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APPLYING FIVE FORCES MODEL TO PHARMACEUTICAL INDUSTRY

Drda. Yulia Nedelcheva

South-West University "Neofit Rilski", Bulgaria
ORCID ID: <https://orcid.org/0000-0002-0252-1825>
yulia.nedelcheva@abv.bg

Ph. D. Milena Filipova

South-West University "Neofit Rilski", Bulgaria
ORCID ID: <https://orcid.org/0000-0002-5003-006X>
emili2000@abv.bg

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Abstract

The aim of the article is to apply Porter's model to pharmaceutical industry. The pharmaceutical industry is chosen as a subject of study due to its complexity and importance. The analysis has a critical nature to the universality of the model. We take into account the opinion of other authors, as well as the dynamics of competitiveness analysis towards the new reality. The results of the article confirm the universality of the Porter's model. The features of pharmaceutical industry are reflected in the model – the demand-side factors are leading over supply-side ones. In core of competitiveness assessment is customer's satisfaction instead of ability to manufacturing of safe, effective and available pharmaceutical products.

Keywords

Five forces model – Competitiveness – Competitors – Pharmaceutical industry

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Introduction

The process of assessing competitiveness aims to form an accurate and objective judgment of its level. In this context, it is important in assessment to follow the requirements and principles that arise from the main characteristics of economic concept for “firm competitiveness”. The assessment of firm competitiveness must be based on the following requirements:

- Systemic and complex approach in forming the system of assessment indicators;
- Use of minimum possible, but also sufficient number of indicators for complete, reliable and accurate assessment;
- Use mainly of quantitative indicators for assessment;
- Avoiding duplication of assessment indicators;
- Minimizing the subjectivity in the assessment, resp. when choosing assessment indicators and their significance coefficients;
- The assessment must be carried out regularly in accordance with a certain frequency¹.

The existing methodological approaches for assessing competitiveness are grouped into two major groups: graphical and analytical methods². The study of competitive environment includes the following main components: industry analysis, competitive analysis and forecasting of changes in the competitive environment for each component of the analysis³.

Modern concepts for competitiveness take into account the presence of external factors:

– The country in which production is located offers a competitive advantage⁴. The firm goals begin to consider as a factor for competitiveness the positioning in a country in which to locate the manufacture⁵.

– The two-way relationship “manufacturer-customer” expands and includes new participations according to the sequence of production stages. For modern firm is necessary not only to know the competitors, but also its contractors⁶. Competition takes on a new dimension not only as a starting point for analyzing the productivity, but also as a decision to establish cooperation with external contractors given the benefits of transaction costs and taking decisions for outsourcing and offshoring.

The Positioning school presents competitiveness as a concept in the form of advantages of country choice.

¹ Rayna Dimitrova, Monitoring na konkurentosposobnostta na predpriyatieto (Blagoevgrad: Universitetsko izdatelstvo Neofit Rilski, 2014), 11.

² Rayna Dimitrova, Konkurentosposobnost na predpriyatieto – tekhniki za razvitie (Blagoevgrad: Langov, 2012), 29.

³ Rayna Dimitrova, Konkurenten analiz na turisticheskiya pazar (Blagoevgrad: Universitetsko izdatelstvo Neofit Rilski, 2017), 72.

⁴ Raya Madgerova and Vyara Kyurova, “Specifics of Entrepreneurship in the Field of Cultural and Creative Industries”, Entrepreneurship Vol: VII Issue 2 (2019): 104.

⁵ Marcin Piatkowski, “Factors Strengthening the Competitive Position of SME Sector Enterprises. An Example for Poland”, Social and Behavioral Sciences Vol: 58 (2012): 271.

⁶ Radost Yuleva, “Competitive Advantages and Competitive Strategies of Small and Medium-Sized Enterprises”, Economics and Management Vol: XVI Issue 1 (2019): 71.

The main idea is the influence of external factors on the market advantage of a firm. Proponents of the Positioning school criticize the theory of comparative advantage by presenting it as based on limited factors of production. Their view explains the presence or absence of competitive advantage for economy sectors.

The leading proponent of Positioning school is Michael Porter. He creates a model for assessing competitiveness through the interaction of five factors called “forces” (Figure 1).

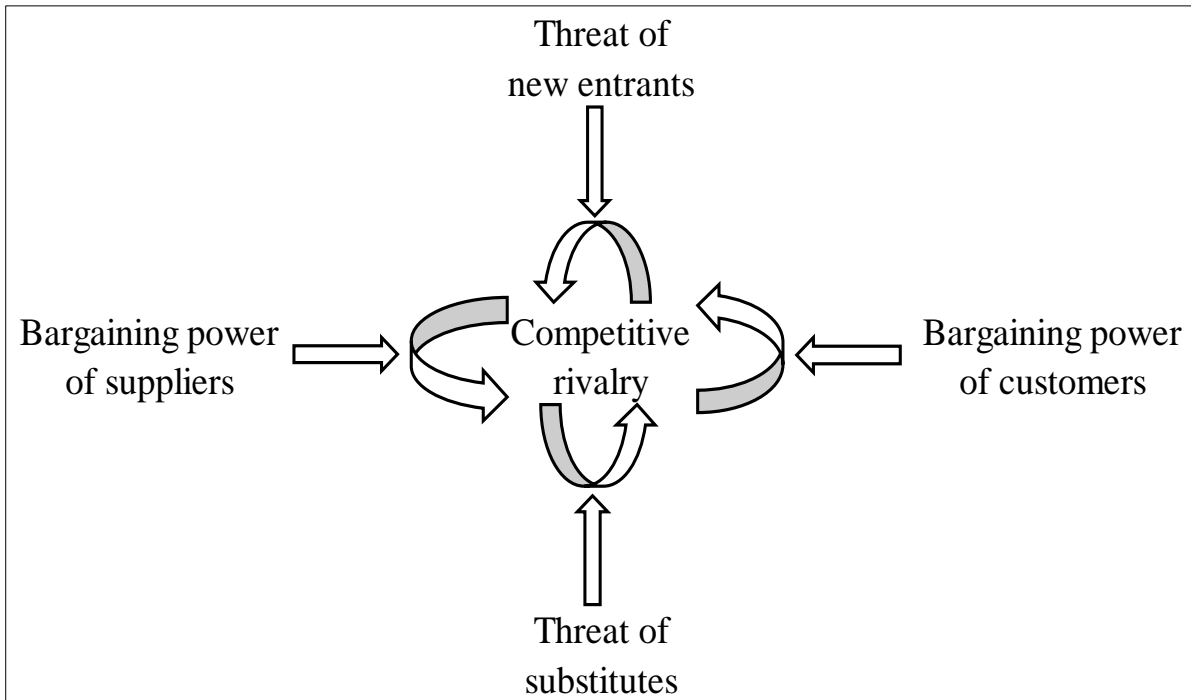


Figure 1

Five forces model (M. Porter)

Source: Michael Porter, “How Competitive Forces Shape Strategy”, Harvard Business Review Vol: 57 Issue 2 (1979): 139.

Main characteristics of Five forces model

Application. The model is applied in assessing the competitiveness of:

- going concern, i.e. a firm that is already competing in an industry;
- for small enterprises that are influenced by external factors⁷.

Limitations. The model refers to:

- a particular industry, i.e. a firm needs to make separate assessment for each industry in which it operates, for example assessment separately for original and generic pharmaceutical products in case of pharmaceutical companies;
- a specific moment and it is recommended to repeat the assessment over time.

⁷ Monika Sipa, “Determinanty Konkurencyjności Małych Przedsiębiorstw - Wybrane Aspekty”, In Determinanty rozwoju małych i średnich przedsiębiorstw w Polsce, eds. Małgorzata Okręglika and Olga Ławińska (Częstochowa: Wydawnictwo Politechniki Częstochowskiej, 2009), 2-15.

Advantages. The model is:

- applicable to any industry, whether low-tech or high-tech, emerging economy or developed economy;
- accessible to practitioners because the model has narrative and prescriptive nature without any mathematical models.

Weaknesses. The model:

- Does not allow to determine the dynamics in an industry, for example for the innovation level. In assessing the role of innovation and innovation activity for increasing competitiveness, it should be taken into account that both innovation activity and competitiveness is a synthetic indicator that combines a number of achievements of enterprises⁸. Innovation is included as one of the many elements (indices) for assessing competitiveness. Both in assessing competitiveness and in determining innovation, the use of a balanced scorecard is recommended⁹.
- Does not reply for inter-firm differences because it is a model of industry profitability, not a model for predicting why one firm outperforms another in the same industry¹⁰.

The Five forces model in pharmaceutical industry

1st Force. Competitive rivalry

Competitive rivalry takes many forms, such as lowering prices, introducing new products, using advertising and improving services. As competition between existing competitors increases, the profitability of industry decreases. The intensity of competition is determined primarily by industry leaders and to a lesser extent by the number of competitors.

The competitive rivalry is determined by the status of offered pharmaceutical product – with patent and without patent:

- Competition for patented pharmaceutical products is determined by the innovations made and by the number of introduced new pharmaceutical products. A small number of large diversified multinational companies, based mainly on science and research, compete in the market. The wave of mergers between companies for original pharmaceutical products does not increase competition between wholesalers¹¹. Due to the lack of substitutes, the distribution of original pharmaceutical products is rarely carried out through its own retail network. Competition between companies for original pharmaceutical products focuses on specific therapeutic sub-markets rather than on geographically limited areas to achieve economies of scale and scope, and to overcome the high cost of innovative research. With regard to substitutes, competition involves entering into strategic alliances

⁸ Viktoria Kalaydzhieva, „Model for Exploring the Influence of Innovations on the Competitiveness of Industrial Enterprises“, In: Enhancing Competitiveness of National Economies and Enterprises, eds. Bojan Krstić (Niš: SaTCIP d.o.o. Vrnjačka Banja, 2019), 181-194.

⁹ Lalka Borisova, “Balansirana sistema ot pokazateli v organizatsiite”, Entrepreneurship Vol: V Issue 1 (2017): 69.

¹⁰ Frank Rothaermel, “Competitive Advantage in Technology Intensive Industries”, In Technological Innovation: Generating Economic Results, ed. Marie Thursby (London: Emerald, 2016), 230-242.

¹¹ European Commission, Pharmaceutical Products. The Single Market Review series, Subseries I Vol: 2 (London: Kogan Page, 1997), (12.11.2020) <https://op.europa.eu/en/publication-detail/-/publication/9fcacbd4-e753-435e-b340-153236ec141f>

with companies that offer a complementary range of products or diversify by entering generic markets. Packaging does not play a role in the marketing mix and only certain promotional activities participate in the competition. The market share is based on innovation, intellectual property rights and product patents. In a sense, competition for research and development of pharmaceutical products can be seen as competition between competent licensing authorities and can be described as a patent competition¹².

– Competition for non-patented pharmaceutical products is geographically limited to a specific country in whose market the patent for original pharmaceutical product has expired. The products can be highly differentiated by their clinical efficacy. The competitors are mainly small and medium enterprises. The countries' plans to reduce the effects of global financial crisis (2007–2008) are aimed at stimulating the use of generic pharmaceutical products given the limited budgets, which has raised barriers to exit from the sector. In most cases, the competing products are locally produced and in limited cases, there is a competition between importers to ensure a continuous supply of pharmaceutical products¹³, including competition between logistic and distribution firms. The competition is price based for over-the-counter pharmaceutical products, as well as some marketing tools such as location of points of sales and their opening hours according to the product's life cycle.

2nd Force. Bargaining power of suppliers

Suppliers negotiate with each other and influence in the absence of reserve suppliers or when there is only one specific supplier. In such situations, suppliers have the power to increase the price or to reduce the quality of purchased goods / services. This force has high level when suppliers do not depend on the industry for revenue, offer unique products or there is no substitute for the products.

It can be argued that suppliers are a market force when they manage to transfer costs to industry participants. For example, pharmaceutical companies that offer patented pharmaceutical products are more influential over hospitals, wholesale distributors, and health insurance organizations than pharmaceutical companies that offer generic pharmaceutical products¹⁴.

Suppliers in pharmaceutical industry are determined by the stages of value chain:

– At the initial stage of the value chain, the development of new pharmaceutical products, suppliers are linked to the human factor and its qualifications. Suppliers include universities and laboratories with which new pharmaceutical products are being developed.

– At the next stage, the clinical trials, suppliers are determined by holding of a patent and the conditions for carrying out the trials phases. The main suppliers are the manufacturers of medical equipment and consumables, as they have the bargaining power to raise the prices of pharmaceutical products.

– Manufacturers of chemical compounds represent suppliers at the stage of pharmaceutical product manufacturing. Suppliers of packaging materials have limited

¹² Corey Van Der Wal; Elihu Bogan and Adam Henry, Strategic Report for Pfizer Pharmaceutical Company (New York: Gotham Global, 2007), 45.

¹³ Murray Aitken, "Understanding the Pharmaceutical Value Chain", *Pharmaceuticals Policy and Law* Vol: 18 (2016): 55.

¹⁴ Miroslav Nedelchev, "Corporate Governance of State-Owned Enterprises: the Case of Healthcare Establishments in Bulgaria", *Economic Studies* Vol: 1 (2019): 115.

bargaining power. Unlike the previous two stages, the human factor has a decreasing influence and increased importance of production automation suppliers.

– At the distribution stage, the suppliers are the manufacturers of pharmaceutical products. At this stage, the threat by suppliers is the state and regulatory professionals, who influence changes in the regulatory framework and support stakeholders¹⁵. Suppliers of original products have significant bargaining power due to the holding of patent. In case of vaccines and nutrients, the limited number of suppliers is strength¹⁶. In cosmetics sector, the strength of suppliers is low due to the lack of threat of forward integration. Retail distributors have little bargaining power, as they sell the same products and the switching costs are significant for the business. Wholesale distributors have bargaining power when their number decreases due to merging with competitors¹⁷.

Vertical integration processes since the early 1980s have reduced the bargaining power of suppliers. The market force caused by forward integration has greater potential, for example, the pharmaceutical supplier becomes a direct competitor in the market¹⁸.

3rd Force. Bargaining power of customers

Customers influence competition by gaining more value by influencing lower prices, demanding better quality or greater service at the expense of industry profitability¹⁹. The power exerted by customers is determined by the level of differentiation of products / services, for example in the oil and pharmaceutical business, the level is high and customers have more power. Therefore, in these sectors it is common practice for customers to undertake vertical integration backwards, i.e. to acquire his supplier due to the holding of patent or to reduce the risk of supply.

What is unique about the pharmaceutical industry is the presence of more than one person who can be defined as a “customer”: the prescribing physician when choosing a pharmaceutical product that is paid for by health insurance system and is used by the final customer – the patient. Not all persons identified as customers can produce their own pharmaceuticals, unlike most sectors outside pharmacy.

Different types of customers in pharmaceutical industry have different bargaining power:

– Patients themselves are a scattered multitude, which is why they have weak bargaining power in the pricing of patented pharmaceutical products. Upon expiration of patent, i.e. in the generic pharmaceutical products market, patients have a strong market influence as buyers due to brand loyalty as well as low switching costs. When choosing

¹⁵ Veska Gergova; Assena Stoimenova and Dobriana Sidjimova, “Reporting of Clinical Trials on Medicinal Products – Regulations and Practices in EU”, Health Policy and Management Vol: 19 Issue 4 (2019): 55.

¹⁶ RocSearch, Global Nutraceuticals Market (London, RocSearch,2010), 3.

¹⁷ Assena Stoimenova; Kirilov, Bogdan and Krassimira Zaykova, “Analysis of Good Distribution Practice Inspection Deficiency Data of Pharmaceutical Wholesalers in Bulgaria”, Pharmacia Vol: 66 Issue 3 (2019): 85.

¹⁸ Petra Maresova and Kamil Kuca, “Porter’s Five Forces on Medical Device Industry in Europe”, Military Medical Science Letters Vol: 83 Issue 4 (2014): 135.

¹⁹ Dessislava Ilijeva-Tonova; Assena Stoimenova and Ivanka Pencheva, “Market Surveillance and Control of Medicinal Products in Bulgaria 2009 – 2015”, Science & Technologies Vol: VI Number 1 (2016): 367.

over-the-counter pharmaceutical products, the pharmacist has a leading role as a customer over the patient. With an undifferentiated product, the bargaining power of customers is higher and is easily substituted by another product. With low product differentiation, customers lose brand loyalty. A small amount of information about the technology and effects of pharmaceutical product, as well as price elasticity, characterize this group of customers.

– In addition to patients, important factors in the pricing of pharmaceutical products are the government through its regulatory function, the health insurance system through the price list and the list of pharmaceutical products for reimbursement, insurance companies in the health sector and the hospital market through wholesale purchases. Governments, like other indirect consumers of pharmaceutical products, are inefficient buyers²⁰. Emergency medical centers as a customer choose among different suppliers for the most cost-effective pharmaceutical products, as most cases are related to diabetes and heart diseases, for which large quantities of pharmaceutical products are prescribed which have a cheap effective substitute²¹.

4th Force. Threat of new entrants

This threat relates to the appropriate conditions of a sector that attract the interest of new competitors. Their goal is to gain market share. The threat arises when barriers to entry into the sector are low, as well as from the reaction of existing competitors to new competitors. Entry barriers include safeguards such as establishment of professional guilds, holding of patents, requirements as equity, license or professional certificate²². The state as a regulator also contributes to create entry barriers for new competitors by differentiating products and excluding independent markets. Last but not least, the entry barrier is the requirement for initial investment to achieve the effect of scale, such as investing huge amount in pharmaceutical industry before making a profit.

The most dynamic force in Porter's Model is the new entrants due to expansion and globalization of pharmaceutical markets. Despite the new reality after the global financial crisis (2007–2008) and the pandemic of corona virus COVID 19 (2020), high barriers to entry, brand loyalty and the sales threshold remain a challenge for new entrants.

New entrants in the pharmaceutical industry must take action to establish the brand among physicians and pharmacists, gain the trust of patients, to meet the expectations of patients' organisations and government regulators. Given the already established contractual relations in the distribution of pharmaceutical products, lower prices are necessary in order to overcome the switching costs compared to other competitors.

Finally yet importantly, it should be borne in mind that the pharmaceutical industry, like most manufacturing and service industries, tends to transform into oligopolies, i.e. narrow number of large firms to dominate the market²³. The wave of vertical integration between pharmacy groups and wholesalers in the 1980s is a key barrier to entry, as it makes it difficult

²⁰ John Clark, "Competition advocacy: Challenges for developing countries", OECD Journal of Competition Law and Policy Vol: 6 Issue 4 (2005): 69.

²¹ Jesse Pines, "The Economic Role of the Emergency Department in the Health Care Continuum: Applying Michael Porter's Five Forces Model to Emergency Medicine", The Journal of Emergency Medicine Vol: 30 Issue 4 (2006): 447.

²² Russell Jones; Walter Mead and Philip Sorensen, "Free Entry into Crude Oil and Gas Production and Competition in the U.S. Oil Industry", Natural Resources Journal Vol: 18 Issue 1 (1978): 859.

²³ Robert Grant, Contemporary Strategy Analysis (Oxford: Blackwell Publishing, 2008), 4.

for both independent pharmacies and other players to reap the same benefits from wholesalers²⁴.

The threat of new entrants is determined by the activities of pharmaceutical companies:

- Pharmaceutical research companies have the lowest threat from new entrants due to the need for large investments in human, financial and time resources.
- For pharmaceutical company-patent holder, the competent authorities have a decisive influence with regulations for new entrants by reducing time and financial costs.
- For pharmaceutical companies for generic pharmaceutical products, distribution channels are crucial. The leading factor is overcoming inertia in customer preferences and long-term contracts with the health care system, for example for local manufactured pharmaceutical products²⁵.
- For pharmaceutical companies targeted on hospital market, the ability of hospitals to make payments and the government's practice of assuming public hospital debt are essential.
- Biotech and generic firms are major competitors to research-based pharmaceutical firms. The introduction of a new organic product or the expiration of a patent contributes to the emergence of new entrants.

5th Force. Threat of substitutes

This threat is the likelihood that a new product will be offered on the market to substitute the functions of main product. For example, alternative energy sources are a potential substitute for fossil fuels after the introduction of environmental norms.

The substitute products arise in industries where the buyer's price for switching to a substitute product is low. The main product and the substitute product are not in direct competition with each other. Substitute products affect the industry by limiting the expected profit by setting an upper limit on the price of main product. Substitute products attract customer satisfaction, for example, different technologies lead to a variety of products and prices, different purchasing power of people according to their social status and income²⁶.

The substitute product performs the same or similar function as the main product in a different way. The main factor for the emergence of a substitute product is the buyer, as in recent years the factor is the laws and innovations, including by the manufacturer of main product.

For pharmaceutical industry, the general question is whether pharmaceutical products are competitors or substitutes. A product is considered as a substitute when it achieves a similar effect through a different technology from the original pharmaceutical product. A feature of substitutes for pharmaceutical products is the lack of patent, which is why most often substitutes are considered between original and generic products instead of their price.

²⁴ Anders Anell, "Deregulating the Pharmacy Market: the Case of Iceland and Norway", Health Policy Vol: 75 (2005): 9.

²⁵ Spartak Keremidchiev, "Mestna proizvodstvena mreza i upravljenje: Sravnitelno prouchvane na obuvnata promishlenost v Bŭlgariya i Polsha", Problemi na geografiyata Issue 1 (2009): 74.

²⁶ Dragomir Nedeltchev, Sotsialen kapital i ikonomichesko razvitie (Sofia: Akademichno izdatelstvo Marin Drinov, 2005), 11.

Except on patent, a substitute for an original pharmaceutical product may arise due to use of another delivery method, as well as due to difference in the selling price and the cost of switching to another supplier compared to the original pharmaceutical product. Of particular interest are substitute pharmaceutical products, which are distributed by post – they emerge as a substitute by offering trade discounts for chronic pharmaceutical products due to reduced costs for maintaining points of sales and staff²⁷. We may suggest introduction of new substitute – vendor machines for over-the-counter pharmaceutical products to reduce crowding indoors.

Unlike original pharmaceutical products, which are intended for global use, generic pharmaceutical products are targeted at a specific national market and only for that market can they be considered as a substitute. These are countries where patent has expired, there is a market authorization and import quotas have been respected, pricing systems and reimbursement offer priority to generic pharmaceutical products. Regardless of the national healthcare system, in some cases the traditions and public opinion determine the existence of substitute pharmaceutical products, for example in Belgium the consumption of generic pharmaceutical products is relatively low due to the skepticism of patients towards generic pharmaceutical products²⁸.

The following are accepted as substitutes for original pharmaceutical products: generic and biosimilar pharmaceutical products; nutritional supplements such as minerals and vitamins for immune system; alternative therapies through herbs and bio substances, use of nutrients in response to protein needs. As a special case of substitutes for original pharmaceutical products can be accepted: procedures of traditional pharmaceutical product, incl. self-medication; homeopathy; surgical intervention of chronic expensive diseases; balneotherapy; hypnosis; telemedicine.

The procedure for substituting a pharmaceutical product is initiated by participants in pharmaceutical industry. The initiators are both on the supply side and on the demand side:

– The customer has no information about both the original and the generic pharmaceutical products, which is why the trademark is a decisive factor for the substitution. Following the effects of global financial crisis (2007–2008), most countries are encouraging to use generic pharmaceutical products due to limited health care budgets.

– Another initiator for substitution is the prescribing physician. He can substitute an original pharmaceutical product with another original or with biosimilar pharmaceutical product. In rare cases, there is a substitute for the original pharmaceutical product for patients with additional diseases and the prescribing physician has the choice to substitute it with a limited set of original pharmaceutical products.

– The third initiator of substitution is the pharmacist, who can substitute an original pharmaceutical product with a generic or biosimilar. Such initiative is limited to specific countries subject to specific substitution requirements. The pharmacist is the initiator of the substitution because of his information about the effects and prices of original pharmaceutical products and their substitutes, as well as the client's preferences and financial potential.

²⁷ Sara Ellison and Christopher Snyder, "Countervailing Power in Wholesale Pharmaceuticals", *Journal of Industrial Economics* Vol: 58 Issue 1 (2010): 32.

²⁸ Austrian Health Institute, *Surveying, Assessing and Analysing the Pharmaceutical Sector in the 25 EU Member States* (Luxembourg: European Communities, 2006), (12.11.2020) https://ec.europa.eu/competition/mergers/studies_reports/oebig.pdf

– The last initiator is the health insurance system, including the hospital market, patient's organisations and insurance companies, which may prefer substitute pharmaceutical products, for example locally manufactured.

Another area of substitution are electronic accessories, which are aimed not so much at diagnosis but rather at treatment:

– A software application called Happiness aims to be a substitute for antidepressants. The application tracks mood swings and users are informed of events that negatively affect their happiness.

– In a limited number of areas of health care industry, attempts are being made to substitute a pharmaceutical product with an engineering device. For example, the CEFALY device is designed to treat migraines using an electric shock.

Conclusions

The globalization process reduces the advantage of choosing a country of production. In new reality, the leading factor is the good knowledge of internal and external environment of company. External factors are identical for different countries and unique for a particular sector.

Part of competitiveness is the choice of an assessment method that is globally accepted and universally applicable. One of these models is M. Porter's Five Forces. We analyzed applicability of the model to pharmaceutical industry. For this purpose, we adopted the model as a special case of factor analysis. The results of our analysis indicate the model as applicable in the pharmaceutical industry, but it is not universal enough.

Our analysis outlined the following specifics in application of Five Forces Model in pharmaceutical industry:

– The model is not bilateral between supplier and buyer, but rather multilateral, incl. state and quasi-state competent authorities.

– The model considers the competition between two large groups of pharmaceutical products – original and generic. Biosimilar medicines are not considered as competitors, as they are produced by a separate technology and are mainly with lower costs for scientific research.

– Customers are limited in their rational choice between pharmaceutical products. The involvement of the prescribing physician, pharmacist, reimbursing authority, life insurance company and patient's organisations determines to a greater extent choice of pharmaceutical product instead of the patient.

– The state plays many roles both at the input and at the output of the industry. This nature of the state is inherent for pharmaceutical industry given its health and social functions.

– The threat of a pharmaceutical product-substitute does not exist because the pharmaceutical products are produced by different technologies and are used in their own way in treatment process.

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