1
6.	GlaxoSmithKline	UK	6.3	3
7.	AstraZeneca	UK	5.5	3
8.	Johnson&Johnson	USA	7.6	2
9.	E.Lilly	USA	5	/
10.	Abbott	USA	4.1	/

Source: adapted from the companies official published reports

As listed above, leading ten pharmaceutical companies invested together over 71 billion \$ funds in 2011 and they all launched only 15 new products to world market. We could calculate on the basis of these figures an average R&D investments needed to bring one new pharmaceutical product to market in that year are estimated to be 4.1 billion \$ which is a huge investment. We may say a product is definitively the most valuable asset for pharmaceutical company. We researched the business activities and strategies of pharmaceutical companies and found out that pharmaceutical companies are not able to research and develop sufficient number of new products alongside their own business performances and activities, despite they have been generally raising their R&D investments considerably over last couple of years. We found out that pharmaceutical companies have practically two options to secure new product development:

- establishing a research and development co – operations with other pharmaceutical companies, in some cases even with their immediate competitors (specialised pharmaceutical research and development companies, biotechnology and pharmaco-genomic companies, other pharmaceutical companies) and various institutions (universities, R&D campuses, other institutions),
- to acquire other pharmaceutical company to get its R&D potential.

Pharmaceutical companies tend to use acquisition strategy predominantly to get new product sources in aim to assure its further business development, growth and long term competitiveness.

4. Development trends in Pharmaceutical industry

We may say pharmaceutical industry has been in the intensive processes of the concentration and consolidation for a period of over 20 years. We may argue that research & development and marketing activities are two the most important and strategic priorities of pharmaceutical companies and into which the greatest part of funds are being invested as well. According to our research, we may emphasize the main strategic reasons for the intensive consolidation processes of world pharmaceutical industry, are the following:

- lack of new products to drive sales growth further,
- huge investments needed for R&D activities to develop new products,
- fast globalization processes of world economy,
- global marketing and sales activities which need large investments as well,
- new, changed structure of the competitors, created by M&A (merger & acquisition) strategy and consolidation process.

According to our research study and findings, there have been more than 10,000 various alliances formed in the world pharmaceutical industry in the last decade (Datamonitor 2005, 67). The concentration process has practically created brand new pharmaceutical players; however some previously well-known pharmaceutical firms have practically disappeared from the global market scenery. For example, the world leading pharmaceutical company Pfizer has been created from 6 big international players, including Pfizer itself, Warner Lambert, Upjohn, Searle, Pharmacia and lastly Wyeth which Pfizer acquired in 2009. GlaxoSmithKline has been formed as well from 5 companies, including Smith, Kline, Beecham, Glaxo and Wellcome.

When we analyzed the most important reasons for such consolidation we found out the most important strategic reason for numerous acquisitions and mergers is definitively a product itself.

Table 7: Some major acquisitions in pharmaceutical industry and main strategic reasons for the deals

Acquirer	Target	Year of closing deal	Value in billion \$	Main strategic reasons for take-over
Zeneca, UK	Astra, Sweden	1999	32	Product-Losec(omeprazole)
Pfizer, USA	Warner Lambert, USA	2000	89	Product-Lipitor (atorvastatin)
Novartis, Switzerland	Alcon, USA	2008/2010	52	Product-portfolio - ophthalmology
Roche, Switzerland	Genentech, USA	2008	42	Product-Avastin (bevacizumab)

Source: own estimation, adapted from the companies official published reports

We may argue as well that world pharmaceutical industry has become more and more oligopolistic indeed. We may entirely agree with Knickerbrocker's theory of oligopolistic reaction (Knickerbrocker 1973, 69) which says, that "Oligopolistic companies, as minimizers of taking risks in avoidance of destroying effects of competition follow each other to new markets to protect their own interests. It is significant that the action of one player creates a reaction of the other competitors, an action creates a reaction and so the story of oligopolization is going on." We may conclude Knickerbrocker's theory properly illustrates and explains a consolidation process of pharmaceutical industry.

Consolidation processes are continuing to speed up as the pharmaceutical companies try to follow their competitors' strategy of M&A (Mergers and Acquisitions) in endeavour to maintain their global market position and a long-term competitiveness. It is quite significant some stand-alone pharmaceutical companies are not able to satisfy longterm and ever-changing market needs and customers' expectations, to invest heavily into R&D and marketing activities in their goal to bring new products to global markets. We argue this process enables pharmaceutical companies new development circles and their long-term development and growth. Formation of partnerships for a sake of maintaining long-term competitiveness is today one of the most usable strategies in pharmaceutical industry. We may argue that pharmaceutical companies make alliances in endeavours to create common synergies and to manage product life cycles. Thus we can underline the most important and strategic activities of creating common strategies for the pharmaceutical companies are:

- research and development (R&D), due to creating of new products,
- products, due to drive the sales growth and gain market shares,
- markets, due to create geographic and market expansion,
- marketing and sales, due to enforce marketing and sales activities to compete on the global markets and to drive further sales growth.

We may say as well due to a complexity in the pharmaceutical industry it is not unusual that the pharmaceutical companies tend to form partnerships and to compete at the same time. They can cooperate on some particular projects (for example R&D projects), however they compete strongly for particular market shares. We have found out in our research that this is so called "C and C phenomena" as we may even call it "Co-opetition" (cooperation and competition at the same time) (Zineldin 2004, 45).

According to that Svetlicic (Svetlicic 1996, 59) stipulates that " Modern ways of the internationalization with an aid of network formation and strategic alliances enable internationalization without a growth of the companies. Today companies decide for internationalization and alliances due to:

- be closer to customers,
- increase effectiveness,
- gain a better access to technologies and knowledge (know-how),
- protect them from competitors (strategic reasons)".

5. Importance of Product

We stipulate today companies do not execute their business activities on the markets with constant, known customers, competitors and buyers who do not change their preferred products. Companies of today, and moreover companies of tomorrow make business as they would have been on the war battle fields with a fast changing competition, a quick technological development, a new and changing regulatory issues, in conditions of the changing world trade policies, and with predominantly less and less loyal customers. We need to take into consideration that today and even more tomorrow customers have had in each product category a numerous offer of various products, and different, ever-changing demands to various combinations of the products and services and as well various prices to choose from. On such a rich offer varieties customers will definitively decide for a product or service which would be able to optimally fulfil their individual needs and expectations. Thus it comes as a no surprise to us that successful companies, and they will be successful in the future as well with this marketing management practices, know how to satisfy their focused customers.

In these companies marketing and marketing management represent business philosophy of a whole company instead to be just a separate function. This properly underlines Drucker (Drucker 1973, 83), when saying "Marketing is so important that it cannot be a stand-alone function. If we look upon it from a point of the final result, that means from a point of the final customer, marketing represents a whole business, a whole business performance. Care for a marketing must go through all the company structures. Business success is not dependent upon a producer, but upon a customer. Thus whole and thoroughly marketing management concept should be the most important one in a company, and must prevail over innovativeness, organisation structuring, financial resources, physical sources, productivity, social responsibility and demand for a profit making". Marketing way of thinking and marketing management are especially important in the pharmaceutical industry as pharmaceutical companies tend to be market oriented and proactive by emphasizing the advantage of their pharmaceutical products. They try to communicate within regulatory allowed frameworks, they strive to build strong brand names (trade marks) and to create long-term loyalty to final customers. It is decisive for them which product a doctor chooses and prescribes to a final user – to a patient and how many times a patient would use it: just once, or repeatedly or even would choose a product from other competitors.

We may even say in a certain way concept of the marketing management clearly designates a company's business philosophy. We may entirely agree with Corstjens' estimation (Corstjens 1991, 55) that "Sector of the pharmaceutical industry, despite being very specific in the all aspects, is an ideal case, how a practice and usage of the marketing management concept directly relates to a very successful business performance of this industrial sector".

According to our research, we can say a product is the most important asset of pharmaceutical company. Even the latest strategic movements in form of acquisitions which were executed in May 2011 in pharmaceutical industry in three cases – when Israeli pharmaceutical company Teva acquired the USA pharmaceutical company Cephalon, Japanese pharmaceutical company Takeda acquired Swiss pharmaceutical company Nycomed and UK pharmaceutical company Shire Pharmaceuticals acquired the USA pharmaceutical company Advanced BioHealing, perfectly acknowledges our research outcome findings. Takeda's management emphasized that the "Transformational transaction is a strategic fit, boosting its presence in Europe and the emerging markets and what is the most important we are getting hold of product Daxas (roflumilast) for chronic obstructive pulmonary disease which is expected to be a major source of revenue growth".(http://www.pharmatimes.com/Article/11-05-19/Speculation_over_as_Takeda_acquires_Nycomed.aspx).

Shire's management concluded very similar, adding as "This acquisition is a strong and complementary strategic fit for Shire. We will invest in the strengths of Advanced BioHealing's specialist commercial team, its manufacturing and its product development. The potential to build on the success of product Dermagraft is attractive; it's already a leading product providing a solution for a common complication suffered by diabetics in the US We believe there's an opportunity to create more value from Dermagraft and Advanced BioHealing's proprietary technology and that with Advanced BioHealing's team joining Shire, we can build Advanced BioHealing into an exciting new business providing regenerative medicine for patients' unmet needs."(<http://www.shire.com/shireplc/en/investors/investorsnews/irshirenews?id=483>).

Teva's management expressed quite a similar statement at the Cephalon's acquisition, saying "We are embarking today on a new and exciting future for Teva's branded business, and we are delighted that we will be working together with the Cephalon team," said Shlomo Yanai, President and Chief Executive Officer of Teva. "This is transforming for Teva's branded business, as it will help us to deliver on our strategic goal of creating a diversified, multi-faceted company. Our significantly broader product portfolio will permit marketing and sales synergies and enhance profitability.« (http://www.tevapharm.com.pr/2011/pr_1008.asp) An urgency of the fast adaptation is not just the strategy for smaller companies and countries but it is a valid strategy of victorious success for the bigger firms, too, as changes in world economy and globalization are quite fast and complex. This is why we argue a product and marketing management are the decisive factors of strategic business success for pharmaceutical companies in globalised and ever-changing world market place.

We may say pharmaceutical companies which want to be globally the leading ones and successful business performers in the future, need to primarily think entirely and differently about products, their research and development, markets, competitiveness, competitors, and strategy with relation to a structure to reach their targets. Especially, they need to bear in minds that the needs of tomorrow customers are different from the needs of today's customers and they do change fast and tremendously in a relation to facts which are the most important to pharmaceutical industry itself. In that relation, we foresee a role of product as a decisive, crucial and the most important strategic asset of a particular pharmaceutical company.

6. Findings and Conclusion

The purpose of paper is to analyze whether a product plays an important role in strategic performance of pharmaceutical industry. Using public available data and information, predominantly on the business performance of pharmaceutical industry, world pharmaceutical markets and development trends within the pharmaceutical industry in our research work, we found out world pharmaceutical industry has been changing profoundly in the last couple of years. In order to explain this phenomenon properly we analyzed in details the trends in pharmaceutical industry and key reasons for such movements. We researched that a lack of new product and endeavor for searching them drive intensive consolidation of pharmaceutical industry. Further on, we conclude that increased competitiveness and amended structure of competitors which is conditioned by a merger and acquisition process, impact a strategic orientation of the particular pharmaceutical companies. We found out products are one of the major reasons for fast consolidation of pharmaceutical industry. Acquisitions prevail more and more as a viable strategic orientation for pharmaceutical companies, predominantly as searching for new products' options. Following that, we can say a fast consolidation of pharmaceutical industry is predominantly a product and market driven and conditioned process, related with typical strategic reasons like: a huge lack of new products, an intensive competitiveness, a changed structure of competitors, a fierce fight for the global market shares and customers' loyalty. We may further conclude a future strategic development of pharmaceutical industry will be predominantly dependent on the stipulated strategic management issues which pharmaceutical companies will be capable to understand, develop and introduce in their operational and strategic business performances.

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