KAPOSVÁR UNIVERSITY

DOCTORAL SCHOOL FOR MANAGEMENT AND
ORGANIZATIONAL SCIENCE

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**The recent trends in the pharmaceutical industry with
special attention for the Republic of Kazakhstan!**

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ABBREVIATIONS

Pharmaceuticals: are used to prevent, diagnose, treat, or cure diseases in humans and animals.

Drugs:
formulations   there are two types of drugs: bulk drugs and

Generic drugs: copies of off-patent brand-name drugs that come in the same dosage, safety, strength, and quality and for the same intended use. These drugs are then sold under their chemical names as both over the counter and prescription forms. Also, referred to as unbranded formulations

Innovator drugs: are drugs with patents on their chemical formulation or their production process

Branded generics: generic drugs for which a drug manufacturing company has attached its brand name and may have invested in its marketing to differentiate it from other generic brands.

Prescription drugs: medicines that encompass two classes, innovator drugs and generic drugs.

Pharma: Pharmaceutical

R&D: Research and Development

GDP: Gross Domestic Product

USA: United States of America

UK: United Kingdom

USD: United States Dollar

GSK: GlaxoSmithKline

J&J: Johnson and Johnson

CIS:	Commonwealth of Independent States
KIDI:	Kazakhstan Industry Development Institute
HUF:	Hungarian Forint
KZT:	Kazakhstan Tenge
Bln.:	Billion
Mln.:	Million

Preface

The theme selection of the dissertation was motivated by my earlier work experiences. During my ministry work, I had a good impression about the situation of the Kazakh pharmaceutical industry. I met with a lot of experts and with a lot of data, so I could reasonably believe that an appropriate database could be built for a reliable statistical analysis. During my PhD training one quantitative methodology course made it clear to me, that the available and accessible Kazakh pharmaceutical industry's data, relating to my topic, is unsuitable for a comprehensive statistical analysis. One reason for this is that the regular data collection in the Kazakh industry was subordinated to the needs of the Moscow center, therefore till 1990 only aggregated data was disclosed. The situation has changed since then, but the fast-moving economy has suffered from slow or rapid growth periods. The inflation rate is sometimes very high with two digits number, though sometimes much lower. As it is well known the Kazakh economy is very much dependent on the oil market. When the oil prices are high, our economy is growing fast, when it is lower our economy is slowing down. I could only create comparable time series if I had internal information about these processes. In the meantime, however, my relationship with the pharmaceutical sector was broken due to the scholarship. During my research activity, my interest also has changed. Although macroeconomic factors are playing an important role in the development of the pharmaceutical industry, external factors like oil prices are disturbing this picture so deeply, that it is almost impossible for an outsider, like myself, to separate the external factors from the internal ones. As I learned more and more in the PhD program, I had to realize that my original research questions moved far from me. A solid study based on statistics could be analyzed if there were adequate data, what is not the case. In the literature I have found more facts but less explanations or answers to my questions. Today I am more interested in what the reason is, why people - even the professionals - think about the so-called objective reality so differently. In the pharmaceutical and healthcare sector, I have also found that opinions are even more subtle, such as whether the patient can choose what drugs to take, or he must accept medications that are supported by health insurance? There are very different opinions about the advertising of medicines as well. There are some people who are very positive about advertisement, and there are others who are criticizing it because they are aware, that the advertisements are the

main driving force behind the growth of the consumption of pharmaceuticals. During my research, it became clear to me that I was more interested in subjective opinions. At the beginning of my research I was trying to rely on the so-called objective, professional opinions. The roots of my starting interest were my job experiences in my ministerial work. The second, not less important reason behind my new research orientation, that for a broad, rational questionnaire survey I did not have any financial resources, we had to look for a method that could be used with little financial resources and more personal involvement and could reliably prove my hypotheses. I chose the Q method at the advice of my supervisor Professor Sándor Kerekes.

In the first chapter of the dissertation I work on the literature, which I group around four dilemmas. With regard to the pharmaceutical industry, each of the four dilemmas can be considered a research question. The first dilemma: Generic or original drugs. The second: Innovate or die. The third: Producing or importing the drugs? And the fourth: More marketing than R&D. Of course, we could not find clear answers to these questions, so I called these dilemmas. In the second chapter of the dissertation I analyzed the development of the pharmaceutical business between 2001 and 2017 based on the available statistical data.

The accurate statistics are often missing so we have to estimate the expenditure on Marketing and Sales as well as on Research and Development. We tried to focus on those companies in Hungary and in Kazakhstan where the appropriate data were available. We cannot generalize the results, which are based on two companies, one representing Hungary, this is Richter Gedeon and the other is a Kazakhstan pharmaceutical company Chempharm. Beside the market statistics, we are considering the regulation differences among the countries with special attention to Hungary and Kazakhstan. Currently pharmaceutical companies are spending proportionally less on Research and Development year by year. The development of new drugs is a costly and time consuming process. The research activity of creating new drugs requires billions of dollars and the licensing process may take some decades. The shortest time frame is at least 10-15 years. Economic growth is especially important for countries such as Kazakhstan, where the standard of living is still very low, so the government should encourage it with many measures. Kazakhstan's pharmaceutical industry is focused on the domestic market to meet domestic demand for pharmaceutical products at the expense of domestic producers by attracting foreign investment.

In the second chapter of the dissertation I analyze the situation of the Kazakh pharmaceutical industry. I pay special attention to foreign investments and international relations of Kazakh industry. The analysis shows that Kazakhstan's participation in some international conventions helps to create a monopoly situation and restricts competition, which can lead to higher drug prices.

In the third chapter I present the Q methodology used for empirical research, relying on the literature. Based on my own experience and the opinions of my former colleagues, I have tried to formulate statements that represent people's views on the pharmaceutical industry and healthcare in Kazakhstan. The Q methodology literature calls this concourse. Then I asked the opinion of twenty high-ranking intellectuals about the statements, and in the final part of the chapter I analyze the results and draw conclusions from them.

In the fourth chapter, based on the experiences of previous analyzes and empirical research, I deal with the current development problems and opportunities of the Kazakh pharmaceutical industry. In this chapter, I try to critically analyze the development of the industry and formulate its development potential.

Research questions and hypothesis's

To complete the introduction, I summarize the most important research questions and hypotheses of the dissertation.

The hypotheses can be divided into two groups. The first group includes my hypotheses that deal with structural changes in the pharmaceutical industry and can be proved by objective statistical data or based on interviews:

1. The sharpening competition should result in a price reduction. However, this is not the case in the pharmaceutical industry. Prices are rising due to increased marketing costs. Demand for industry products is increasing because people are increasingly willing to spend on their health.

2. The cost structure of the pharmaceutical industry has changed. At the moment, marketing is the biggest cost factor, while Research and Development costs represented the biggest cost factor until the turn of the century.

3. Some pharmaceutical companies specialize in generic medicines, which would justify a significant reduction in the cost of generic medicines, but this is not the case because most of the manufacturers are in a monopoly

position in the markets concerned, partly due to drug regulation. The drugstore accepts certain import products, but not others.

4. Convergence is an important condition for emerging economies. Professionals agree that only the economy that is present in high value-added industries is successful. In the pharmaceutical industry, this means that it cannot be specialized solely in the production of generic drugs. Emerging economies must also spend on pharmaceutical research if, due to a lack of economies of scale, the production of organic medicines will not be profitable. This is innovate or die dilemma.

5. The pharmaceutical industry is a strategic industry. Because of the security of the country, you cannot give up the ability to manufacture certain basic medicines. We cannot answer the question on the basis of economic considerations only to produce or import drugs. The country's security vulnerability is lower if at least the majority of generic medicines are produced by the local economy.

The second group of hypotheses are phenomena that can be explained by subjective factors. My research questions were:

1. What is the reason, why people - even the professionals - think about the so-called objective reality so differently? Whether the patient can choose what drugs to take, or he must accept medications that are supported by health insurance?

2. There are some people who are very positive about advertisement, and there are others who are criticizing it because they are aware, that the advertisements are the main driving force behind the growth of the consumption of pharmaceuticals. Why their opinion is so different?

The Q method was used to reveal the opinions. According to my hypothesis, three main opinion centers can be distinguished:

1. The group of intellectuals who have closer ties with the pharmaceutical sector because of their qualifications or current jobs will have almost the same opinion about the pharmaceutical industry and drug consumption.

2. The second opinion group is made up of intellectuals and entrepreneurs who are only consumers in relation to drugs and their knowledge is influenced by their personal experiences with healthcare and possibly their knowledge acquired through the media.

3. I assume that intellectuals, who have spent longer period in higher education in the West, have been influenced by this, and it has had a certain

impact on their value judgment. I expect that their opinion is biased by the impact of the «consumer society» and the knowledge of the western pharmaceutical market.

1. Literature Review (Development tendencies of the world pharmaceutical industry)

1.1. The first dilemma: «Generic or original drugs, the debate of patents»

Pharmaceuticals are traditionally a highly R&D intensive sector, which has undergone a series of radical technological and institutional «shocks». However, the core of leading innovative firms and countries has remained quite small and stable for a very long period of time, but the degree of concentration has been consistently low, whatever level of aggregation is considered (Franco M & Orsenigo L, 2002).

The pharmaceutical industry is so dependent on the adequate patent protection, because it is only through enforceable patent protection that drug companies can generate sufficient revenues to undertake the expensive and risky R&D that makes the introduction of new products possible (Tancer R, 1995).

The pharmaceutical industry is one of the most productive and profitable industrial sectors; however, the drug development process remains risky and expensive. Therefore, effective intellectual property protection is the key to maintain innovation for drug development (Kermani F & Bonacossa P, 2003). Most medical research is done in high-income countries: 12 countries concentrate 80% of research spending. Moreover, medical research financing has been moving towards the private sector. In the US, more than 60% of pharmaceutical research and more than 70% of clinical trials are financed by the private pharmaceutical industry, and the trend continues. This is the root cause of the 10/90 gap denounced by the Global Forum for Health Research, explaining why investment in R&D is directed mainly towards drugs for central nervous system, metabolic, neoplastic and cardiovascular diseases (Creese A, Gasman N, & Mariko M, 2004).

According to the 2010 UNESCO Science Report (Science Report, 2010), developing countries, with a share of 41.8% of the world's GDP, contribute only 23.8% of global R&D investment. With 81.7% of the world's population, they contribute 37.9% of scientific researchers and produce 32.4% of

scientific publications. This is the volume problem, and there is vast literature that speaks to it. But it is even more important to recognize that a substantial part of this limited R&D remains unconnected to the economic structure of society. It is not easy to find unbiased indicators to demonstrate this relationship. But if we take patents, for example, the North-South divide is even more prominent: developing countries, although they produce 32.4% of scientific papers, own only 4.5% of patents.

Many pharmaceutical companies are paying more attention to nanotechnology than before, in order to find new solutions for pharmaceutical innovation with lower cost, lower risks and much higher efficiency compared to traditional drug development (Wagner V, Dullaart A, Bock A, & Zweck A, 2006).

Innovation has always been the backbone and underlying strength of the pharmaceutical industry. During decades the industry has delivered multiple life-saving medicines contributing to new treatment options for several medical needs. Many diseases, particularly acute disorders, are now treatable or can be managed effectively. The discovery of new medications for cardiovascular, metabolic, arthritis, pain, depression, anxiety, oncology, gastrointestinal disorders, women health, infectious diseases and many others have led to improvement in health, quality of life and increased life expectancy. The decade of 1990s is considered a golden era in the pharmaceutical industry that yielded several blockbuster drugs and lifted the pharmaceutical sector and its selected players to top ranks (Munos B, 2009).

The pharmaceutical sector is complex and highly regulated in most economies. Government price controls and purchasing, public and private insurance schemes, restrictions on marketing and promotion, and the involvement of «learned intermediaries» such as physicians and pharmacists powerfully influence demand for pharmaceuticals. On the supply side, stringent product safety review, regulatory oversight of manufacturing, and legal frameworks governing technology transfer between publicly-funded biomedical research institutions and commercial entities play an equally significant role in shaping competition (Cockburn J, 2009).

Intellectual property rights became an important strategic weapon for pharmaceutical companies nowadays. The average gross sales margins of United States pharmaceutical companies during the past few years are nearly twice those of the semiconductor companies. Such significant differences in gross margins are primarily attributed to the better records of pharmaceutical companies in protecting their innovation by patents. Therefore, the protection

of R&D outcomes is a paramount concern for pharmaceutical companies. Since R&D costs of developing new drugs are very high but the costs of manufacturing pharmaceutical drugs are very low, very few pharmaceutical companies are willing to make huge investments in pharmaceutical R&D without patent protection. The owner of the technology can ensure not to lose control of his technology through patents, since he can acquire the monopoly position in the market under patent protection. The patent system can help the owner to exclude others from using his technology during the protection term of the patent (Chen Y & Chang K, 2010).

Patent protection is beneficial to inventions in the pharmaceutical industry. In addition, market exclusivity in the pharmaceutical industry acquired through patents can yield higher prices and profits for pharmaceutical products, so pharmaceutical companies can try to obtain more patents to increase market exclusivity of their products (Bhat V, 2005).

Some studies claimed that patents played a more important role in protecting companies' R&D outcomes in some industries, such as the chemical industry and the pharmaceutical industry, than in others, such as the motor industry and the rubber industry (Comanor W & Scherer F, 1969), (Bettis R & Hitt M, 1995).

Original drug research of the kind that the industry was supporting in the past was, and still is, full of uncertainties and surprises. Serendipitous findings are frequent, and whether such findings will lead to a new drug is almost impossible to predict. Whether drugs that emerge from open and unrestricted scientific process will be blockbusters is equally difficult to assess (The New Generation of Blockbusters, 2002).

Pharmaceutical companies face worldwide competition, economic volatility, increasing costs, patent restrictions and the production of generics (IMS health lowers 2009 global pharmaceutical market forecast to 2.5–3.5 percent growth, 2009).

Generics are considerably less expensive than the original drugs, because their manufacturers do not incur the risks and costs associated with the R&D of innovative medicines. Before they reach pharmacies, their values have to be proved through testing, but preclinical tests and clinical trials can be replaced by bioequivalence studies (Twardowska A, 2007) .

Penetration of generic medicines is more successful in countries, permit (relatively) free pricing of medicines (Germany, United Kingdom) than in countries, having pricing regulation (Belgium, Italy, Spain). This is because

countries that adhere to free market pricing generally have higher medicine prices, thereby facilitating market entry of generic medicines, and a higher price difference between originator and generic medicines (Bartosik M, 2005). The situation is significantly different in many Central and Eastern European countries, where generics make up as much as 70% of all medicines prescribed in terms of volume, whilst in value terms generics represent only 30% of pharmaceutical expenditure. Consequently, the availability of affordable generic medicines in these countries, many of which joined the EU on May 1st 2004, is actually a major budgetary factor in both the retail and hospital sectors (The role of generics in Europe, 2010).

To analyze the European generic markets it is important to understand the core nature of national regulations on pharmaceutical products. They reflect the overall underlying national attitudes towards the provisions and financing of healthcare. The national regulations operating in a given market determine the structure and the environment, in which generic manufacturers need to function, commercialize and compete (A review on the European generic pharmaceutical market, 2005).

Generics make up the majority in the these countries' products, accounting for 60 percent of prescription volume in the Czech Republic, 70 percent in Hungary, and 77 percent in Poland. Branded generics are particularly popular, as they offer the dual benefits of lower prices and higher perceived quality. Because of the evolution of patent law, the "generics" category often includes products that are patented elsewhere (Clark T, 2004).

For many large pharmaceutical firms that sell branded drugs, the successful launch of new therapies remains the key to profitable growth. New therapies are essential in enabling pharmaceutical companies to overcome the challenge of generic substitution - the replacement of branded drugs with generic alternatives, at the initiative of either physicians or pharmacists - as the patents of older drugs in their portfolios expire. Generic drugs enter the market at much lower prices compared with the original branded drugs they replace, as generic drugs do not need to go through the risky, costly, and lengthy process of new drug development (Grabowski H & Vernon J, 1992) show that an original brand typically loses half of its market share 1 year after patent expiration. Generic substitution is ever increasing in scope and speed, given government regulations in many countries that promote generic dispensing at the pharmacy, in an attempt to control drug spending. Granted, there are multiple ways in which pharmaceutical firms that produce brand-name drugs

can fight the trend of generic substitution. Some companies (e.g., Pfizer) own their own generic subsidiaries, others (e.g., Bayer, Merck Serono) offer diagnostics and other types of services in addition to their drugs or try to convince patients or physicians to be brand loyal, for instance, through social media (e.g., Johnson & Johnson). Nevertheless, the successful launch of new branded drugs remains crucial to the survival of such pharmaceutical companies and continues to be their primary means of differentiation.

The modern generic pharmaceutical industry came into existence through the 1984 USA Drug Price Competition and Patent Restoration (Hatch-Waxman) Act, which provided for facilitated market entry for generic versions of all post-1962 approved products in exchange for an extension of the patent period for the original drug (How increased competition from generic drugs has affected prices and returns in the pharmaceutical industry, 1998), (Lofgren H, 2004).

As more generics became available, USA health maintenance organizations and pharmacy benefit management companies encouraged or mandated measures such as generic prescribing, brand substitution by pharmacists, and reimbursement on the basis of cheapest brand. In 2005, more than 60% of prescriptions in the USA were filled with a generic. Their established role in the USA effectively debunks the disparagement of generics that is still occasionally forthcoming from brand industry sources such as the Pharmaceutical Research and Manufacturers of America (PhRMA) (Gray N, 2006).

Other countries with highly developed generics markets include the UK, Germany, the Netherlands, Canada, and the Nordic countries, and generics markets are expanding rapidly, from a lower base, in France, Spain, Italy, Russia, Latin America, Australia, and elsewhere (Class S, 2005).

The profit margins in generic market in the USA are getting narrow and narrower as the manufacturers face intense competition, particularly from India and Israel. This is influencing many pharmaceutical companies (such as GSK, Pfizer, Merck, Abbott) to build strategic partnerships and buyouts in cost-effective regions, particularly India. Many generic drugs are sold as «branded formulations» or «established products» in emerging markets (e.g. BRIC countries), where these fetch higher premium approximating 30-80% of original price. The emerging markets are growing but so is the competition and debate on cost containment which is likely to influence profit margins (Khanna I, 2012).

The primary aims of pharmaceutical companies are, through research, development, production and marketing, to provide new medicines to improve the health of populations (Henry D & Lexchin J, 2002) and, as any other industry, to run a profitable business.

The pharmaceutical industry is, of course, accountable to its shareholders, but also to society at large. This latter role often seems to be forgotten by the industry, witness its inappropriate pricing of drugs, its large-scale indifference to the needs of developing countries, and the imbalance between true innovation and promotional activity (Dukes M & Graham N, 2002).

The pharmaceutical industry is heavily reliant on private and public investment in research to bring new products to market. The development of a new marketable drug product requires the establishment of basic knowledge related to a disease, the discovery of possible treatments, the engineering of methods for drug production, and the performance of tests to establish safety and efficacy. Each stage may be costly because of the complexities of human health, compound manufacturing, and treatment response (Morgana S, Grootendorst P, & Lexchin J, 2011).

The development of new drugs could foster advances in the methods used to treat illnesses and reduce skyrocketing healthcare costs (Cook J, Vernon J, & Manning R, 2008). Innovative drugs with new chemical entities fundamentally transform the process of treatment and lead to better health results. Pharmaceutical advances that have caused considerable improvements in life expectancy and health are a result of steadily increasing investments in research. Pharmaceutical drugs have been prescribed to prevent illness, treat disease, and maintain health, so that one's quality of life is enhanced (Cutler D, 2007). Health-related R&D is the key to the future of the pharmaceutical industry.

Commercialization is the process of transforming new technologies into commercially successful products. The commercialization process includes such efforts as market assessment, product design, manufacturing engineering, management of intellectual property rights, marketing strategy development, raising capital, and worker training. Typically, commercialization is a costly, lengthy process with a highly uncertain outcome. The costs of commercialization can run from between 10 and 100 times the costs of development and demonstration of a new technology. Moreover, success is rare, less than five percent of new technologies are successfully commercialized (Reamer A, Icerman L, & Youtie J, 2003).

(Grant R, 2008) Defines an invention as distinct from an innovation: «Invention is the creation of new products and processes through the development of new knowledge or the combination of existing knowledge. Innovation is the initial commercialization of invention by producing and marketing a good or service or by using a new method of production».

Consistent with (Grant R, 2008) and others (Hitt M, Hoskisson R, & Nixon R, 1993), (Schumpeter J, 1934) the definition of invention used here focuses on the development of new ideas, whereas innovations are considered the development of commercially viable products or services from creative ideas. Because invention and innovation represent different dimensions of creative outputs, the impact of R&D spending on each is analyzed separately. Specifically, the relationship between a firm's R&D spending and one measure of its inventions, the number of patents granted, is tested. A separate examination investigates the relationship between R&D spending and a measure of innovation, the number of new product announcements. Moreover, because many inventions ultimately result in marketable innovations and because patents may provide protection for new products, the relationship between patents and product announcements is investigated. Finally, the ability of a firm to benefit from its inventions and innovations is analyzed by examining their separate effects on firm performance.

Today, however, it is becoming more difficult for pharmaceutical companies to meet profit expectations, due to increasing R&D costs and competition from generics manufacturers (Behr A, et al., 2004).

As stated by (Hall B, Griliches Z, & Hausman J, 1986) «The annual R&D expenditures of a firm are considered to be investments which add to a firm's stock of knowledge». In addition, strong R&D spending capabilities not only play a direct role in creating the internal knowledge needed for product innovation but also allow evaluation of potential outcomes of the knowledge created (Rosenberg N, 1990).

Pharmaceutical R&D has paid off handsomely in previous decades, with statistical studies showing a historical correlation between the number of new drugs introduced and declines in mortality and other health indicators across a wide range of diseases (Lichtenberg F R. , 2003).

Pharmaceutical companies appropriated returns from R&D through a combination of extensive patenting, proprietary know-how, brands, regulatory barriers to entry and favorable product market conditions. Most of these firms were long-lived, mature organizations, tracing their roots back many decades,

often to the nineteenth century chemical industry. Their large and sustained investments in R&D, marketing assets, and human and organizational capital were largely financed from internal cash flow. Competitive advantage was driven by firms' ability to effectively manage product market interactions with regulators and end users and to «fill the pipeline» with internally developed blockbuster drugs. In turn, the productivity of internal R&D appears to have been driven by economies of scale and scope in conducting research, efficient allocation of resources in internal capital markets, and the ability to capture internally and externally generated knowledge spillovers (Cockburn I M. , 2004).

In this environment, patents impede drug discovery in two ways. First, many research inputs, such as disease-linked human genes and techniques to manipulate DNA and proteins, are patented. Innovating firms must therefore conduct R&D cognizant of the landscape of existing patents (Palombi L, 2009), (Stix G, 2006). Second, although there have been some notable successes, hypotheses about disease mechanisms derived from animal models are often refuted in human clinical trials; this results in enormous costs to firms. Indeed, the high rate of attrition in clinical trials of drugs that target unprecedented mechanisms is a primary contributor to the declining productivity (i.e., increasing cost) of pharmaceutical R&D observed over the last several decades (Food and Drug Administration Challenge and opportunity on the critical path to new medical products, 2004), (Peck R, 2007).

In addition, innovating firms engage in costly battles with rival firms, both generic and brand-name drug manufacturers. Generic drug manufacturers seeking to launch their product before the expiry of the last patent on a branded drug can challenge outstanding patents in court, claiming either patent invalidity or no infringement. For their part, manufacturers of brand-name drugs can attempt to delay entry of generic copies through strategic patenting (Frank R, 2007).

The developer of a commercially successful first-in-class medicine can expect to lose profits to competitors developing therapeutically similar follow-on drugs (subsequent class entrants). Part of the profit loss comes from reduced sales revenues, estimated to be greater than the revenue loss from competition with generic drugs (Lichtenberg F & Philipson T, 2002). Another part of this loss is due to the extensive promotional expenditures firms undertake to shift prescriptions from rivals. The proliferation of therapeutically similar drugs

also appears to explain the growth of economic appraisal, prior authorization, beneficiary cost sharing and other cost-control initiatives by drug plans that reduce sales revenues.

Much as R&D spending is expected to stimulate firm invention, it is also anticipated that it will result in more innovation, as measured by new product announcements. While a firm's R&D spending is expected to stimulate inventive activity, for many firms its primary purpose is to develop inventions that are transformed into sellable products. This centrality of R&D spending to new product development is noted by (Penner-Hahn J & Shaver J, 2005) who state that «firms undertake R&D activities in large part to create innovations that will ultimately provide new products and therefore profits». While the effectiveness of innovation for a firm depends on the technological capabilities that reside in its R&D function, successful innovation is not guaranteed (Tsai K, 2005). A firm may have «great technological and inventive potential but be relatively unsuccessful in the commercialization of its product» (Fleming L, 2002).

While R&D spending is directed at both inventions and innovations, there are also links between a firm's inventions and its product innovations. Researchers have pointed out that invention is an important antecedent of new product development (Trajtenberg M, 1990).

It should be recognized, however, that because of the expense involved not all inventions are patented. Moreover, not all inventions that are patented will result in marketable products, as the potential economic significance of patented products varies significantly. Firms are more likely to patent inventions that demonstrate potential to be commercially exploited. Therefore, a link is expected to exist between firm patenting propensity and the products it ultimately brings to market (Ernst H, 2001).

The appropriability of an innovation is also determined by the effectiveness of legal protection mechanisms such as patents. While approved patents vary widely in their significance, patents have generally been regarded as a useful instrument to grant inventors temporary exclusionary rights and allow them to recapture the value of their development efforts (Bogner W & Bansal P, 2007). According to the USA Office of Technology Assessment (OTA), «Innovation encompasses both the development and application of a new product, process, or service. It assumes novelty in the device, the application, or both. Thus, innovation can include the use of an existing type of product in a new application or the development of a new device for an existing application.

Innovation encompasses many activities, including scientific, technical, and market research; product, process, or service development; and manufacturing and marketing to the extent they support dissemination and application of the invention» (United States. Congress. Office of Technology Assessment, 1995).

1.2. The second dilemma: «Innovate or die»

The competitive environment for new drugs has shifted in the past 20 years, causing increased pressure on innovator firms to «innovate or die». Because of changes in federal and local laws in the 1980s that increased the availability and encouraged the use of generic medicines, generic competition is now much stiffer than prior to this time. Generic competition erodes innovator drug profits by reducing revenues owing to reductions in both volume and price (Grabowski H G. , 2003).

In a market system of pharmaceutical innovation, industry revenues support continued R&D, and patents support revenues. The estimated average R&D cost of a new drug brought to market in 2000 exceeded 800 million USD (DiMasi J, Hansen R, & Grabowski H, 2003). Because drug companies are making substantial investments with no certainty about outcomes, they rely on patent-protected revenues to recoup their R&D expenditures (Grabowski H G. , 2002).

Nevertheless, companies that produce generic drugs can challenge such patents, beginning the process of competing with brand-name drugs after only 4 years. To market a generic version, the law requires a company to file an Abbreviated New Drug Application (ANDA) with the FDA that specifies how the generic version relates to the brand-name drug and its patents. Paragraph IV permits generic-producing companies to «challenge» each patent associated with the brand-name drug, stating either that (i) the patent is invalid or (ii) the ANDA does not infringe the patent (Higgins M & Graham S, 2009). Thus, without policy intervention, the effective life of key patents will continue to decline, which further compresses the pay-back period during which brand name firms can recoup R&D investments (DiMasi J A. , 2003).

Society ought to be concerned about less pharmaceutical innovation, because research shows it is positively related to life expectancy (Lichtenberg F R. , 2005) and to lower nondrug medical spending of all types (Lichtenberg F R. , 2001).

The R&D process is marked by high attrition rates due to scientific failures. The so-called technical success probability achieves only 8% for a new drug (Gilbert J, Henske P, & Singh A, 2003) and is especially low in the first R&D stages. In addition to technical risks, the potential drug candidates also face the market risk that results from the unpredictable commercial performance after market introduction.

Incentives to develop new therapies also depend on the costs, risks, and length of new drug development. Pharmaceutical R&D costs in general have been estimated to be high and rising substantially over time (DiMasi J, Hansen R, & Grabowski H, 2003). Costs (at least clinical phase expenditures) have also been shown to differ by therapeutic class (DiMasi J, Grabowski H, & Vernon J, 2004).

Market knowledge is often disregarded in the management of science-based firms. These kinds of companies belong to industries where the core investment is in basic and applied research with respect to other strategic investments (Pavitt K, 1984).

In fact, science-based companies are founded with the aim of focusing on specific technological know-how and tend to develop and grow by nurturing their technological competence base (Teece D, 1982).

Since it is publicly recognized that science-based firms are major contributors to the knowledge economy, all these examples highlight the need to better understand their actual strategies and sources of performance (Severi B & Verona G, 2009).

The pharmaceutical industry has become a research-oriented sector that makes a major contribution to healthcare. The success of the industry in generating a stream of new drugs with important therapeutic benefits has created an intense public policy debate over issues such as the financing of the cost of research, the prices charged for its products and the socially optimal degree of patent protection (Schwartz E, 2001).

Pharmaceutical companies customarily apply for patent protection on new chemical entities shortly before clinical tests in humans commence. The basic statutory patent life is 20 years, and by the time commercial marketing is allowed, approximately 12 to 13 years of basic product patent life remain, under regulatory conditions of the late 1990s (Kaitin K & DiMasi J, 2000).

Drug patents provide particularly strong protection against competition from other companies because even a slightly different molecular variant must undergo the full panoply of clinical tests. Numerous cross-industry surveys

have shown that managers of pharmaceutical R&D assign unusually great importance to patent protection as a means of recouping their investment in research, development, and testing. (Cohen W, Nelson R, & Walsh J, 2000). Striving to prolong the period of patent protection, pharmaceutical companies have obtained patents on minor variants in product formulation and production processes, and some have entered into agreements delaying entry of generic manufacturers challenging their patents. Several of these competition-impeding agreements were abandoned in recent years after antitrust complaints (Generic drug entry prior to patent expiration: an FTC study, 2002).

It is sometimes asserted that drug prices are high because R&D costs are high and must be defrayed. Assuming that companies maximize their profits or the contribution of profits to the repayment of past Research and Development costs, this is a fallacy. Sunk Research and Development costs are bygones and are therefore irrelevant in current pricing decisions. For rational profit maximizers, what matters is the position of the demand curve (including adjustments for expected competitive reactions) and the variable costs of production and distribution. To be sure, errors may be made under conditions of uncertainty, and prices may be held below the profit-maximizing level if adverse public reaction is feared. It would be equally wrong, however, to infer that drug prices are unrelated to the cost of R&D. The short-term monopoly profits that can be realized from patented and successfully differentiated drug sales are the lure, which prompts investments in research, development, and testing. Indeed, the linkage is surprisingly close: as drug prices rise or the difference between drug sales revenues and production costs increases, R&D outlays also tend to rise relative to their trend; as drug prices fall, so in tandem do R&D outlays (Scherer F, 2001), (Giacotto C, Santerre R, & Vernon J, 2003). But the chain of causation runs from the expectation of high profits to increased Research and Development outlays. Similar logic holds for promotional outlays, which tend to be concentrated in the early phases of a drug product's marketing cycle.

Innovation is becoming an increasingly open process thanks to a growing division of labor. One company develops a novel idea but does not bring it to market. Instead, the company decides to partner with or sell the idea to another party, which then commercializes it. To get the most out of this new system of innovation, companies must open their business models by actively searching for and exploiting outside ideas and by allowing unused internal

technologies to flow to the outside, where other firms can unlock their latent economic potential (Henry W, 2007).

Technology has become increasingly critical for firms as they struggle to achieve and maintain competitive advantage. Trends such as globalization, fast product-cycle times, greater competition, product commoditization, and technology fusion have only added to this importance. Close examination of the pharmaceutical industry shows that this industry, while consistently profitable has not been immune from these same forces. Fewer drug introductions and increased R&D expenditures, increased popularity of generic substitutes, increased foreign competition, an increased number of significant drugs coming off patent protection, and increased healthcare reform have simultaneously squeezed profit margins and limited the selection of drugs made available to consumers through health plans (Ravenscraft D & Long W, 2000).

Over the last couple of decades, economic globalization has been the major driver affecting the competitive business environment. Throughout this intensive competition fostered by new market dynamics, as well as other factors such as declining R&D, high number of generics entries, the emergence of new markets in middle-income countries, and social pressures, pharmaceutical companies will only improve their profit margins if they change the relationship between volume and costs, which can be achieved through productivity increase along the supply chain. For this purpose, the industry's generally preferred mechanism has been to increase investment in current business activities, primarily R&D and sales, which are shown as the two extreme ends of the supply chain (Achilladelis B & Antonakis N, 2001), (Sharabati A & Nour A, 2013).

Defined as a complex of processes, operations and organizations involved in the discovery, development and manufacture of drugs and medications, pharmaceutical industry has the major characteristics of being a research-based and most closely regulated manufacturing sector. It is differentiated from other industries by having high fixed R&D costs and low marginal cost of production, as well as involvement of third parties as the paying entities, wholesalers, prescribing physicians, and dispensing pharmacies. An important feature for the pharmaceutical industry has been that it has made multidimensional impacts on societies overall the world through change processes due to the establishment of a sector bringing high profitability (Kremer M, 2002), (Sharabati A & Nour A, 2013).

Originality is a concept referring to the quality of being new and inventive. In accordance with this concept, product originality was described as the level of newness to the consumer or to the firm (Gatignon H & Xuereb J, 1997).

In the pharmaceutical sector, it refers to the classification of the pharmaceutical firms according to their product portfolio as innovator and generics, where these both have been acknowledged as the most important applicable classification criteria, based on the market entries of products, whether this happens as a result original research or through creation of a copy with identical quality, quantity and formulation after expiry of original product's patent protection. Innovator drugs protected by patents have their originalities based on the chemical composition, therapeutic action and effectiveness, on the other hand, generic drugs are defined as the ones having the same active pharmaceutical ingredients (API's) as the innovator drugs and are comparable to them in dosage form, strength, route of administration, quality, safety and performance characteristics, as well as intended use. A product enters the pool of available substances when its originator loses its exclusivity through the expiry of a patent, so generics are generally accepted as products that are no longer patent-protected and which are therefore available in an unbranded version (Achilladelis B & Antonakis N, 2001), (Prasnikar J & Skerlj T, 2006).

In the case of original and generic manufacturers, it is more appropriate to speak of two segments of the pharmaceutical industry and to note that the sizes, cost structures, processes and human resources of companies in the two segments should not be compared against each other. If a single group of companies makes both original and generic products, the lines of original and generic products are handled in separate divisions, as separate strategic business areas (West D, 2002)

The relationship between originality and market performance of medical innovations was examined through classifying them into two groups as innovator company and generics company, implying that product innovations are new drugs which are defined as new chemical entities (NCEs) differing in chemical composition and structure, and in terms of technological innovation, pharmaceutical companies consider product innovation mostly and generally. The originality of the product innovation is based on the chemical composition, therapeutic action and effectiveness, timing of commercialization and the extent to which the product is imitated. Main findings showed that highly original drugs in composition and therapeutic

action catalyzed the interaction and accelerated the advance of both science and technology, created strong demand by opening new markets, and contributed to the growth of innovator companies (Achilladelis B & Antonakis N, 2001).

Opening the firm's boundaries to external inputs in a managed way enables companies to realize radically new product innovation. Recently, the strategy to access knowledge resources externally has been emphasized, as knowledge is growing faster and clusters of highly specialized knowledge are globally dispersed. External sources of knowledge and innovation have become increasingly relevant (Porter M & Stern S, 2001).

The propensity to cooperate on R&D projects has increased since the 1980s yet reached a new peak during the 1990s. As firms replaced their internal R&D activities more and more by contract research and external development, the academic community (Rigby D & Zook C, 2002a) began to emphasize the opening of the firm's boundaries to outside innovation.

The open innovation phenomenon is a complex issue that has received contributions from different research streams. Opening up the innovation process includes various perspectives: (1) globalization of innovation, (2) outsourcing of R&D, (3) early supplier integration, (4) user innovation, and (5) external commercialization and application of technology (Gassmann O, Opening up the innovation process: towards an agenda, 2006). 1) Globalization of innovation: Owing to modern Information and Communication Technologies, virtual teamwork on a global scale has changed from a rather exceptional working mode to a standard one. Large companies from small home countries, such as ABB and Novartis in Switzerland and Philips in the Netherlands, were pioneers of R&D internationalization. On average, European companies spend 30% of their R&D expenditures abroad, and Swiss companies spend even more than 50% (Gassmann O & von Zedtwitz M, Organization of industrial R&D on a global scale, 1998), (Gassmann O & von Zedtwitz M, Trends and determinants of managing virtual R&D teams, 2003) Major drivers of the internationalization of R&D are access to markets and resources.

2) Outsourcing of R&D: Technical service providers such as engineering firms and high-tech institutions have become more important in the innovation process. Collaborative R&D appears to be a useful means by which strategic flexibility can be increased and access to new knowledge can be realized (Pisano G, 1990), (Quinn J, 2000), (Fritsch M & Lukas R, 2001). While R&D

outsourcing has been reduced to cost savings in most companies, more and more managers are discovering the value of cooperative R&D for higher innovation rates.

3) Suppliers' early involvement in the innovation process increases innovation performance in most industries (Hagedoorn J, Understanding the rationale of strategic technology partnering: Inter-organizational modes of cooperation and sectoral differences, 1993), (Hagedoorn J, 2002). (4) User innovation: Following von Hippel's (1986) groundbreaking work on lead users, the importance of users as a source of innovation has been widely recognized (Olson E & Bakke G, 2001).

(5) External commercialization of technology: Internally created intellectual property is being exploited more systematically outside the firm. IBM earned about 1.5 billion USD by licenses and know-how transfer in 2005. Patents have turned to strategic assets. As an indicator the number of patents worldwide has increased by more than 25% per year (1996–2004). To own intellectual property has become more important than to own factories. Companies gain leverage effects by multiplying their internally generated patents and trademarks to the outside world. In order to optimize the external commercialization of technology many multinational companies, have created their own organizational units, so called corporate incubators (Becker B & Gassmann O, 2006).

International trade is the exchange of goods and services across national boundaries. It is the most traditional form of international business activity and has played a major role in shaping world history. It is also the first type of foreign business operation undertaken by most companies because importing or exporting requires the least commitment of, and risk to, the company's resources. For example, a company could produce for export by using its excess production capacity. This is an inexpensive way of testing a product's acceptance in the market before investing in local production facilities. A company could also use intermediaries, who will take on import-export functions for a fee, thus eliminating the need to commit additional resources to hire personnel or maintain a department to carry out foreign sales or purchases (Daniels J & Radebaugh L, 2004).

1.3. The third dilemma: «Producing or importing the drugs»

Why do some countries export or import more than others? Several studies have been conducted to establish major factors that influence exports. The trade and exchange rate regime (import tariffs, quotas, and exchange rates), presence of an entrepreneurial class, efficiency enhancing government policy, and secure access to transport (and transport costs) and marketing services are considered to be important influential factors of export behavior (Fugazza M, 2004).

One of the most significant signs of competitiveness is the ratio of natural (or value) values of exports and imports. Indeed, if a country exports more goods than it imports, it can be assumed that the product produced in the country is more competitive (Borodin K, 2006).

When determining the strategic priorities of export development for the future, it seems expedient to focus on stable trends in the development of world exports in terms of the most dynamic commodity groups, and also take into account the direction of the economic strategy and policies of states that successfully compete in international trade (Kruglov B, 2010).

The existing scientific economic schools note that the expansion of exports and imports, of other forms of international relations makes it possible to make better use of available natural, labor and intellectual resources, production capacities, increase aggregate demand, make fuller use of world science and technology achievements, improve people's quality of life (Semykin V, Safronov V, & Terekhov V, 2014).

In the framework of industrialization, developing countries are making efforts to develop import-substituting industries, designed to replace imported goods in the national market due to greater attractiveness for end-users: compliance with stringent conditions, both in terms of price level and qualitative characteristics. Such a policy allows developing countries to achieve significant growth rates of national economies, as well as favorable changes in the structure of the balance of payments (Fedoseeva G, 2015).

Import replacement is effective for the economy only in the case when the products of domestic production are competitive with respect to imports both in quality and price. Therefore, the most important condition for import substitution is to improve the quality of domestic products, reduce the costs of its production and prices. Import replacement is the result of a competitive struggle for the domestic market. Simultaneously, it can be accompanied by

an increase in exports of domestic products in foreign markets (Faltzman V, 2015).

Cost reductions in the production of pharmaceutical products on an industrial scale can be achieved through several aspects. First, it is a reduction in the cost of raw materials, active pharmaceutical ingredients, pharmaceutical substances and other raw materials. To achieve a reduction in the cost of raw materials provided 80% of the country is imported, it is possible due to the establishment of international relations with foreign producers. The largest of them are representatives of India and China. On the other hand, considering that at the moment one of the directions of the state policy is active investment in import substitution, it is worthwhile to start looking for domestic producers of raw materials (Izmailov A, 2015).

There is a close correlation between economic growth and export growth. Entering the world market gives additional stimulus for economic growth. There are some countries which are going in the way of modern economic growth and not participating in the global division of labor (Gaidar E, 1996).

This study emphasizes both the effect of the income multiplier and the external benefits that are believed to exist with export growth and economic growth. The existence of a large domestic market promotes growth of exporting industries, but growth of exports also promotes the growth of the domestic economy (Leichenko R, 2000).

The export sector is the most efficient sector of the economy. The export promotion points out that development of the export sector permits countries to have access to higher levels of technology and technologically rich capital. This access is crucial to developing countries. Such inflow of foreign capital and transfer of technology would not be possible without the export sector providing the means for payment since exports constitute the main source of foreign exchange. Export expansion allows countries to follow a speedier pace toward industrialization and economic growth (Zestos G, 2002).

Export activity leads economic growth and export promotion directly encourages the production of goods for exports. This may lead to further specialization in order to exploit economies of scale and the nation's comparative advantages. Moreover, increased exports may permit the imports of high quality products and technologies, which in turn may have a positive impact on technological change, labor productivity, capital efficiency and, eventually, on the nation's production (Konya L, 2006).

Economic theory suggests that export expansion contributes positively to economic growth through such means as facilitating the exploitation of economies of scale, and enhancing efficiency through increased competition. On this basis, exports increase long-run growth by allowing the economy to specialize in those sectors with scale economies that arise from R&D (R&D), human capital accumulation or learning by doing (Roshan S, 2007).

Economic growth generates export growth if innovation and technical progress result in well-developed markets, improving export performance in the trade sector. Also, an increase in exports may result from economies of scale due to productivity gains with increase in exports enabling cost reductions which may lead to further productivity gains. Finally, a further approach postulates a feedback relationship between exports and economic growth (Andraz J, 2010).

Export contributes to the economy in three ways. Firstly, it is a source of foreign exchange which helps to improve the balance of payments. Secondly, it acts as a source of job creation and thirdly, it helps the country to enjoy the economies of scale and also accelerates the technology advancement in production (Ismail A, 2009).

Despite the potentially important role of imports and import competition, relatively little attention has been devoted to the causal relationship between imports and economic growth. Most studies on the effect of trade openness on growth have primarily focused on the role of exports and have mostly ignored the contribution of imports. However, some recent studies have shown that without controlling for imports, any observed causal link between exports and economic growth may be spurious and thus misleading (Esfahani S, 1991), (Thangavelu S & Gulasekaran R, 2004). Imports may be very important to economic growth since significant export growth is usually associated with rapid import growth.

Export growth allows firms to take advantage of economies of scale that are external to firms in the non-export sector but internal to the overall economy. Third, expanded exports can provide foreign exchange that allows for increasing levels of imports of intermediate goods that in turn raises capital formation and thus stimulate output growth (Balassa B, 1978).

There are several policy implications of this finding for developing countries. First, export promotion as a strategy for economic growth would only be partially effective if import restrictions are maintained. Second, import openness is very important to economic growth as it complements the role of

exports by serving as a supply of intermediate production inputs needed in the export sector. Third, developing economies with limited technological endowment could benefit from access to foreign technology and knowledge from developed countries via imports (Grossman G & Helpman E, 1991).

This idea is based on the statement that export uses the domestic factors of production to generate income and job opportunities and it is considered as an important factor in the circular flow of income (Syed Ali & Mohd Zaini, 2017).

Modern business firms make strategic choices about investment in R&D in the hope of enjoying competitive advantage in subsequent periods. Their choice of R&D expenditure levels may depend upon many factors, and the choice of R&D investment levels is the outcome of lengthy negotiations within firms. Since the returns to R&D cannot be known ex ante (by definition), considerable leeway exists for behavioral factors and business intuition as opposed to any kind of serious «cost-benefit analysis» – R&D investment is very much an «art» rather than a science (Rao A & Coad R, 2007).

Marketing is particularly important to pharmaceutical companies in this highly competitive environment. It is crucial for pharmaceutical companies to produce and sustain efficient sale strategies; as a result, these companies spend one-third of their income on promotional expenses (Pattison N & Warren L, 2003).

Sale strategies have increasingly gained importance for healthcare workers and the general public. In addition to sanctioned promotion methods, illegal or unregulated actions are increasingly noted in the literature, such as paying scientists for implicit propaganda, manipulating research results and giving expensive gifts to physicians for prescribing certain medications (Abbasi A & Smith R, 2003), (Tonks A, 2002).

Pharmaceutical companies marketing are problematic in many ways: it can erode professional values and demean the profession, lead to irrational prescribing, and unnecessarily increase cost (Lexchin J, 1993), (Wazana A, 2000). In addition, marketing can negatively influence the public trust in medical institutions and the healthcare professions.

Pharmaceutical companies adapt their advertising strategies to changing opportunities within society and the marketplace to remain competitive and profitable (Lyles A, 2002).

The pharmaceutical industry uses a range of marketing strategies: direct to consumer advertisements and «educational material» (Mahon S, 2006), (Healy D, 2006); sponsorship of professional educational and teaching materials (Wazana A, 2000), (Relman A, 2001); advertising in medical journals (Smith R, 2003), (Smith R, 2002). These marketing techniques are designed to heighten clinician and patient awareness of specific conditions and corresponding remedies.

Stock prices are based in large part on corporate financial statements, augmented by analysis by stock analysts. The ultimate goal of any marketing expenditure should be to increase the value of the firm, but the road from marketing expenditure to stock price is usually circuitous. This is because marketing's path to financial impact is through revenues, and the road to revenues runs through the customer. Typically, a long chain of effects is involved to account for the impact of a marketing expenditure (Rust R, Tim A, Gregory S, Kumar V, & Rajendra K, 2004), and the effects of marketing investments play out over time.

We first need to clarify the ways marketing activities build shareholder value. For example, when we talk of marketing «investment», we must identify the marketing assets in which we invest and understand how the assets contribute to profits in the short run and provide potential for growth and sustained profits in the long run. In this context, the spotlight is not on underlying products, pricing, or customer relationships (Webster F, 1992) but on marketing expenditures (e.g., marketing communications, promotions, other activities) and how these expenditures influence marketplace performance. The firm should have a business model that tracks how marketing expenditures influence what customers know, believe, and feel, and ultimately how they behave.

It is important to understand that marketing actions, such as advertising, service improvements, or new product launches, can help build long-term assets (e.g., brand equity, customer equity). These assets can be leveraged to deliver short-term profitability (e.g., the advertising and promotional expenditures related to stronger brands are more productive). Thus, marketing actions both create and leverage market-based assets. It is also important to distinguish between the «effectiveness» and the «efficiency» of marketing actions (Rust R, Tim A, Gregory S, Kumar V, & Rajendra K, 2004).

Marketing strategy plays a central role in winning and retaining customers, ensuring business growth and renewal, developing sustainable competitive

advantages, and driving financial performance through business processes (Srivastava R, McInish, Wood R, & Capraro A, 1999).

The strategic roles of marketing include setting strategic direction for the firm and guiding investments to develop marketing assets that can be leveraged within business processes to provide sustainable competitive advantages. Although marketing investments (e.g., advertising, customer support) and resultant assets are largely intangible, their benefits to the firm are similar to those provided by more tangible resources, such as manufacturing infrastructure. Differentiated brands enable their owners to charge higher prices (Farquhar P, 1989).

In recent years, there has been explosive growth in direct to-consumer advertising (DTC) by pharmaceutical manufacturers. Pharmaceutical DTC expenditures varied from slightly less than 1 billion USD in 1996 to 2.5 billion USD in 2000. Compare that with expenditures on detailing (i.e., sales representatives «detail» physicians in their offices), which have increased from 8 billion USD in 1995 to only approximately 9 billion USD in 2000. Industry sources predict that by 2005, DTC spending will reach 7 billion USD. It is widely recognized that such growth was partially fueled by a change in the Food and Drug Administration's (FDA) policy toward DTC (Sridhar N, Ramarao D, & Pradeep K, 2004).

Productive marketing and advertising investments likely obtain valuable feedback from the market and customers, which facilitates R&D and new product innovations. In turn, this offers enhanced cash flow to the firm. In addition, intense R&D in the new product development process can «ensure speedy and successful commercialization of technologies and products at a low cost» (Dutta S, Om N, & Surendra R, 1999).

The more competitive the market, the more firms may rely on marketing and R&D skills simultaneously to ensure the successful commercialization of their existing and new technologies, products, and services (Griffin Abbie & Hauser J, 1996), (Mizik N & Jacobson R, 2003).

As countries move from the industrial age into an information and knowledge economy, it is increasingly important to develop their intellectual capital and manage their intangible assets. In addition to nurturing their skilled people, businesses need to consider the importance of investments in the 'soft assets' of advertising expenditure (adspend) and R&D. The sums spent on both advertising and R&D are positively related to the profitability of companies (Andras T & Srinivasan S, 2003). Adspend comprises the costs of advertising

in all display and classified media such as newspapers, magazines, directories, television, radio, cinemas, and, most recently, the Internet (Blankley W, 2007).

Both R&D and advertising create and/or strengthen key intangible assets that contribute to the future earnings potential of the firm (Erikson G & Jacobson R, 1992). Investment in R&D leads to production efficiencies, improvements of existing products, and creation of innovative products that enable a firm to compete more effectively with its competitors. Advertising contributes toward building strong brands that enable a firm to earn a price premium relative to competing brands and reduces its vulnerability to competition (Keller K, 1998). Advertising also has a significant long-term effect on a firm's sales by influencing the attitudes of consumers and changing their consumption behaviors (Surinder T & Ahmed E, 2010).

Investments in innovation enable pharmaceutical companies to achieve greater capability to meet the demands of their domestic and international markets. In addition, investments in innovation for exports can bring about positive spillovers in the domestic market, too (Valentini E, 2011).

There is also a consensus among scholars that the profitability of companies is largely determined by research and marketing costs. Evans and Drummond and others summarize it well in their papers: «In pharmaceutical industry R&D plays a key role on developing of new drugs, which has a tremendous effect on companies' profitability according to patent. On the other hand, drug and health service constitute a large volume of advertising in the world. (Evans R, 1995). «Two factors affecting companies' profitability are costs related: one is R&D and the other is marketing cost» (Drummond M, 1992).

The value chain of the industry is long and complex. R&D is the intellectual source of the industry and of new products. It can account for over 20 per cent of manufacturers' sales (vs 12 per cent in 1980). Many believed that a spend of at least 1.5 – 2.0 billion USD was required to remain for a research major pharmaceutical company. The traditional product development cycle begins with the search for, and discovery of, a new compound. This process typically takes one year to find one pharmacologically viable new chemical entity (NCE). An NCE then moves into pre-clinical testing for about 2 years and generally one in 20 NCEs survives this stage. Clinical testing involves three phases of testing on human subjects. Typically, a year is spent on Phase I safety assessment. A further two years are spent on assessing effectiveness, dosage and side effects in Phase II. Finally, safety in long-term use in large

samples of patients is assessed over a period of three years. For every five new drugs entering Phase I, 1.65 typically completed Phase III successfully. On successful completion of clinical trials, a new drug application is filed. It is then reviewed by a regulatory authority. One in every 5000 compounds at the discovery stage typically survived to become a new approved drug. Over two thirds of the total R&D cost of a successful new drug was spent on clinical trials (Heracleous L & Murray J, 2001).

Since the costs of doing R&D have been rising rapidly, increases in nominal R&D spending likely overstate the real increase in resources applied to drug discovery and development. Also, the long, complex process of drug development makes it remarkably difficult to fully account for and unambiguously attribute specific inputs to specific outputs (Joseph D, 1999-2003). Today's new drugs are the product of yesterday's R&D spending, and today's R&D spending will contribute to output far in the future.

1.4. The fourth dilemma: «acquired through the media»

«Although the pharmaceutical industry emphasizes how much money it devotes to discovering new drugs, little of that money actually goes into basic research. Data from companies, the United States National Science Foundation, and government reports indicate that companies have been spending only 1.3% of revenues on basic research to discover new molecules, net of taxpayer subsidies» (Lexchin J, Foreign free riders and the high price of US medicines, 2005).

Pharmaceutical companies direct extensive marketing efforts toward many professional groups including pharmacists, administrators, nurses, psychologists and, of course, physicians (Heber A, 1993).

Successful pharmaceutical companies realize that they must do more than just make attractive products. More often than not the 'packaging of a product' is more important than the product itself. To this end, promotional strategies are used to develop persuasive communication linkages between the company and its markets. Pharmaceutical promotion and advertising can influence not only the use of a product, but also our (doctors and public alike) belief on medicines. As promotion has the potential to change behavior and because it is a major source of drug information for health professionals, the messages promoting pharmaceuticals should be factual, evidence-based, unambiguous and balanced. Many countries have already developed guidelines for

promotional material (Roughead E, 1999), (American College of Physicians, 1990).

The authors generally agree that marketing costs are growing rapidly in the industry: «Marketing budgets in the pharmaceutical industry are huge by comparison to most other industries, but they are often predominantly spent on the marketing channel, delivering the product to the customer. These characteristics seem to indicate that the simple linear model of innovation still captures the overall approach to innovation in the pharmaceutical industry» (Trott P, 2002).

In contrast the authors disagree on the causes of the rapid increase in marketing costs. Most authors (Stremersch) argue that this is the «specialty» of this industry and stresses the difficulties of delivering information on medicines to consumers. Stremersch speaks about «specialized marketing knowledge»: «The pharmaceutical industry spends a notably large percentage of its revenues on marketing. United States pharmaceutical companies spend on average more on marketing, compared to their average R&D expenditure. The pharmaceutical industry requires specialized marketing knowledge. The market faces unique challenges in facets such as new product development, life cycle management and marketing management» (Stremersch S & Van Dyck, 2008).

Some other authors like Manchanda P. focus more on the «unic challenges» of the industry: «Pharmaceutical companies are characterized by many new drugs launches. For instance around 41 completely new drug molecules were launched each year on average (IMS Health). However, the industry faces many unique challenges in developing and commercializing innovations. Most notably the industry faces high risk (on average one success from 10 000.00 original compounds), high cost (typically greater than 800 million USD for each successful drug), a long development cycle (12 years on average) with a limited product life (effective patent protection is only 8–10 years)» (Manchanda P, 2005).

The others focus more on the personnel costs related to the doctor-visitor system: «In the pharmaceutical industry there has been a traditional triad relationship among doctors, patients and pharmacists. As medical professionals are the ones who directly treat patients for their ailments, their recommendations are highly regarded. In addition, medical doctors play an important role in decision-making process in planning pharmaceuticals that are carried in the formulary of their individual/group private practices and/or

hospitals. Consequently pharmaceutical companies in general invest a handsome amount of resources in personal selling and other related marketing activities for promoting pharmaceuticals to the medical practitioners» (Liu S, 2004).

The majority of the authors (Smith, Lakdawalla, Rosenthal and Rubin) focus on the positive effect of marketing. Smith speaks about the «promotion of hope and promise». «Marketing has two main objectives: first, it should maintain present customers of it are products and services and second, it should attract new customers toward the products and services (Smith M, 2014).

The others speak about the general aim of advertisement: «to persuade consumers that the advertised product is better». «Today the pharmaceutical world realizes that it should spend a significant amount from its investment for drug marketing in order to increase drug prescription level as well as enhance the customer satisfaction level. For instance 10 leading pharmaceutical companies in the world annually spend 34% of their sales on updating drug prescription by physicians and internal marketing» (Lakdawalla D, 2013).

«The literatures of the effect of advertising on prescribing practices have shown that such advertising increases class wide sales, helps to avert under use of medicines to treat chronic conditions and leads to some overuse of prescription drugs». (Rosenthal M, Berndt E, & Donohue J, 2003).

«However supporters of pharmaceutical promotions claim that marketing expenditures give innovative pharmaceutical manufacturers a fair chance to recover high R&D expenditures. Moreover marketing may serve as a communication channel to educate physicians and expose consumers to information that may improve their health outcomes and medical options» (Rubin P, 2003).

In 2000, the top ten pharmaceutical companies were spending just under 1.9 billion USD on 314.000 promotional meetings (Promoting drugs through physician meetings and events: Pfizer leads the way; antidepressants are top category, 2001). IMS does not include the amount spent on phase IV «seeding» trials, trials designed to promote the prescription of new drugs rather than to generate scientific data. In 2004, 13.2% (4.9 billion USD) of R&D expenditures by American pharmaceutical firms was spent on phase IV trials (Hensley S & Martinez B, 2005). Almost 75% of these trials are managed solely by the commercial, as opposed to the clinical, division of

biopharmaceutical companies, strongly suggesting that the vast majority of these trials are done just for their promotional value (La Puma J & Seltzer J, 2002).

Finally, IMS data seem inconsistent with estimates based on the information in the annual reports of pharmaceutical companies. For example, in an accounting study based on the annual reports of ten of the largest global pharmaceutical firms, Lauzon and Hasbani showed that between 1996 and 2005, these firms globally spent a total of 739 billion USD on «marketing and administration». In comparison, these same firms spent 699 billion USD in manufacturing costs, 288 billion USD in R&D, and had a net investment in property and equipment of 43 billion USD, while receiving 558 billion USD in profits (Lauzon L-P & Hasbani M, 2006).

Based on United Nations Industrial Development Organization estimates, a report from the Organization for Economic Cooperation and Development estimated that, in 1989, pharmaceutical firms globally spent 24% of their sales on marketing (Jacobzone S, 2000). Finally, in 2006 Consumers International surveyed 20 European pharmaceutical firms to obtain more information about their exact expenditures on drug promotion. Among the 20 firms contacted, only five agreed to provide separate figures for marketing, which ranged from 31% to 50% of sales depending on the firm (Consumers International, 2006).

The prescribing behavior of doctors is influenced by a number of factors, one of which being visits from the pharmaceutical sales representatives (PSR) of pharmaceutical companies. It is estimated that approximately 15.000 PSRs carry out some 20 million visits to medical practices and hospitals in Germany every year (Korzilius H & Rieser S, 2016). During these visits, the PSRs inform the doctors about their company's products and new publications, and they use a variety of marketing strategies to motivate the doctors to prescribe their products. In an earlier study, we were able to demonstrate that 77% of doctors in Germany were visited by PSRs at least once a week, and 19% of doctors were visited daily. We showed that drug samples, stationery and dinner invitations were the most frequently accepted gifts (Lieb K & Brandtönies S, 2010).

The pharmaceutical industry spent over 11 billion USD in pharmaceutical marketing, excluding medication samples, in 2004, with more than 7 billion USD directed to clinicians (Total U.S. promotional spend by type, 2005). Such marketing also creates the potential for inappropriate prescribing practices,

which contribute to escalating national health care costs (Xu K, Moloney M, & Phillips S, 2003).

Direct-to-physician (DTP) marketing is one important facet of the promotion of pharmaceuticals. DTP includes verbal in-office presentations which are usually accompanied by promotional advertising brochures, free medication samples, and possibly gifts such as meals or other promotional items. These in-office presentations by pharmaceutical representatives (PRs) are an important method of promotion for pharmaceutical companies. Their impact is undeniable, as PRs are most frequently reported by physicians as their source of primary information about new medications (Peay M & Peay E, 1994). While direct-to consumer (DTC) pharmaceutical marketing has increased dramatically in the last decade, DTP marketing expenditures remain 48% greater than for DTC marketing (Total U.S. promotional spend by type, 2005).

Direct-to-consumer advertising has also been controversial in light of post marketing revelations regarding problems with drug safety. Specifically, clinical trials that are required for drug approval are typically not designed to detect rare but significant adverse effects, and contemporary methods of post marketing surveillance often fail to connect adverse events that have a high rate of background prevalence with the use of particular drugs. After the market withdrawal of Vioxx (rofecoxib), a drug heavily promoted to consumers (Bradford W, Kleit A, Nietert P, Steyer T, McIlwain T, & Ornstein S, 2006), critics called for the FDA to place limits on direct-to-consumer advertising, particularly for new drugs (Saul S, 2005).

Since direct-to-consumer advertising has a significant effect on demand for prescription drugs, it is important to understand the evolution of such advertising and its regulation. Although one study reported that spending for such advertising increased by a factor of 3 from 1996 to 2000 (Rosenthal M B. , Berndt E, Donohue J, Frank R, & Epstein A, 2002), little is known about trends in spending and other forms of pharmaceutical promotion in recent years.

Advertising in medical journals is one of the techniques used by pharmaceutical companies to promote their products to medical doctors. During the first four years of a new medicine on the market, pharmaceutical companies may gain approximately 2.43 USD for each dollar spent on medical journal advertisements for a medicine (Liebman M, 2000).

In most countries, regulation of the quality of advertisements in medical journals is a responsibility of government agencies (Morris L & Pines W, 2000). Despite the availability of regulations and controls of drug promotion worldwide, pharmaceutical advertising in medical journals has been criticized for being of poor quality (Carandang E & Moulds R, 1994).

An important component of the health care industry is the pharmaceutical industry-in 2002, its size was estimated at 193 billion USD (The Pharmaceutical Research and Manufacturers of America, PhRMA, 2004). While the pharmaceutical industry is driven by innovation, it spends more money on marketing than on R&D (Off the charts: pay, profits and spending by drug companies 3, 2001). For example, this industry spends more than any other U.S. industry on its sales, force (7 billion USD annually) and on media advertising (2.8 billion USD annually) (Dick R, 2002).

Pharmaceutical companies typically direct their marketing efforts toward physicians and, as of late, directly to patients (consumers). The marketing efforts directed at physicians comprise personal selling through sales representatives (detailing) (Jeremy E, 2004), sampling (provision of drugs at no cost), physician meetings and events, and advertisements in medical journals (Bradley S & Weber J, 2004).

The pharmaceutical industry exerts tremendous influence on medical practice through the marketing of drugs and medical devices to physicians and consumers. Direct-to-physician advertising (DTPA), which is common in most developed countries, occurs through sales pitches from pharmaceutical representatives who provide details about specific drugs (physician detailing) and through providing free samples, continuing medical education, advertising in medical journals, and direct mailings (Sufrin C & Ross J, 2008), (Kaiser Family Foundation: Impact of direct-to-consumer advertising on prescription drug spending, 2003). Direct-to-consumer advertising (DTCA), which is legally permitted only in the US and New Zealand, primarily occurs through broadcast and print advertisements. DTCA on the Internet, however, reaches an international audience (Liang B & Mackey T, 2011).

Direct-to-consumer advertising of prescription drugs is a powerful force in the health care market. Proponents claim that good direct-to-consumer advertising educates and empowers patients in their relationship with their health care providers (America's pharmaceutical industry announces guidelines on direct-to-consumer advertising, 2006).

Direct-to-consumer advertising is not a new phenomenon. The first recorded advertisement of a pharmaceutical product occurred in the early 18th century, and the practice became widespread in the 19th and early 20th centuries (Wilkes M, Bell R, & Kravitz R, 2000). Partially as a response to the proliferation of these advertisements, the United States Congress undertook a series of legislative steps to regulate drug advertisements. One of the first steps was the Federal Food, Drug, and Cosmetic Act (FDCA) in 1938 that established the FDA and required medications be proven safe prior to marketing. This act was amended in 1962 to require that medications be proven both safe AND efficacious prior to being advertised to the public (Lyles A, 2002).

In the 1980s, pharmaceutical companies expanded direct-to-consumer advertising in magazines and newspapers with the intent of empowering consumers who were newly focused on the notion of patient autonomy (Kessler D & Pines W, 1990).

Since 1997, there has been a significant increase in the rate of growth of direct-to-consumer advertising in all 3 categories. In 2000, pharmaceutical companies spent 15.7 billion USD on drug promotion (Findlay S, 2001). The majority of this money was earmarked for retail samples (7.9 billion USD) and physician detailing (4 billion USD), whereas 2.5 billion USD was spent on direct-to-consumer advertising. Between 1996 and 2003, there was a 400% increase in spending on direct-to-consumer advertising, from 791 million USD to 3.2 billion USD. (Statement of the American College of Physicians for the Record of the Public Hearing on Consumer-Directed Promotion of Regulated Medical Products, 2005). In 2004, the amount spent on direct-to-consumer advertising increased to over 4 billion USD, another 23% increase from the year prior (Querna B, 2005).

In the United States, pharmaceuticals are heavily promoted to providers and patients. The pharmaceutical industry spent nearly 30 billion USD in 2005 on marketing and promotion, of which 84% went toward physician detailing and free samples, with less devoted to professional advertising and direct-to-consumer advertising (DTCA) (Donohue J, Cevasco M, & Rosenthal M, 2007). Spending varied considerably by product, although both detailing and DTCA tended to favor drugs with broader clinical indications for use (Campbell S, 2009). Pharmaceutical promotion can influence demand for prescription drugs, increase physician visits for conditions treated by heavily advertised drugs (Iizuka T & Jin G, 2005).

Little is known about how pharmaceutical companies have altered promotional spending in response to major health care changes. First, during the past decade there has been a slowdown in new drug introductions. During the second half of the 1990s, the FDA approved a large number of small molecule therapies for common conditions, including many drugs that were the first of their kind. These «blockbuster» drugs were heavily marketed, resulting in a 162% increase in total promotional spending between 1996 and 2005 (Donohue J, Cevasco M, & Rosenthal M, 2007). In recent years, however, blockbuster drugs have faced increasing competition from generics, as well as branded rivals, with the generic share of total prescriptions increasing markedly from 63% in 2006 to nearly 80% in 2010 (IMS Institute for Healthcare Informatics, 2011). Fewer new drugs have been approved annually in recent years (Aitken M, Berndt E, & Cutler D, 2009).

Additionally, pharmaceutical companies increased emphasis on direct-to-consumer advertising as a means of drug promotion. For example, although total promotional efforts as a percentage of sales have remained constant, the proportion of sales devoted to direct-to-consumer advertising has increased and has done so at a faster rate than expenditures for R&D (Heinrich J, 2002). As compared with physician detailing, spending on direct-to-consumer advertising is focused on a more limited array of products. In fact, the top 20 advertised drugs in 2000 accounted for approximately 60% of all spending on direct-to-consumer advertising (Rosenthal M B. , Berndt E, Donohue J, Frank R, & Epstein A, 2002). The most heavily advertised classes include antidepressants, antihistamines, antihyperlipidemics, proton pump inhibitors, and anti-inflammatory agents. In 2000, the top spender was Merck. The 161 million USD they spent advertising Vioxx rivals the marketing spent by Dell (160 million USD), Budweiser (146 million USD), Pepsi (125 million USD), or Nike (78 million USD) in the same year (Rosenthal M B. , Berndt E, Donohue J, Frank R, & Epstein A, 2002).

By stimulating consumer demand, pharmaceutical companies hope to increase physician prescriptions for a particular product. About half of physicians in the FDA survey reported some pressure to prescribe as a result of direct-to-consumer advertising, with primary care physicians again more likely than specialists to report pressure. Approximately 73% of primary care physicians felt patients expected a prescription, compared with 63% of specialists. In fact, patients who asked for a particular brand were more likely to receive the drug than those who did not ask (Aikin K, Swasy J, & Braman A, 2004).

The primary form of promotion directed towards the physicians is detailing. This activity refers to the calls made by representatives of the pharmaceutical firms (referred to as detailers) on physicians. In these calls, detailers talk to the physician about specific conditions, drug characteristics, results of clinical trials, potential side effects etc. During these calls, they typically use brochures and other printed material as information aids. At the end of the call, they may also leave behind other promotional material such as office items and drug samples. Other marketing activities that pharmaceutical firms direct towards physicians include meetings and seminars, where experts for particular diseases or conditions are invited for talks, and advertising in medical journals. Relative to detailing, expenditure on these activities is relatively small (Wittink D, 2002).

The price of drugs also plays a role, either directly or through intermediaries, in affecting the choice of the prescribed drug. In the case of patients covered by insurance, there are often differential co-payments for more expensive and less expensive drugs. For instance, insurance plans usually have a differential copayment amount for branded and generic drugs (Artunian J, 2002).

1.5. The pharmaceutical market and the main players

Pharmaceutics is a large, high-growth, globalized, and innovation intensive industry. Its products - drugs - are directed to satisfy consumer needs in an area - healthcare - which is vital for society. Healthcare and therapeutics are among the most relevant issues in the definition of the concepts of welfare and democracy in the New Century (Gambardella A, Orsenigo L, & Pammolli F, 2000).

The growth of the pharmaceutical market is influenced by such demographic factors as population size, life expectancy, aging, etc. According to the forecasts of the Department of Economic and Social Affairs of the United Nations, by 2025 the population will increase to 8 billion people, the proportion of the population over 60 years will increase to 15% by 2025. One of the important factors of development is the state policy in the field of pharmaceuticals, where health is considered a priority item of budget expenditures. For this reason, pharmaceutics is one of the most attractive industries for investment.

At present, the expiration of patents for original drugs, increasing competition in the market of medicines, a short life cycle of products, etc., affect the innovative processes in the pharmaceutical market. The industry adapts to a

more competitive environment through increased research and the organization of mergers or acquisitions. Large companies absorb small companies that produce drugs in a narrower direction to strengthen the R&D process.

Manufacturers of quality generics have become drivers of growth in the world pharmaceutical market. The cheapest assortments are washed out from the market. Generic branded drugs from the middle price segment will have advantages over the original drugs.

The main producers of pharmaceutical products are the United States of America, Europe, Japan and India. In terms of companies world leaders are: Pfizer - USA, Merck&Co., Inc. - USA, Sanofi - France, GlaxoSmithKline - United Kingdom, Roche - Switzerland, Novartis - Switzerland, AstraZeneca - United Kingdom, Abbott - USA, Bayer - Germany, Astellas Pharma Inc. - Japan, Takeda Pharmaceutical Ltd - Japan, Sun Pharmaceutical Industries Limited - India, Lupin Limited - India, Cipla - India.

According to estimates of the international analytical company «Evaluate Pharma» in 2017 the global pharmaceutical market volume reached 1.200 billion USD, which is 3.6% more than in 2016 (World pharmaceutical market in 2017) (See Figure 1).
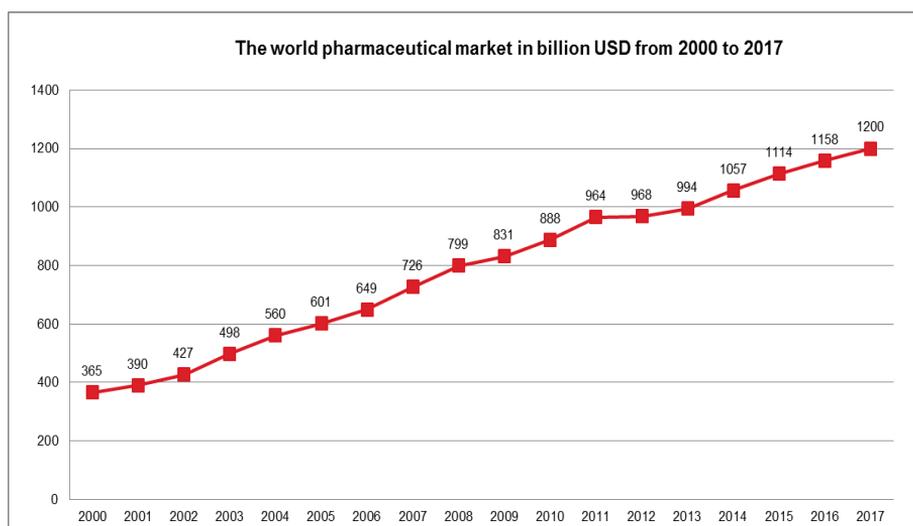
FIGURE 1. THE WORLD PHARMACEUTICAL MARKET IN BILLION USD FROM 2000 TO 2017
Sources: (Evaluate Pharma, 2017), (Revenue of the worldwide pharmaceutical market, 2000-2017).

The USA pharmaceutical market not only remains the regional leader, but also determines the main trends in the development of the global pharmaceutical industry. In 2017, its volume increased by 4% and reached 456 billion USD. The Chinese pharmaceutical market firmly held the second place in the world ranking in 2017. Its volume reached 165 billion USD. At the same time, it is growing twice as fast as developed pharmaceutical markets. In 2017, the Japanese pharmaceutical market retained its third position in the world ranking. Despite all the efforts undertaken by the Japanese government to curb the costs of the health care system, in 2017 prescription drugs expenditures increased by 1% and the market reached a volume of 120 billion USD. The Japanese government is seeking to control growing costs in particular measures are being taken to increase the share of generics from 60% to 80%. In addition, the goal has been set to reduce the price of expensive innovative medicines by up to 50% (World pharmaceutical market in 2017).

An important place in the global pharmaceutical market is occupied by the group of countries «Pharmerging'markets» (highlighted by the analytical company IMS Health and consists of 21 countries). According to economic indicators, it is divided into three subgroups. The first is China, the second is Brazil, India and Russia, and the third is 17 countries with a significant population and with great growth prospects. These markets have become the locomotive and the main driver of growth in the global pharmaceutical market over the past decade. On average, they increase annually by 11-15%, while saturated traditional pharmaceutical markets grow only by 1-4% per year. In 2017, the total volume of pharmaceutical markets «Pharmerging'markets» reached 405 billion USD, representing 33.8% of the global pharmaceutical market (World pharmaceutical market in 2017). The Top 10 drugs, which became the leaders in sales in 2017 (See Table 1).

TABLE 1. TOP 10 PHARMACEUTICAL SALES IN 2016-2017 YEARS

№	Drug name	Manufac-turer	Substance	2016 in million USD	2017 in million USD	Growth 2016/2017, %
1.	Humira	Abbvie	Adalimumab	16 078	18 427	14,61%
2.	Rituxan	Roche/Biogen	Rituximab	9 059	9 238	1,98%
3.	Revlimid	Celgene	Lenalidomide	6 974	8 187	17,39%
4.	Enbrel	Amgen/Pfizer	Etanercept	8 874	7 885	-11,14%
5.	Herceptin	Roche	Trastuzumab	7 195	7 441	3,42%
6.	Eliquis	BMS/Pfizer	Apixaban	5 056	7 395	46,26%
7.	Remicade	J&J/MSD	Infliximab	8 234	7 152	-13,14%
8.	Avastin	Roche	Bevacizumab	7 197	7 096	-1,40%
9.	Xarelto	Bayer/J&J	Rivaroxaban	5 919	6 589	11,32%
10.	Eylea	Bayer/Regene ron	Aflibercept	5 338	6 034	13,04%

Source: (World pharmaceutical market in 2017).

It should be noted that almost all the drugs that are among the leaders in sales in 2017 are biotechnological products. Obvious evidence of the importance of biotech drugs is such an indicator as their share in the total turnover of the leaders of the pharmaceutical market. The share of biotech drugs in the total turnover of Abbvie is 65%, Pfizer - 50%, Roche - 45% (World pharmaceutical market in 2017).

According to estimates in 2018 world exports of pharmaceutical products amounted to 600.907 million USD, and in 2001, 117.432 million USD. Imports of pharmaceutical products totaled 628.806 million USD in 2018 and in 2001 116.941 million USD, which shows almost a similar picture of exports and imports. The major share of pharmaceutical products export is occupied by Germany 96.765 million USD in 2018. The second share of exports is Switzerland 75.199 million USD. The third share of exports is Ireland 53.490 million USD. The next is USA 48.391 million USD. Belgium exported 47.610 million USD. Netherlands exported 43.335 million USD. France exported 33.843 million USD. UK exported 30.003 million USD. Italy exported 27.738 million USD. India exported 14.277 million USD. Hungary exported on 6.389 million USD. Also Kazakhstan exported on 34 million USD of pharmaceutical products, which takes a small share of exports (See Table 2).

TABLE 2. EXPORT AND IMPORT OF PHARMACEUTICAL PRODUCTS IN MILLION USD IN 2001-2018 YEARS

| Country	Export in 2001 in million USD	Export in 2018 in million USD	Import in 2001 in million USD	Import in 2018 in million USD
Germany	16 676	96 765	8 963	57 914
Switzerland	10 886	75 199	5988	29 985
Ireland	7 281	53 490	1 496	12 777
USA	12 508	48 391	16 046	116 347
Belgium	8 844	47 610	7 411	40 631
Netherlands	4 308	43 335	4 210	29 582
France	12 037	33 843	7216	25 215
UK	12 875	30 003	8 655	30 256
Italy	6 347	27 738	5 908	26 710
India	1 047	14 277	164	2 061
Hungary	415	6 389	612	5 587
Kazakhstan	2	34	121	1 177
World	117 342	600 907	116 941	628 806

Source: (Trade statistics for international business development, 2001-2018).

The most importing countries of pharmaceutical products USA 116.347 million USD in 2018, as it was dependent on imports of pharmaceutical products from European countries. Germany imported pharmaceutical products for 57.914 million USD. Belgium imported 40.631 million USD. UK imported 30.256 million USD. Switzerland imported 29.985 million USD. Netherlands imported 29.582 million USD. Italy imported 26.710 million USD. France imported 25.215 million USD. Ireland imported 12.777 million USD. In the 20th place Hungary imported 5.587 million USD. In the 43th place India is 2.061 million USD. Also on the 56th place Kazakhstan imported pharmaceutical products 1.177 million USD.

The pharmaceutical industry is an important component of the world economy. This high-tech industry has high R&D costs. The all expenditure for R&D amounted to 152.8 billion USD in 2016, compared to 2006, when it was 108 billion USD.

From 2000 to 2018 shows Roche is the leader among the Top 10 companies in the world according to expenditure on R&D 10.8 billion USD and in 2000 was 4.1 billion USD. J&J is second on the Rank 10.6 billion USD and in 2000 was 2.9 billion USD (See Figure 2 and Table 3).
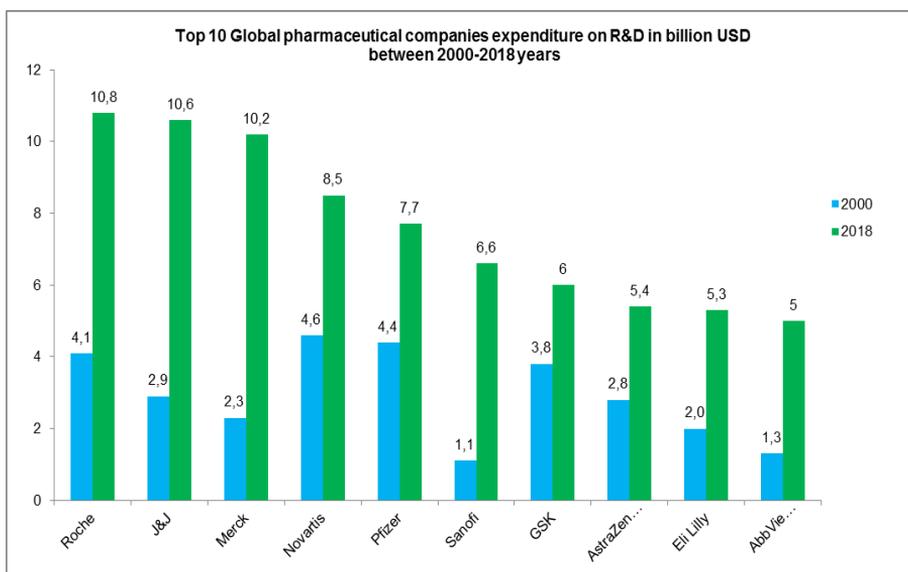
FIGURE 2. TOP 10 GLOBAL PHARMACEUTICAL COMPANIES EXPENDITURE ON R&D IN BILLON USD BETWEEN 2000-2018 YEARS

Source: (The 2018 Global Innovation 1000 study, 2005-2018).

Merck is third in the Rank 10.2 billion USD and in 2000 was 2.3 billion USD. Next is Novartis 8.5 billion USD in 2018, although in 2000 was the first expenses for R&D 4.6 billion USD. Pfizer expenses in 2018 7.7 billion USD and in 2000 was 4.4 billion USD. Sanofi in 2018 6.6 billion USD and in 2000 was 1.1 billion USD.

TABLE 3. TOP 10 GLOBAL PHARMACEUTICAL COMPANIES EXPENDITURE ON R&D IN BILLION USD BETWEEN 2000-2018 YEARS

Rank	Company	Pharmaceutical companies expenditure on R&D in billion USD in 2000	Pharmaceutical companies expenditure on R&D in billion USD in 2018
1.	Roche	4.1	10.8
2.	J&J	2.9	10.6
3.	Merck	2.3	10.2
4.	Novartis	4.6	8.5
5.	Pfizer	4.4	7.7
6.	Sanofi	1.1	6.6
7.	GSK	3.8	6.0
8.	AstraZeneca	2.8	5.4
9.	Eli Lilly	2.0	5.3
10.	AbbVie Inc.	1.3	5.0

Source: (The 2018 Global Innovation 1000 study, 2005-2018).

In 2017, there is a tendency to increase the market launch of new molecules or even new therapeutic schemes (and, mainly, biotechnological preparations). By the end of 2017 43 new drugs received approval from the FDA. Their sales according to market experts 5 years after the launch will reach 31.6 billion USD (World pharmaceutical market in 2017).

Analysis of the list of new products shows that, as before, the most promising areas include: oncology, HIV infection, diabetes mellitus, multiple sclerosis, orphan diseases and biosimilars. With full confidence we can expect that these trends will continue in 2018. German market analysts predict that in 2018 30 new molecules will be introduced to the market. One third of them will have to improve the treatment of patients with oncological diseases. This list is a direct consequence of the fact that leading pharmaceutical companies are investing heavily in the development of new promising groups of drugs. R&D costs increased by another 4% and in 2017 amounted to 158.9 billion USD. Today, the world's leading pharmaceutical companies invest in R&D from 13% (Celgene) to 36% (Johnson & Johnson) of their net turnover (World pharmaceutical market in 2017).

Three more companies from Top-20 Mylan, Allergan and Sun Pharmaceutical - occupy more than 5% of the generic market and companies such as Aspen, Hospira, Sanofi, Fresenius Kabi, Lupin, Dr. Reddy's Laboratories, Apotex, Stada Arzneimittel, Aurobindo, Cipla, KRKA Group, Valeant, Zydus Cadila, ParPharmaceutical. The last place in the ranking is taken by the Japanese Nichi-Iko Pharmaceutical with revenues from generics of 1.2 billion USD (Top-20 generics manufacturers, 2016).

1.6. The shift from R&D to Marketing in the expenditure of global pharmaceutical companies

The role of Marketing, Sales and R&D expenditure is the most influencing one in the pharmaceutical industry. The other expenditures are stable, so we decided to study how much pharmaceutical companies spend for Marketing, Sales and for R&D. In such circumstances, testing the relationship between R&D expenditure and advertising costs with the profitability of the pharmaceutical market can be interesting (Acosta A & Ciapponi A, 2014).

Figure 3 and Table 4 consider the largest share of expenditure on Marketing, Sales and for R&D of pharmaceutical companies. The pharmaceutical

company Pfizer in 2018 on Marketing and Sales spent 8.7 billion USD and for R&D 7.7 billion USD, however in 2000 for Marketing and Sales spent 11.4 billion USD and for R&D 4.4 billion USD. The pharmaceutical company Novartis in 2018 on Marketing and Sales spent 9.0 billion USD for R&D 8.5 billion USD (See Figure 3 and Table 4).
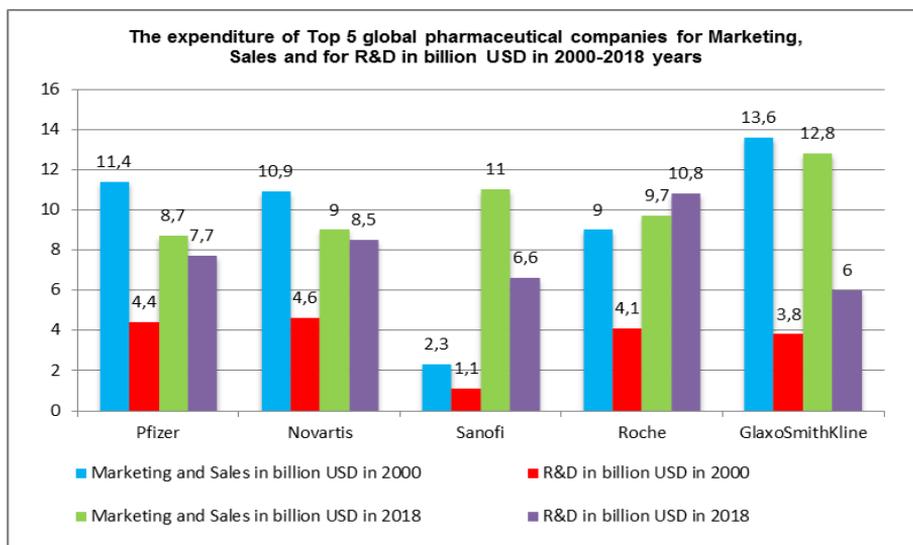
FIGURE 3: THE EXPENDITURE OF TOP 5 GLOBAL PHARMACEUTICAL COMPANIES FOR MARKETING, SALES AND FOR R&D IN BILLION USD IN 2000-2018 YEARS

Sources: (The 2018 Global Innovation 1000 study, 2005-2018), (Pfizer, Annual report, 2000), (Pfizer, Financial report, 2018), (Novartis, Financial report, 2000), (Novartis, Financial report, 2018), (Sanofi, Annual report, 2000), (Sanofi, Financial report, 2018), (Roche, Financial report, 2000), (Roche, Financial report, 2018), (GlaxoSmithKline, Financial report, 2000), (GlaxoSmithKline, Financial report, 2018).

The pharmaceutical company Sanofi in 2018 spent on Marketing and Sales 11.0 billion USD and for R&D 6.6 billion USD. The pharmaceutical company Roche in 2018 for R&D spent 10.8 billion USD and for Marketing and Sales 9.7 billion USD. The pharmaceutical company GSK in 2018 for Marketing and Sales spent 12.8 billion USD and for R&D 6.0 billion USD (See Figure 3 and Table 4).

№	Company	Marketing and Sales in billion USD in 2000	R&D in billion USD in 2000	Marketing and Sales in billion USD in 2018	R&D in billion USD in 2018
1.	Pfizer	11.4	4.4	8.7	7.7
2.	Novartis	10.9	4.6	9.0	8.5
3.	Sanofi	2.3	1.1	11.0	6.6
4.	Roche	9.0	4.1	9.7	10.8
5.	GlaxoSmithKline	16.0	3.8	12.8	6.0

Sources: (The 2018 Global Innovation 1000 study, 2005-2018) (Pfizer, Annual report, 2000) (Pfizer, Financial report, 2018), (Novartis, Financial report, 2000), (Novartis, Financial report, 2018), (Sanofi, Annual report, 2000) (Sanofi, Financial report, 2018), (Roche, Financial report, 2000), (Roche, Financial report, 2018), (GlaxoSmithKline, Financial report, 2000), (GlaxoSmithKline, Financial report, 2018).

Here I will analyze the expenditure on R&D by the industry sectors for the period 2005-2018. Also I consider the spending of the top 10 global companies in the world focused on R&D for 18 years. In this paper I analyze the Marketing and Sales expenditures of the global pharmaceutical companies for the period for 2000-2018 years. The accurate statistics are often missing so I have to estimate the expenditure on Marketing and Sales as well as on R&D.
I tried to focus on those companies in Hungary and in Kazakhstan where the appropriate data were available. In our detailed study I looked at a more detailed analysis only of the Hungarian and Kazakhstan pharmaceutical industries. Of course, I have also looked at some of the most important players in the world's pharmaceutical industry as well.
Also we cannot generalize the results, which are based on two companies, one representing Hungary, this is Richter Gedeon, which is still an independent Hungarian company and still has original drugs, where the patent is their own, and the other on is a Kazakhstan pharmaceutical company ChemPharm, which focuses on the production of generic drugs. Beside the market statistics, we are considering the regulation differences among the countries with special attention to Hungary and Kazakhstan.

«Big Pharma says this occurs because of the astronomical costs of developing a new drug. The truth is that US law allows drug companies to set the prices for drugs and protects them from free-market competition. Other countries set a limit on what companies can charge based on the benefit of the drug. The true cost of developing a drug is shrouded in mystery with many unverifiable figures reported by Big Pharma. Advertising instead of research: For each dollar spent on «Basic research» Big Pharma spends 19 USD on promotions and advertising in medical journals, internet, television, radio and in other instruments to attract the attention of consumers» (Llamas M, 2016).

«There are some challenges and «threats» within the industry. The first question is the sustainability of growth, but not less important the ever-increasing cost to bring new drugs to the market and the profitability loss because of the increasing marketing and R&D costs. The prices of the drugs vary in Europe and in different regions of the World. The uptake of new drugs to the market is slowing down and the patent expiration issues are harder than used to be in the past» (Rod M, Nicholas J, & Carruthers A, 2007).

1.7. The expenditure on R&D by pharmaceutical industry in 2005-2018 years

To understand the role of R&D in the pharmaceutical industry we have to compare it with other industries. We see in Figure 4 first is Pharmaceutical spent 180 billion USD on R&D in 2018, which was 90 billion USD in 2005. Computing and Electronics 170 billion USD in 2018 that shows an increase from 120 billion USD was spent in 2005. Also Software and Internet 165 billion USD was spent in 2018 and in 2005 it was 30 billion USD.

Auto industry spent 130 billion USD in 2018 and 70 billion USD in 2005. In 2018 Industrials spent 90 billion USD and 40 billion USD in 2005. In the last thirteen years there are changes but Pharmaceutical is the first most research concentrated in the world and second is Computing and Electronics (See Figure 4 and Table 5).
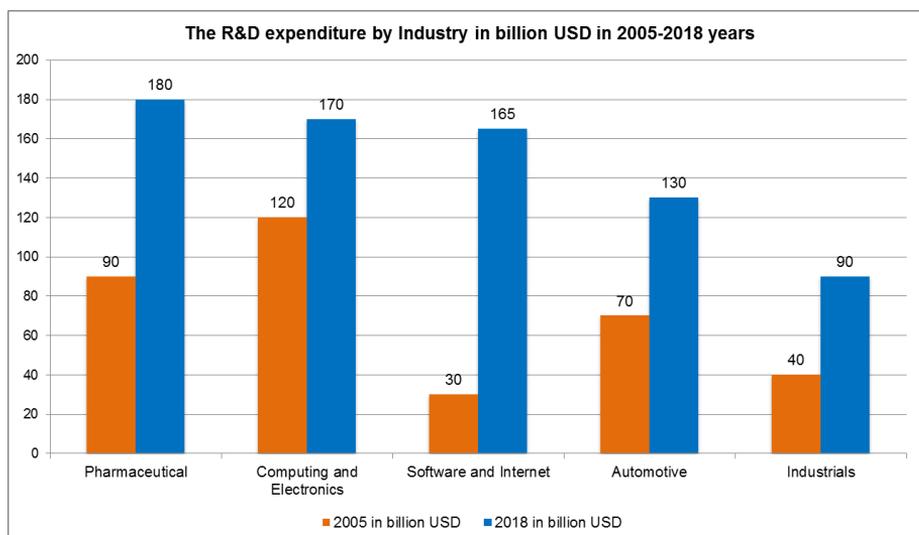
FIGURE 4. THE EXPENDITURE ON R&D BY INDUSTRY IN BILLION USD IN 2005-2018 YEARS
Source: (Tech&Innovation, 2005-2018).

TABLE 5. THE EXPENDITURE ON R&D BY INDUSTRY IN BILLION USD FOR 2005-2018 YEARS

Sector	2005 in billion USD	2018 in billion USD
Pharmaceutical	90	180
Computing and Electronics	120	170
Software and Internet	30	165
Automotive	70	130
Industrials	40	90

Source: (Tech&Innovation, 2005-2018).

As we see here in Table 6 among the most R&D oriented companies from the Top 10 five companies are Pharmaceuticals. In 2018 company Volkswagen (Automotive) took the lead with a significant increase in expenditure of 15.8 billion USD on R&D. Then Company Samsung (Computing&Electronics) comes with expenditure of 15.3 billion USD in 2018 on R&D, which is much more than in 2005. Company Microsoft (Software&Internet) in 2018 spent 12.3 billion USD on R&D. The pharmaceutical company Roche in 2018 spent 10.8 billion USD on R&D, which significantly increased in comparison with 2005. The pharmaceutical company Novartis in 2018 spent 8.5 billion USD on R&D. The pharmaceutical company Pfizer spent 7.7 billion USD (See Table 6 below).

Source: (The 2018 Global Innovation 1000 study, 2005-2018).

№	Company	Country	Sector	R&D in billion USD in 2005	R&D in billion USD in 2018
1.		Germany	Automotive	4.7	15.8
2.	SAMSUNG	South Korea	Computing and electronics	4.3	15.3
3.	Microsoft	USA	Software& Internet	7.8	12.3
4.	Roche	Switzerland	Pharmaceutical	4.1	10.8
5.	NOVARTIS	Switzerland	Pharmaceutical	4.2	8.5
6.	Pfizer	USA	Pharmaceutical	7.7	7.7
7.	GM	USA	Automotive	6.5	7.3
8.	Daimler	Germany	Automotive	7.0	7.1
9.	SANOFI	France	Pharmaceutical	9.3	6.6
10.	gsk GlaxoSmithKline	UK	Pharmaceutical	5.2	6.0

Automotive company General Motors in 2018 spent 7.3 billion USD on R&D. Also company Daimler spent 7.1 billion USD for R&D. The pharmaceutical company Sanofi spent 6.6 billion USD for R&D but in 2005 was the first with 9.3 billion USD for R&D expenditure. The pharmaceutical company GSK in 2018 spent 6.0 billion USD for R&D. But these are only slight changes and the pharmaceutical industries still keep their position among the most innovative companies.

1.8. Dynamics of production and the share of exports of pharmaceutical products of Hungary in 2001-2017 years

As we see in Diagram 1 Hungary's production of pharmaceutical products shows a dynamic growth from 98 USD per capita in 2001 348 USD per capita

in 2017, but it has reached this level in 2012 already. Basically from 2012 the production level was not really increasing, the changes coming mainly from the HUF/USD exchange rate (See Diagram 1).
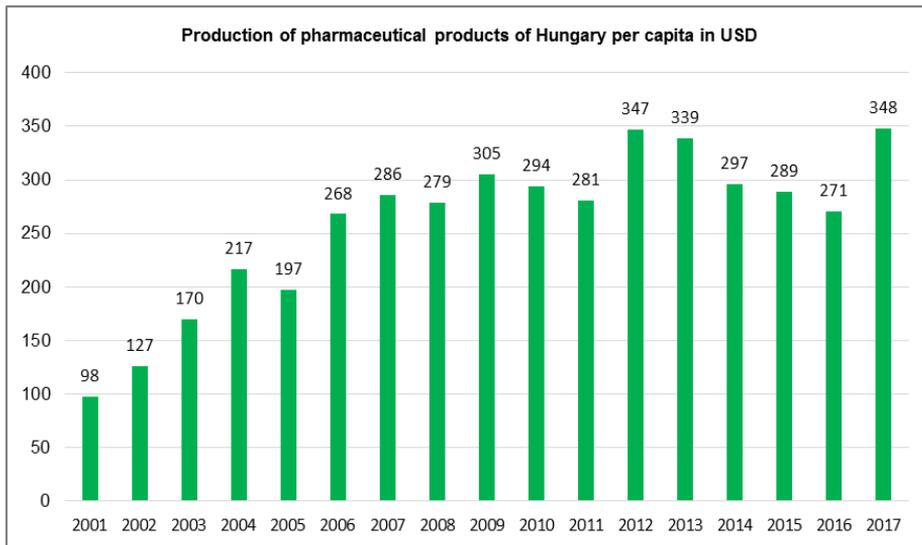
DIAGRAM 1. PRODUCTION OF PHARMACEUTICAL PRODUCTS OF HUNGARY PER CAPITA IN USD IN 2001-2017 YEARS

Source: (Hungarian Central Statistical Office, 2001-2018).

The pharmaceutical industry of Hungary is traditionally an important branch of the Hungarian economy. This sector is strongly export-oriented, and the only one which could maintain high R&D activities during the transition period, and only this was able to keep a relatively high investment level in the field of R&D. In Hungary the chemical and pharmaceutical industry is traditionally strong. This is because of the early specialization of the market during the Soviet period and the good tradition of the higher education in the field of chemistry. Some Hungarian chemists and physiologists got a Nobel prize for their discoveries, like Albert Szentgyörgyi 1937, György Hevesi 1943, György Békési1961, János Polányi 1986, János Oláh 1994. Although the majority of them got the Nobel prize not in Hungary, they studied or worked in Hungarian Universities in part of their life. Hungary invested a lot in this field for education and research. Organic and biochemistry is one of the success fields. Hungary has four medical universities and all of them are very successful even internationally. Chemical institutes at several Hungarian

universities are equally important in developing new drugs. This creates a solid basis for the pharmaceutical industry to develop original products.

High rates of economic development of Hungary were largely achieved through foreign capital investments. Over the past 18 years all major pharmaceutical companies have been privatized. Large stake in Chinoin (Sanofi-France), EGIS (Servier-France), Biogal (Teva-Israel) Human (Novopharma-Canada) was purchased by foreign drug manufacturers. Richter Gedeon was privatized through an international private placement on the Budapest stock exchange (Market of pharmaceutical products in Hungary, 2015).

In Figure 5 we observe the pace of development of pharmaceuticals in Hungary. The production volume in 2017 amounted to 33.9 million USD from 10.0 million USD in 2001. In Forint the dynamic increase in the production of pharmaceutical products is even more obvious. Export of pharmaceutical products shows a dynamic growth of up to 52.0 million USD from 4.1 million USD in 2001. Export-oriented producers of Hungary are Richter Gedeon, Egis, Sanofi, Teva, and others (See Figure 5).
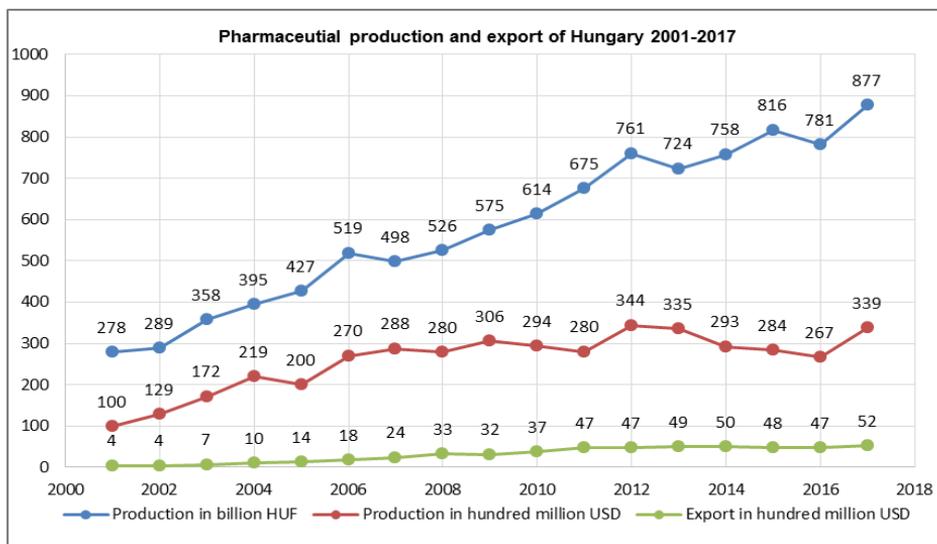
FIGURE 5. DYNAMICS OF PRODUCTION AND EXPORTS OF PHARMACEUTICAL PRODUCTS OF HUNGARY IN 2001-2017 YEARS

Sources: (Hungarian Central Statistical Office, 2001-2018), (Trade statistics for international business development, 2001-2018).

It should be noted that in Hungary the market of pharmaceutical products is small, because of this the export takes a huge share of production. Hungary mostly exports pharmaceutical products to Europe, USA and CIS countries in the following areas: cardiological, psychoneurological, dermatological, gynecological, antifungal, antihistaminic, gastroenterological, and antiallergic and others.

2. Analysis of the threats and opportunities of the Kazakhstan's pharmaceutical business

2.1. Dynamics of production and the share of exports of pharmaceutical products of Kazakhstan between 2001-2017

In Diagram 2 we see production of pharmaceutical products per capita that shows 11.4 USD in 2017 after increasing to 14.0 USD in 2013, but decreasing 6.2 USD in 2015. The decrease is due to the volume of production of vitamins and antibiotics as well as syringes used in medicine (See Diagram 2).
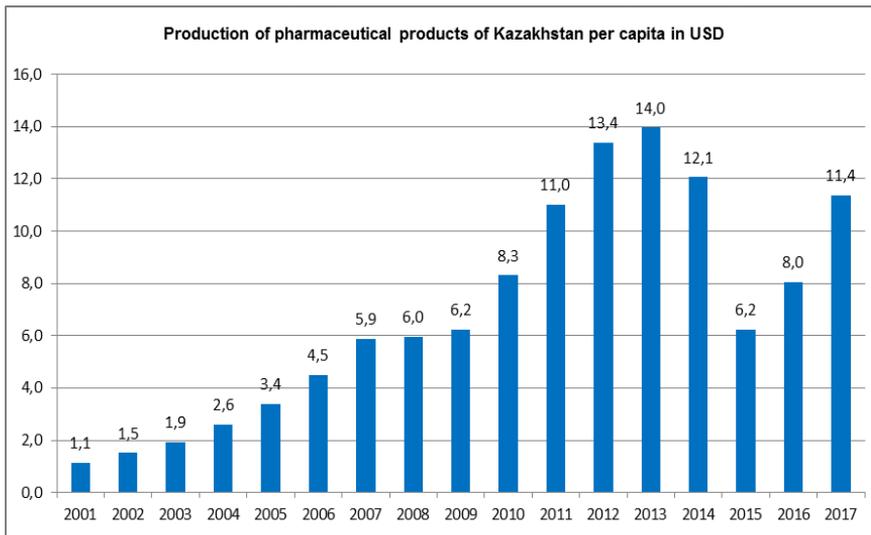
DIAGRAM 2. PRODUCTION OF PHARMACEUTICAL PRODUCTS OF KAZAKHSTAN PER CAPITA IN USD BETWEEN 2001-2017 YEARS

Source: (Committee on Statistics Ministry of National Economy of the Republic of Kazakhstan, 2018).

The Kazakhstan pharmaceutical industry is more focused on the domestic market to meet the domestic demand in pharmaceutical products through

domestic producers by attracting foreign investment. This is a task related to the high import of medicines, which is 78% (in value terms). Pharmaceutical industry of Kazakhstan is divided into two categories of production: 1) manufacture of basic pharmaceutical products - 12 producers; 2) pharmaceutical preparations – 65 manufacturers.

The main producers of pharmaceutical products are: Joint-stock company Chempharm-Polpharm merger with a major Polish pharmaceutical company Polpharm, Joint-stock company Almaty pharmaceutical factory - Nobel with the Turkish company Nobel, GlobalPharm - AbdiIbrachim joint production with the Turkish company AbdiIbrachim, Karaganda Pharmaceutical Complex with the Russian company Pharmstandart, KazPharm-Kelun in conjunction with the major Chinese company Kelun and other companies.

In Figure 6 we see the dynamics of the development of pharmaceutical products in Kazakhstan from 17.0 million USD in 2001 to 131.0 million USD in 2017. In 2015 a sharp declined to 110.0 million USD can be observed. If you look at the local currency KZT then it shows an increase to 43.5 billion KZT in 2017. Kazakhstan's production of pharmaceutical products is not export oriented, but is gradually gaining momentum in 2017 having increased compared to the previous year and amounted to 32 million USD. Mostly exported to Switzerland, Kyrgyzstan and Russia, other medicines, veterinary vaccines were sent to Russia and Kyrgyzstan for this period and clotting factors of blood of human origin were sent to Switzerland. Russia and Kyrgyzstan are the main export markets due to their geographical proximity to manufacturers of pharmaceutical products in Kazakhstan. The domestic pharmaceutical products are exported to other countries in small quantities (see Figure 6).
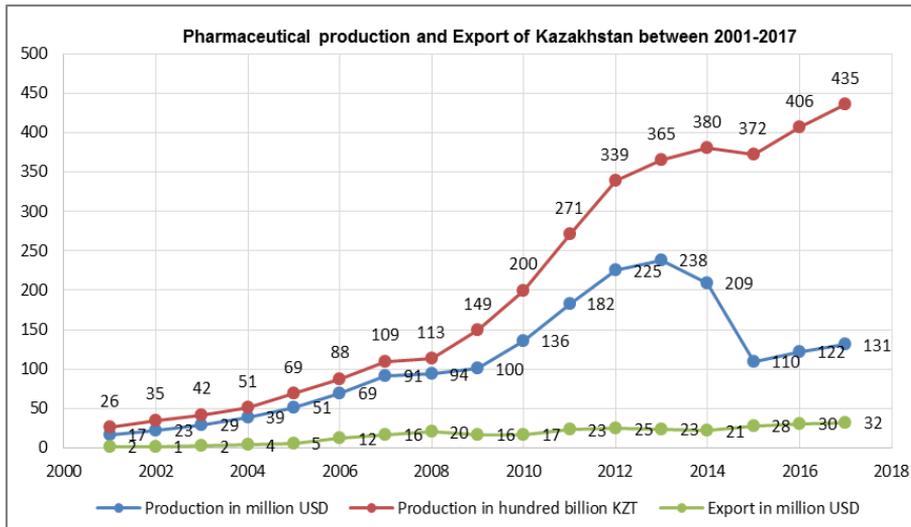
FIGURE 6. DYNAMICS OF PRODUCTION AND EXPORTS OF PHARMACEUTICAL PRODUCTS OF KAZAKHSTAN BETWEEN 2001-2017 YEARS

Sources: (Committee on Statistics Ministry of National Economy of the Republic of Kazakhstan, 2018), (Trade statistics for international business development, 2001-2018).

The main domestic pharmaceutical exporting companies are Chempharm (medicines), Dolce-Pharm (medical products), Almaty pharm factory-Nobel (medicines - antibiotics, antitussives and expectorants, cardiac funds), Global Pharm-AbdiIbrachim (gastroenterological drugs, drugs for the treatment of diabetes, anti-tuberculosis and retroviral drugs) (KIDI, Annual report, 2018).

The state has a significant impact on the promotion of domestic pharmaceutical production by providing a guaranteed market through a Distributor SK-Pharmacy.

State support measures provided by the National Company KAZAKH INVEST as part of the export development and promotion program Exporter-2020 provide financial support - grants to exporters, trade finance, insurance; as well as service support - providing information and expert services, providing manufacturers with marketing and analytical information on export markets, publishing instructional materials to help exporters, promoting trademarks of specific products, organizing trade missions of Kazakhstan abroad, creating a network of foreign representative offices of the Operator (KAZNEX INVEST, 2015).

Within the framework of promotion of Kazakhstani export to foreign markets 6 pharmaceutical companies were provided with service support:

1. Dolce - trade missions to the Republic of Latvia, Ukraine, Russia; international exhibitions in Turkmenistan, Vietnam; exhibition of the national stand in the Russian Federation;

2. Dosfarm - trade missions to the Republic of Latvia, the Kyrgyz Republic, the Russian Federation; international exhibition in Turkmenistan; exhibition of the national stand in Vietnam;

3. Chempharm - trade mission to Tajikistan; international exhibition in Turkmenistan; advertising and presentation event in Mongolia;

4. Global Pharm Abdi Ibrachem - trade mission in Belarus;

5. Kelun Kazpharm - trade missions in Russia, Tajikistan;

6. Nobel - advertising and presentation event in Russia, exhibition of the national stand in Vietnam.

2.2. The pharmaceutical market in Kazakhstan

The pharmaceutical market in Kazakhstan is the largest and most structured in Central Asia. At the same time, it is inferior to the market of Central and Eastern Europe in the context of its size and quality of the business environment. This review is based on the report prepared by the company UPharma Consulting healthcare (Review of the pharmaceutical market in Kazakhstan, 2017). Pharmaceutical market of Kazakhstan began to form in the mid-90's. In 1994 the supply of medicines was provided by the State Holding «Pharmacy», which owned 1.832 pharmacies. After the demonopolization of the Holding and the privatization of its pharmacies, the national drug supply system was destroyed. In 1996 the transformation processes were launched, which made it possible to translate the country's drug supply system into market relations. According to market operators, these transformation processes are still being implemented in Kazakhstan.

The pharmaceutical sector of the Republic of Kazakhstan accounts for less than 1% of real GDP: in 2004 its share was less than 0.97%, and in 2008 only 0.87%.

The share of the pharmaceutical industry in the volume of industrial production was 0.12 - 0.13% in the period from 2004 to 2007. In 2008, the share of the pharmaceutical industry fell to 0.1% per year due to the outstripping growth of prices for manufactured goods and the volume of pharmaceutical production.

High economic growth and increasing purchasing power of the population in recent years has provided a significant increase in sales of pharmaceuticals and health care costs in the country. But despite impressive growth dynamics (in the period from 2010 to 2014 the market grew by an average of 14.3%), the contribution of the pharmaceutical industry to the country's GDP remains rather low due to the weak market base. In 2015 the pharmaceutical industry accounted for 0.08% of GDP.

To date the pharmaceutical market of Kazakhstan is among the most developed in the CIS. Here you can observe the strengthening and development of vertically integrated organizations among local producers, distributors and pharmacies along with improving the culture of service.

Kazakhstan market of pharmaceutical products is developing very fast, but unfortunately, due to import content. The pharmaceutical market in Kazakhstan is almost 78% import, despite the annual growth rates of production of pharmaceutical products.

In 2016 the pharmaceutical market in Kazakhstan showed a positive growth dynamics in national currency. In dollar terms, the indicator was less in comparison with 2015 due to the instability of the exchange rate (see Figure 7 below).
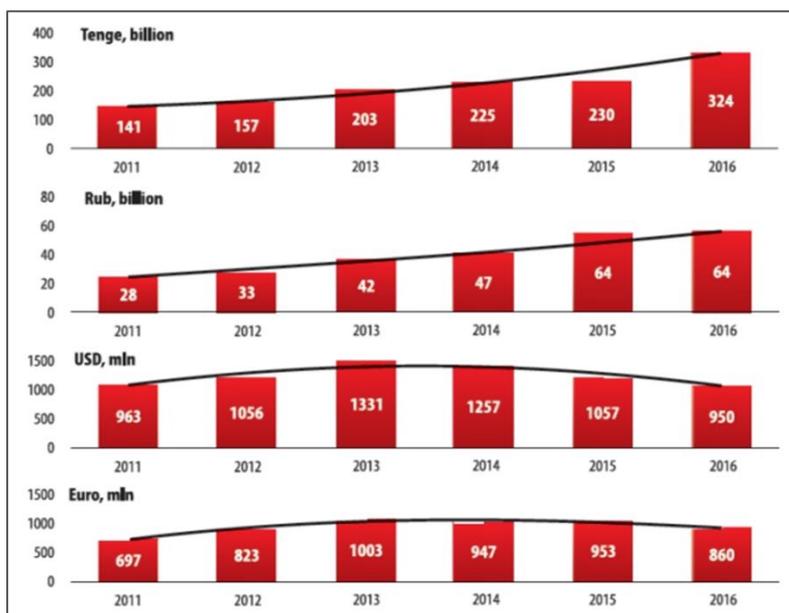
FIGURE 7. THE DYNAMICS OF THE GROWTH OF THE PHARMACEUTICAL MARKET FOR THE PERIOD 2011-2016 YEARS

Source: (Consulting Group "Vi-ORTIS", 2018).

Pharmaceutical industry in Kazakhstan is heavily dependent on imports of pharmaceutical raw material (substances), equipment and packaging materials. The dominant position of generic drugs in the Kazakhstan market allegedly linked to the lack of conditions for the creation of innovative products. The bulk of the consumption drugs in Kazakhstan generic - about 90%, and the market of original drugs is no more than 8-10%, so that the production of generic drugs is the most attractive for increasing the share of domestic producers.

Production of drugs develops slowly, over seventeen years, the share of domestic producers of medicines on the market in money terms has increased from 3% to 12%. Pharmaceutical companies in Kazakhstan produce no more than 12% in value of the volume of medicines consumed in the republic.

The pharmaceutical industry, as a developing industry, presented a total of 77 companies - pharmaceutical manufacturers, including small manufacturers of medical products. The share of 6 largest factories accounts for over 90% of all drugs produced in Kazakhstan in terms of money. ChemPharm - Santo, AbdiIbrahim GlobalPharm, Nobel Almaty Pharmaceutical Factory, Karaganda biopharmaceutical complex - Pharmstandart, Nur-MaiPharm,

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Kelun KazPharm, Vivapharm, Eleas, Sultan companies and others. Kazakhstan pharmaceutical industry provides 30% of national health care drugs in physical terms.

Diagram 3 in 2017 the growth in production amounted to 43.5 billion KZT and in 2016 was 40.6 billion KZT. The increase in pharmaceutical production in 2017 was due to the state procurement of medicines and medical products within the guaranteed volume of free medical care (See Diagram 3).
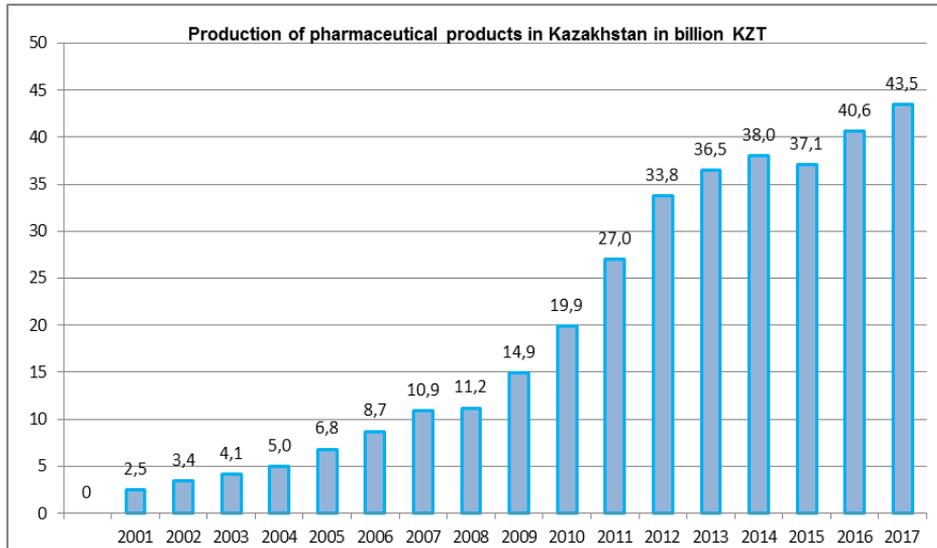
DIAGRAM 3. PRODUCTION OF PHARMACEUTICAL PRODUCTS IN KAZAKHSTAN IN BILLION KZT BETWEEN 2001-2017 YEARS

Source: (Committee on Statistics Ministry of National Economy of the Republic of Kazakhstan, 2018)

More than 80% of pharmaceutical products are produced in Southern Kazakhstan and Almaty, while the shares of other regions are insignificant (below Map 1).
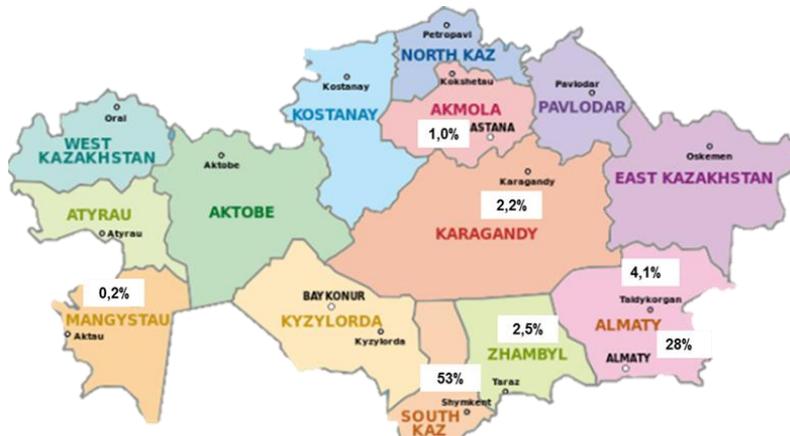
Source: (Aequitas Law Firm, Healthcare, Medicine and Pharmaceuticals, 2017).

Since 2001 exports in the Figure 8 have increased from 1.7 million USD to 34.9 million USD by 2018. The main domestic pharmaceutical exporting companies are Chempharm (medicines), Dolce-Pharm (medical products), Nobel Almaty Pharmaceutical Factory (antibiotics, antitussives, expectorants and cardiac agents), Abdi Ibrahim Global Pharm (gastroenterological drugs, drugs for the treatment of sugar diabetes, antituberculous and retroviral drugs) (see below Figure 8).
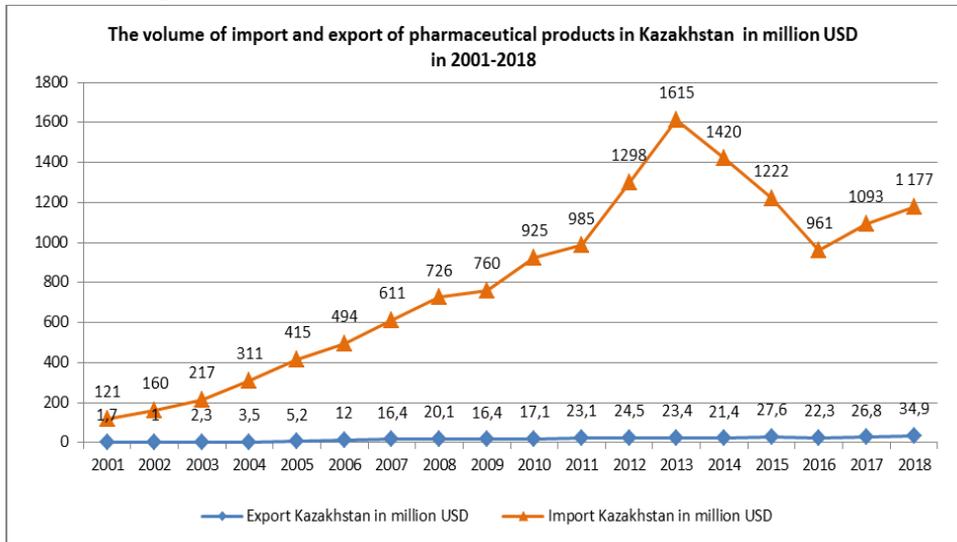
FIGURE 8. THE VOLUME OF EXPORT AND IMPORT OF PHARMACEUTICAL PRODUCTS IN KAZAKHSTAN IN MILLION USD IN 2001-2018 YEARS

Source: (Trade statistics for international business development, 2001-2018).

The import of pharmaceutical products in 2018 amounted to 1.177 million USD. The main suppliers of pharmaceutical products for this period were Germany (17%), Russia (13.5%), France (9.3%) and India (6.1%). During this period, most of these medicines were imported from these countries; Hemoglobin, blood globulins and serum globulins; other blood fractions and immunological products; other vaccines, toxins, cultures of microorganisms. Despite the existing programs on import substitution, there have been no significant changes in the volumes of exports and imports. Currently, the Pharmaceutical Industry is unable to cover the entire demand for many expensive, original and brand-name drugs of foreign origin.

The pharmaceutical market of the Republic of Kazakhstan consists of two large segments - retail market and the public procurement sector (which provides patients with drugs in hospitals and at the outpatient level).

2.3. The hospital market in Kazakhstan

A significant part of the hospital market in Kazakhstan (67% in monetary terms in 2015) belongs to the single distributor of SK-Pharmacy, established in 2009 to purchase medicines and medical equipment for their healthcare facilities within the guaranteed volume of free medical care. In 2013, 100% of the company's capital was transferred to the Ministry of Healthcare of the Republic of Kazakhstan.

The main activities of the Single Distributor: organization of open tenders for drug procurement within the guaranteed scope of free medical care, of storage of drugs in accordance with the requirements of proper distribution practices and legislation of the Republic of Kazakhstan, of logistics processes of medicines and medical devices in state medical organizations, creation of an information system for the integration of logistics processes of a single distributor, the customer and suppliers, as well as for obtaining up-to-date information on turnover, commodity balances.

State support is one of the main stimulating supports for pharmaceutical manufacturers in Kazakhstan, as public procurement accounts for 45% of the total market. In 2018 Kazakhstan companies formed 29% of the hospital market. They were followed by companies from Germany 14%, France 10%, Ireland 7% USA 5%, Italy 4%, India, Switzerland, Austria, Denmark 3%.

From 915 purchased medicines and medical products 463 are of Kazakhstan production. Below Figure 10 there is an increase in the volume of purchases of a Single Distributor from 31.3 billion KZT in 2010 to 200.2 billion KZT in 2018 (preliminary data) (See Figure 9).

Purchase of pharmaceutical products of the Single Distributor SK-Pharmacy in billion KZT
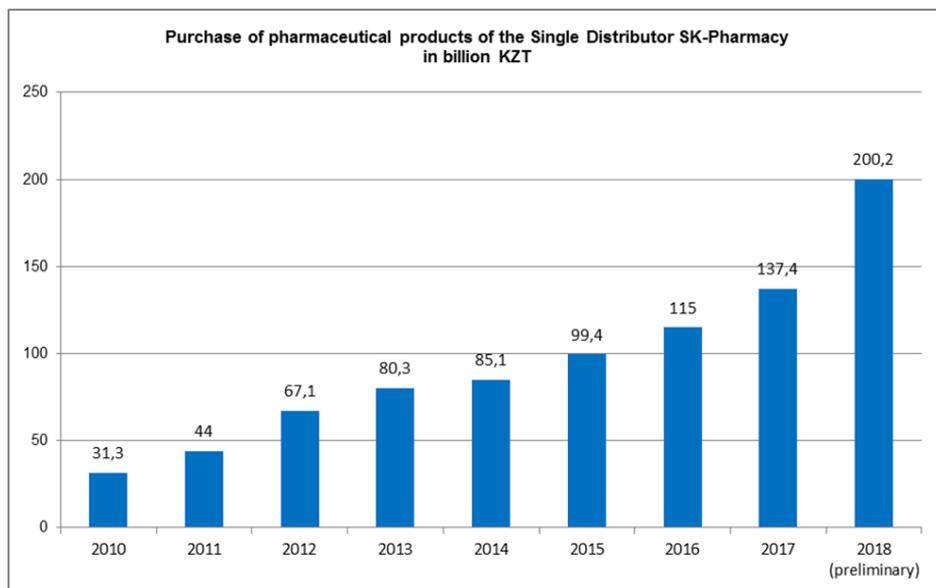
FIGURE 9. PURCHASE OF PHARMACEUTICAL PRODUCTS OF THE SINGLE DISTRIBUTOR SK-PHARMACY IN PERIOD 2010-2018 YEARS

Source: (Single Distributor "SK-Pharmaceuticals", 2018).

In the structure of public procurement of medicines and medical products, the leaders are vaccines against diphtheria, tetanus, whooping cough, hepatitis B, poliomyelitis and hemophilia; pneumococcal vaccines; Pentaxim, a vaccine for the prevention of diphtheria and tetanus adsorbed; lyophilizate for the preparation of a solution for infusions; antitumor drugs; preparations for the treatment of diseases of the digestive tract and metabolic disorders; preparations for the treatment of hemophilia A; drugs for the treatment of tuberculosis of various forms and localizations; preparations for the treatment of chronic hepatitis C; antiviral drugs for the treatment of HIV infection; means for treating multiple sclerosis; preparations for the treatment of diabetes mellitus.

Among the top 20 leading drugs in terms of the value of public procurement only 4 are domestic drugs:

- Immutin - antitumor drug, producer Nobel Almaty Pharmaceutical Factory (2.5 billion KZT);

- Capreomycin sulfate - powder for solution for injection, manufacturer of Chempharm-Santo (2 billion KZT);

- Duolazide - antiviral drug for HIV infection, producer AbdiIbrahim - Global Pharm (1.9 billion KZT);

- Cycloserin is an antibiotic produced by AbdiIbrahim - GlobalPharm (1.3 billion KZT).

Purchases of medical products from domestic manufacturers are also carried out: Dolce (a set of medical products for examination, surgical suits, gloves), Brando (surgical gloves, syringes), Juldyz Kenan Co., Ltd. (catheters), Super Pharm (bandages, medical examination kit, surgical clothing), Almerek (test tubes for blood products, blood collection tubes, scarifier, therapeutic spatula), Ecopharm International (medical needles, vacuum test tubes for hemostatic system examination) (Single Distributor "SK-Pharmaceuticals", 2018).

The main therapeutic directions for public procurement were malignant neoplasms, hemostasis disorders and diabetes mellitus. In addition, the expenditure on the treatment of tuberculosis, fermentopathy and diseases caused by the formation of blood clots in the vessels increased.

The main players in public procurement are Chempharm - purchase of 79 molecules, BaxterAG - purchase of 7 molecules, Nobel Almaty Pharm. Factory - purchase of 40 molecules, F. Hoffmann LaRocheAG, Sanofi-Aventis, AbdiIbrahim GlobalPharm (KIDI, Annual report, 2018), (Single Distributor "SK-Pharmaceuticals", 2018).

Within the framework of the State Program for Forced Industrial and Innovative Development of the Republic of Kazakhstan and the Sectoral Program for the Development of the Pharmaceutical Industry of the Republic of Kazakhstan for 2010-2014, the main instrument of state support for the pharmaceutical industry of the Republic to ensure the market for products is the conclusion of long-term contracts by the Single Distributor SK-Pharmacy of the Ministry of Health of the Republic of Kazakhstan with investment projects that carry out the construction, modernization and reconstruction of enterprises in accordance with European GMP quality standards (KIDI, Annual report, 2018).

From 2009 to the present, a Single Distributor of SK-Pharmacy concluded 31 long-term contracts with 19 domestic manufacturers of pharmaceutical products for the supply of 765 medicines and medical products. A Single

Distributor provides 1892 medical organizations within the guaranteed scope of medical care. There are 9 main warehouses in the republic and 13 transit warehouses. (Single Distributor "SK-Pharmaceuticals", 2018).

In addition to the Single Distributor, in Kazakhstan there are also financing outpatient, hospital and price tenders at the expense of regional budgets, which forms the outpatient sector of the market (about 30% of the hospital market).

In the context of the incidence rate, respiratory diseases amounting to 28%, diseases of the digestive organs - 8.4%, circulatory system - 7.2%, the genitourinary system - 6.8%, and infectious-parasitic diseases - 6% have the largest proportion. According to statistics (Ministry of HealthCare of the Republic of Kazakhstan, 2017), the main cause of death is cardiovascular disease, 51.9% (as in the rest of the world), namely, myocardial infarction, coronary heart disease, cerebral vascular lesions (strokes). And this despite the fact that annually newest drugs are produced for treating these diseases and are offered to patients free of charge within the framework of guaranteed free provision (100% reimbursement), despite the fact that cardiosurgical centers are opened in each regional center and quota operations are carried out (free of charge). Hence, the need for these drugs and surgical interventions is not yet satisfied (Ministry of HealthCare of the Republic of Kazakhstan, 2017).

2.4. The retail drugs market in Kazakhstan

In Kazakhstan, there are about 25 foreign pharmaceutical companies and 24 domestic pharmaceutical companies. For today, domestic companies produce medicines, antibiotics and medical products. In 2016 Kazakhstan registered 7483 names of medicines. About 14% of them came from India, 10% from Kazakhstan and 9.8% from Russia. 41% of registered drugs had a solid dosage form, and 23% - a liquid form. In the retail market there are 5 main cities of Kazakhstan: Almaty, Karaganda, Astana, Shymkent, Aktobe. Among other cities, the pharmaceutical market in Almaty significantly increased in terms of sales of pharmaceutical products by 31% (37.6 million USD). According to the dynamics of sales, Astana and Shymkent city lag behind competitors of Karaganda, Aktobe, especially Astana, practically without growth of market capacity (Consulting Group "Vi-ORTIS", 2018).

In the country there are about 7 thousand pharmacies. The largest pharmacy chain in Kazakhstan is part of the company «Amanat» and includes 3

pharmacy supermarkets and 32 pharmacies in Karaganda, Pavlodar, Astana, Balkhash and Temirtau. Most foreign pharmaceutical companies operate in Kazakhstan through representative offices or through local distributors.

At the end of 2016, the total market of medicines in the total value (USD) decreased by 18% compared to the same period of the previous year. In quantitative terms, on the contrary, there was a positive increase of 13%. The outpatient clinic showed a 27% drop in monetary terms, occupying 14% of the market share, and increased by 63% in quantitative terms compared to 2015. Analysis of the remaining sales channels showed the following: Single Distributor SK-Pharmacy - 30% drop in total terms and positive growth in packs by 2%. Retail channel takes the largest share of the whole market: 59% - in money and 86% - in packages. Considering sales of RX/OTC drugs, we see that both categories have reduced their value in the analyzed period. Moreover, in RX-drugs, the decrease is more significant than in OTC (see Figure 10).
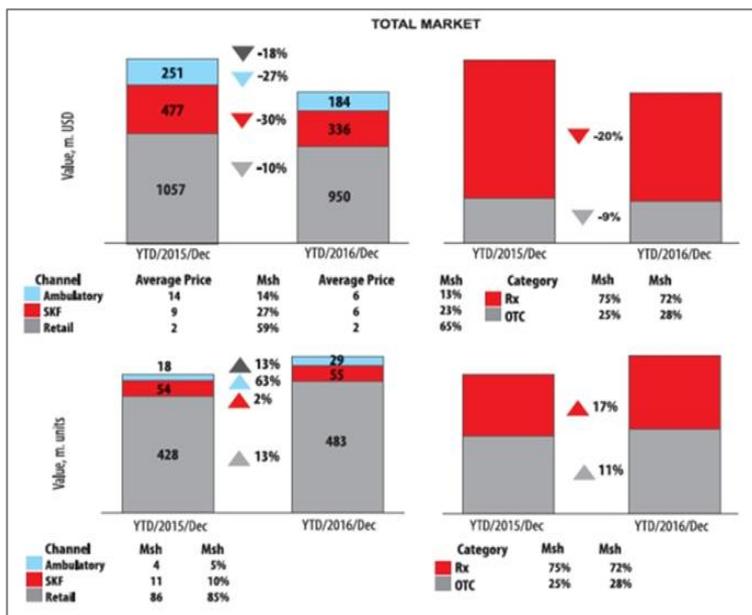
FIGURE 10. DEVELOPMENT OF THE PHARMACEUTICAL MARKET IN KAZAKHSTAN THROUGH CHANNELS AND CATEGORIES FOR THE PERIOD 2015-2016

Source: (Consulting Group "Vi-ORTIS", 2018).

2.5. Volumes of investments in the pharmaceutical industry in Kazakhstan

The volume of investments into the fixed capital of the pharmaceutical industry of the Republic of Kazakhstan in 2011 was 11.519.2 million KZT, which is 6.1% more than in 2015. In the structure of investments, the bulk is accounted for by own funds (77.7%) and borrowed funds (22.3%). The increase in investments in 2016 is because over the past three years, more than 8 pharmaceutical enterprises have been put into operation, including those with the participation of foreign capital. At the Kazakh pharmaceutical enterprises there is a planned modernization of existing facilities and the development of new competencies in the production sector (Committee on Statistics Ministry of National Economy of the Republic of Kazakhstan, 2018).

The pharmaceutical industry in Kazakhstan is underdeveloped, in view of the technological backwardness of the pharmaceutical industry. Nevertheless, the pharmaceutical industry is considered one of the most attractive areas for investment in the world, because of its great profitability. The specificity of Kazakhstan lies in the fact that the domestic pharmaceutical industry is lagging in comparison with the world players, even in comparison with the partners in the Eurasian Economic Union, Russia and Belarus. As a result, the pharmaceutical industry needs constant stable growth in investment activity, since the industry is capital intensive and requires constant support from large investors.

Over the past 10 years foreign investments have been attracted, which accelerated access to advanced technologies: Polpharma-ChemPharm (Poland), Ulkar Holding-Nobel (Turkey), AbdiIbrahim-GlobalPharm (Turkey), Pharmstandard-Karaganda pharmaceutical complex (Russia), Sichuan Kelun Pharm-KelunKazPharm (China). Attraction of investment in the pharmaceutical market in Kazakhstan will lead to further obtaining technological and personnel competencies for the production of innovative products.

It is the world's producers that allow expanding the assortment and improving the quality of manufactured domestic products. All innovative developments

in the production of new types of pharmaceuticals are carried out by the world's leading pharmaceutical manufacturers, as they require significant financial investments and a competent scientific research base.

2.6. State support measures for the pharmaceutical industry in Kazakhstan

One of the instruments to increase the volume of pharmaceutical products, as well as their withdrawal to foreign markets is the provision of state support to pharmaceutical enterprises through the provision of financial support, grants, business incubation services, public procurement, etc.

The National Manager of Baiterek Holding supports sustainable development of the economy of the Republic of Kazakhstan by providing financial support to priority sectors of the economy; supports small and medium-sized enterprises; and also supports the export activities of Kazakhstani enterprises. Development institutions that are part of the Holding's structure participate in the financing, investment and export support of major projects and enterprises, implement the State Program for Industrial and Innovative Development for 2015-2019, and also support the development of innovative activities. Below is information on the support measures provided in 2016 by the following institutions of the holding: the Development Bank of Kazakhstan, the Damu Enterprise Development Fund and the National Agency for Technological Development.

The Development Bank of Kazakhstan provides medium/long-term loans to investment projects and export operations, lending to current activities, intermediate and mezzanine financing, financing of leasing transactions, and provision of guarantees. As part of the implementation of investment projects under the State Program for Industrial and Innovative Development for 2015-2019, the enterprise was supported by the Almaty pharmaceutical factory Nobel (opening of additional production workshops), Chempharm (construction of new workshops, modernization, repair of existing equipment, buildings and structures, purchase of equipment, spare parts and components), Kazakhstan pharmaceutical company Medservis Plus (purchase and installation of equipment for the production of medicinal products and additional works on manning the plant and bringing it to launch) in the form of a loan of 3.8 billion KZT.

The Enterprise Development Fund «Damu» provides lending, subsidizing and guaranteeing loans for business, financing leasing transactions, granting grants for innovative business ideas. As part of the implementation of the program, the Business Road Map 2020 in 2016 provided subsidies to the 9 pharmaceutical companies Dolce-Pharm for the purchase of new equipment, the Super Pharm for replenishment of working capital, production of honey, appointments and their realization and production of single-use products, Abdi Ibrahim – Global Pharm for the construction of a drug manufacturing plant, Almerek for the purchase of new equipment, KazMedProm for the production of medical sterile and non-sterile gloves, Seyitbek Juleti for the purchase of licorice root, TIN company for the purchase of medical equipment on the production of bottling of finished products - antiseptics ("Damu" Entrepreneurship Development Fund, 2017).

The National Agency for Technology Development provides state support to pharmaceutical enterprises through such support tools as innovative grants, project financing, financing through venture funds, provision of technology business incubation services, design office services, and provision of services from international technology transfer centers. In 2016, NATD provided innovative grants to only two pharmaceutical companies: the International Research and Production Holding «Phytochemistry» for the commercialization of technologies (The National Agency for Technological Development of the Republic of Kazakhstan).

The National Agency for the Development of Local Content «NADLoC» provides service support by reimbursing part of the cost of product certification and quality management systems in accordance with international standards (API, ASTM, GMP, EN), permitted for use in the territory of the Republic of Kazakhstan in accordance with the procedure established by law and entered in the register of the state system of technical regulation. In 2016 NADLoC provided state support to Sultan and EcoPharm International for a total of 3.9 million KZT (The National Agency for the Development of Local Content "NADLoC", 2018).

The National company KAZAKH INVEST provides financial support in the framework of the Export Development and Export Development Program - grants to exporters, trade financing, insurance; as well as service support - providing information and expert services, providing manufacturers with marketing and analytical information on export markets, publishing instructional materials to help exporters, promoting trademarks of specific

products, organizing trade missions of Kazakhstan abroad, creating a network of foreign representative offices of the Operator. In 2016 within the framework of reimbursing a part of the costs of subjects of industrial and innovative activities to promote domestic processed goods, 6 pharmaceutical companies (ChemPharm - Santo, Nobel Almaty Pharm. Factory, Kelun - KazPharm, Dosfarm, Viva Pharm, Juldyz Kenan Co.LTD)were provided with state support to the amount of 30.5 billion KZT (The National company KAZAKH INVEST, 2016).

The list of enterprises that implemented the GMP standard, from 2008 to the current period of 2017. International GMP certificate – «Good manufacturing practice» - is a set of rules for the production of high-quality and safe products, such as medicines, medical equipment and medical devices. The rules prescribe the requirements for the work of pharmaceutical production:

• to personnel, equipment and premises;
• to keeping records;
• to the organization of quality control;
• on contracts for the production of products;
• for analysis and sampling;
• dealing with complaints and recall procedures;
• packaging and labeling of active pharmaceutical substances and intermediates;
• to storage and sale of finished products, etc.

The availability of an international GMP certificate from pharmaceutical companies is one of the main factors in the export of pharmaceutical production, which guarantees compliance with the necessary conditions and requirements for the production of products.

Of the 24 domestic pharmaceutical manufacturers, 12 have an international GMP certificate (Nobel Almaty Pharmaceutical Factory, ChemPharm-Santo, VivaPharm, FitOleum, Eykos - Pharm, Kelun KazPharm, Eleas, DosPharm, TKPharm Aktobe, AbdiIbrahim - GlobalPharm, Nur-Mai Pharmacy, Lekos) which corresponds to 17 production sites. In the structure of domestic pharmaceutical enterprises, the proportion of those who received the GMP certificate is 15% (Ministry of HealthCare of the Republic of Kazakhstan, 2017).

One of the factors impeding the active transition of domestic pharmaceutical enterprises to the international standards of GMP is the insufficient number of engineering companies involved in the construction of premises, complexes,

factories for the manufacture of pharmaceuticals and medical products in accordance with international standards. Training specialists in the pharmaceutical industry should be conducted with knowledge of GMP standards. The training of pharmaceutical process engineers with knowledge of GMP standards would facilitate the work of the pharmaceutical complex after the introduction of the international standard of GMP and in the future would allow the creation of competitive production. To assist domestic companies in moving to international GMP standards, it is necessary to develop an effective mechanism for the full or partial return of funds invested in obtaining GMP standards. It is also worth noting that the GMP certificate is issued for a production site for a period of not more than three years, which in the future must be received repeatedly, with the passage of all necessary procedures (KIDI, Annual report, 2018).

In addition, other international standards included in the GXP are actively being introduced in Kazakhstan, which establish requirements for the production, transportation, storage and sale of pharmaceutical products. In accordance with the Code of the Republic of Kazakhstan «On the Health of the People and the Health System» of April 6, 2015, from January 1, 2018, compliance with the requirements of the GXP standards will be mandatory for the entities of the pharmaceutical market. GXP standards include:

- GLP (Good Laboratory Practice);
- GCP (Good Clinical Practice);
- GMP (Good Manufacturing Practice;
- GDP (Good Distribution Practice);
- GPP (Good Pharmacy Practice);
- GVP (Good Value Pharmacy) - good pharmacovigilance practice.

Compliance with the above standards will make it possible to move from a quality system of finished products to a quality assurance system and guarantee the provision of the population with safe and effective medicines. The receipt by pharmacists of these certificates will ensure the population of the country with quality, safe and effective medicines. So, domestic pharmaceutical manufacturers from January 1 2018, must necessarily receive international certification, because the availability of this standard will provide access to the Kazakhstani pharmaceutical market.

To date, more than 26 pharmaceutical companies in Kazakhstan have implemented the GDP (proper distribution practices) standards; 23 pharmacies implemented GPP standards (good pharmacy practice), which are

also valid for not more than 3 years (Ministry of HealthCare of the Republic of Kazakhstan, 2017).

A preliminary plan for the phased introduction of standards of proper pharmaceutical practices by GXP has been formed by entities in the sphere of circulation of medicines, medical devices and medical equipment.

When implementing international standards GXP, pharmaceutical companies need to make a decision to implement a quality management system; to conduct an analysis of enterprises on the possibilities of developing a system; decide on the implementation methods and the development stages of the GXP standards; conduct training by specialized centers for the preparation or retraining of the company's management and specialists to the requirements of GXP standards taking into account the recommendations of international pharmaceutical communities; to design or re-design premises, storage areas, equipment and systems that support the life of enterprises, including temperature compliance; conduct training and on-site training, update all documentation; conduct a pre-inspection or final audit of the management system with a description of the whole process; submit applications to the authorized body to conduct an inspection with subsequent issuance of an opinion on the compliance of the GXP.

There are various ways to implement GXP standards, such as involving employees of an enterprise trained in quality standards; acceptance into the company staff of an employee with experience of implementing GXP in another enterprise; attracting a consulting company for the entire project period; purchase of a one-time service, i.e. the standard is implemented by the company itself, but the external consultant trains management and staff, assists the quality manager in selected issues, trains and conducts training of internal auditors, accompanies certification audit, etc.

In accordance with the standards GXP requires well-trained and qualified personnel. The organization of training for compliance with GXP standards leads to numerous operational advantages in the form of fewer errors in work, less waste and more efficient productivity. Every employee involved in the production, packaging, storage, transportation of any drug must be trained within the standard to obtain long-term benefits.

Enterprises, educating their employees, inform them about the benefits and methods of compliance with GXP standards.

Highly qualified employees are an integral part of GXP standards. The requirements for the qualification, training and development of all employees involved in the work must be fulfilled in order to ensure the effectiveness of the assigned tasks in accordance with their positions. To achieve this goal, training courses are conducted, adapted to the work of each employee. This training program should not be limited to an introductory program, but periodically conducted to support the knowledge of employees at the required level.

Thus, the use of GMP standards in the production of pharmaceutical products guarantees the high quality of medicines manufactured in Kazakhstan and increases the competitiveness of the domestic pharmaceutical industry in external markets. The introduction of the international standard of GMP at pharmaceutical enterprises in Kazakhstan will help to increase the output of manufactured products, as well as the free promotion of domestic medicines to external markets.

3. The Q methodology used for empirical investigation

3.1. Exploring expert opinions on the Kazakh's healthcare industry, using Q methodology

Today I am more interested in what the reason is, why people - even the professionals - think about the so-called objective reality so differently. In the pharmaceutical and healthcare sector, I have also found that opinions are even more subtle, such as whether the patient can choose what drugs to take, or he must accept medications that are supported by health insurance? There are very different opinions about the advertising of medicines as well. There are some people who are very positive about advertisement, and there are others who are criticizing it because they are aware, that the advertisements are the main driving force behind the growth of the consumption of pharmaceuticals. During my research, it became clear to me that I was more interested in subjective opinions. At the beginning of my research I was trying to rely on the so-called objective, professional opinions. The roots of my starting interest were my job experiences in my ministerial work. The second, not less important reason behind my new research orientation, that for a broad, rational

questionnaire survey I did not have any financial resources, we had to look for a method that could be used with little financial resources and more personal involvement and could reliably prove my hypotheses. I chose the Q method at the advice of my supervisor Professor Sándor Kerekes.

3.2. The mathematical roots of Q methodology (based on (Comrey A & Lee H, 2013)

The method was developed by William Stephenson, a physicist who in 1926 obtained a PhD from physics, and in 1929 from psychology when his mentor was Charles Spearman. Spearman is well-known to all the scientists because of the Spearman correlation coefficient. Stephenson finally developed the Q methodology in 1953 to study psychological attitudes of individuals. (Stephenson W, 1953).

«Factoring of persons rather than traits. In this brief presentation (Stephenson's letter to the Nature 1935) of «inverted» factor analysis, he advanced an audacious methodological adaptation for studying intra-individual, rather than inter-individual, differences». We begin with a population of n different tests (or essays, pictures, traits or other measurable material), each of which is measured or scaled by m individuals» (p.287) (McKeown B & Thomas D, 2013).

An important difference between Q- and R-techniques was illustrated by (Comrey A & Lee H, 2013) through a typical data matrix (see Figure 11). There are N data objects or subjects, as rows of the data matrix. Each column consists of standard scores for one data object or person for all the n data variables. «In the R-technique factor analysis, a correlation is computed by taking a pair of rows of matrix Z and determining the average cross-product term:

$$r_{ij} = \frac{1}{N} \sum_{k=1}^{k=N} z_{ik} z_{jk}$$

For R-technique factor analysis, N, the number of cases, is normally much larger than n, the number of data variables. The number of cases N must be large to obtain stable correlation coefficients» (Comrey A & Lee H, 2013) p. 229.
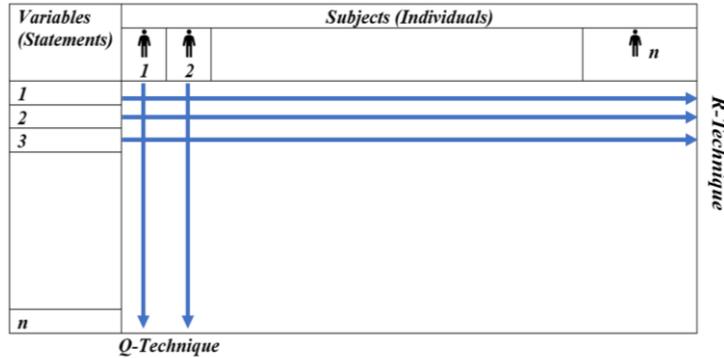
FIGURE 11. DATA MATRIX FOR Q- AND R- TECHNIQUES

«In Q-technique factor analysis, the starting correlation matrix is computed in a different way. Instead of correlating two data variables over the sample of data objects (or subjects), two data objects (or subjects) are correlated over the sample of data variables. In Fig. 11 this is shown by two parallel vertical lines indicating that in order to give a correlation coefficient, two columns of the data matrix are related rather than two rows as in R-technique. For the Q-technique factor analysis, then, the correlation is computed as follows:

$$r_{ij} = \frac{1}{n} \sum_{k=1}^{k=n} z_{ki} z_{kj}$$

The limits on the summation are from 1 to n, the number of data variables, whereas in the previous equation the limits are from 1 to N, the number of data objects. In that equation the column subscript varies from 1 to N, whereas in this equation it is the row subscript that varies, and from 1 to n rather than 1 to N. When the data objects are people, the matrix of correlations that is factor analysed in Q-technique contains correlations between persons rather than between variables as in R-technique». (Comrey A & Lee H, 2013) p.230.

Except for these differences between the R- and the Q- techniques, the internet-accessible program will perform the calculations in accordance with the standard factor analysis program. The program also determines factor weights and factor values as well as communalities.

The formula for the factor weights, according to (Brown S R. , 1980) originates from Spearman (1927):

$$w_{ij} = a_{ij} / (1 - a^2_{ij})$$

where a_{ij} is the factor loading of the *i*th individual on the *j*th factor, and w_{ij} is the weight. Compared to the regression approach for the computation of exact factor scores, this is a very simple formula. In effect the weights over-proportionally increase the impact of higher loadings on the respective factor». (QMethod Page, 2019).

An interesting and very convincing methodological description of the method is found in an article published in 2006. (Baker R, Thompson C, & & Mannion R, 2006). The method is widely used - and described in several books, such as Q Methodology, the second edition of 2013. (McKeown B & Thomas D, 2013).

3.3. The steps of investigation in the Q method:
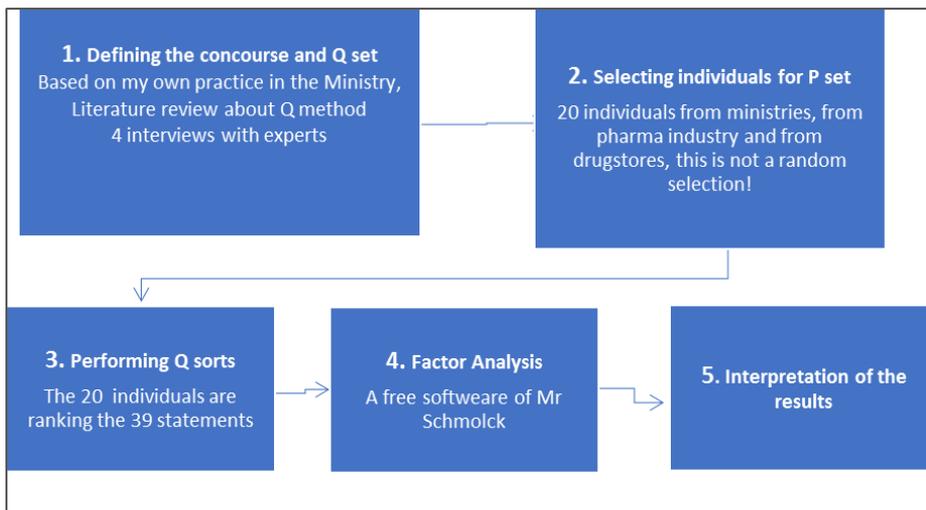
FIGURE 12. THE STAGES OF Q METHOD

First things first: revealing the Kazakh pharmaceutical concourse and creating the statements

From the point of view of my dissertation, the Q method is just a tool. It is not my task to develop further the Q methodology itself. I want to use the Q methodology for cognition of Kazakh pharmaceutical industry and Kazakh drug-related opinions. The method makes it possible to understand the structure of opinions and views on the manufacture and use of the drugs as well as the relationship between the different views about these topics. In the Q method, all of the opinions and views about the topic are called

«concourse». «In Q, the flow of communicability surrounding any topic is referred to as a concourse (from the Latin *concourses,* meaning all running together», as when ideas run together in thought), (Brown S R. , 1993).

«Q methodology's task to reveal the inherent structure of a concourse - the vectors of thought that sustain it and which, in turn, are sustained by it». (Brown S R. , 1993) p.95.

«A concourse can be gotten in a number of ways. The most typical is by interviewing people and jotting down or recording what they say, but commentaries from newspapers, talk shows, and essays have also been used. The level of discourse dictates the sophistication of the concourse: hence, factors which should be taken into account in decisions». (Brown S R. , 1993) p.95.

In my case, formulation of the concourse was not a simple task. During the years I spent working in the pharmaceutical department in a senior position, I learned the opinions of a number of experts. It became apparent from the friends' inquiries, that the so-called ordinary man rarely meets the opinions of professionals. Concourse considered appropriate if they represent the opinion of the multitude of people involved and if they are able to reveal the different clusters of views and the differences among them.

The tools available for research did not make it possible to fully understand the opinions, but this problem also exists in the case of questionnaire methods. The main issue with the Q method is the representativeness of the concourse. According to the relevant literature, it is impossible to achieve complete representativeness, as the following quotation proves, but the lack of perfect representativeness does not question the applicability of the method, but only limits the generalization of the results.

«Theoretically, if we wish to know *the* correlation between two individuals, the correlation should be computed over a representative sample of all possible data variables. It is manifestly impossible, however, and perhaps not desirable, to correlate people over all possible data variables or even a representative sample from that universe. Therefore, in practice, Q-technique analyses must be based on a limited and usually non-representative subset of the universe of all possible data variables. The clusters of similar individuals that emerge as factors in such analyses must be considered as «types» only with respect to the variables sampled. The more limited is the sampling of data variables, the more limited is the sense in which the individuals may be classified as belonging to the same type» (Comrey A & Lee H, 2013).

In the first round, we made almost seventy statements partly based on our own experiences, partly based on the experience found in the literature and based on research on the health sector of using the Q method. Taking into account the selection of respondents, I could expect about twenty respondents who would to conscientiously evaluate the allegations.

«The set of variables must contain enough elements to provide stable correlations between individuals. Several hundred elements would be desirable. Select several individuals to represent each pure «type» that is hypothesized to exist. At least a half-dozen, and more if possible, should be included for each type» (Comrey A & Lee H, 2013).

As it is stated above mathematically «Several hundred elements would be desirable». Although hundreds of statements would increase the stability of correlation coefficients, it would make it almost impossible for individuals to rank the claims. Practical experience and literature also show that, in the case of 20-60 statements, the stability of the correlations may already be adequate and, more importantly, with these statements, the various positions can be described in many ways «A subset of statements, called a Q sample, is drawn from the larger concourse, and it is this set of statements which is eventually presented to participants in the form of a Q sort» (Brown S R. , 1993) p. 98.

Too many statements would harm the application of the method because it would take so much time for the individuals involved in the study, which they cannot afford for this task.

The Q method often raises the question of the reliability of the method. In order to dispel the doubts about its reliability, I will quote a little longer Van Exel and De Graaf's summary, with which I fully agree:

«Because Q is a small sample investigation of human subjectivity based on sorting of items of unknown reliability, results from Q methodological studies have often been criticised for their reliability and hence the possibility for generalisation (Thomas D & Baas L, 1992). The most important type of reliability for Q is replicability: will the same condition of instruction lead to factors that are schematically reliable – that is, represent similar viewpoints on the topic - across similarly structured yet different Q samples and when administered to different sets of persons. According to Brown (Brown S R. , 1980) an important notion behind Q methodology is that only a limited number of distinct viewpoints exist on any topic. Any well-structured Q sample, containing the wide range of existing opinions on the topic, will reveal these perspectives. Based on the findings of two pairs of tandem studies,

Thomas and Baas (Thomas D & Baas L, 1992) concluded that scepticism over this type of reliability is unwarranted. The more common notion of statistical reliability, regarding the ability to generalise sample results to the general population, is of less concern here. The results of a Q methodological study are the distinct subjectivities about a topic that are operant, not the percentage of the sample (or the general population) that adheres to any of them». (Van Exel J & De Graaf G, 2005) p.3.

In my case, considering the mathematical assumptions of the factor analysis methodology, and the experience of the Q method, we need about forty statements that meet the requirements of the method and adequately represent the concourse of the problem under examination. Of the seventy statements, we could have missed a lot because they were the ones that were in complete agreement with the ad hoc groups in which the relevance of the claims was tested. We left some statements out because the interpretation also caused problems for the panel during the discussions. Finally, the following 39 statements remained:

1. The pharmaceutical industry spends an unreasonably lot of money for advertisement of drugs.

2. Pharmaceutical advertisement is very useful because the consumers are getting very useful information through it about new drugs.

3. Most doctors prescribe conventional and well-known drugs.

4. It would be desirable to monitor the R&D activities of pharmaceutical companies more closely.

5. The price of medicines should be determined by the state.

6. It is advisable to keep the medicines for acute diseases at a persistently low level.

7. People are consuming unnecessarily many medications. It would be reasonable to sell the drug for medical prescription only.

8. The pharmaceutical industry is one of the most profitable industries. For international firms the profit is more important than the healing of diseases.

9. The pharmaceutical industry should operate based on the same ethical principles, like the doctors. The profit is secondary.

10. The income of doctors largely depends on their relationship with the pharmaceutical industry, this undermine the credibility of the doctors.

11. The drug consumption is unjustifiably high.

12. The aim of marketing is to know and understand the customer so well the product or service fits him and sells itself.

13. Understanding patient behaviour is essential to influencing them.

14. Models of consumer behaviour can help pharmacists increase medication adherence, change smoking behaviour, communicate health messages, design services, and influence physician prescribing.

15. Some patients have more diseases and they get treatment for them. Used drugs interact. We need independent research to study this issue.

16. The pharmacy store should be an intimate private area where the consumer and the pharmacist can discuss how the consumer should use her/his medicines.

17. The customers can use the competence of the pharmacists as support, when they decide what drugs to take, and when to take them.

18. The pharmacist should make a thorough professional review of each drugs bought by the consumer.

19. The pharmacist should confirm to the consumer that the chosen drug is safe for use.

20. The pharmacy should be like a health marketplace, where consumers can get drugs, lifestyle advice, blood pressure measurements or whatever they need.

21. The pharmacy I leave with good questions for the physician visit when I have discussed my drug use with the pharmacist.

22. The pharmacist knows the medicine better than the physician, so it is advisable to ask him before the prescription of the medication.

23. The pharmacist's connections with the physicians make it 100% certain that everybody get the right drug on.

24. When a consumer has questions about his/her drugs, the pharmacist should answer them.

25. Each drug has side effects, to use them for medication is based on the patient's assessment of risks versus benefits.

26. The use of a drug is enough a belief that the disease will get better with treatment.

27. The protection of intellectual property is a barrier to scientific progress. If world scientists could make their findings public, they would have solved a number of diseases.

28. From a business interest, they also buy patents that they do not want to use. This slows down scientific progress.

29. Most of the innovations are not born today because explorers "want to make the world better", but from business interests or research fame.

30. Research across the world of pharmaceuticals with minimal coordination would be enough to treat illnesses that affect only few people or poor people.

31. The branded drugs in the world are much more expensive than the quality difference justifies. The success of the drug is largely based on marketing.

32. A researcher, when he discovers a new drug, is best sold to his patent to world business.

33. In the pharmaceutical industry, research and licensing costs are so high that small-scale small companies can maintain a meaningless research laboratory.

34. Newer pharmaceutical companies are trying unnecessarily with research, and market success cannot be achieved.

35. In all countries it is advisable to maintain laboratories for pharmaceutical research, not because they could expect economic results, but because without that, the country would still be unable to follow the development of world science.

36. There are some types of drugs that are used to treat the most important for life, but with the quality of life ethically questionable.

37. People trust local pharmaceutical drugs because of their quality-price ratio.

38. The quality of pharmaceutical drugs satisfies the need of local consumers.

39. In Kazakhstan, Ukrainian, Russian and Belarusian medicines are more recognizable than medicines from Europe and the USA.

The 39 statements were translated into Russian (1st attachment) and had been distributed among the cells by each of the individuals in the following triangle. This procedure is called: Q sorting. We could have used a variety of triangles, but this would not significantly affect our results, as can be seen from the following quote:

«Most typically, a person is presented with a set of statements about some topic and is asked to rank-order them (usually from 'agree' to 'disagree'), an operation referred to as 'Q sorting.' The statements are matters of opinion only (not fact), and the fact that the Q sorter is ranking the statements from his or

her own point of view is what brings subjectivity into the picture. There is obviously no right or wrong way to provide «my point of view» about anything…Yet the rankings are subject to factor analysis, and the resulting factors, inasmuch as they have arisen from individual subjectivities, indicate segments of subjectivity which exist. And since the interest of Q-methodology is in the nature of the segments and the extent to which they are similar or dissimilar, the issue of large numbers, so fundamental to most social research, is rendered relatively unimportant». (Brown S R. , 1993) in (Van Exel J & De Graaf G, 2005) p.2.

According to the logic of Q method, in order to provide a discrete normal distribution, sample members had to position the 39 statements into 39 squares of the following triangle:

-4	-3	-2	-1	0	1	2	3	4

FIGURE 13. THE FORCED-DISTRIBUTION Q SORTS TRIANGLE FOR 39 STATEMENTS

The distribution among the cells took 30 to 45 minutes for each participant. At first, they were averse to the task. Many people have challenged us, why the method narrows their choices into this framework.

«Arguments favouring free- over forced-distribution *Q* sorts have assumed that forcing leads to loss of important statistical information and interferes with interval properties, rendering Pearson's *r* inappropriate for analysis. *Q* sorts with identical item orderings but with varied distributions are shown to provide essentially the same correlations and factor structures when coefficients are computed using Spearman's r^s, Kendall's τ, and Pearson's *r*,

leading to the conclusion that the same results are obtained, despite distribution and whether interval or ordinal statistics are used» (Brown S R. , 1971).

«The advantage of forced distribution is that the individual forces him/herself not to express his or her preference for each statement individually and separately, but in their context. Obviously, the respondents had difficulty in just having two statements that they could fully agree with, and why there could be only two statements they disagree completely. This constraint has the advantage that they have to form their opinion on the 39 statements as a coherent system. Respondents classify claims into three groups. The first group contains the statements they agree with. The second groups are those with which they disagree, and the third group that seems to be indifferent. The separation of these three groups is usually not a problem for individuals. The harder question is what level of (1, 2, 3, 4) the person agrees with. While finding the position of the statement in one of the cells of the triangle below, coherence is created in good case. The literature maintains this coherence as one of the main virtues of the method». (Brouwer, 1999) argued that one of the important advantages of Q is that questions pertaining to one and the same domain are not analysed as separate items of information but rather in their mutual coherence for the respondent: «(subjective feelings and opinions are most fruitfully studied when respondents are encouraged to order a good sample of items from one and the same domain of subjective interest (instead of just replying to single questions)» (Van Exel J & De Graaf G, 2005)p.3.

At first, many people had problems with why there could be no more than two of the total agreements or the total number of denied claims. Later, they were reconciled to the task and after about 10 minutes they went into the task and later, several people said they considered it a challenge and, finally, they were particularly interested in stumbling on allegations and placing them in the appropriate cell. The members of the group solved the task one by one within a three-week time interval when I personally visited the group members and with some of them managed to make a structured interview, which is described in the evaluation part of my dissertation.

3.4. The selection of the P set, the group statistics of the persons involved to the evaluation

The literature refers as P set the group of individuals who are involved in the study, and who rank the statements according to the method described above. The advantage of this method is that there is no need for too many people to evaluate. It is sufficient that five or six people, representing the factor-specific position, are included in each of the factors based on our ex ante hypothesis. Van Exel and De Graaf summarize this as follows:

«Q methodological study requires only a limited number of respondents: «...all that is required are enough subjects to establish the existence of a factor for purposes of comparing one factor with another […] P sets, as in the case of Q samples, provide breath and comprehensiveness so as to maximise confidence that the major factors at issue have been manifested using a particular set of persons and a particular set of Q statements» (Brown S R. , 1980), (Brown, 1993). This P set usually is smaller than the Q set (Brouwer, 1999). The aim is to have four or five persons defining each anticipated viewpoint». (Van Exel J & De Graaf G, 2005).

«The P set is not random. It is a structured sample of respondents who are theoretically relevant to the problem under consideration; for instance, persons who are expected to have a clear and distinct viewpoint regarding the problem and, in that quality, may define a factor» (Brown S R. , 1980). Eventually, the number of persons associated with a factor is of less importance than who they are; (Van Exel J & De Graaf G, 2005).

In my investigation the P set were created from twenty respondents who formed a heterogeneous group. All of them are graduates of universities, some of them have graduated abroad. Some have established their own companies or leading industrial companies. Significantly public employees were involved among the respondents, which obviously influenced their opinion.

In order to preserve the anonymity of the 20 respondents, I applied work nicknames and sometimes changed the name of the workplace. Of course, I did not change the type of job nor the quality of employment. The information required to identify it is shown in the Table 7 below:

TABLE 7. LIST OF PEOPLE

№	Nickname	Age	Sex	Type of education	Specialization	City	Work experience	Organisation	Leader or employee

1.	Gulnur	38	F	Higher education, State University	English lang.	Astana	15	JSC Medical University Astana	Employee
2.	Nurgul	33	F	Higher education, State University	Economics	Karaganda	11	LLP Conversion	Employee
3.	Zhuldyz	43	F	Higher education, State University	International economic relations	Astana	20	Company Astana-Expo	Employee
4.	Askar	50	M	Higher education, University of Statistics and Economics	Economics	Astana	34	Ministry of Investment and Development RK	Leader
5.	Zhandos	35	M	Higher education, University of Technology	Mechanical engineer	Astana	14	Ministry of Investment and Development	Leader
6.	Ahmed	42	M	Higher education, Medical University	Pharmacist	Almaty	25	Bio Global Pharm Incorporation «Remilena»	Leader
7.	Zhaslan	31	M	Higher education, Financial Academy	Project Management	Astana	10	National Technology Development Agency	Leader
8.	Turar	31	M	Higher education, Kazakh Economic University	Economics and Management	Astana	8	Kazakhstan Institute of Industry Development	Leader
9.	Asel	38	F	Higher education, Pedagogical Institute	English lang.	Astana	17	Company Lukoil	Employee
10.	Dinara	35	F	Higher education, Staffordshire University UK	Technology Management	Astana	13	Nazarbayev University	Leader
11.	Svetlana	37	F	Higher education, State University	Economics	Astana	9,8	Ministry of Transport	Employee
12.	Zhanibek	36	M	Higher education, Warwick University UK	International technology management	Astana	11	Ministry of Defense and Aerospace industry	Leader
13.	Ardak	27	M	Higher education, Eurasian National University	Physicist - Economist	Astana	5	Ministry of Energy	Employee
14.	Azamat	36	M	Higher education, National University of Public Service	International relations	Astana	16	Kar-Tel	Employee
15.	Arman	31	M	Higher education, Eurasian National University	Chemistry	Astana	11	Ministry of Economics	Leader
16.	Ainura	35	F	Higher education, Medical University	Pharmacist	Astana	15	Pharmacy	Employee
17.	Dana	41	F	Higher education, Medical University	Pharmacist	Astana	18	Pharmacy	Employee

18.	Roza	53	F	Higher education, Medical University	Pharmacist	Astana	30	Pharmacy	Employee
19.	Darhan	28	M	Higher education, University of City London UCL	Information security	Astana	6	Ministry of Defense and Aerospace industry	Leader
20.	Diana	36	F	Higher education, Almaty Medical University	Pharmacist	Astana	14	Ministry of Healthcare RK	Employee

3.5. Q sorting

After a successful preparation, another important part of the method is when individuals express their preferences about the claims. In the picture below, this seems like a loose practice, but in reality, it is the second most important part of the research. Individuals are expected to have a coherent position regarding to the 39 statements. «The general procedure is as follows. The Q set is given to the respondent in the form of a pack of randomly numbered cards, each card containing one of the statements from the Q set». (Brown S R. , 1993).

Figure 14. Q SORTING

Source: (Teaching the Q Method in a class on urban sustainability, 2016).

TABLE 8. THE RESULTS OF THE Q SORTS WITH 20 PARTICIPANTS AND 39 STATEMENTS

№1. Gulnur
+4. 29, 1
+3. 19, 3, 7
+2. 18, 1, 20, 3, 35
+1. 38, 12, 24, 23, 8, 5
0. 39, 14, 4, 9, 34, 6, 15
-1. 30, 11, 13, 28, 22, 33
-2. 25, 27, 17, 37, 16
-3. 2, 36, 32
-4. 10, 26

№2. Nurgul
+4. 27, 20
+3. 9, 35, 39
+2. 5, 8, 7, 37, 28
+1. 14, 24, 12, 3, 2, 19
0. 25, 1, 29, 21, 15, 13, 11
-1. 32, 26, 6, 17, 34, 31
-2. 33, 36, 16, 23, 14
-3. 22, 10, 18
-4. 30, 38

№3. Zhuldyz
+4. 14, 9
+3. 4, 17, 1
+2. 12, 25, 15, 31, 1
+1. 3, 24, 29, 7, 36, 35
0. 21, 28, 16, 37, 13, 26, 18
-1. 34, 22, 19, 8, 33, 20
-2. 39, 32, 10, 6, 5
-3. 2, 30, 23
-4. 27, 38

№4. Askar
+4. 9, 24
+3. 8, 15, 20
+2. 3, 5, 7, 31, 35
+1. 4, 12, 37, 13, 21, 11
0. 10, 25, 26, 1, 6, 28, 36
-1. 38, 2, 19, 23, 34, 22
-2. 16, 32, 29, 18, 14
-3. 39, 17, 27
-4. 30, 33

№5. Zhandos
+4. 18, 7
+3. 36, 26, 9
+2. 35, 15, 12, 31, 2
+1. 28, 13, 27, 23, 24, 25
0. 38, 4, 5, 19, 33, 32, 1
-1. 22, 20, 34, 17, 10, 37
-2. 3, 16, 14, 11
-3. 8, 29, 21
-4 30, 39

№6. Ahmed
+4. 20, 3
+3. 29, 34, 2
+2. 10, 6, 14, 8, 28
+1. 5, 30, 38, 22, 18, 19

№8. Turar
+4. 20, 8
+3. 31 7, 28
+2. 4, 12, 35, 24, 19
+1. 15, 17, 18, 6, 32, 3
0. 13, 30, 36, 14, 25, 11, 9
-1. 21, 23, 27, 2, 38, 10
-2. 16, 29, 37, 1, 34
-3. 22, 5, 26
-4. 33, 39

№9. Asel
+4. 20, 24
+3 6, 10, 31
+2. 5, 26, 7, 4, 12
+1. 32, 16, 19, 33, 35, 18
0. 21, 14, 23, 34, 17, 37, 9
-1. 11, 39, 36, 13, 27, 3
-2. 1, 28, 30, 29, 2
-3. 25, 8, 15
-4. 38, 22

№10. Dinara
+4. 25, 35
+3. 1, 36, 31
+2. 3, 17, 4, 34, 20
+1. 2, 10, 13, 12, 18, 23
0 39, 30, 16, 22, 9, 38, 32
-1. 14, 6, 26, 8, 28, 29
-2. 37, 21, 33, 15, 27
-3. 5, 24, 11
-4. 19, 7

№ 11. Svetlana
+4. 3, 25
+3. 17, 9, 24
+2. 26, 7, 15, 27, 39
+1. 1, 31, 11, 18, 6, 13
0. 23, 10, 21, 5, 20, 36, 19
-1. 34, 29, 12, 16, 8, 4
-2. 14, 38, 30, 2, 37
-3. 35, 33, 32
-4. 22, 28

№ 12. Zhanibek
+4. 12, 35
+3. 7, 38, 32
+2. 13, 14, 15, 31, 9
+1. 17, 34, 4, 37, 8, 29
0. 10, 36, 6, 11, 26, 3, 25
-1. 18, 2, 23, 30, 27, 28
-2. 1, 5, 21, 22, 24
-3. 33, 20, 19,
-4. 39, 16

№13. Ardak
+4. 9, 8,
+3. 10, 24, 25
+2. 7, 37, 31, 12, 1
+1. 3, 17, 20, 5, 4, 27

№15. Arman
+4. 31, 3
+3. 17, 23, 7
+2. 11, 35, 12, 4, 10
+1. 32, 26, 19, 14, 29, 25
0. 1, 9, 2, 34, 30, 24, 20
-1. 16, 8, 18, 37, 39, 36
-2. 13 6, 27, 15, 28
-3. 21, 38, 33
-4. 5, 22

№16. Ainura
+4 25, 5
+3. 1, 24, 20
+2. 8, 39, 4, 10, 31
+1. 3, 36, 7, 15, 17, 18
0. 34, 14, 33, 21, 35, 13, 19
-1. 38, 30, 12, 28, 37, 32
-2. 22, 2, 11, 9, 16
-3. 27, 6, 26
-4. 23, 29

№17. Dana
+4. 31, 28
+3. 29, 1, 8
+2. 5, 8, 14, 35, 19
+1. 11, 12, 3, 37, 25, 24
0. 15, 36, 20, 7, 10, 6, 34
-1. 30, 39, 17, 32, 16, 13
-2. 38, 4, 26, 21, 9
-3. 23, 27, 2
-4. 22 33

№18. Roza
+4. 20, 28
+3. 15, 4, 11
+2. 2, 3, 30, 7, 19
+1. 25, 6, 1, 5, 35, 18
0. 16, 21, 8, 13, 24, 36, 14
-1. 34, 33, 32, 27, 37, 12
-2 22, 26, 38, 31, 29
-3. 10, 23, 39
-4. 9, 17

№19. Darhan
+4. 9, 35
+3. 20, 29, 31
+2. 3, 7, 11, 18, 19
+1. 2, 10, 12, 14, 17, 24
0. 1, 8, 13, 15, 27, 33, 34
-1. 4, 25, 28, 32, 36, 37
-2. 5, 6, 16, 30, 21
-3. 23, 26, 38,
-4. 22, 39

№20. Diana
+4. 3, 8
+3. 18, 28, 20
+2. 15, 1, 4, 24, 27
+1. 14, 2, 5, 31, 35, 12

0. 21, 15, 1, 25, 4, 13, 12	0. 6, 39, 36, 34, 21, 28, 11	0. 21, 17, 13, 6, 11, 19, 25
-1. 26, 9, 24, 27, 23, 31	-1. 38, 13, 14, 16, 26, 32	-1. 34, 10, 7, 39, 29, 36
-2. 39, 11, 7, 36, 35	-2. 29, 22, 2, 18, 19	-2. 37, 9, 23, 16, 38
-3. 16, 37, 32	-3. 35, 23, 15	-3. 22, 30, 26
-4. 17, 33	-4. 33, 30	-4. 32, 33
№7. Zhaslan	№14. Azamat	
+4. 9, 4	+4. 9, 8	
+3. 10, 31, 11	+3. 29, 3, 24	
+2. 6, 38, 16, 24, 27	+2.7, 31, 17, 39, 2	
+1. 19, 12, 18, 20, 17, 26	+1. 23, 20, 26, 28, 12, 35	
0. 13, 25, 37, 23, 33, 30, 21	0. 30, 6, 36, 14, 4, 33, 15	
-1. 7, 1, 5, 35, 39, 15	-1. 34, 21, 27, 5, 32, 19	
-2. 36, 28, 32, 2, 22	-2. 10, 16, 1, 13, 22	
-3. 29, 34, 14	-3. 37, 18, 11	
-4. 8, 3	-4. 38, 25	

3.6. The factor analysis

The 20 persons, although they form a heterogeneous group, can be divided into three groups with respect to their values. According to my hypothesis, the intellectuals who have closer ties with the pharmaceutical sector because of their qualifications or current jobs will have almost the same opinion about the pharmaceutical industry and drug consumption. The other opinion group is made up of intellectuals and entrepreneurs who are only consumers in relation to drugs and their knowledge is influenced by their personal experiences with health care and possibly their knowledge acquired through the media. In my hypothesis, I also assumed that intellectuals, who spent longer period in higher education in the West, have been influenced by this, and it has a certain impact on their value judgment. I expect that their opinion is biased by the impact of the «consumer society» and the knowledge of the western pharmaceutical market.

The correlation matrix shows who has similar opinion among the «experts» in the sample, and we can recognize who is the so-called opinion leader. In my case the opinion leader, with the highest factor weight is Diana and/or Askar. Their correlation coefficients are very high with Nurgul, Turar, Ardak and they have a correlation coefficient of around 0.5, but some others are close to their opinion as well. Another opinion leader is Darhan, whose correlation coefficients are also high with several members of the sample, so we find a correlation of around 0.5 between him and Zhuldyz, Turar, Arman and Dana. Zhaslan stands out from the sample that he has 10 opposing opinions. The

correlation coefficients are not high, but there are many negative values. The opinions of Dinara and Zhanibek are also out of line, but they only have a different opinion against 7 colleagues.

The analysis of the correlation matrix is a rather complicated task, but it may be important to interpret the results of the factor analysis. In the end, it is obviously worth reviewing the first impressions of the correlation matrix, but it may be an exciting question whether the first impressions are really relevant findings.

```
Correlation Matrix Between Sorts

SORTS          1    2    3    4    5    6    7    8    9   10   11   12   13   14   15   16   17   18   19   20

 1 Gulnur    100   24   19   30   -6   31  -16   30    6   -6   12    2    3   25   15   21   46   22   39   42
 2 Nurgul     24  100   14   48   10    2   -4   29   17  -14   24   -1   42   42    6   19   18   25   36   47
 3 Zhuldyz    19   14  100   39   19  -19   11   28   10   17   31   33   32   19   41   24   38    8   48   24
 4 Askar      30   48   39  100   31   18   12   51   25   -2   31   29   55   30   13   36   30   26   38   46
 5 Zhandos    -6   10   19   31  100  -22   21   24   20   12   18   35    6    2   14    4    2    4   29    7
 6 Ahmed      31    2  -19   18  -22  100  -32   20  -13   11   -7   -5    4   11   -5    6   26   35   14   48
 7 Zhaslan   -16   -4   11   12   21  -32  100    8   46   -5   28   -4   22  -21   11   -4  -19  -14    9  -12
 8 Turar      30   29   28   51   24   20    8  100   26   10   10   38   31   34   41   26   44   46   52   58
 9 Asel        6   17   10   25   20  -13   46   26  100   -8   16   -5   23   19   32   19   12    1   30    5
10 Dinara     -6  -14   17   -2   12   11   -5   10   -8  100    4   20    8   -3   34   24    8  -12   11   14
11 Svetlana   12   24   31   31   18   -7   28   10   16    4  100   -5   46   19   32   30    7   -9   21   28
12 Zhanibek    2   -1   33   29   35   -5   -4   38   -5   20   -5  100   15   11   37  -12   17  -13   34    0
13 Ardak       3   42   32   55    6    4   22   31   23    8   46   15  100   18   21   45   28  -14   22   35
14 Azamat     25   42   19   30    2   11  -21   34   19   -3   19   11   18  100   35   -4    7  -12   36   24
15 Arman      15    6   41   13   14   -5   11   41   32   34   32   37   21   35  100    5   26   -5   51   12
16 Ainura     21   19   24   36    4    6   -4   26   19   24   30  -12   45   -4    5  100   38   26   14   45
17 Dana       46   18   38   30    2   26  -19   44   12    8    7   17   28    7   26   38  100   32   45   54
18 Roza       22   25    8   26    4   35  -14   46    1  -12   -9  -13  -14  -12   -5   26   32  100   17   52
19 Darhan     39   36   48   38   29   14    9   52   30   11   21   34   22   36   51   14   45   17  100   40
20 Diana      42   47   24   46    7   48  -12   58    5   14   28    0   35   24   12   45   54   52   40  100

 ♠
PQMethod2.35                    pharma industry of Kazakhstan
```

Figure 15. CORRELATION MATRIX BETWEEN SORTS

The rotation revealed that the first factor is most likely to be identified by Diana. Based on the correlation matrix, it was not yet clear. Askar also showed high correlation coefficients with some of the individuals in the sample. It turned out that Diana is clearly one of the opinion leaders. She is the one who has the highest factor weight in the factor weight matrix, of course, with those with whom the correlation matrix could have guessed that their opinion was close. Choosing Askar as an opinion leader based on the factor weight matrix, would seem to be a mistake, since he does not represent a strong opinion. He «agrees» with almost everyone, that is one of the problems which divides the group, Askar is not really an opinion leader, he is relatively neutral.

According to the non-rotated factor matrix, 11 individuals are belonging to the first factor of the tested sample.

```
            1        2        3
 1 Gulnur   0.62 X  -0.10     0.08
 2 Nurgul   0.53 X   0.18    -0.36
 3 Zhuldyz  0.36     0.54 X   0.19
 4 Askar    0.62 X   0.38    -0.22
 5 Zhandos  0.05     0.51 X   0.12
 6 Ahmed    0.52 X  -0.48     0.11
 7 Zhaslan -0.24     0.57 X  -0.39
 8 Turar    0.70 X   0.29     0.17
 9 Asel     0.12     0.52 X  -0.29
10 Dinara   0.08     0.19     0.41 X
11 Svetlana 0.22     0.51 X  -0.38
12 Zhanibek 0.13     0.44     0.63 X
13 Ardak    0.39     0.50    -0.40
14 Azamat   0.37 X   0.25     0.13
15 Arman    0.26     0.59 X   0.42
16 Ainura   0.50 X   0.11    -0.37
17 Dana     0.70 X   0.03     0.17
18 Roza     0.59 X  -0.34    -0.09
19 Darhan   0.58 X   0.45     0.28
20 Diana    0.86 X  -0.05    -0.13
```

Figure 16. THE FACTORS

The rotation helps to better distinguish among the factors and in this way among the interviewed experts. As it is shown in the table below, both 8 and -28-degree, rotation resulted relatively stable factors. Diana, in the case of the -28° rotation, became the center of the first factor with a very high factor weight (0,86).

Based on the non-rotated factor matrix, 11 persons belong to the first factor, 6 to factor 2, and only 2 to the 3rd factor. Ardak's factor weights are high in all three factors. Values in the first and second factors are positive, while in the third factor, Ardak's factor weight is negative. In the detailed analysis, it may be an interesting question whether Ardak is a real outlier, or he is out of the line, because of some other reasons? Ardak is a physicist and an economist and is working for the Ministry of Energy. It may also be, that he just wanted to joke with the interviewer. The latter may not be the case, because Svetlana's profile is quite like his profile. She also has the highest factor weight in Factor 2 and has a relatively high negative factor weight in Factor 3. Svetlana is an economist and works at the Ministry of Transport, so her profile is like Ardak's profile.

Due to the manual rotation of Factor 1 and Factor 2, the factor weight matrices have slightly changed as shown in the table below. In manual rotation, I tried to bring Diana to the 1-axis, this was the best at -28° rotation. The factors slightly changed, only 10 persons belong to factor 1 and 7 person to factor 2.

TABLE 9. THE FACTOR WEIGHTS AFTER ROTATION

Factor matrix before rotation, corrected database	

	1	2	3
1 Gulnur	0.50 X	−0.34	0.0?
2 Nurgul	0.55 X	−0.10	−0.3?
3 Zhuldyz	0.57 X	0.31	0.1?
4 Askar	0.73 X	0.04	−0.2?
5 Zhandos	0.29	−0.42 X	0.1?
6 Ahmed	0.23	−0.67 X	0.1?
7 Zhaslan	0.06	−0.61 X	−0.3?
8 Turar	0.75 X	−0.08	0.1?
9 Asel	0.35	0.40	−0.2?
10 Dinara	0.16	0.12	0.4?
11 Svetlana	0.43	0.35	−0.3?
12 Zhanibek	0.32	0.35	0.6?
13 Ardak	0.58 X	0.36	−0.4?
14 Azamat	0.44 X	0.05	0.1?
15 Arman	0.51	0.41	0.4?
16 Ainura	0.49 X	−0.14	−0.3?
17 Dana	0.63 X	−0.31	0.1?
18 Roza	0.36	−0.68 X	−0.0?
19 Darhan	0.73 X	−0.13	0.2?
20 Diana	0.73 X	−0.45	−0.1?

-28° rotation	

	1	2	3
1 Gulnur	0.63 X	−0.02	0.08
2 Nurgul	0.50 X	0.22	−0.36
3 Zhuldyz	0.28	0.59 X	−0.1?
4 Askar	0.66 X	0.47	−0.2?
5 Zhandos	−0.02	0.51 X	0.1?
6 Ahmed	0.59 X	−0.40	0.11
7 Zhaslan	−0.32	0.53 X	−0.3?
8 Turar	0.55 X	0.33 X	−0.1?
9 Asel	0.06	0.50	−0.2?
10 Dinara	0.05	0.20	0.41
11 Svetlana	0.15	0.63 X	−0.38
12 Zhanibek	0.07	0.48	0.6?
13 Ardak	0.31	0.55 X	−0.4?
14 Azamat	0.33 X	0.30	0.1?
15 Arman	0.17	0.62 X	0.4?
16 Ainura	0.48 X	0.18	−0.3?
17 Dana	0.69 X	−0.13	0.1?
18 Roza	0.63 X	0.63	−0.2?
19 Darhan	0.51		
20 Diana	0.86 X	0.07	−0.1?

34° rotation	

	1	2	3
1 Gulnur	0.46 X	−0.39	0.09
2 Nurgul	0.54 X	−0.15	−0.36
3 Zhuldyz	0.60 X	0.25	0.19
4 Askar	0.73 X	−0.04	−0.22
5 Zhandos	0.33	0.39 X	0.12
6 Ahmed	0.16	−0.69 X	0.11
7 Zhaslan	0.12	0.60 X	−0.39
8 Turar	0.74 X	−0.15	0.18
9 Asel	0.39	0.36	−0.29
10 Dinara	0.17	0.11	0.40 X
11 Svetlana	0.46	0.30	−0.38
12 Zhanibek	0.36	0.29	0.63 X
13 Ardak	0.60 X	0.19	−0.40
14 Azamat	0.44 X	0.00	0.12
15 Arman	0.55	0.35	0.42
16 Ainura	0.47 X	−0.19	−0.37
17 Dana	0.60 X	−0.37	0.17
18 Roza	0.29	−0.62 X	−0.09
19 Darhan	0.73 X	0.05	0.28
20 Diana	0.68 X	−0.53	−0.13

-9° rotation

	1	2	3
1 Gulnur	0.52 X	−0.31	0.09
2 Nurgul	0.55 X	−0.07	−0.36
3 Zhuldyz	0.55 X	0.34	0.19
4 Askar	0.73 X	0.08	−0.22
5 Zhandos	0.27	0.44 X	0.12
6 Ahmed	0.27	−0.66 X	0.11
7 Zhaslan	0.03	0.62 X	−0.39
8 Turar	0.76 X	−0.04	0.18
9 Asel	0.33	0.41	−0.29
10 Dinara	0.15	0.13	0.40
11 Svetlana	0.41	0.37	−0.38
12 Zhanibek	0.31	0.34	0.63
13 Ardak	0.56 X	0.28	−0.40
14 Azamat	0.44 X	0.07	0.12
15 Arman	0.48	0.43	0.42
16 Ainura	0.50 X	−0.11	−0.37
17 Dana	0.65 X	−0.28	0.17
18 Roza	0.39	−0.56 X	−0.09
19 Darhan	0.72 X	0.16	0.28
20 Diana	0.76 X	−0.42	−0.13
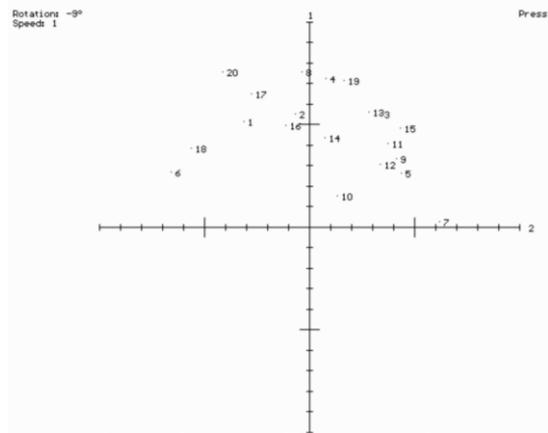
1 and 3 factors after -58° rotation

	1	2	3
1 Gulnur	0.20	−0.31	0.49 X
2 Nurgul	0.60 X	−0.07	0.28
3 Zhuldyz	0.13	0.34	0.57 X
4 Askar	0.57 X	0.08	0.50
5 Zhandos	0.04	0.44 X	0.29
6 Ahmed	0.05	−0.66 X	0.29
7 Zhaslan	0.34	0.62 X	−0.18
8 Turar	0.25	−0.04	0.74 X
9 Asel	0.42	0.41	0.13
10 Dinara	−0.26	0.13	0.34 X
11 Svetlana	0.54 X	0.37	0.14
12 Zhanibek	−0.37	0.34	0.59 X
13 Ardak	0.64 X	0.28	0.26
14 Azamat	0.13	0.07	0.44 X
15 Arman	−0.10	0.43	0.63 X
16 Ainura	0.58 X	−0.11	0.23
17 Dana	0.20	−0.28	0.64 X
18 Roza	0.28	−0.56 X	0.28
19 Darhan	0.14	0.16	0.76 X
20 Diana	0.51	−0.42	0.57
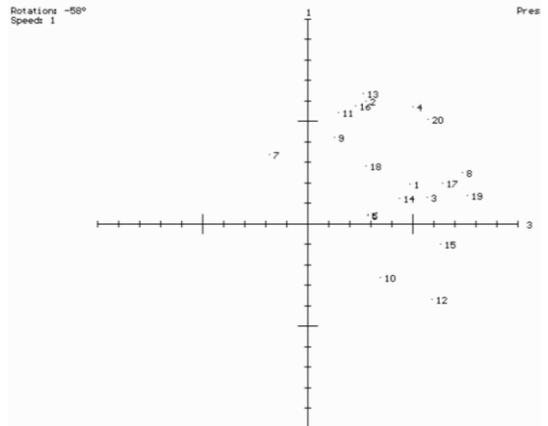
1 and 3 factors after -12° rotation

	1	2	3
1 Gulnur	0.47 X	−0.34	0.19
2 Nurgul	0.61 X	−0.10	−0.24
3 Zhuldyz	0.52 X	0.31	0.30
4 Askar	0.76 X	0.04	−0.06
5 Zhandos	0.26	0.42 X	0.17
6 Ahmed	0.20	−0.67 X	0.16
7 Zhaslan	0.14	0.61 X	−0.36
8 Turar	0.70 X	−0.08	0.33
9 Asel	0.41	0.40	−0.21
10 Dinara	0.07	0.12	0.43 X
11 Svetlana	0.50 X	0.35	−0.29
12 Zhanibek	0.19	0.32	0.68 X
13 Ardak	0.65 X	0.25	−0.27
14 Azamat	0.41 X	0.05	0.21
15 Arman	0.41	0.41	0.51
16 Ainura	0.56 X	−0.14	−0.26
17 Dana	0.58 X	−0.31	0.30
18 Roza	0.37	−0.58 X	−0.02
19 Darhan	0.65 X	0.13	0.43
20 Diana	0.75 X	−0.45	0.02

	1 and 2 factors after 10° rotation		

	1	2	3
1 Gulnur	0.43 X	−0.42	0.09
2 Nurgul	0.52 X	−0.19	−0.36
3 Zhuldyz	0.62 X	0.21	0.19
4 Askar	0.73 X	−0.09	−0.22
5 Zhandos	0.36	0.36	0.12
6 Ahmed	0.11	−0.70 X	0.11
7 Zhaslan	0.17	0.59 X	−0.39
8 Turar	0.73 X	−0.21	0.18
9 Asel	0.42	0.33	−0.29
10 Dinara	0.18	0.09	0.40 X
11 Svetlana	0.48 X	0.27	−0.38
12 Zhanibek	0.37	0.26	0.63 X
13 Ardak	0.61 X	0.15	−0.40
14 Azamat	0.44 X	−0.03	0.12
15 Arman	0.57 X	0.31	0.42
16 Ainura	0.46 X	−0.22	−0.37
17 Dana	0.57 X	−0.42	0.17
18 Roza	0.25	−0.63 X	−0.09
19 Darhan	0.74 X	−0.00	0.28
20 Diana	0.64 X	−0.58	−0.13

	1 and 2 factors after 8° rotation	

	1	2	
1 Gulnur	0.28	−0.54 X	0.0
2 Nurgul	0.44	−0.34	0.1
3 Zhuldyz	0.65 X	0.00	0.1
4 Askar	0.66 X	−0.31	0.2
5 Zhandos	0.45 X	0.24	0.1
6 Ahmed	−0.11	−0.70 X	0.1
7 Zhaslan	0.34	0.51	0.3
8 Turar	0.63 X	−0.42	0.1
9 Asel	0.50 X	0.18	0.2
10 Dinara	0.20	0.03	0.4
11 Svetlana	0.54 X	0.11	0.3
12 Zhanibek	0.44	−0.13	0.6
13 Ardak	0.63 X	−0.08	0.1
14 Azamat	0.41 X	−0.16	0.1
15 Arman	0.64 X	0.12	0.4
16 Ainura	0.37	−0.35	0.1
17 Dana	0.41	−0.57 X	0.1
18 Roza	0.04	−0.68 X	0.0
19 Darhan	0.70 X	−0.23	0.2
20 Diana	0.43	−0.75 X	0.1

The basic z score formula for a sample is: $z = (x − \mu) / \sigma$

We have found several articles in the literature in which both the number of statements and the number of respondents were smaller or very close to the case we used. For example, in one of the cited articles, 22 people were interviewed in the PR study, with whom 20 statements were ranked and the results considered interpretable. The theoretical requirements for interpretation can be summarized in a single sentence: «All three types met the statistical requirements to be selected and interpreted: «Eigenvalues higher than 1.0» per factor (Stehle H & Huck-Sandhu S, 2016)» In the Kazakh pharmaceutical industry research, the statistics of the results meet the theoretical requirements as shown in the Table 10 below.

TABLE 10. THE STATISTICS OF THE FACTOR ANALYSES RESULTS

	1	2	3	Total
1	1.0000			
2	0.1930	1.0000		
3	-0.2452	-0.1967	1.0000	
Composite reliability	0.960	0.941	0.952	
S.E. of Factor Z cores	0.200	0.243	0.218	
Eigenvalue	3.7427	1.9939	1.6970	
% exp. Var.	25	13	11	49

TABLE 11. FACTOR SCORES WITH CORRESPONDING RANKS (COLOUR INDICATES SIGNIFICANCE AT P < .01 FOR DISTINGUISHING STATEMENTS FOR FACTOR'S)

1. The pharmaceutical industry spends an unreasonably lot of money for advertisement of drugs.	0.97	6	0.34	16	-0.12	24
2. Pharmaceutical advertisement is very useful because the consumers are getting very useful information through it about new drugs.	0.15	19	-1.16	35	-0.10	21
3. Most doctors prescribe conventional and well-known drugs.	1.75	2	0.51	11	1.13	7
4. It would be desirable to monitor the R&D activities of pharmaceutical companies more closely.	0.68	10	0.95	8	0.79	9
5. The price of medicines should be determined by the state.	0.47	14	0.85	9	-1.67	37
6. It is advisable to keep the medicines for acute diseases at a persistently low level.	0.35	16	0.39	12	-0.90	32
7. People are consuming unnecessarily many medications. It would be reasonable to sell the drug for medical prescription only.	0.21	18	1.10	5	1.47	5
8. The pharmaceutical industry is one of the most profitable industries. For international firms the profit is more important than the healing of diseases.	1.57	4	0.34	15	-0.12	23
9. The pharmaceutical industry should operate based on the same ethical principles, like the doctors. The profit is secondary.	-1.12	35	1.96	2	1.49	4
10. The income of doctors largely depends on their relationship with the pharmaceutical industry, this undermine the credibility of the doctors.	-0.69	28	1.01	6	0.21	14
11. The drug consumption is unjustifiably high.	0.13	20	0.32	17	0.44	11
12. The aim of marketing is to know and understand the customer so well the product or service fits him and sells itself.	0.41	15	0.60	10	1.59	3
13. Understanding patient behaviour is essential to influencing them.	-0.16	23	-0.03	22	0.06	18
14. Models of consumer behaviour can help pharmacists increase medication adherence, change smoking behaviour, communicate health messages, design services, and influence physician prescribing.	0.59	12	-1.10	34	0.85	8

#	Statement					
15.	Some patients have more diseases and they get treatment for them. Used drugs interact. We need independent research to study this issue.	0.80	8	-0.27	24	0.20	15
16.	The pharmacy store should be an intimate private area where the consumer and the pharmacist can discuss how the consumer should use her/his medicines.	-1.08	33	-0.45	27	-1.34	35
17.	The customers can use the competence of the pharmacists as support, when they decide what drugs to take, and when to take them.	-0.95	30	0.38	13	1.22	6
18.	The pharmacist should make a thorough professional review of each drugs bought by the consumer.	1.33	5	-0.33	25	0.00	19
19.	The pharmacist should confirm to the consumer that the chosen drug is safe for use.	0.83	7	-0.14	23	-0.52	28
20.	The pharmacy should be like a health marketplace, where consumers can get drugs, lifestyle advice, blood pressure measurements or whatever they need.	1.84	1	1.45	3	-0.23	26
21.	The pharmacy I leave with good questions for the physician visit when I have discussed my drug use with the pharmacist.	-0.10	22	0.10	21	-1.43	36
22.	The pharmacist knows the medicine better than the physician, so it is advisable to ask him before the prescription of the medication.	-1.39	36	-1.94	39	-1.74	39
23.	The pharmacist's connections with the physicians make it 100% certain that everybody get the right drug on.	-1.10	34	-0.99	31	-0.12	22
24.	When a consumer has questions about his/her drugs, the pharmacist should answer them.	0.63	11	2.16	1	-0.17	25
25.	Each drug has side effects, to use them for medication is based on the patient's assessment of risks versus benefits.	0.05	21	0.99	7	0.35	13
26.	The use of a drug is enough a belief that the disease will get better with treatment.	-1.61	38	0.16	19	-0.02	20
27.	The protection of intellectual property is a barrier to scientific progress. If world scientists could make their findings public, they would have solved a number of diseases.	-0.25	25	0.37	14	-0.98	33
28.	From a business interest, they also buy patents that they do not want to use. This slows down scientific progress.	1.73	3	-0.88	30	-0.61	29
29.	Most of the innovations are not born today because explorers "want to make the world better", but from business interests or research fame.	0.30	17	-1.43	36	0.69	10
30.	Research across the world of pharmaceuticals with minimal coordination would be enough to treat illnesses that affect only few people or poor people.	-0.52	26	-1.87	38	-0.88	31
31.	The branded drugs in the world are much more expensive than the quality difference justifies. The success of the drug is largely based on marketing.	0.70	9	1.33	4	1.93	2
32.	A researcher, when he discovers a new drug, is best sold to his patent to world business.	-1.49	37	-1.01	32	0.42	12

#	Statement						
33.	In the pharmaceutical industry, research and licensing costs are so high that small-scale small companies can maintain a meaningless research laboratory.	-2.04	39	-1.49	37	-1.29	34
34.	Newer pharmaceutical companies are trying unnecessarily with research, and market success cannot be achieved.	-0.16	24	-0.63	29	0.12	17
35.	In all countries it is advisable to maintain laboratories for pharmaceutical research, not because they could expect economic results, but because without that, the country would still be unable to follow the development of world science.	0.59	13	-0.49	28	2.00	1
36.	There are some types of drugs that are used to treat the most important for life, but with the quality of life ethically questionable.	-0.62	27	-0.40	26	0.12	16
37.	People trust local pharmaceutical drugs because of their quality-price ratio.	-1.00	31	0.23	18	-0.37	27
38.	The quality of pharmaceutical drugs satisfies the need of local consumers.	-0.72	29	-1.09	33	-0.79	30
39.	In Kazakhstan, Ukrainian, Russian and Belarusian medicines are more recognizable than medicines from Europe and the USA.	-1.06	32	0.13	20	-1.68	38

3.7. Interpretation of the results

When exploring concourse, we began by considering that there was a significant difference in opinion among respondents about their relationship with the pharmaceutical sector. People - and in this respect Kazakh are no exception - tend to think in stereotypes. With regard to the pharmaceutical industry, such a stereotype may be that drugs are expensive because they come from imports. Others say that the main reason for this is that they spend too much on advertising in the pharmaceutical industry and do not spend enough on drug research. According to other stereotypes, it is unnecessary for a small economy to develop its own pharmaceutical industry, because the research of original drugs is only rewarding for multinational companies with a strong capital. In developing countries, there is a relatively widespread view that, without their own research and development institution, it is impossible to catch up with the developed regions. Therefore, the pharmaceutical industry needs to be developed even if it does not seem economically rational. The state must definitely regulate and support the pharmaceutical industry. The 39 statements made should represent this diverse picture in a representative way. We hoped that the 20 people interviewed would express their opinions and identify certain types of opinions. At the start, we expected to be able to

identify at least three types, and we assumed that each type would be related to the person's qualification or job.

When we dealt with the types of opinions, exploring the concourse, we were expecting three types. At the end of the analysis, the following three types were identified based on the Q method:

1. type Positively biased pharma-experts (Committed Pharmacists)
2. type Some scepticism against the pharma sector (Doubt about the medical sector)
3. type Marketed and/or socialized health care (Marketizing the pharmaceutical sector)

Type 1. Positively biased pharma-experts (Committed Pharmacists)

As we have already mentioned in the methodological chapter, it is of little importance to which factor the person belongs. The fact that 11 persons belong to the first factor does not mean that they represent a majority opinion and that their opinion would be more important than the opinion of the others. Gulnur, Nurgul, Askar, Ahmed, Turar, Azamat, Ainura, Dana, Rosa, Darhan, Diana are in the first factor group, and they have very similar opinion. Some of them are working in the pharmaceutical industry or pharmacy, possibly a graduate in R&D, a ministerial position or a managerial position. The opinions expressed by 11 people describe a type relatively well. They form a center of opinion and agree that doctors tend to prescribe only the medicines they know, who consider the pharmaceutical industry to be a very profitable industry, and who think foreign manufacturers are too profit oriented. Their professional commitment is also reflected in the fact that pharmacists are highly respected. Pharmacists believe that they should also perform other services for the benefit of society. The pharmacy says they can't be a marketplace.

Let's take a closer look at what this type, called «Dedicated Pharmacist», describes? As we have seen above, Diana is considered to be an opinion leader based on Factor 1, this facilitates the identification of the factor. Diana agrees in +4 level with the following two statements:

3. Most doctors prescribe conventional and well-known drugs.

8. The pharmaceutical industry is one of the most profitable industries. For international firms the profit is more important than the healing of diseases.

Diana agrees with +3 levels with the next three statements:

18. The pharmacist should make a thorough professional review of each drugs bought by the consumer.

20. The pharmacy should be like a health marketplace, where consumers can get drugs, lifestyle advice, blood pressure measurements or whatever they need.

28. From a business interest, they also buy patents that they do not want to use. This slows down scientific progress.

Diana disagrees with - 4 levels with the following two statements:

32. A researcher, when he discovers a new drug, is best sold to his patent to world business.

33. In the pharmaceutical industry, research and licensing costs are so high that small-scale small companies can maintain a meaningless research laboratory.

And she disagrees in -3 level with the next three statements:

22. The pharmacist knows the medicine better than the physician, so it is advisable to ask him before the prescription of the medication,

26. The use of a drug is enough a belief that the disease will get better with treatment,

30. Research across the world of pharmaceuticals with minimal coordination would be enough to treat illnesses that affect only few people or poor people,

The Factor Scores for Factor 1 in descending order is shown in the following Table 12:

TABLE 12. FACTOR SCORES WITH CORRESPONDING RANKS (1ST FACTOR)

Statements	1. Factor scores	1.F. ranks
20.The pharmacy should be like a health marketplace, where consumers can get drugs, lifestyle advice, blood pressure measurements or whatever they need,	1,84	1
3.Most doctors prescribe conventional and well-known drugs,	1,75	2
28.From a business interest, they also buy patents that they do not want to use, this slows down scientific progress,	1,73	3
8.The pharmaceutical industry is one of the most profitable industries. For international firms the profit is more important than the healing of diseases,	1,57	4
18.The pharmacist should make a thorough professional review of each drugs bought by the consumer,	1,33	5
1.The pharmaceutical industry spends an unreasonably lot of money for advertisement of drugs,	0,97	6
17.The customers can use the competence of the pharmacists as support, when they decide what drugs to take, and when to take them,	0,95	30
19.The pharmacist should confirm to the consumer that the chosen drug is safe for use,	0,83	7
15.Some patients have more diseases and they get treatment for them, used drugs interact, we need independent research to study this issue,	0,8	8
38.The quality of pharmaceutical drugs satisfies the need of local consumers,	0,72	29

31.The branded drugs in the world are much more expensive than the quality difference justifies, the success of the drug is largely based on marketing,	0,7	9
10.The income of doctors largely depends on their relationship with the pharmaceutical industry, this undermine the credibility of the doctors,	0,69	28
4.It would be desirable to monitor the R&D activities of pharmaceutical companies more closely,	0,68	10
24.When a consumer has questions about his/her drugs, the pharmacist should answer them,	0,63	11
36.There are some types of drugs that are used to treat the most important for life, but with the quality of life ethically questionable,	0,62	27
14.Models of consumer behaviour can help pharmacists increase medication adherence, change smoking behaviour, communicate health messages, design services, and influence physician prescribing,	0,59	12
35.In all countries it is advisable to maintain laboratories for pharmaceutical research, not because they could expect economic results, but because without that, the country would still be unable to follow the development of world science,	0,59	13
30.Research across the world of pharmaceuticals with minimal coordination would be enough to treat illnesses that affect only few people or poor people,	0,52	26
5.The price of medicines should be determined by the state,	0,47	14
12.The aim of marketing is to know and understand the customer so well the product or service fits him and sells itself,	0,41	15
6.It is advisable to keep the medicines for acute diseases at a persistently low level,	0,35	16
29.Most of the innovations are not born today because explorers "want to make the world better", but from business interests or research fame,	0,3	17
27.The protection of intellectual property is a barrier to scientific progress, if world scientists could make their findings public, they would have solved a number of diseases,	0,25	25
7.People are consuming unnecessarily many medications, it would be reasonable to sell the drug for medical prescription only,	0,21	18
13.Understanding patient behaviour is essential to influencing them,	0,16	23
34.Newer pharmaceutical companies are trying unnecessarily with research, and market success cannot be achieved,	0,16	24
2.Pharmaceutical advertisement is very useful because the consumers are getting very useful information through it about new drugs,	0,15	19
11.The drug consumption is unjustifiably high,	0,13	20
21.The pharmacy I leave with good questions for the physician visit when I have discussed my drug use with the pharmacist,	0,1	22
25.Each drug has side effects, to use them for medication is based on the patient's assessment of risks versus benefits,	0,05	21
37.People trust local pharmaceutical drugs because of their quality-price ratio,	-1,00	31
39.In Kazakhstan, Ukrainian, Russian and Belarusian medicines are more recognizable than medicines from Europe and the USA,	-1,06	32
16.The pharmacy store should be an intimate private area where the consumer and the pharmacist can discuss how the consumer should use her/his medicines,	-1,08	33
23.The pharmacist's connections with the physicians make it 100% certain that everybody gets the right drug on,	-1,1	34
9.The pharmaceutical industry should operate based on the same ethical principles, like the doctors, the profit is secondary,	-1,12	35
22.The pharmacist knows the medicine better than the physician, so it is advisable to ask him before the prescription of the medication,	-1,39	36
32.A researcher, when he discovers a new drug, is best sold to his patent to world business,	-1,49	37
26.The use of a drug is enough a belief that the disease will get better with treatment,	-1,61	38
33.In the pharmaceutical industry, research and licensing costs are so high that small-scale small companies can maintain a meaningless research laboratory,	-2,04	39

Askar and Ahmed belong to the first factor. I also made a structured interview with them. I have highlighted the most important findings from their answers to the questions asked. These findings demonstrate the common values and clear commitment of the first factor to Kazakh pharmaceutical industry development. The following sentences in the two interviews convincingly prove the existence of the «Positively biased pharma-experts» type:

Is it good for Kazakhstan to develop own pharmaceutical industry?
Ahmed: Of course, it is necessary to develop the pharmaceutical industry in Kazakhstan. Today, about 87% of pharmaceutical products are imported from Russia, Belarus, Ukraine, India, China, Europe, America, Israel, and Japan. In Kazakhstan, more than 200 names of medicinal plants that are intended for the treatment and prevention of diseases (licorice root, white wormwood, hemp) germinate.
Askar: It is necessary to develop our own pharmaceutical industry, this, in addition to jobs and new medicines, also improves the country's image, reduces the outflow of capital from the country and attracts investments.
Turar: Kazakhstan is a country producing simple generic drugs based on imported raw materials from China, India and the Russian Federation. In Kazakhstan market consumption of medicines and medical products destination, the share of domestic production accounts for only 15%, and 85% are imported drugs (Germany, Russia, France). For this reason, domestic products are still not fully covering the needs of the Kazakhstan pharmaceutical market drugs by main pharmaco-therapeutic groups - cardiovascular system, digestive tract and metabolism, nervous system, musculoskeletal system, systemic antimicrobial drugs, urinary system and sex hormones, respiratory system, anticancer drugs and immune-modulators.
Opportunity for the development of the Kazakhstan pharmaceutical market may become a gradual transition from the production of simple generics to more challenging. For this reason, it is necessary to pay special attention to the development research activities in the pharmaceutical industry. The creation of research centers and research bases makes it possible increase the competitiveness of the industry. In addition, Kazakhstan grows its own vegetable raw materials from which simple herbal remedies are produced and exported to foreign markets. Processing plant materials and producing more complex drugs from medicinal plants can have significant economic effect - domestic enterprises will be able to provide local pharms with processed plant

raw materials, the country's export potential will increase, additional jobs will be created, and foreign investments will be attracted.

How important is the pharmaceutical sector to the economy?

Ahmed: Important for the economy of the country is the availability of innovative and original products. Scientific research, taxes, national security, import substitution.

Askar: The sector is important as an industry that provides growth in revenues to the economy, providing the country's population with domestic drugs.

Turar: Developed pharmaceutical industry of the state is an indicator of the economic development of the country, as well as a criterion of high innovativeness of the economy. Formation of a strong national pharmaceutical industry of the Republic is sufficiently time-consuming, laborious, complex and expensive process. But, nevertheless, the development of the pharmaceutical industry requires the creation of conditions for the health of the population.

The main task of the pharmaceutical industry today is creating conditions for the import substitution of pharmaceutical products through increasing production capacity and the introduction of modern technology in accordance with international GMP standards.

What to do and how to develop?

Ahmed: In order to attract investors, privileges, VAT, duties, preferences and premises are required, and the term for registering medicines is reduced. The role of investors is a scientific base for new and innovative drugs, the introduction of a quality standard in the production of medicines. We give preference to European manufacturers and standards.

Askar: It is necessary to provide comprehensive assistance to the development of the industry. The role of investors is very important. Foreign investment is needed from those who are actually drug developers and have experience implementing in production. Partners can be from different countries and the availability of their choice is very gratifying.

Turar: For the pharmaceutical industry in Kazakhstan, a steady growth in investment activity is needed. Attracting pharmaceutical leaders, the market will lead to the further acquisition of technological and personnel competencies for the production of innovative products. This will allow to produce more complex drugs. Due to participation in the production of domestic pharmaceutical products of foreign investors of world renown, Kazakhstan consumers could purchase high-quality medicines at an affordable

price. After all, global manufacturers allow us to expand the range and improve the quality of manufactured domestic products. All innovative developments in the production of new types of pharmaceuticals are carried out by leading global pharmaceutical manufacturers (Pfizer, Roche, Novartis, etc.), as they require significant financial investments and a competent research base.

Type 2. Some scepticism against the pharmaceutical sector

Type 2: «Some scepticism against the pharma sector» is represented by six people: Zhuldyz, Zhandos, Zhaslan, Asel, Svetlana, Arman representing the twenty respondents interviewed. Zhaslan is only included in the second factor with a positive factor weight, while in the other two factors Zhaslan's factor weights are negative. Arman, on the other hand, can be considered a hybrid and has a relatively high positive factor weight in all three factors, so it cannot be clearly linked to the second factor alone. All six people graduated from university. They are engineers, economists or language teachers according to their qualifications. Perhaps Arman's hybrid situation is explained by the fact that He was originally a chemical engineer, this qualification is professionally close to the pharmaceutical industry. Zhaslan's special position is not accidental. He is a financial economist who now works as a project manager and is therefore reasonably skeptical about the pharmaceutical potential of a relatively small economy.

TABLE 13. FACTOR SCORES WITH CORRESPONDING RANKS (2ND FACTOR)

Statements	2nd Factor scores	2nd F. ranks
9.The pharmaceutical industry should operate based on the same ethical principles, like the doctors, the profit is secondary,	1,96	2
20.The pharmacy should be like a health marketplace, where consumers can get drugs, lifestyle advice, blood pressure measurements or whatever they need,	1,45	3
31.The branded drugs in the world are much more expensive than the quality difference justifies, the success of the drug is largely based on marketing,	1,33	4
24.When a consumer has questions about his/her drugs, the pharmacist should answer them,	1,02	1
7.People are consuming unnecessarily many medications, it would be reasonable to sell the drug for medical prescription only,	1,01	5
10.The income of doctors largely depends on their relationship with the pharmaceutical industry, this undermine the credibility of the doctors,	1,01	6
25.Each drug has side effects, to use them for medication is based on the patient's assessment of risks versus benefits,	0,99	7

23.The pharmacist's connections with the physicians make it 100% certain that everybody gets the right drug on,	0,99	31
4.It would be desirable to monitor the R&D activities of pharmaceutical companies more closely,	0,95	8
28.From a business interest, they also buy patents that they do not want to use, this slows down scientific progress,	0,88	30
5.The price of medicines should be determined by the state,	0,85	9
34.Newer pharmaceutical companies are trying unnecessarily with research, and market success cannot be achieved,	0,63	29
12.The aim of marketing is to know and understand the customer so well the product or service fits him and sells itself,	0,6	10
3.Most doctors prescribe conventional and well-known drugs,	0,51	11
35.In all countries it is advisable to maintain laboratories for pharmaceutical research, not because they could expect economic results, but because without that, the country would still be unable to follow the development of world science,	0,49	28
16.The pharmacy store should be an intimate private area where the consumer and the pharmacist can discuss how the consumer should use her/his medicines,	0,45	27
36.There are some types of drugs that are used to treat the most important for life, but with the quality of life ethically questionable,	0,4	26
6.It is advisable to keep the medicines for acute diseases at a persistently low level,	0,39	12
17.The customers can use the competence of the pharmacists as support, when they decide what drugs to take, and when to take them,	0,38	13
27.The protection of intellectual property is a barrier to scientific progress, if world scientists could make their findings public, they would have solved a number of diseases,	0,37	14
8.The pharmaceutical industry is one of the most profitable industries, for international firms the profit is more important than the healing of diseases,	0,34	15
1.The pharmaceutical industry spends an unreasonably lot of money for advertisement of drugs,	0,34	16
18.The pharmacist should make a thorough professional review of each drugs bought by the consumer,	0,33	25
11.The drug consumption is unjustifiably high,	0,32	17
15.Some patients have more diseases and they get treatment for them, used drugs interact, we need independent research to study this issue,	0,27	24
37.People trust local pharmaceutical drugs because of their quality-price ratio,	0,23	18
26.The use of a drug is enough a belief that the disease will get better with treatment,	0,16	19
19.The pharmacist should confirm to the consumer that the chosen drug is safe for use,	0,14	23
39.In Kazakhstan, Ukrainian, Russian and Belarusian medicines are more recognizable than medicines from Europe and the USA,	0,13	20
21.The pharmacy I leave with good questions for the physician visit when I have discussed my drug use with the pharmacist,	0,1	21
13.Understanding patient behaviour is essential to influencing them,	0,03	22
32.A researcher, when he discovers a new drug, is best sold to his patent to world business,	-1,01	32
38.The quality of pharmaceutical drugs satisfies the need of local consumers,	-1,09	33
14.Models of consumer behaviour can help pharmacists increase medication adherence, change smoking behaviour, communicate health messages, design services, and influence physician prescribing,	-1,1	34
2.Pharmaceutical advertisement is very useful because the consumers are getting very useful information through it about new drugs,	-1,16	35
29.Most of the innovations are not born today because explorers "want to make the world better", but from business interests or research fame,	-1,43	36
33.In the pharmaceutical industry, research and licensing costs are so high that small-scale small companies can maintain a meaningless research laboratory,	-1,49	37

30.Research across the world of pharmaceuticals with minimal coordination would be enough to treat illnesses that affect only few people or poor people,	-1,87	38
22.The pharmacist knows the medicine better than the physician, so it is advisable to ask him before the prescription of the medication,	-1,94	39

Unfortunately, I did not have the possibility to make an interview with those in Cluster 2. Azamat in principle belongs to factor 1, but the weights of factor 2 and factor 3 are high as well in his case. He is a public administration expert by education so not a pharma expert like the others in the 1st factor. With him I also made an interview and Azamat's responses express the type of factor 2 and its main characteristic, skepticism about the development potential of the sector.

Is it good for Kazakhstan to develop own pharmaceutical industry?

Azamat: The pharmaceutical industry cannot be considered in isolation from the natural macroeconomic processes of export and import from the point of view of the global market. For example, economies of scale - economies of scale prove that it is profitable for two countries to trade among themselves.

Therefore, I believe, for Kazakhstan it does not seem appropriate to produce medicines that require serious research, production and distribution. This may be good in other countries. At the same time, Kazakhstan should still produce medicines that are the easiest to manufacture and can be consumed both in the domestic market and exported to other countries.

In this regard, each country is unprofitable to produce all the drugs and Kazakhstan is recommended to find its niche in world trade.

How important is the pharmaceutical sector to the economy?

Azamat: The Constitution of Kazakhstan guarantees the right of citizens to health protection.

In this regard, the system of the pharmaceutical industry of Kazakhstan should ensure the implementation of this right.

What to do and how to develop?

Azamat: The development of the pharmaceutical market, like any other market, should depend on the factors of price and quality. In this matter there should be no preferences. Therefore, the choice should be made on the basis of the best offer, long-term and stable relationships. At the same time, the state should also develop the concept of public private partnership with foreign and domestic investors.

3. Type Marketed and/or socialized healthcare

Type 3rd: «Marketed and/or socialized health care» is a mixed type, with sometimes contradiction viewpoints. This type is represented by two persons: Dinara and Zhanibek, both of them working as leader and they studied earlier in the West. On the one hand this type is very much market oriented, some of their attitudes are similar to attitudes of people who are living in advanced market economies. The Factor scores are in the Table 14.

TABLE 14. FACTOR SCORES WITH CORRESPONDING RANKS (3ND FACTOR)

Statements	3rd Factor scores	3rd Factor ranks
35.In all countries it is advisable to maintain laboratories for pharmaceutical research, not because they could expect economic results, but because without that, the country would still be unable to follow the development of world science,	2	1
31.The branded drugs in the world are much more expensive than the quality difference justifies, the success of the drug is largely based on marketing,	1,93	2
12.The aim of marketing is to know and understand the customer so well the product or service fits him and sells itself,	1,59	3
9.The pharmaceutical industry should operate based on the same ethical principles, like the doctors, the profit is secondary,	1,49	4
7.People are consuming unnecessarily many medications, it would be reasonable to sell the drug for medical prescription only,	1,47	5
17.The customers can use the competence of the pharmacists as support, when they decide what drugs to take, and when to take them,	1,22	6
3.Most doctors prescribe conventional and well-known drugs,	1,13	7
27.The protection of intellectual property is a barrier to scientific progress, if world scientists could make their findings public, they would have solved a number of diseases,	0,98	33
6.It is advisable to keep the medicines for acute diseases at a persistently low level,	0,9	32
30.Research across the world of pharmaceuticals with minimal coordination would be enough to treat illnesses that affect only few people or poor people,	0,88	31
14.Models of consumer behaviour can help pharmacists increase medication adherence, change smoking behaviour, communicate health messages, design services, and influence physician prescribing,	0,85	8
4.It would be desirable to monitor the R&D activities of pharmaceutical companies more closely,	0,79	9
38.The quality of pharmaceutical drugs satisfies the need of local consumers,	0,79	30
29.Most of the innovations are not born today because explorers "want to make the world better", but from business interests or research fame,	0,69	10
28.From a business interest, they also buy patents that they do not want to use, this slows down scientific progress,	0,61	29
19.The pharmacist should confirm to the consumer that the chosen drug is safe for use,	0,52	28
11.The drug consumption is unjustifiably high,	0,44	11

32.A researcher, when he discovers a new drug, is best sold to his patent to world business,	0,42	12
37.People trust local pharmaceutical drugs because of their quality-price ratio,	0,37	27
25.Each drug has side effects, to use them for medication is based on the patient's assessment of risks versus benefits,	0,35	13
20.The pharmacy should be like a health marketplace, where consumers can get drugs, lifestyle advice, blood pressure measurements or whatever they need,	0,23	26
10.The income of doctors largely depends on their relationship with the pharmaceutical industry, this undermine the credibility of the doctors,	0,21	14
15.Some patients have more diseases and they get treatment for them, used drugs interact, we need independent research to study this issue,	0,2	15
24.When a consumer has questions about his/her drugs, the pharmacist should answer them,	0,17	25
23.The pharmacist's connections with the physicians make it 100% certain that everybody gets the right drug on,	0,12	22
34.Newer pharmaceutical companies are trying unnecessarily with research, and market success cannot be achieved,	0,12	17
36.There are some types of drugs that are used to treat the most important for life, but with the quality of life ethically questionable,	0,12	16
8.The pharmaceutical industry is one of the most profitable industries, for international firms the profit is more important than the healing of diseases,	0,12	23
1.The pharmaceutical industry spends an unreasonably lot of money for advertisement of drugs,	0,12	24
2.Pharmaceutical advertisement is very useful because the consumers are getting very useful information through it about new drugs,	0,1	21
13.Understanding patient behaviour is essential to influencing them,	0,06	18
26.The use of a drug is enough a belief that the disease will get better with treatment,	0,02	20
18.The pharmacist should make a thorough professional review of each drugs bought by the consumer,	0	19
33.In the pharmaceutical industry, research and licensing costs are so high that small-scale small companies can maintain a meaningless research laboratory,	-1,29	34
16.The pharmacy store should be an intimate private area where the consumer and the pharmacist can discuss how the consumer should use her/his medicines,	-1,34	35
21.The pharmacy I leave with good questions for the physician visit when I have discussed my drug use with the pharmacist,	-1,43	36
5.The price of medicines should be determined by the state,	-1,67	37
39.In Kazakhstan, Ukrainian, Russian and Belarusian medicines are more recognizable than medicines from Europe and the USA,	-1,68	38
22.The pharmacist knows the medicine better than the physician, so it is advisable to ask him before the prescription of the medication,	-1,74	39

They disagree with the sentences: 5. the price of medicines should be determined by the state. 39. In Kazakhstan, Ukrainian, Russian and Belarusian medicines are more recognizable than medicines from Europe and the USA.

22. The pharmacist knows the medicine better than the physician, so it is advisable to ask him before the prescription of the medication.

This type tries to reconcile contradictory opinions. On the one hand, they affirm the market economy, on the other hand, they also consider the ethical and welfare aspects to be important in the day-to-day operation of the health sector. They are clearly open to accepting «western» culture and values, which are largely individualistic and market values (but at the same time affirm the «caring» institutional system (27, 9, 7 statements) (6. It is advisable to keep the medicines for acute diseases at a persistently low level. 9. The pharmaceutical industry should operate based on the same ethical principles, like the doctors, the profit is secondary. 7. People are consuming unnecessarily many medications, it would be reasonable to sell the drug for medical prescription only. 27. The protection of intellectual property is a barrier to scientific progress, if world scientists could make their findings public, they would have solved several diseases.).

4. Results, and discussion

4.1. 5.1. The main players in the Kazakhstan pharmaceutical industry: the biggest companies

In the Republic of Kazakhstan there are 202 enterprises, of which 4 are large, 8 medium and 190 small. Domestic manufacturers of pharmaceutical products are 80 enterprises.

1. Major company ChemPharm-Santo (share in the industry - 50%). The company produces drugs containing antibiotics and alkaloids. The company's capacity to produce antibiotics after launching a new production line reached 40 million vials a year. Chempharm exports its products to countries such as Russia, Kyrgyzstan, Tajikistan, Mongolia and Turkmenistan. The company's sales growth is due to the release of new products, the introduction of new developments, the increase in exports, as well as the volume of government purchases (Santo Member of Polpharma , 2015).

2. Nobel Almaty Pharmaceutical Factory (more than 20% share). The capacity of the company per year is 350 million tablets, 150 million capsules, 20 million bottles of syrup and suspension and 10 million tubes of cream. The main types of drugs produced by the company are expectorants, analgesic and

antipyretic drugs, hypnotics and sedatives, antiviral agents, antifungal agents. The company ranks second in terms of market volume among domestic producers after Chempharm (Nobel Almaty Pharmaceutical Factory, 2002).

3. AbdiIbrahim-GlobalPharm - main drugs produced are sugar reducing, anti-tuberculosis,

antibacterial, for the treatment of gastrointestinal diseases and other drugs. Annual production capacity is 1.5 billion tablets/capsules. At the enterprise there are more than 250 forms of release. In the future, it will expand the product portfolio through new molecules and release forms, engage in the introduction of modern and science-intensive drugs to the market, expand exports to the CIS countries and countries of South-East Asia (AbdiIbrahim-GlobalPharm, 2018).

4. Company DolcePharm offers a wide range of medical products. The high demand for products of Dolce LLP is influenced by the constant demand from medical institutions. The company covers the domestic market, and also exports its products to the countries of Central Asia and the CIS countries (Pharmaceutical company "DolcePharm", 2016).

5. Company Birunipharm. The annual capacity of the company is 240 000-260 000 sets of products. Concentrated acid solution for hemodialysis BF-A and concentrated base solution for hemodialysis BF-B is used to provide acid-base and water-electrolyte balance in hemodialysis treatment, treatment of patients suffering from chronic and acute renal failure, hypertension, intoxication. The company's solutions are registered in Kyrgyzstan and Uzbekistan (Birunifarm, 2018).

6. VivaPharm produces drugs in the following areas: cardiological, antihistaminic, antiviral, painkillers, vitamins, drugs for the treatment of CNS diseases. The volume of sales of products is 5,4 thousand kg, of which 4.4 thousand kg for the sale on the domestic market, 1.0 thousand kg for sale through SK-Pharmacy and 4 kg for export. The company has its own research laboratory for the development of generic medicines. The production capacity is 200 million tablets per year (ViVaPharm, 2018).

7. Nur-Mai Pharmacy is the manufacturer of parenteral solutions (a total of 9 drugs). The company is engaged in the production of infusion solutions in polypropylene containers and injection solutions in vials. The company's production capacity is 12 million containers/bottles per year (Nur-Mai Pharmacy, 2018).

8. Company Sultan produces liquid, solid, disinfectant medicines. In addition, the company is engaged in packaging of bulk products and produces packages for liquid preparations (SultanPharm, 2018).

9. Company Eleas Pharm produces sterile injectable powders, antibacterial drugs (beta-lactam antibiotics). The annual capacity of the company is 20 million bottles. The drug portfolio includes the following areas - antibiotic therapy for intra-abdominal infections, for the treatment of severe out-of-hospital and nosocomial infections, infections of the abdominal cavity, lower respiratory tract, genitourinary system, gynecological infections, septicemia, infective endocarditis, infections of bones and joints, skin and soft tissues (Eleas Pharm, 2018).

10. Company FitOleum produces natural Fito preparations based on natural raw materials. The basic preparations of the enterprise are: KyzylMai polyfitooil, candles of Kyzylmai and candles of Kyzylmai with propolis, biologically active additives (fito-tea and honey in assortment), cosmetics (burdock oils) (FitOleum, 2018).

4.2. Is the problem originating from the economies of scale or is it more than that.

Administrative barriers, which include complex procedures for laboratory analysis, lengthy consideration of registration of medicines, procedures for multiple re-registration (up to 6 months) of drugs also adversely affect the development of the industry. Domestic producers can suffer tangible losses as a result of going through lengthy administrative procedures.

The imperfection of the post-registration monitoring system for the safety and efficacy of medicines is noted on the market of medicines. Consequently, in clinical practice, when deciding on the use of medicines, there is insufficient data on the safety and efficacy of the drugs.

The introduction of international standards GXP in the pharmaceutical industry of Kazakhstan has been an actual direction for several years. The need for innovation is not in doubt, and the requirements for the transition to GXP standards by 2018 are legally enshrined in the Code of the Republic of Kazakhstan «On the Health of the People and the Health System». Thus, the implementation of the international standard GPP (good pharmacy practice) will help improve the quality of drugs. However, there are risks of reducing competition and access to drugs by reducing the number of pharmacies. The

risk to a greater extent may be provided by pharmacy institutions located in rural areas.

One of the limiting factors in the development of the pharmaceutical industry is the high demand for qualified personnel. In the market there is an insufficient level of professional training and a shortage of qualified personnel. To improve the skills of new employees, companies at their own expense conduct training and internships. At present, based at ChemPharm, there is a training center for the training of highly qualified specialists of various profiles using the latest technologies.

The discipline of clinical pharmacology is rapidly developing on the world pharmaceutical market. Clinical pharmacology studies various problems of drug therapy - the methodology of clinical trials, the metabolism of drugs, molecular pharmacogenetics, the analysis of drug intake, etc. The main direction of this discipline as a specialty is the study of questions concerning the health of patients. Specialists working in this field are trying to narrow the gap between drug manufacturers and clinicians. At present, there are about 200 clinical pharmacologists in Kazakhstan, of which only 5% are graduates, the rest have certificates. Moreover, there is no status of clinical pharmacologists, regulatory legal acts, quotas for training in the specialty of «clinical pharmacology».

In the portfolio of domestic pharmaceutical manufacturers there are obsolete and low-profitable generic drugs, which prevents the provision of the population with domestic products that meet international standards and technical regulations. Thus, in the pharmaceutical market of Kazakhstan there is a problem of poor quality of medicines.

The backwardness of domestic technologies for the production of medicines does not allow import substitution of medicines. Domestic production is unable to completely cover the needs of the Kazakhstani pharmaceutical market with medicines on the main pharmacotherapeutic groups (the share of domestic drugs is 10%). Under the existing conditions, the import substitution process will be lengthy due to administrative barriers (changes in the legal framework are required), lack of financing for the re-equipment of production facilities, and updating of the pharmaceutical portfolio. On average, the modernization of production takes 3-4 years. In the process of reconstruction, it is also necessary to maintain the existing production process, train the personnel, switch over to the assortment.

Another problem in the domestic market is the lack of own innovative drugs. Kazakhstan is the country of release, mainly of generic drugs. The most of domestic producers' products consists of low-margin medicines, which prevents the allocation of the required amount from the proceeds for R&D.

In Kazakhstan, there is a decline in the clinical trials market. So, in 2015, only 12 clinical trials were conducted, which is 3 times lower than in 2014. All clinical trials were conducted only by domestic manufacturers. The decrease is due to the obsolete regulatory framework, as the Rules for the conduct of clinical trials and (or) trials of pharmacological and medicinal products, medical devices and medical equipment were approved in November 2009. The main barriers for attracting international clinical research to Kazakhstan include insufficient experience of the country's participation in clinical research; absence of a register of clinical studies conducted in Kazakhstan; insufficient number of medical institutions for conducting clinical trials, since mainly clinical research is carried out by universities and research institutes; insufficient number of experienced researchers. Insufficient number of research institutions reduces the country's attractiveness for conducting clinical trials. Terms for the approval of clinical trials, which are 120-160 days are a barrier to the participation of Kazakhstani medical institutions in international clinical trials. In addition, there is no regulatory procedure in Kazakhstan that regulates the importation of equipment and medical devices for clinical trials.

Conducting international clinical research affects the development of medical science in terms of improving the level of skills of medical personnel, transfer of advanced technology. The sponsor of the Clinical Research provides equipment, which is then donated to the clinic for free. Thus, the conduct of clinical research can become a locomotive for the development of medicine. The main barriers to conducting clinical trials in the Republic of Kazakhstan are the incompatibility of medical organizations with the criteria for accreditation for conducting clinical trials, as well as the shortage of qualified specialists with GCP certificates.

In addition, in the pharmaceutical industry, there are the following barriers: the possibility of import and distribution of counterfeit products; lack of financial resources for the implementation of government programs for the development of the pharmaceutical market; the growth of tariffs for energy carriers, as well as the high cost of capital construction; insufficiently effective cooperation between the state, business and science in the field of creating

complete technological cycles for the production of pharmaceutical products through the formation of innovative clusters; domestic products are mainly exported to the CIS countries (KIDI, Annual report, 2018).

4.3. The difference between Export-Import activities in the pharmaceutical industry in Hungary and Kazakhstan

The aim is a theoretical review of the export and import of pharmaceutical products. Here was studied the dynamics of export and import of pharmaceutical products from Kazakhstan and Hungary between 2001-2018 years. Calculations of exports and imports of pharmaceutical products per capita compared with GDP per capita in Kazakhstan and Hungary for the period 2001-2018. Priorities for the development of the Hungarian pharmaceutical industry and export orientation have been determined, than on the domestic market, also the development strategy for the pharmaceutical industry in Kazakhstan, which is oriented to the domestic market with a small share of exports.

According to the estimation, the world export of pharmaceutical products amounted to 600.907 million USD in 2018, which shows an annual growth compared to 2001, when it amounted to 117.432 million USD. World imports of pharmaceutical products totaled 628.806 million USD in 2018, and in 2001 amounted to 116.940 million USD.

On Figure 17 Kazakhstan shows amount of pharmaceutical exports in 2018 34.9 million USD and 1.714 million USD in 2001. However, it is gradually gaining momentum, mainly in neighboring countries: Uzbekistan, Kyrgyzstan, Tajikistan, Russia, Belarus, Mongolia, Afghanistan and other countries. Imports of pharmaceutical products totaled 1.177 million USD in 2018, in 2001 121 million USD, a decrease compared to 2013, when turnover was 1.615 million USD.

Export of pharmaceutical products in Hungary in 2018 amounted to 6.389 million USD in 2001 it was 415 million USD, which shows a dynamic growth, exporting to Russia, Poland, Great Britain, Kazakhstan, Ukraine, Czech Republic, Romania, Moldova, etc. That proves its export-orientation to foreign markets. Imports of pharmaceuticals in Hungary totaled 5.587 million USD in 2018. Imports are carried out mainly from Germany, France, Belgium, Great Britain, the Netherlands and Italy (See Figure 17).
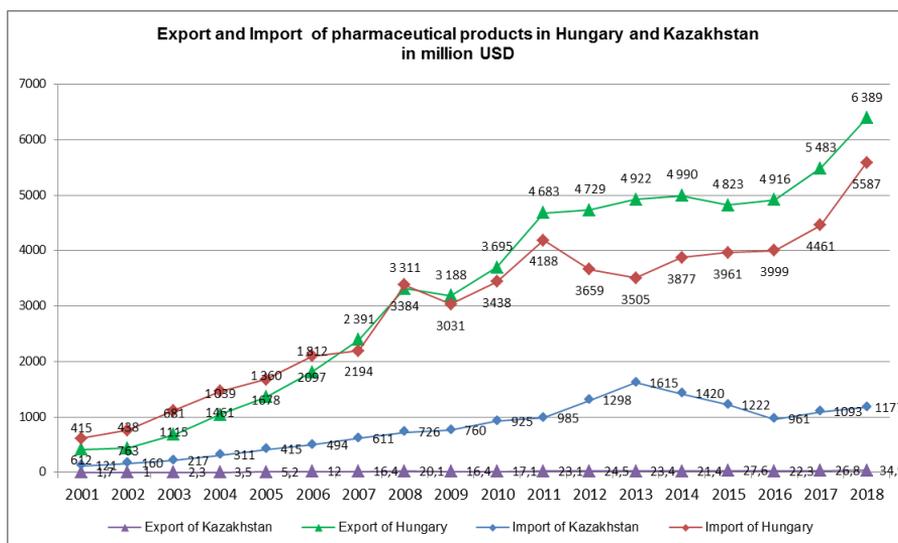
Figure 17. EXPORT-IMPORT OF PHARMACEUTICAL PRODUCTS OF HUNGARY AND KAZAKHSTAN IN MILLION USD BETWEEN 2001-2018 YEARS

Source: (Trade statistics for international business development, 2001-2018).

Export of Pharmaceutical products per capita of Kazakhstan and Hungary in compared with GDP per capita 2001-2018 years

As we see in Figure 18 below in Kazakhstan, GDP per capita in 2018 was 8111 thousand USD. The main reason for the decline in GDP per capita in Kazakhstan was the fall in oil prices, this is the main export-oriented product of the country, which brings about half of the revenues to the country's budget. The consequence was devaluation, in August 2015 for 1 USD rose from 188 KZT to 384 in January 2016.

Hungary's GDP per capita amounted to 12833 thousand USD in 2018. The reasons for the decline in GDP per capita are: the consequences of the global crisis, the reduction of investment - the restriction of cash flows to the country of EU structural funds, the fall in domestic production and a decrease in investment.

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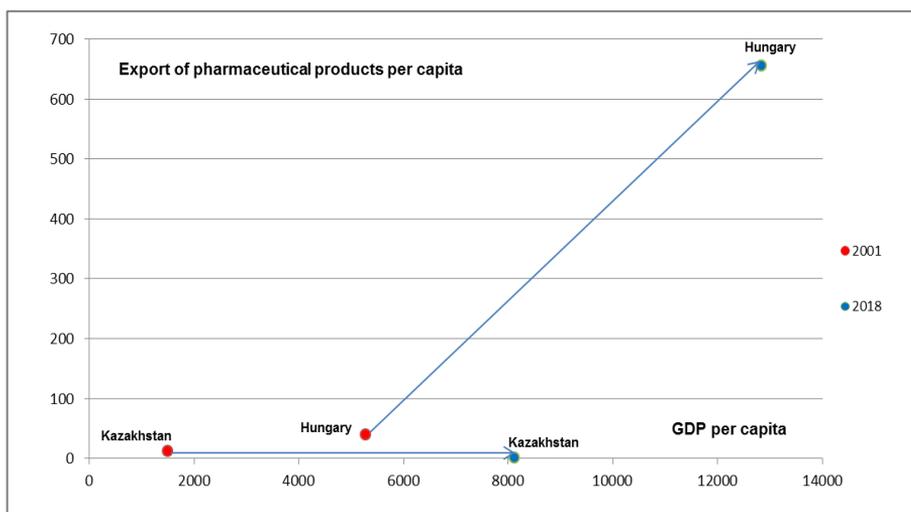
FIGURE 18. EXPORT OF PHARMACEUTICAL PRODUCTS PER CAPITA OF HUNGARY AND KAZAKHSTAN IN COMPARED WITH GDP PER CAPITA IN USD BETWEEN 2001-2018 YEARS

Source: (Trade statistics for international business development, 2001-2018).

Export of pharmaceutical products of Kazakhstan per capita in 2018 was 1.91 USD, and in 2001 - 0.12 USD, which shows at the same level. The export of pharmaceuticals per capita in Hungary in 2018 amounted to 655.60 USD, and in 2001 - 40.68 USD, which indicates a significant increase in exports (See Figure 18 and Table 15).

TABLE 15. EXPORT OF PHARMACEUTICAL PRODUCTS PER CAPITA OF HUNGARY AND KAZAKHSTAN IN COMPARED WITH GDP PER CAPITA IN USD BETWEEN 2001-2018 YEARS

Country	2001 GDP per capita in thousand USD	2001 Export of pharmaceutical products per capita in USD	2018 GDP per capita in thousand USD	2018 Export of pharmaceutical products per capita in USD
Hungary	5267	40.68	12833	655.60
Kazakhstan	1491	0.12	8111	1.91

Source: (Trade statistics for international business development, 2001-2018).
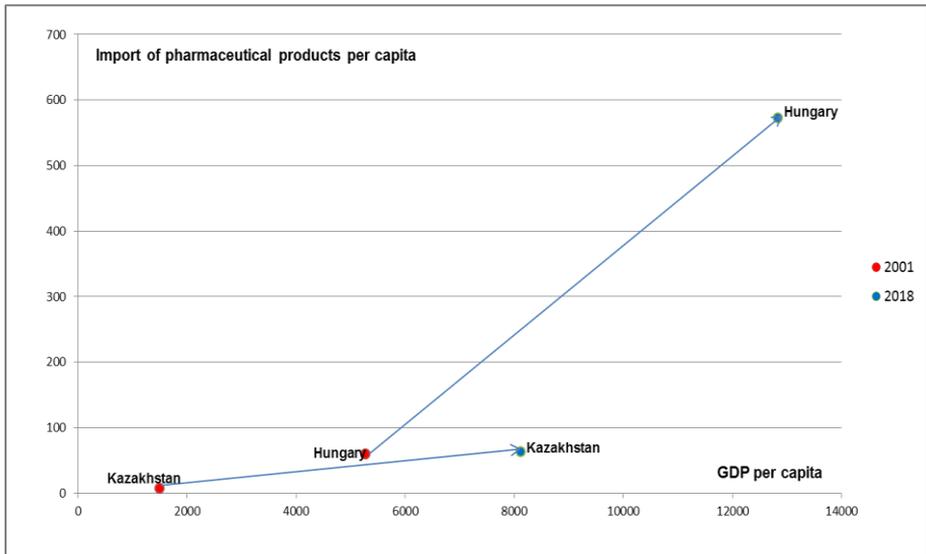
FIGURE 19. IMPORT OF PHARMACEUTICAL PRODUCTS PER CAPITA OF HUNGARY AND KAZAKHSTAN IN COMPARED WITH GDP PER CAPITA IN USD BETWEEN 2001-2018 YEARS
Source: (Trade statistics for international business development, 2001-2018).

Figure 19 shows that in 2018 imports of pharmaceutical products per capita in Kazakhstan amounted to 64.67 USD, and in 2001 8.13 USD, there is a continuation of imports of pharmaceutical products. Hungary imported pharmaceutical products per capita in 2018 by 573.27 USD and in 2001 - 60.04 USD (Figure 19 and Table 16).

TABLE 16. IMPORT OF PHARMACEUTICAL PRODUCTS PER CAPITA OF HUNGARY AND KAZAKHSTAN IN COMPARED WITH GDP PER CAPITA IN USD BETWEEN 2001-2018 YEARS

Country	GDP per capita in thousand USD in 2001	Import of pharmaceutical products per capita USD in 2001	GDP per capita in thousand USD in 2018	Import of pharmaceutical products per capita USD in 2018
Hungary	5267	60.04	12833	573.27
Kazakhstan	1491	8.13	8111	64.67

Source: (Trade statistics for international business development, 2001-2018).

4.4. Comparing the impact of export of pharmaceutical products on the economic growth of Hungary and Kazakhstan

In recent years the trade and economic relations between Hungary and Kazakhstan has developed successfully in such areas as energy, food, pharmaceuticals, engineering, education and tourism. Kazakhstan is the third partner in the trade turnover of Hungary after Russia and Ukraine, despite the geographical distance of the two countries.

The aim of the dissertation is to show the effect of the pharmaceutical export on the economic growth of Hungary and of Kazakhstan between 2001-2018 years.

Any national economy in its development strives to achieve economic growth measured by gross domestic product per capita. The economic growth especially important for countries like Kazakhstan where the living standard is still very low, so the government should stimulate it measures by all possible means.

The size of the population in Hungary and in Kazakhstan is comparable. In the year 2018 the population was 9.7 million in Hungary and 18.2 million in Kazakhstan (Committee on Statistics Ministry of National Economy of the Republic of Kazakhstan, 2018), (Hungarian Central Statistical Office, 2001-2018). The difference is growing because the population is declining in Hungary, but it is still growing in Kazakhstan. In Hungary the GDP/capita is higher than in Kazakhstan. In Hungary in 2018 the GDP/capita was 12833 USD and in Kazakhstan was 8111 USD.

In Hungary the GDP/capita started to grow again, but this is still lower than it was in 2008 when it was 15600 thousand USD. The decline in GDP per capita was the consequence of the global financial crisis, the restriction of cash flows to the country of EU structural funds, a drop in domestic production and a decrease in investment (Overview of the economic sphere in Hungary, 2015). The GDP/capita in Kazakhstan has been decreasing since 2014 it was 12800 thousand, in 2013 13800 thousand USD. The main reason is decline in GDP per capita in Kazakhstan are the falling oil prices. As it is well-known the main export product of the country is oil, which brings about half of the revenues of the country's budget. The consequence of the oil market turbulence was the devaluation of the KZT in August 2015 from 188 KZT/USD to 384 KZT/USD in January 2016 (Committee on Statistics Ministry of National Economy of the Republic of Kazakhstan, 2018).

4.5. The expenditure for Marketing, Sales and R&D of pharmaceutical products in Hungary

In the Hungarian pharmaceutical market 77% of medicines were sold in pharmacies and only 23% in hospitals in 2015. In 2015 the Hungarian pharmaceutical industry invested 310.344 million USD on R&D. This industry employs more than 15000 employees. In Diagram 4 we see that the most ingenious Hungarian pharmaceutical company Richter Gedeon spent 98.310 million HUF on Marketing and Sales and 34.822 million HUF on R&D in 2015. In 2000 Richter Gedeon spent 10.672 million HUF on Marketing and Sales and 5.611 million HUF on R&D (Richter Gedeon Delivering quality therapy since 1901, Annual Report, 2000-2015) (See Diagram 4 and Table 17).
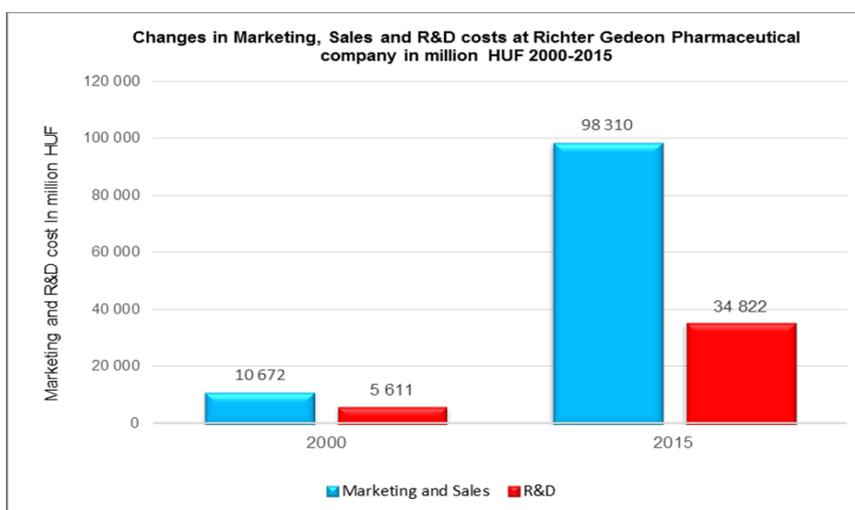
DIAGRAM 4. CHANGES IN MARKETING, SALES AND R&D COSTS AT RICHTER GEDEON PHARMACEUTICAL COMPANY IN MILLION HUF BETWEEN 2000-2015 YEARS

Source: (Richter Gedeon Delivering quality therapy since 1901, Annual Report, 2000-2015).

As we see in Diagram 4 and in Table 17 in 2015 Richter Gedeon spent nine times more on Marketing and six times more on R&D than in the year 2000, therefore the expenditure on marketing grew much faster than the expenditure on R&D, which is in harmony with the world trends (See Diagram 4 and Table 17).

Richter Gedeon company	2000 in million HUF	2015 in million HUF	Growth 2000-2015 in%
Marketing and Sales	10.672	98.310	927
R&D	5.611	34.822	620
Marketing/R&D Cost ratio	1.9	2.8	-

Source: (Richter Gedeon Delivering quality therapy since 1901, Annual Report, 2000-2015)

Richter Gedeon is the leader among the independent Hungarian pharmaceutical companies in investment in research, their share in the total turnover is almost 10%, which in absolute terms puts the company in the 1st place concerning the level of expenditure on R&D in the country and in Central and Eastern Europe as well (Report Hungary Pharmaceuticals&Healthcare, 2015).

The pharmaceutical companies spend €4.0 million on advertisements in medical journals in Hungary. The total amount spent by pharmaceutical companies on product advertisements in the 115 Hungarian printed medical journals came to almost 1.2 billion HUF in 2015 (€4 million), Comfit, a media monitoring company, which specializes in medical journals, revealed it to Central Europe Pharma News. The same companies spend 478.7 million HUF (€1.6 million) on advertising the companies themselves (not their products). Richter Gedeon led the field in terms of advertising expenditure, with a figure of 90.4 million HUF (€303000). In the second place there were Egis and Woerwag Pharma (Central Europe Pharma News Issue, 2013).

4.6. The expenditure on generic drugs and on Marketing of pharmaceutical products in Kazakhstan

The pharmaceutical market of Kazakhstan was estimated at 1.7 billion USD in 2015, the market is divided into retail pharmacy sales and government procurement. In Diagram 5 we can see the structure of the pharmaceutical market in Kazakhstan from 2000 to 2018 as imports remain between 78% and 92%. Out of these domestic productions of pharmaceutical products occupies

only 22%. The main parts of the product portfolios of domestic manufacturers are low-profit generic drugs (share in the total market volume is 90%) and the market of the original drugs is 10%, which allows pharmaceutical manufacturers to allocate their profits on R&D of new original drugs (See Diagram 5 and Table 18).
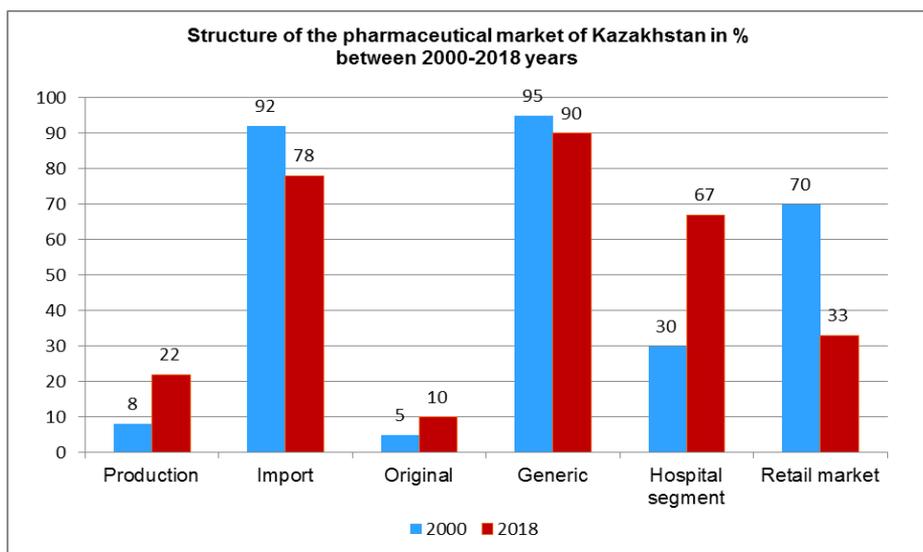
Structure of the pharmaceutical market of Kazakhstan in % between 2000-2018 years

Sources: (Consulting Group "Vi-ORTIS", 2018), (Single Distributor "SK-Pharmaceuticals", 2018).

Diagram 5 and Table 18 show the structure of the pharmaceutical market in Kazakhstan for 2000-2018 years. In 2018 retail pharmaceutical market occupied 33% of the total Kazakhstan market, hospital segment 67%. The retail segment is widely represented by well-known drugs. The rating of the most growing and large market includes vitamins, remedies for cold diseases, for the treatment of the gastrointestinal tract, as well as antibiotics and painkillers.

The hospital sector of procurement of medicines has been more oriented on purchase from domestic manufacturers of pharmaceutical products since 2010, thus the state supports domestic manufacturers of pharmaceutical products for the development of the pharmaceutical industry in Kazakhstan

(Single Distributor "SK-Pharmaceuticals", 2018) (See Diagram 5 and Table 18).

KAZAKHSTAN	2000 IN %	2018 IN %
Production	8	22
Import	92	78
Original	5	10
Generic	95	90
Hospital segment	30	44
Retail market	70	56

Sources: (Consulting Group "Vi-ORTIS", 2018), (Single Distributor, SK-Pharmacy).

The biggest Kazakhstan pharmaceutical company ChemPharm-Santo produces generic drugs and spends much less on marketing than on production of generic drugs. Diagram 6 shows how the pharmaceutical company ChemPharm-Santo spends a very small share of its revenue of 15.1 million KZT on marketing. The production of generic drugs in 2015 produced 733.3 million KZT however in 2000 it produced more than 843 million KZT (See Diagram 6 and Table 19).
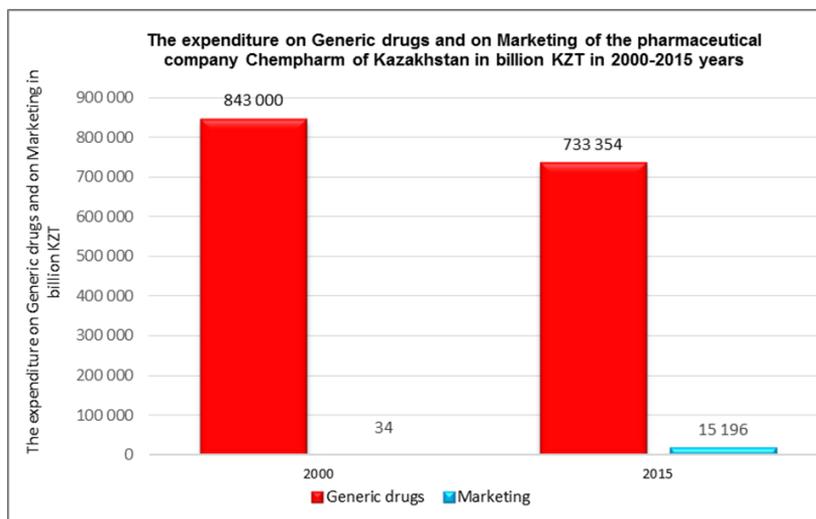
DIAGRAM 6. THE EXPENDITURE ON GENERIC DRUGS AND ON MARKETING OF THE PHARMACEUTICAL COMPANY CHEMPHARM OF KAZAKHSTAN IN MILLION KZT IN 2000-2015 YEARS

Sources: (Santo Member of Polpharma Group, Annual report, 2000), (Santo Member of Polpharma Group, Annual report, 2015).

Diagram 6 and Table 19 show the expenditure on generic drugs and on Marketing of the pharmaceutical company ChemPharm-Santo of Kazakhstan in 2000-2015 years.

TABLE 19. THE EXPENDITURE ON GENERIC DRUGS AND ON MARKETING OF THE PHARMACEUTICAL COMPANY CHEMPHARM OF KAZAKHSTAN IN MILLION KZT IN 2000-2015 YEARS

ChemPharm	2000 million KZT	2015 in million KZT
Generic drugs	843 000 000	733 354 000
Marketing	33 641	15 196 000

Sources: (Santo Member of Polpharma Group, Annual report, 2000), (Santo Member of Polpharma Group, Annual report, 2015).

Foreign pharmaceutical companies in Kazakhstan spend about 10-15% of annual turnover on marketing programs to introduce their products to doctors, including sponsoring a conference participation and publication. In the over-the-counter segment where direct advertising of medicines for consumers is allowed, foreign manufacturers also managed to increase their market share. Foreign pharmaceuticals increased their market share thanks to advertising, despite the fact that domestic medicines were cheaper, but they were not properly advertised. In Kazakhstan imported branded generics and innovative drugs are very popular among physicians, and pharmacy staff often recommends patients who they cured.

4.7. The regulation of advertising and promotion of pharmaceutical products in the United States of America, Europe, Hungary and Kazakhstan

We consider how each country regulates the advertising of pharmaceutical products. In the USA marketing and distribution of pharmaceuticals is heavily regulated by the federal Prescription Drug Marketing Act. In general, pharmaceutical companies adhere to FDA regulatory guidelines that require all DTC ads and information to be accurate in order to provide substantive

evidence of any statements that have been made, to strike a balance between the risks and benefits of the product being promoted and to maintain consistency with the labeling approved by the FDA (U.S. Food and Drug Administration, FDA, 2017). Europeans still have quite limited exposure to pharmaceutical advertisements for prescription drugs. The EU is of particular attraction to pharmaceutical companies, however, as it accounts for a full one-third of global drug sales. In Europe, the advertising is regulated by the International Federation of the Pharmaceutical Industry Manufacturers and Associations (Eagle L & Kitchen P, 2002).

Here are the details about the regulation of advertising and promotion of pharmaceutical products in Hungary and Kazakhstan. In Hungary the sales promotion sent to doctors and advertisements in publications shall be regulated by law. Professional/scientific audit and punishment for false and biased promotional materials the National Institute of pharmacy and Nutrition (OGYEI) (Lengyel G, 2007).

Advertising of drugs in Kazakhstan shall be conducted in accordance with the order of the Ministry of health of the Republic of Kazakhstan. In Kazakhstan advertising of drugs is regulated by the Law of the Republic of Kazakhstan «On Advertising» and National center for expertise of drugs (National center for expertise of medicines, medical devices and medical equipment, Dari.kz).

5. Recommendations for policymakers!

The development and production of new generation antibiotics can be a promising direction. According to the World Health Organization (WHO), new bacteria become resistant to all existing antibiotics. WHO published a list of the main bacteria with which to fight: Acinetobacter baumannii, Pseudomonas aeruginosa, Enterobacteriaceae (critical urgency); Enterococcus faecium, Staphylococcus aureus, Helicobacter pylori, Campylobacter spp., Salmonellae, Neisseria gonorrhoeae (high urgency); Streptococcus pneumoniae, Haemophilus influenzae, Shigella spp. (medium urgency). These types of bacteria are resistant to treatment, which can lead to death. The list shows the scientific community the sphere where it is necessary to concentrate. Over the past 10 years, only few new antibiotics have appeared on the pharmaceutical market due to the fact that antibiotics do not bring big profits, because antibiotics are taken for a short time.

Another promising area of pharmaceuticals is the biotechnology industry. However, the development and production of biotech products poses a greater risk than the production of generic drugs. For this reason, it is necessary to take measures to reduce costs and risks through public funding for clinical research and the creation of industrial consortia. Accelerated development of biotechnological services implies changes in the regulatory framework based on the analysis of international experience of other countries, where the biotechnological segment developed over a long period of time.

The possibility of creating an innovative base of pharmaceutical enterprises can be a gradual transition from the production of simple generic drugs to more complex ones. At the moment, the CIS countries have their own generic productions. For this reason, further expansion of Kazakhstani exports to the CIS countries will be conditioned by the capabilities of domestic producers to offer competitive innovative products or analogs of unique complex drugs.

The innovative potential of domestic pharmaceutical enterprises directly depends on the provision of state support and the creation of an innovative climate. In order to further obtain technological and personnel competencies in the production of innovative drugs, it is necessary to attract leaders of the pharmaceutical market. The interest of foreign investors is due to the availability of storage facilities at the Kazakh side, as well as the infrastructure. Through their of Kazakh partners, foreign companies get opportunities to promote products in the Kazakhstan market, established sales channels, and administrative resources. From such an alliance, domestic companies benefit from investments, advanced technologies and innovations. Implementation of international standards GXP (system of good practices) provides quality in the production of drugs and provides access to international markets. According to the proper practices, quality standards are established at all stages of drug production. A very important standard is the GVP (the standard of post-registration observations), which allows recording cases of side effects or inaction of drugs.

To introduce new qualifications for the pharmaceutical industry, cooperation between higher education institutions and pharmaceutical enterprises should be strengthened. In this regard, it is necessary to create a platform for discussing topical issues and problems in the field of education, which can reduce the existing gap between the education received and the real needs of pharmaceutical enterprises.

The creation of centers for the development of new drugs on the basis of higher education institutions will allow to unite the stakeholders in the pharmaceutical industry. At the same time, in higher educational institutions in the field of pharmaceuticals, it is necessary to update educational programs, considering international experience and standards. Thus, educational programs should be taught in accordance with GMP standards, which would further facilitate the work of the pharmaceutical complex after the introduction of the international standard of GMP and in the future would allow the creation of competitive production. In addition, the creation of a training center for pharmacists should be envisaged for the international standard of GMP, involving domestic and foreign specialists.

To achieve high production of pharmaceutical products, it is necessary to increase the level of state support for the industry. Measures should be envisaged for producers of domestic pharmaceutical products:

- receiving loans guaranteed by the government with a deferred payment and partial reimbursement of the loan from the republican budget;
- financial support from the state when registering domestic drugs abroad, buying licenses and raw materials;
- exemption from payment of import customs duties on equipment necessary for the investment project;
- development of mechanisms for the inclusion in the existing long-term contracts of new, innovative medicines produced by domestic producers that have evidence-based medical effectiveness;
- development of a mechanism for redistributing the supply of drugs between domestic producers, in case of failure to fulfill the declared obligations under long-term contracts;
- strengthening the position of domestic pharmaceutical companies by stabilizing existing measures of state support (primarily in the framework of the state order);
- development of new mechanisms to stimulate investment in the pharmaceutical industry, which should create conditions for a new qualitative growth in domestic production of pharmaceutical products in the long run;
- monitoring of new categories of diseases that tend to spread in Kazakhstan, as well as in other countries;
- establishment of centers for the development of new medicines for the planned import substitution of medicines;

- approval of specialties for the development and production of medicines in higher and specialized educational institutions, as well as training specialists taking into account international standards of GMP.

In addition, it is necessary to maintain the level of purchased pharmaceuticals within the guaranteed volume of free medical care because of their great social importance. From the state side, it is necessary to provide support to domestic pharmaceutical enterprises in the form of preferences and benefits. To date, there has been a decline in the purchasing power of pharmaceutical companies, as well as the renewal of a memorandum to contain prices for essential medicines in Kazakhstan. Under the changed market conditions, it is necessary to take measures to stimulate the activities of domestic pharmaceutical manufacturers, which may suffer economic losses due to the containment of prices for medicines in the changed market conditions.

It should also be noted that domestic producers should be actively involved in the existing measures of state support provided for under various development programs, including reimbursement of costs incurred for training and professional development of personnel.

6. Summary

We analyzed the export and import of pharmaceutical products. The Hungarian pharmaceutical industry is oriented to foreign markets rather than to the domestic market, the Kazakh pharmaceutical industry is more focused on import substitution of pharmaceutical products. I studied the reduction of pharmaceutical imports to Kazakhstan and to Hungary, as well as determined the growth in the export of pharmaceutical products, which means that overall there is growth, the competitiveness of pharmaceutical products in Hungary and Kazakhstan.

The dynamics of the development of pharmaceutical products is compared with the export of pharmaceutical products. The share of exports in the pharmaceutical production of Hungary and of Kazakhstan is considered where it can be seen that the Hungarian pharmaceutical industry is focused on exports than on the domestic market. And Kazakhstan's pharmaceutical production is aimed at import substitution of its products rather than for export, although is it gradually gaining momentum. The production of pharmaceutical products per capita of Hungary and Kazakhstan for 16 years is calculated. The measures of state support for the promotion of

pharmaceutical products for the export of Hungary and Kazakhstan are considered. The strategies for the development of the Hungarian pharmaceutical industry, which is oriented to export and influence on economic growth, are defined. The Kazakhstan pharmaceutical industry is concentrated on the domestic market and the production of generic drugs. Today pharmaceutical manufacturers in Kazakhstan create production in accordance with international standards of excellence in order to accelerate the production of pharmaceutical products for export. Measures are being taken for realization of pharmaceutical products, establish joint production, exchange and transfer of experience between the two countries.

I analysed the expenditure on R&D by the industry sectors for the period 2005-2018. I have considered the costs of 10 leading companies in the world focusing on R&D for 18 years. I have studied the expenditure on R&D and on Marketing, sales of global pharmaceutical companies for the period 2000-2018. The top 5 global pharmaceutical companies spend more on Marketing and Sales than on R&D, and since 2000 the gap has been permanently increasing. The R&D expenditure used to be above 40 % and in 2018 it was less than 30 % in three cases out of five.

I have examined the expenditure of the company Richter Gedeon, which is still an independent Hungarian company and still has original medicines where the patent belongs to them and also the Kazakhstan Company Chempharm, which focuses on the production of generic drugs. In addition to market statistics, I have considered the differences in regulation between countries with special attention to Hungary and Kazakhstan. This trend exists in Hungary and in Kazakhstan as well.

The Hungarian companies heavily promote their products in journals, as well as through radio and television. I compared the regulation of advertising and promotion of pharmaceutical products in the USA, Europe, Hungary and Kazakhstan. I recommend the Governments and the International institutions to implement means which drive the pharmaceutical companies back to research. The governments should set limits for the advertisement in this field. They have to promote the open an the crowdsourcing innovations to make this kind of public good affordable for the poor as well.

To develop research in the pharmaceutical industry, measures to support domestic producers in terms of cost recovery associated with R&D should be considered. The creation of scientific centers and research bases makes it possible not only to expand the domestic market, but also to enter foreign

markets, as well as increase the competitiveness of the industry. It requires active state participation in financing R&D through improving the regulatory framework.

Today I am more interested in what is the reason, why people-even the professionals-think about the so-called objective reality so differently. In the pharmaceutical and healthcare sector, I have also found that opinions are even more subtle, such as whether the patient can choose what drugs to take, or he must accept medications that are supported by health insurance? There are very different opinions about the advertising of medicines as well. There are some people who are very positive about advertisement, and there are others who are criticizing it because they are aware, that the advertisements are the main driving force behind the growth of the consumption of pharmaceuticals. During my research, it became clear to me that I was more interested in subjective opinions. At the beginning of my research I was trying to rely on the so-called objective, professional opinions.

From the point of view of my dissertation, the Q method is just a tool. It is not my task to develop further the Q methodology itself. I want to use the Q methodology for cognition of Kazakh pharmaceutical industry and Kazakh drug-related opinions. The method makes it possible to understand the structure of opinions and views on the manufacture and use of the drugs as well as the relationship between the different views about these topics. In the Q method, all of the opinions and views about the topic are called «concourse». «In Q, the flow of communicability surrounding any topic is referred to as a concourse (from the Latin concourses, meaning all running together», as when ideas run together in thought).

Q methodology's task to reveal the inherent structure of a concourse - the vectors of thought that sustain it and which, in turn, are sustained by it.

In my case, formulation of the concourse was not a simple task. It became apparent from the friends' inquiries, that the so-called ordinary man rarely meets the opinions of professionals. Concourses are considered appropriate if they represent the opinion of the multitude of people involved and if they are able to reveal the different clusters of views and the differences among them. The tools available for research did not make it possible to fully understand the opinions, but this problem also exists in the case of questionnaire methods. The main issue with the Q method is the representativeness of the concourse. According to the relevant literature, it is impossible to achieve complete representativeness, as the following quotation proves, but the lack of perfect

representativeness does not question the applicability of the method, but only limits the generalization of the results.

Of the seventy statements, we could have missed a lot because they were the ones that were in complete agreement with the ad hoc groups in which the relevance of the claims was tested. We left some statements out because the interpretation also caused problems for the panel during the discussions. Finally, the following 39 statements remained.

The 39 statements were translated into Russian (1st attachment) and had been distributed among the cells by each of the individuals in the following triangle. This procedure is called: Q sorting.

The members of the group solved the task one by one within a three-week time interval when I personally visited the group members and some of them managed to make a structured interview, which is described in the evaluation part of my dissertation.

When exploring concourse, we began by considering that there was a significant difference in opinion among respondents about their relationship with the pharmaceutical sector. I hoped that the 20 people interviewed would express their opinions and identify certain types of opinions. At the start, we expected to be able to identify at least three types, and we assumed that each type would be related to the person's qualification or job.

7. New scientific results

1. Numerous analyses have been conducted for both the Hungarian and Kazakh pharmaceutical industries. These analyses also include international comparisons. My analysis is specific because it compares the pharmaceutical industry of two countries that used to belong to Comecon Countries. Despite differences in population and level of development, it can be concluded that this comparison is more instructive for Kazakhstan than if I compared Kazakhstan's pharmaceutical industry with more advanced European countries, such as Denmark's or the Switzerland's pharmaceutical industry. Based on this comparison I could define my recommendations for the government.

2. The pharmaceutical industry is still one of the most research-intensive sectors today. And indeed, it is. In the business world and in the pharmaceutical industry in particular, it is considered natural and widely accepted that marketing costs have risen much faster than research costs over

the past few decades. Because of the high marketing costs, pharmaceutical prices are high, so drugs are not accessible to the poor. Advertisements cause unreasonable drug consumption, which, in addition to health hazards, makes it impossible for the drug store to function effectively. Pharmaceutical prices are factors determining human well-being. The drug marketing in Kazakhstan is now emerging. It should be brought to the attention of the authority that this area should also be regulated. One of the scientific results of this dissertation is this early warning.

We recommend the Governments and the International institutions to implement means which drive the pharmaceutical companies back to research. The governments should set limits for the advertisement in this field. They have to promote the open and the crowdsourcing innovations to make this kind of public good affordable for the poor as well.

3. The Q method is widely used in the world to explore the attitudes of the consumers. The method helps to structure development ideas of industrial sectors. I think it is a new result of my own research, that despite the cultural differences, the method can be applied without difficulty for revealing the drug-related concourse of Kazakh people. Neither the statements nor the results differ from those used in international practice.

(1) Analysis the situation and the development of the Kazakh pharmaceutical business between 2001 and 2017 based on the available statistical data with Time Series Analysis.

(2) Analysis the problems and opportunities of the Kazakh pharmaceutical industry and formulate its development potential using Q-method with 39 statements and 20 interviews.

(3) At the end of the factor analysis, the following three types were identified based on the Q-method in the Kazakh pharmaceutical sector:

1. Positively biased pharmaceutical-experts;

2. Some scepticism against the pharmaceutical sector (Doubt about the medical sector);

3. Marketed and/or socialized healthcare (Marketizing the pharmaceutical sector).

The existence of these main types is proved by my own practical experience and the structured deep interviews presented in the dissertation as well. The types are extensively described in the dissertation and in the theses above.

Curriculum Vitae

Her name is Dinara Aliyeva and She was born on the 14th of June, 1980. She is citizen of the Republic of Kazakhstan. She lives in Astana.

In 1996, She left from high school, in the same year and graduated from the Karaganda state Medical Academy, Faculty of Public Health.

Since 2003, after graduating, She started working in Medical Center of Affairs of the President of the Republic of Kazakhstan medical adviser of the scientific department of the Centre of introduction of innovative technologies.

In 2008, She graduated from Karaganda Economic University, specialty «Legal regulation in the sphere of economy».

In 2008-2009, She worked in the Management of Industries of the Department of Industrial and Innovative development of the Ministry of Industry and Trade of the Republic of Kazakhstan.

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In 2010, She attended courses of advanced training in Singapore «Industrial-Innovative Development».

In 2011, She received Master's degree in «Economics and Business» from Finance Academy in Astana.

In 2013, She received a letter of thanks from Deputy Prime Minister of the Republic of Kazakhstan.

Since 2011-2014, She worked in the Management of Chemical and Pharmaceutical Industries of the Industry Committee of the Ministry of Industry and New technologies of the Republic of Kazakhstan.

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1st Appendix The Statements in Russian

1.Фармацевтическая промышленность тратит необоснованно много денег на рекламу лекарств.

2.Фармацевтическая реклама очень полезна, потому что потребители получают очень полезную информацию через нее о новых лекарствах.

3. Большинство врачи назначают обычные и общеизвестные лекарства.

4. Было бы желательно более внимательно следить за деятельностью НИОКР фармацевтических компаний.

5. Цена лекарств должна определяться государством.

6. Желательно поддерживать лекарственные препараты при острых заболеваниях на постоянном низком уровне.

7. Люди потребляют излишне много лекарств. Было бы разумно продавать лекарства только по медицинскому рецепту.

8. Фармацевтическая промышленность является одной из наиболее прибыльных отраслей. Для международных фирм, прибыль важнее лечения болезней.

9. Фармацевтическая промышленность должна действовать на основе тех же этических принципов, что и врачи. Прибыль является вторичной.

10. Доходы врачей во многом зависят от их отношений с фармацевтической промышленностью, что подрывает доверие к врачам.

11. Потребление лекарств, неоправданно велико.

12. Цель маркетинга - хорошо знать и понимать клиента, чтобы продукт или услуга соответствовали и продавались сами.

13. Понимание поведения пациентов важно для их воздействия.

14. Модели поведения потребителей могут помочь фармацевтам повысить приверженность лекарственным средствам, изменить поведение курения, сообщать медицинские сообщения, проектные услуги и влиять на назначение врача.

15. У некоторых пациентов больше болезней, и они получают лечение для них. Используемые лекарства взаимодействуют. Нам нужны независимые исследования для изучения этого вопроса.

16. Аптека должна быть закрытой частной территорией, где потребитель и фармацевт могут обсудить, как потребитель должен использовать свои лекарства.

17. Клиенты могут использовать компетенцию фармацевтов в качестве поддержки, когда они решают, какие лекарства принимать и когда их принимать.

18. Фармацевт должен провести тщательный профессиональный обзор каждого лекарства, купленного потребителем.

19. Фармацевт должен подтвердить потребителю, что выбранное лекарство безопасно для использования.

20. Аптека должна быть похожа на рынок здоровья, где потребители могут получать лекарства, советы по вопросам образа жизни, измерения артериального давления и все, что им нужно.

21. В аптеке я оставляю хорошие вопросы для посещения врача, когда я обсуждал свое употребление лекарств с фармацевтом.

22. Фармацевт лучше знает лекарства, чем врач, поэтому желательно спросить его перед назначением лекарства.

23. Связь фармацевта с врачами делает его на 100% уверенным, что все получают правильный препарат.

24. Когда у потребителя возникают вопросы о препаратах, фармацевт должен ответить на них.

25. У каждого препарата есть побочные эффекты, чтобы использовать их для лечения, основываясь на оценке пациентами рисков и преимуществ.

26. Использование препарата является достаточным убеждением в том, что болезнь улучшится при лечении.

27. Защита интеллектуальной собственности является препятствием для научного прогресса. Если бы мировые ученые могли публиковать свои результаты, они бы разрешили ряд заболеваний.

28. С бизнес-интереса они также покупают патенты, которые они не хотят использовать. Это замедляет научный прогресс.

29. Большинство инноваций сегодня - это не прибыль, не увеличение имен исследователей, а потому, что исследователи хотят «сделать мир лучше».

30. Исследования по всем фармацевтическим препаратам в мире с минимальной координацией будут достаточными для лечения болезней, затрагивающих лишь несколько человек или бедных людей.

31. Брендированные лекарства в мире намного дороже, чем оправдывает качественное различие. Успех препарата во многом основан на маркетинге.

32. Исследователь, когда он обнаруживает новый препарат, лучше всего продавать свой патент мировому бизнесу.

33. В фармацевтической промышленности затраты на исследования не слишком высоки, поэтому небольшие предприятия могут успешно поддерживать исследовательские возможности.

34. Новые фармацевтические компании необоснованно пытаются проводить исследования, и успех на рынке не может быть достигнут.

35. Во всех странах целесообразно поддерживать лаборатории для фармацевтических исследований не потому, что они могут ожидать экономических результатов, а потому, что без этого страна все еще не сможет следить за развитием мировой науки.

37. Люди доверяют местным фармацевтическим лекарствам из-за их соотношения качества и цены.

38. Качество фармацевтических лекарств удовлетворяет потребность местных потребителей.

39. В Казахстане украинские, российские и белорусские лекарства более узнаваемы, чем лекарства Европы и США.

2. Appendix Interviews with experts

1. Interview – Azamat

Senior manager of the company «Car-Tel»

1. What is your opinion on the healthcare system of Kazakhstan?

Currently, the healthcare system of Kazakhstan is in a relatively good situation than it was in the 1990s.

On the part of the state, certain attempts were made:

- the construction of a program of 100 schools and 100 hospitals. The results of the program are not completely clear;

- A program with a diploma in the village. Provided certain preferences for young professionals;

In general, the situation develops as follows:

- ongoing reforms in the state system simultaneously create certain difficulties in terms of staff optimization and insufficient financing of equipment;

- On the whole, people's confidence in domestic medicine leaves much to be desired;

- private clinics and insurance are being developed, to which specialists are moving;

- there are state quotas for treatment both in Kazakhstan and abroad, including state programs for training specialists;

- people tend to be treated abroad, and also trust foreign medicines more than domestic.

2. What are the strengths and weaknesses?

Strengths: there are state clinics and hospitals, as well as medicines provided by the state

Weaknesses:

- lack of joint foreign medical universities. Perhaps they are, but there is no information on them;

- there is no feeling that medicine is a priority in Kazakhstan.

3. Is it good for Kazakhstan to develop own pharmaceutical industry or would it be better to import medicines? And why?

The pharmaceutical industry cannot be considered in isolation from the natural macroeconomic processes of export and import from the point of view of the global market. For example, economies of scale - economies of scale prove that it is profitable for two countries to trade among themselves.

Therefore, I believe, for Kazakhstan it does not seem appropriate to produce medicines that require serious research, production and distribution. This may be good in other countries. At the same time, Kazakhstan should still produce medicines that are the easiest to manufacture and can be consumed both in the domestic market and exported to other countries.

In this regard, each country is unprofitable to produce all the drugs and Kazakhstan is recommended to find its niche in world trade.

4.   How important is the pharmaceutical sector to the economy?

The Constitution of Kazakhstan guarantees the right of citizens to health protection.

In this regard, the system of the pharmaceutical industry of Kazakhstan should ensure the implementation of this right.

5. What to do and how to develop? What is the role of foreign investors in this development? Is it better to prefer traditional partners (Russia, etc.) or find partners from the West?

The development of the pharmaceutical market, like any other market, should depend on the factors of price and quality. In this matter there should be no preferences. Therefore, the choice should be made on the basis of the best

offer, long-term and stable relationships. At the same time, the state should also develop the concept of public private partnership with foreign and domestic investors.

2. Interview – Askar

Head of Construction Industry Department, Ministry of Investment and

Development of the Republic of Kazakhstan

1. What is your opinion on the health care system of Kazakhstan?

The health care system is gradually developing, aligning itself with international experience. Insurance is being introduced, polyclinics and hospitals are being built.

2. What are the strengths and weaknesses?

Strengths: Availability of various research centers and clinics.

Weaknesses: Weakly competent human resources, many complaints about the competence of doctors, it is necessary to improve their qualifications.

3. Is it good for Kazakhstan to develop own pharmaceutical industry or would it be better to import medicines? And why?

It is necessary to develop our own pharmaceutical industry, this, in addition to jobs and new medicines, also improves the country's image, reduces the outflow of capital from the country and attracts investments.

4. How important is the pharmaceutical sector to the economy?

The sector is important as an industry that provides growth in revenues to the economy, providing the country's population with domestic drugs.

5. What to do and how to develop? What is the role of foreign investors in this development? Is it better to prefer traditional partners (Russia, etc.) or find partners from the west?

It is necessary to provide comprehensive assistance to the development of the industry. The role of investors is very important. Foreign investment is needed from those who are actually drug developers and have experience implementing in production. Partners can be from different countries and the availability of their choice is very gratifying.

3. Interview – Ahmed

Director of the company «Bio Global Pharm»

1. What is your opinion about the health care system in Kazakhstan?

Very weak healthcare in Kazakhstan. Lack of mobility to provide medical care to the population. It would be good exchange of experience with other countries, more qualified doctors in Europe, America and Japan.

2. What are the strengths and weaknesses?

Strengths:

- sanitary and hygienic standards;

- strict requirements for registration of medicines, medical devices and medical equipment.

Weaknesses:

- lack of professional medical personnel;

-absence of the main base for conducting research on a new drug and laboratory;

- lack of funding for the development of pharm. industry;

- lack of a base for organ transplantation;

- Customs Union is an obstacle to the development of pharmaceutical industry because Russian, Belarusian pharmaceuticals are more recognizable and cheaper than Kazakhstani drugs, which hinders the development of the local pharmaceutical industry.

3. Is it good for Kazakhstan to develop own pharmaceutical industry or would it be better to import medicines? And why?

Of course, it is necessary to develop the pharmaceutical industry in Kazakhstan. Today, about 87% of pharmaceutical products are imported from Russia, Belarus, Ukraine, India, China, Europe, America, Israel, and Japan. In Kazakhstan, more than 200 names of medicinal plants that are intended for the treatment and prevention of diseases (licorice root, white wormwood, hemp) germinate.

4. How important is the pharmaceutical sector to the economy?

Important for the economy of the country is the availability of innovative and original products. Scientific research, taxes, national security, import substitution.

5. What to do and how to develop? What is the role of foreign investors in this development? Is it better to prefer traditional partners (Russia, etc.) Or find partners from the west?

In order to attract investors, privileges, VAT, duties, preferences and premises are required, and the term for registering medicines is reduced. The role of investors is a scientific base for new and innovative drugs, the introduction of a quality standard in the production of medicines. We give preference to European manufacturers and standards.

4. Interview – Turar

Director of the Processing Industry Department, Kazakhstan Industry Development Institute

1.   What is your opinion on the healthcare system of Kazakhstan?

In Kazakhstan, like many industries, it arrives in chaos, there are systemic errors that do not have enough time, many organizational problems that can be properly structured and systematized:

    - the ambulance service suffers, the city is actually a large population, than the fixed ones - for which money is allocated, the ambulance Medina is designed for 100,000 people, in fact they serve 250,000 thousand people, respectively: there are not enough brigades and the waiting time for ambulance;

    - training with old data and bureaucracy, introduction of new data into practice;

    - low salaries of medical personnel, high workload and increased bureaucracy;

    - fight against neglected diseases that are more expensive than prevention although colossal money is allocated for the organization of Medical Ambulance - still low education and responsibility;

    - low medical education;

    - lack of motivation in professional development;

    - omission of underlying mechanisms in the development of any disease, such as hypoxia, dehydration, nutritional deficiency, acidosis: which is the basis of social diseases like oncology, Cardiovascular diseases, diabetes, tuberculosis.

2.   What are the strengths and weaknesses?

Strengths - world-class operations in our centers! We have strong professionals in terms of heart and nervous system surgery. We have free

medicine - (low efficacy generic drugs) many examinations and consultations can be obtained free of charge.

Weaknesses - they also release antibacterial drugs uncontrollably (both by doctors and by the patients themselves), which leads to the development of bacterial resistance ... these are like super weapons and armor against it, the steeper the armor, the steeper the weapons, children and human immunity suffer .

3. Is it good for Kazakhstan to develop own pharmaceutical industry or would it be better to import medicines? And why?

Kazakhstan is a country producing simple generic drugs based on imported raw materials from China, India and the Russian Federation. In Kazakhstan market consumption of medicines and medical products destination, the share of domestic production accounts for only 15%, and

85% are imported drugs (Germany, Russia and France). For this reason, domestic products are still not fully covers the needs of the Kazakhstan pharmaceutical market drugs by main pharmacotherapeutic groups - cardiovascular system, digestive tract and metabolism, nervous system, musculoskeletal system, systemic antimicrobial drugs, urinary system and sex hormones, respiratory system, anticancer drugs and immunomodulatory.

Opportunity for the development of the Kazakhstan pharmaceutical market may become a gradual transition from the production of simple generics to more challenging. For this reason, it is necessary to pay special attention to the development research activities in the pharmaceutical industry. The creation of research centers and research bases makes it possible increase the competitiveness of the industry. In addition, Kazakhstan grows its own vegetable raw materials from which simple herbal remedies are produced and exported to foreign markets. Processing plant materials and producing more complex drugs from medicinal plants can have significant economic effect - domestic enterprises will be able to provide local pharms with processed plant raw materials, the country's export potential will increase, additional jobs will be created and foreign investments will be attracted.

4. How important is the pharmaceutical sector to the economy?

Developed pharmaceutical industry of the state is an indicator of the economic development of the country, as well as a criterion of high innovativeness of the economy. Formation of a strong national pharmaceutical industry of the Republic is sufficiently time-consuming, laborious, complex and expensive

process. But, nevertheless, the development of the pharmaceutical industry requires the creation of conditions for the health of the population.

The main task of the pharmaceutical industry today is creating conditions for the import substitution of pharmaceutical products through increasing production capacity and the introduction of modern technology in accordance with international GMP standards.

5. What to do and how to develop? What is the role of foreign investors in this development? Is it better to prefer traditional partners (Russia, etc.) or find partners from the west?

For the pharmaceutical industry in Kazakhstan, a steady and steady growth in investment activity is needed. Attracting pharmaceutical leaders the market will lead to the further acquisition of technological and personnel competencies for the production of innovative products. This will allow to produce more complex drugs. Due to participation in the production of domestic pharmaceutical products of foreign investors of world renown, Kazakhstan consumers have the opportunity to purchase high-quality medicines at an affordable price. After all, global manufacturers allow us to expand the range and improve the quality of manufactured domestic products. All innovative developments in the production of new types of pharmaceuticals are carried out by leading global pharmaceutical manufacturers (Pfizer, Roche, Novartis, etc.), as they require significant financial investments and a competent research base.

5. Interview – Dinara

Director of the Research Support Office Nazarbayev University

1. What is your opinion on the health care system of Kazakhstan?

The state of the healthcare system is in disrepair since Soviet times.

First of all the quality of the health care system, insufficient equipment with modern equipment, low qualifications of doctors, lack of hospitals, perpetual queues, and an underdeveloped insurance system suffer. All this, one way or another connected with insufficient financing of this industry.

According to the latest WHO data, in 2013, national health expenditures in Kazakhstan amounted to 3.6% of GDP, which is 3-4 times lower than in developed countries. For example, in the US, national healthcare expenditures

in 2013 amounted to 17% of the country's GDP, in the Netherlands - 13%, in France - 12%, in Germany - 11%.

In the WHO ranking in terms of expenditure on healthcare, Kazakhstan ranks only 153 out of 190 countries.

2. Is it good for Kazakhstan to develop its own pharmaceutical industry or would it be better to import medicines? And Why?

Of course, Kazakhstan should develop its own pharmaceutical industry. Despite the small capacity of the domestic market, long distances between settlements, remoteness from potential buyers in foreign markets and close proximity to the "giants" - Russia and China, Kazakhstan is striving to develop the pharmaceutical industry, as this industry is one of the most highly profitable and fastest growing sectors of the world economy. Traditionally, since Soviet times, our country has been selling medicinal raw materials, since 243 types of medicinal herbs grow in the Republic of Kazakhstan, and 20 of them grow only here. Once in the Kazakh Soviet Socialist Republic, state pharms worked, specializing in the cultivation of medicinal plants and gathering wild herbs. By the way, the industry has already experienced a crisis period in its new development. So, in connection with the transition to the free-floating exchange rate regime from August 20, 2015, the question of the change in prices for medicines and their accessibility to the population became acute. The government - in all regions of the republic, found the solution memoranda were signed to contain the prices of medicines and medical products.

3. What are the strengths and weaknesses?

First, I will list the weaknesses of the health care system: Insufficient material and technical base of medical organizations:

- low availability of specialized medical and medicinal care for the population (primarily rural residents)
- lack of medical personnel
- insufficient preventive work against various groups of diseases
- imperfect health insurance system
- insufficient development of the rehabilitation network in the republic
- low wages of medical workers
- lack of health culture among the population
- lack of online medicine.

Strengths:

- free drugs for patients;

- creation of medical clusters;
- relatively inexpensive treatment.

4. How important is the pharmaceutical sector to the economy?

The pharmaceutical market is one of the most highly profitable and fast-growing sectors of the global economy. The pharmaceutical sector of the Republic of Kazakhstan provides less than 1% of real GDP, but it has a very important social value. Increase in sales of medicines contributes to: the overall increase in morbidity in the world under the influence of environmental degradation, the aging of the population in developed countries, the growth of income of the population in developing countries.

5. What to do and how to develop? What is the role of foreign investors in this development? Is it better to prefer traditional partners (Russia, etc.) or find partners from the West?

At present, the pharmaceutical industry in Kazakhstan is a developing industry that attracts foreign investment in the domestic market. In 2003, the Turkish company NOBEL Pharmaceuticals made investments in the Almaty pharmaceutical factory. In 2011, the Polish pharmaceutical company Polpharma became a shareholder of Chempharm. In 2012, the Russian group of companies Pharmstandard became one of the shareholders of Karaganda Pharmaceutical Plant LLP.

For a strong pharmaceutical industry of its own, it is a very lengthy, time consuming and expensive process. It is necessary to create conditions for the import substitution of pharmaceutical and medical products based on modern technologies in accordance with international GMP standards.

The development of the pharmaceutical industry in Kazakhstan provides:

- introduction of production technologies;
- research and development and development work on the development and development of the production of new competitive drugs;
- the creation of raw materials bases in the regions from domestic medicinal plant materials;
- training of personnel for pharmaceutical production in accordance with GMP, which ultimately should help increase the production volume of domestic production.