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CONTENT

ABSTRACT

At the present stage of human development, the pharmaceutical industry is becoming increasingly important in the global market. The ever-increasing population of the planet, the fight against diseases, including those caused by violations of the environmental situation, the desire to increase life expectancy, determine the increasing demand for the products of this industry. It is characterized by a steadily high rate of development, production growth; production crises in some countries do not reduce the global production of such products. The pharmaceutical industry is one of the branches of the chemical industry; it includes a large number of sub-sectors. The present work aims to study the relationship of the organizational-economic aspect of pharmaceutical firms and economic performance of Kazakhstan. As an indicator of economic growth, the real GDP , total labor force, as well as the main indicators in the pharmaceutical sector, export and import were adopted. A review of the literature on this topic was carried out and hypotheses of the relationship were proposed. After studying the literature, the pharmaceutical sector of the Republic of Kazakhstan was studied. Statistics on the company's pharmaceutical performance and real GDP from 2012 to 2017 were carefully studied and tested using Excel. Regression analysis (ordinary least squares) and correlation test were chosen as research tools for data interpretation. The results of the study show that there is a significant relationship between these economic variables and the proposed hypotheses are confirmed. Although the correlation is not so high, this is due to the positive dependence of the economy of Kazakhstan on such indicators as the economic aspects of the development of pharmaceutical companies.

АБСТРАКТ

На современном этапе развития человечества фармацевтическая отрасль приобретает все большее значение на мировом рынке. Постоянно увеличивающееся население планеты, борьба с болезнями, в том числе вызванными нарушениями экологической обстановки, стремление к увеличению продолжительности жизни, предопределяют все увеличивающийся спрос на продукцию этой отрасли. Для нее характерны устойчиво высокие темпы развития, роста производства, кризисы производства в отдельных странах не уменьшают общемировые объемы производства такой продукции. Фармацевтическая промышленность – это одна из отраслей химической промышленности, в нее входит большое количество подотраслей. Настоящая работа направлена на изучение взаимосвязи организационно-экономического аспекта деятельности фармацевтических фирм и показателей экономического развития Казахстана. В качестве показателя экономического роста был принят реальный показатель ВВП, население, трудовая обеспеченность страны, а так же главные показатели в фармацевтическом секторе экспорт и импорт. Был проведен обзор литературы по данной теме и предложены гипотезы взаимосвязи. После изучения литературы были изучен фармацевтический сектор Республики Казахстан. Статистические данные о фармацевтических показателях фирмы и реальном ВВП с 2012 по 2017 год были тщательно изучены и протестированы с использованием Excel. В качестве инструментов исследования для интерпретации данных были выбраны регрессионный анализ (обычные наименьшие квадраты) и корреляционный тест. Результаты исследования показывают, что между этими экономическими переменными есть существенная взаимосвязь и предложенные гипотезы подтверждены. Хотя корреляция не столь высока, это объясняется наличием положительной зависимости экономики Казахстана от таких показателей как экономические аспекты развития фармацевтических фирм.

АҢДАТПА

Адамзаттың дамуының қазіргі кезеңінде фармацевтика саласы дүниежүзілік нарықты мағынаны арта иемденеді. Әлемде халық саны өсүі, ауқандармен күресу сонын ішінде экологиялық жағдайдын бұзылуының әкелінуі, өмір ұзақтығын ұзартуға ұмтылуы осы саладағы өнімге сұраныстың артуын алдын ала анықтайды.

Оған тұрақты-жоғары даму, өнеркәсіптің дамуы тепмтері тән, өзге елдерде өнеркәсіп саласындағы кризистар бұл өнімнің бүкіләлемдік өнеркәсіп көлемін азайтпайды.

Фармацевтикалық өнеркәсіп – бұл химия өнеркәсібіндегі бір саласы, оған көп деген дербес салалары кіреді. Бұл жұмыс фармацевтикалық фирмалардың ұйымдастыру-экономикалық аспектісіндегі өзін-ара байланыс жұмысын және Қазақстанның экономилакық даму көрсеткіштерін зерттегуге бағытталған.

Экономикалық өсу көрсеткіші ретінде Жалпы Ішкі Өнімнің нақты корсеткіші, халық саны, мемелкеттің жумыс орнымен камтамасыз етілуі және фармацевтика саласындағы экспорт және импорттың басты көрсеткіштері алынды. Бұл тақырып бойынша әдеби көрініс көрсетілді және өзін-ара байланыс гипотезалары ұсынылды.

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1. INTRODUCTION

The pharmaceutical sector is one of the fastest and fastest growing commodity sectors in the world economy. The pharmaceutical industry is unique in its kind; it must meet the needs of the population in maintaining health, its improvement and preservation. This characteristic allows us to classify it as a vital and necessary sector of the economy.

Pharmaceutical firm are part of the most important sector for the country's economy. The level of development of organizational and economic aspects generally characterizes part of the sector of economic development as a well-built health care system, which provides a high level of working capacity of the population and the growth of the quality of its life.

An aspect of the development of pharmaceutical companies in a particular country determines its performance. State indicators are necessary for the development of the industry and the implementation of large-scale pharmaceutical projects.

This work is devoted to the study of the pharmaceutical market of Kazakhstan, namely the identification of the characteristics of the interaction of the economic development of the country. This topic is relevant, as the Kazakhstan pharmaceutical market is currently actively developing due to the increase in market regulation by the state, knowledge intensity and the importance of this market for the population of the country. A comparison of the necessary indicators points to qualitative and quantitative development factors.

1.1. BACKGROUND

Pharmaceutical market of Kazakhstan beginning its formation (development) in the middle 1990's year. The providing of drugs in the country in 1993 – 1994 it was carried by the State Joint Stock Holding "Pharmacia" owning 1833 pharmacies. The national drugs provision system was destroyed after full of the demonopolization of the Holding and pharmacies privatization. At the developing a drug provision system based on market relationships started using in 1996. However, the system constructed of the based transformation processes still experiences some to change.

At present, the pharmacy market of Kazakhstan is among the most developed ones in the CIS. Consolidation scope and vertically evolution of the integrated pharm companies can be seen in local producers, distributors, and pharmacies together with the improving of culture service. In last year's (2013-2017) high economic growth in pharmaceutical industry and the rise of purchasing of consumer's pharm products has provided pharmaceutical sales and healthcare expenditures of our country.

Despite considerable growth dynamics (the market rose 25.93% in past data 2013-2017); the contribution of the pharmaceutical industry in the country's GDP remains quite small about 1% in between 2013-2017. This is due to the fact that our country has a relatively small base of the pharmaceutical market.

The pharmaceutical industry have the unbalanced regional structure is seen as its weak pocket of the which creates problems for supply and distribution. In South Kazakhstan region and Almaty about 81% of pharmaceutical production is produced, while the share of other regions is insignificant. Foreign companies have settled a dominant position on the market due to poor productive capacities of local producers and technologies.

High growth the share of foreign products consumed on the retail market increased from 2011 to 2015, which gave increased 29.3 percent import growth (from 50.7% to 80%). Unstability of domestic manufacturing was worsened particularly in 2014-2015 years when the share of Kazakh pharmaceutical companies on the market amounted 8%. A big threat for the our country regarding strategic security, fact about low share of local manufacturing, as according to the World Health Organization (WHO) recommendation, local producers should provide no least that 20% of pharmaceutical production in a country. Amount the main pharmaceutical product importers in 2015-2016 were Russia, Spain, India, France, Slovenia, Ukraine, Egypt, Poland, Great Britain, and Germany. Recently the EU countries increase export volumes share in Kazakhstan, while the share of importers from the CIS is declining over the years

1.2. PROBLEM STATEMENT

The lack of guaranteed markets. To create joint ventures and attract strategic investors, pharmaceutical companies and manufacturers of medical equipment, long-term guaranteed orders from the state and guaranteed return on investment for all parties are needed. One of the possibilities of providing guarantees for innovative projects could be the signing of long-term contracts "off-take" with manufacturers for the purchase of medicines, medical devices (medical devices) produced within the framework of investment projects or joint ventures (joint ventures).

Shortage of qualified personnel. At present, the problem is the shortage of qualified personnel in the pharmaceutical industry, as well as the relatively high cost of experienced employees. Manufacturers offer to improve training in this area and make funding for training abroad and attracting foreign specialists (especially with the experience of GMP) one of the national priorities.

The scarcity of credit. The global financial crisis has severely limited the access of Kazakh companies to credit markets. During the study by "Baumgartner" it was revealed that of the planned investments in the modernization of plants by enterprises in the amount of 35,552 billion tenge, about 16,3 billion tenge can not provide any development Bank of Kazakhstan, or other state financial institutions of development, or local or foreign investors. Local companies have repeatedly expressed interest in obtaining cheap loans for the purchase of equipment for the implementation of innovative projects, but the cost of credit resources of commercial banks during the crisis has increased.

Trade policy. Non-compliance with the legal framework of the European Union by the Union for medicines, medical devices and medical devices manufactured in the Republic of Kazakhstan, and for the import of components for manufacturers of medical equipment, substances, as well as other auxiliary substances for the production of medicines, as well as the lack of mutual recognition of registration certificates of drugs of domestic manufacturers of medicines in accordance with international standards (GMP) since 2014.

Improvement of the regulatory framework. One of the problems is the time and cost of obtaining customs permits for the import of substances, plant raw materials, glass vessels and covers [7]. Changes will be made to the tax legislation in terms of increasing the deduction rate from the tax base for corporate income tax by 150% on expenses incurred by the enterprise for the implementation of the international GMP standard. A significant problem for the development is the lack of implementation and deterrence of the international standard (GMP) in pharmaceutical enterprises. Thus, the export potential of the Republic of Kazakhstan is seriously limited by the lack of its capacities corresponding to the level of international standards.

1.3. RESEARCH QUESTION

The research question is

1. How does a pharmaceutical firm sale affect GDP in Kazakhstan? And how information that give for our?
2. How does a pharmaceutical firm sale affect real population in Kazakhstan? And how information that give for our?
3. How does a pharmaceutical firm sale affect total labor force in Kazakhstan? And how information that give for our?
4. How does a pharmaceutical firm sale affect manufacturing in Kazakhstan? And how information that give for our?
5. How does a pharmaceutical firm sale affect export/import in Kazakhstan? And how information that give for our?

1.4. RESEARCH OBJECTIVE

The main objective of the research is to examine the organizational-economic aspect of development of pharmacy in Kazakhstan.

Specific objectives include investigating the impact of the corresponding figure sales of pharmaceutical firms on economic aspects of development.

2. LITERATURE REVIEW

Definition of main terms

Firm as a special form of economic activity can be carried out both in the public and private sectors of the economy. In accordance with this distinguished: economic and organizational aspect. The form of implementation of economic firms on behalf of the company, established: - the public authorities control who is authorized (under current laws) to manage public property (state-owned enterprise). (AFI, \CFED, 2015)

Ownership of such firms is a form of separation of a part of the state or municipal government, part of the budget funds, and other sources. An important characteristic of such firms is that circumstances that they are responsible for its obligations only IMU society, in their possession (or the state is not liable for their obligations, nor do they not answer required. the obligations of the state).

Another form of economic activity on behalf of a firm (if it is registered as such) or an entrepreneur (if such activity is carried out without hiring a workforce, in the form of self-employment). (Rutherford S, 2006) Of course, each of these types – public and private firms – has its own distinctive signs, but the basic principles of their implementation in many ways fall. In both cases, the implementation of such activity implies initiative, responsibility, innovative approach, the desire to maximize the profit. The typology of both organizational and economic aspects types is similar. (SBA, 2014) Firm development as a form of initiative activity, aimed at profit-making (entrepreneurial income), involves:

- Implementation of direct producer functions, i.e. production of goods or provision of services

- Implementation of intermediary functions, i.e. providing services related to the promotion of goods on the market and its transfer in the appropriate (socially acceptable) form from the direct manufacturer of such goods to its consumer.

The public understanding of the problem is that, on the one hand, the first type of business activity is of priority, since social wealth (as a generalized result of the level and quality of life of each member of society) depends on the state of affairs in the sphere of material production, scientific and technical and service services. On the other hand, such public attitude to this type of entrepreneurship is not really of a priority nature in practice – the society promotes the development of the second type of business activity, i.e. mediation. (Weber S., 2014)

Organizational principle. The principle of the program works.The organization of work of the system components should be carried out in accordance with the plans and programs, establishing the appropriate target indicators, the order of interaction of subjects for the joint performance of functions. Currently, the system is supported by the State development program. To every consulting organization functioning as a state institution or enterprise brought plans-tasks. Plans are available from each business unit and consultant.

The principle of complexity. The organization of the system should be such that all its components work as a single coherent mechanism, the functions complement each other, create a comprehensive consulting product that allows solving a complex of problems. (Ahlin, C., and Jiang, N., 2008)

The principle of integration. Integration involves establishing the necessary links between the components of the system and ensuring their interaction on this basis. According to this principle, the organization of material and information flows should be

carried out by an integrated system that unites the subjects and individual stages of the consultation process.

The principle of optimal management establishes the requirement to achieve the objectives of management on the principle of maximum evaluation of the quality of management, including a minimum of resource consumption and a minimum of maneuver time from one mode to another. The optimality criteria based on a combination of several specific criteria - the adequacy of the functions of personnel management to the goals of functioning, rapid response to changes in the specifics of the organization's functioning. (Zhang M., 2013)

The principle of continuous self-improvement. The need for systematic organizational work to improve the provision of information and Advisory services, forms and methods of work.

The principle of openness and constant communication of the system with the government, scientific and educational institutions. The system works under the leadership of the governing bodies to implement the state policy. To promote scientific and technical developments and bring those to rural producers, it is necessary to have a close connection of the system components with scientific organizations.

Principle of regulation. According to this principle, all the processes taking place in the system should be regulated, that is, a detailed system of rules and norms should be developed that determine the functioning of both the system as a whole and its individual structures.

The principle of formalization provides for the formal consolidation of the rules and regulations of the system in the form of orders, instructions and orders of the agribusiness management bodies, as well as in the form of provisions on specific structures, job descriptions of consultants.

The application of the principles of regulation and formalization allows to streamline the process of system functioning, make it more systematic, rational, reliable and predictable. (Weber S., 2014)

Organizational and technical principles. The principle of Informatization of all processes. All functions in the process of information and consulting work should be carried out with the maximum degree of automation with the participation or under human control with the use of information and communication.

The principle of constant updating of information resources and improvement of information technologies. Information resources can only be used for making management decisions if they are constantly updated, updated with new data. In the field of information technology there are significant changes due to scientific and technological progress, so the level of information and consulting support of agribusiness entities depends on the degree of accounting for these changes. The most important condition for the unity of the system is the use of modern computer technologies, the formation and systematic update of information resources, the completion of data banks and improvement of their structure. (Pollinger, J., Outbwaite, J., and Cordero-Guzman, H., 2007)

The principle of timeliness and efficiency of information and consulting services. Information and consulting services are valuable only if they are provided at a time when they can be applied. Given the seasonality of diseases, tight deadlines, services should be provided on time. The structures of the system play an important role in the prompt communication of information.

The principle of reliability of communication and technical support involves the creation of such organizational and economic conditions that would ensure the smooth operation of all components on the basis of modern software and professional technical assistance. (Robinson M., 2001)

Causes of Kazakhstan pharmaceutical firm

In recent years, the pharmaceutical industry of Kazakhstan has seen a significant increase in production the volume of products produced by domestic producers amounted to 42 billion tenge. On behalf of the head of state, systematic work is being carried out on the pricing policy in the pharmaceutical market. The effectiveness and safety of drugs, as well as their availability, are considered to be priorities. For the first time, the state and development of the pharmaceutical industry in the Republic of Kazakhstan were discussed at the parliamentary hearings in the Majilis on May 12, 2017. In order to achieve 50% of the country's needs in domestic production of medicines and improve the competitiveness of domestic pharmaceutical products, the head of state set the task of transition of the pharmaceutical industry of Kazakhstan to "Good Manufacturing Producing" standards, confirming the effectiveness, safety and quality of medicines. The increase in the share of domestic production of pharmaceuticals is associated with the launch of new production facilities and modernization of existing facilities, as well as an increase in the range of products. (http://www. parlam.kz/)

There are 112 pharmaceutical manufacturers in Kazakhstan, but no domestic enterprise produces its own (Kazakhstan) substances. At the same time, there is a significant scientific groundwork in the development and introduction of more than 50 new original drugs into pharmaceutical production in the Republic. This development of the Treasury.al-Farabi Kazakh national University, Kazakh National Medical University named. S. D. Asfendiyarov, Institute named of A. B. Bekturov, Ministry Of Healthcare Of The Republic Of Kazakhstan "Phytochemistry".

One of the limiting factors in the introduction of the developments of Kazakh scientists - the lack of a pilot production according to the type of pre-existing industrial

laboratories, where laboratory regulations must undergo pilot testing of the methods for producing new drugs.(http://dari.kz/)

Development of production of medicines based on plant raw materials is a unique source of revival of the domestic pharmaceutical industry.

One of the domestic pharmaceutical enterprises with more than a century of history is Shymkent chemical and pharmaceutical plant, for a long time producing pharmaceutical substances exclusively from Kazakh plant raw materials and finished dosage forms based on them. But now, as this plant is reoriented to the technology of generic drugs based on foreign synthetic substance, it has ceased to be engaged in processing of medicinal plant raw materials. Also, to date, the work of pharmaceutical plants for the processing of licorice roots "M Shieli" in the Kyzylorda region and "Liquorice" in the city of Uralsk of West Kazakhstan region has been suspended. They are engaged only in the sale of Kazakh medicinal raw materials abroad.

Among the companies that produce original pharmaceutical products, it should be noted "Firm" Kyzyl may "(Almaty) and Karaganda pharmaceutical plant (KPH), focused on the production of original drugs developed by holding "Phytochemistry". The plant has a unique infrastructure with a full production cycle: from the cultivation of medicinal raw materials to the production of finished forms and their preclinical and clinical studies. The production capacity of the plant is 2 million ampoules, 120 million tablets, capsules and soft dosage forms of original competitive phytopreparations per years.

The same age as independence of Kazakhstan - the international scientific and production holding "Phytochemistry "(Ministry Of Healthcare Of The Republic Of Kazakhstan " Phytochemistry") is one of the leading scientific centers of the Republic in the field of phytochemical study of plant raw materials and creation of original medicines. It has developed, optimized and implemented into production more than 72

new original herbal drugs: anticancer "Arglabin", a hepatoprotector "Salsokollin", antiparasitic, "Sausalin", adaptogenic "Aktifit", lipid-lowering tool "Ataraid", etc., used in clinics in the country and already known abroad.

It should be noted that there are a number of foreign companies interested in the construction of pharmaceutical plants in Kazakhstan. Using the measures of state support, foreign companies such as Polpharma (Poland), Abdi Ibrahim, Nobel (Turkey) introduce modern technologies in Kazakhstan. However, most of them have modernized some Kazakh pharmaceutical plants at the expense of foreign investments and adapted them to the packaging of generic substances, while using the brands of Kazakh plants, are essentially only engaged in the sale of imported drugs.

At the same time, the Hungarian pharmaceutical company PannonPharma Ltd together with the mnph “Phytochemistry” Karaganda pharmaceutical plant is planning to organize a joint production of original drugs based on Kazakh medicinal raw materials and to register them in Europe.

To a greater extent, the solution to the problem of the development of the pharmaceutical industry will be facilitated by the pharmaceutical cluster created on the basis of Ministry Of Healthcare Of The Republic Of Kazakhstan "Phytochemistry", which unites 17 Kazakhstani enterprises in the form of a consortium. The cluster will effectively and efficiently implement the results of research and development and innovative technologies in pharmaceutical production, as well as commercialize scientific achievements and train qualified specialists, ensure the effective participation of the cluster enterprises in the formation of the added value of finished pharmaceutical products.(http://pharmnews.kz/)

For the development of this cluster, a scientific and technical program "Development of new herbal medicines and their pharmacological and clinical studies" is being implemented, which involves 15 domestic and foreign research centers,

pharmaceutical enterprises, as well as 5 business partners that will provide co-financing of the program-up to 25% of the state budget funding. The program will contribute to the creation of original, competitive drugs and increase the share of domestic products in the global pharmaceutical market, which will reduce the price of drugs.

The development of the domestic pharmaceutical industry and its compliance with international requirements is impossible without qualified specialists, primarily process engineers, as well as mid-level specialists. The problem of training of middle-level specialists, i.e. technicians and operators for pharmaceutical production, are designed to solve medical colleges, and agronomists in medicinal plant growing - agricultural colleges of the Republic. The development of the dual system of education of students, undergraduates and doctoral students, which provides a combination of training and production activities, requires support.

The increase in the production of original domestic drugs requires a close integration of science, production and education in the field of pharmaceutical production technology. It is the unique developments of Kazakh scientists that will contribute to the solution of actual problems of health care of the Republic.

2.1. PROPOSED HYPOTHESIS

Hypothesis 1: Gross domestic product has a significant positive influence upon pharmaceutical firm sales in Kazakhstan.

Hypothesis 2: Real population has a significant positive influence upon pharmaceutical firm sales in Kazakhstan.

Hypothesis 3: Total labor force has a significant positive influence upon pharmaceutical firm sales in Kazakhstan.

Hypothesis 4: Export has a significant positive influence upon pharmaceutical firm sales in Kazakhstan.

Hypothesis 5: Import has a significant positive influence upon pharmaceutical firm sales in Kazakhstan.

Dependent variable (DV) in the five hypotheses is the five aspects of economic growth of Kazakhstan which is influenced by independent variable (IV) such as pharmaceutical firm sales. As it was discussed earlier, GDP, population, labor force, export and import rates will be taken as the measure of economic growth like organization-economic aspect of development. The 5 hypotheses were in order to learn about impacts of each aspect on economic growth separately. They will provide us with the overall picture of the situation, so that we know about of the economic aspect of development of pharmaceutical firm. Similarly, we will understand how hypotheses exercise.

3. METHODOLOGY

1.1. RESEARCH DESIGN

Due to the fact that the research is aimed at examining the relationship between pharmaceutical sale rate and economic growth of the state, population, total labor force, export and import the paper will have both qualitative data to test the hypothesis. Moreover, results of the study will be based on secondary data to ensure objectivity and reliability of the research.

1.2. STATISTICAL DATA ANALYSIS

In order to reduce bias and be sure about validity of the research findings, the data will be taken from official sites which provide reliable statistical information, such as www.stat.gov.kz and https://data.worldbank.org. If the former one contains information on economics only on national level, the latter one is considered as international source of financial data. The null hypothesis will be tested by using youth (at the age of 15-24 years) unemployment rate from 1991 till 2017 and real GDP rate in those years. As it was mentioned earlier, youth unemployment rate will be taken as independent variable and real GDP rate as dependent variable. Finally, in order to statistically test proposed hypothesis, both regression (precisely, OLS (ordinary least squares) test) and correlation tests will be applied.

Similarly, remained four additional hypotheses will be also tested via regression. Statistics on rural and urban youth unemployment will be taken from www.stat.gov.kz as well. However, this time it will cover the years between 2012 and 2016 and real GDP rate for that time period will be tested, respectively.

4. RESULTS

Table 1. Domestic data of pharmaceutical firm sale of Kazakhstan, billion (2012-2017)

Years	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**
Total market size **(USD billion)**	0.963	1.056	1,257	1,058	0,950	1,330

Source: Student's computed

Table 2. Pharmaceutical firm sales and economic growth Regression Analysis Results, 2013-2017

Dependent Variable: RGDP

Regression Analysis	
Multiple R	0,501665503
R-squared	0,251668277
Adjusted R-squared	-0,122497585
Standard Error	39,413208265
Observations	4

ANOVA

	Df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1044.835	1044.835	0.672612	0.498334
Residual	2	3106.802	1553.401		
Total	3	4151.637			

	Coefficients	*Standard Error*	*t-statistic*	*P-value*
Intercept	5,2862685	1,641462573	0,351669	0,758981561
Sales, billion	0,1063916	0,129725412	0,820129	0,898334497

Source: Student's calculations

Consider the analysis in the results table of the regression analysis. The value of the R-square, also called a measure of certainty, characterizes the quality of the regression line obtained. This quality is expressed by the degree of correspondence between the initial data and the regression model (calculated data). In our example, the measure of certainty is 0.25167, which indicates a very good fit of the regression line to the original data and the results with the coefficient of determination R2, calculated by the formula.

Multiple R - coefficient of multiple correlations R - expresses the degree of dependence of the independent variables (X) and the dependent variable (Y) and is equal to the square root of the determination coefficient.

Table 3. Data of pharmaceutical firm sales and economic growth, 2013-2017

Year	**Sales, billion**	**GDP, billion**
2013	**1.056**	**236.64**
2014	**1.257**	**221.42**
2015	**1.058**	**184.39**
2016	**0.95**	**133.67**
2017	**1.33**	**143.89**
Correlation coefficient - 0.06499		

Source:

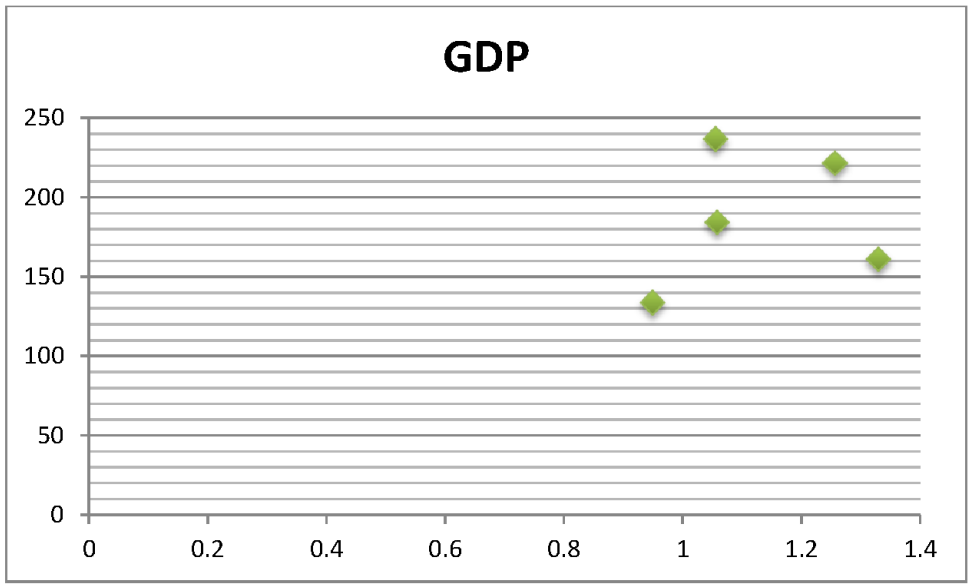
Student's computed

In a simple linear regression analysis, the multiple coefficient R is equal to the linear correlation coefficient (r = 0.196).

Coefficients of the linear model: the Y-intersection derives the value of the free term b, the variable X1 is the regression coefficient a. Then the linear regression equation: is in good agreement with the calculation results in the example.

Next, we check the significance of the regression coefficients: a and b. Comparing the values of the columns in the Coefficients and the standard error in the table, we see that the absolute values of the coefficients are larger than their standard errors. In addition, these coefficients are significant, which can be judged from the values of the P-value indicator.

Figure 1. GDP correlation plot



Source: Student's computed

Table 4. Real population and pharmaceutical firm sales Regression Analysis Results, 2013-2017

Dependent Variable: Population

Regression Analysis	
Multiple R	0,088843818
R-squared	0,007893224
Adjusted R-squared	-0,488160164
Standard Error	0,004047642
Observations	4

ANOVA

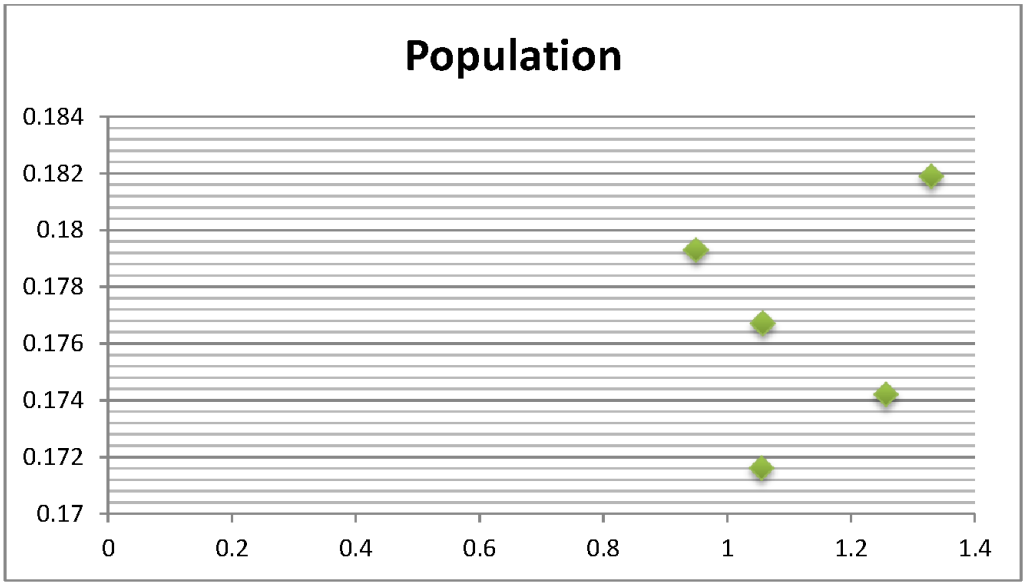
	Df	*SS*	*MS*	*F*
Regression	1	2,6069401176	2,6069401176	0,915061655
Residual	2	3,2768598824	1,6383460805	
Total	4	3,30275		

	Coefficients	*Standard Error*	*t-statistic*	*P-value*
Y-intercept	0,178934607	0,015437442	11,40692756	0,007597796
Population	0,001605387	0,013322488	0,126142956	0,911156182

Source: Student's calculations

What concerns other additional hypotheses for real population? P-value we got from regression analysis is 0.91, which means that it is approximately than our alpha value 1.033. Therefore, we can take that seriously and say about positive influence.

Figure 2. Population correlation plot



Source: Student's computed

Table 5. Total Labor force and pharmaceutical firm sales Regression Analysis Results, 2013-2017

Dependent Variable: Labor force

Regression Analysis	
Multiple R	0,008008416
R-squared	0,641347059
Adjusted R-squared	0,499903798
Standard Error	0,857294054
Observations	4

ANOVA

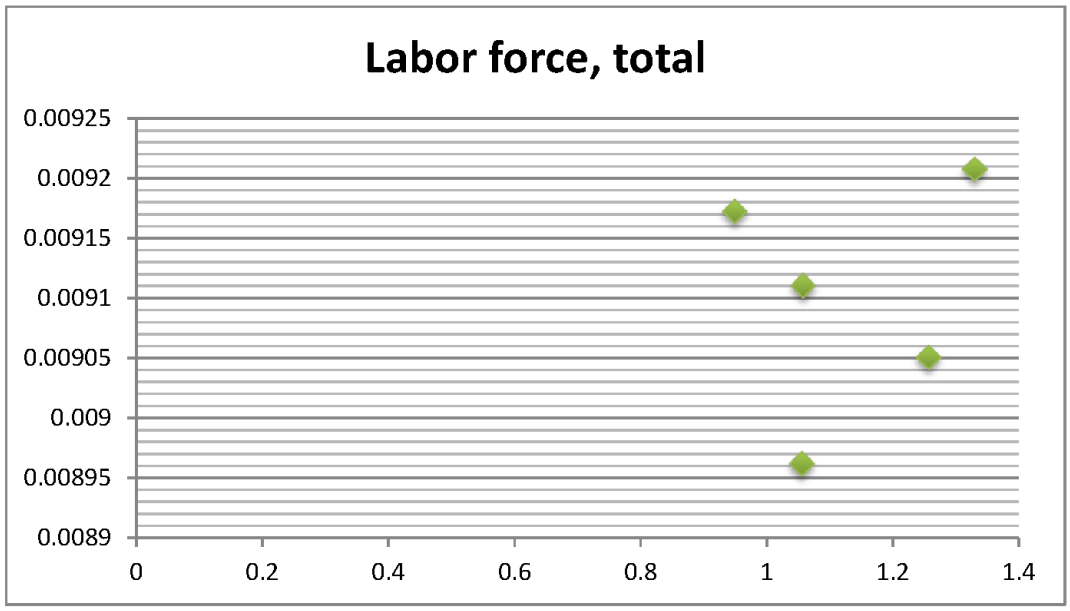
	Df	*SS*	*MS*	*F*
Regression	1	1,959003399	1,959003399	0,99199158
Residual	2	0,168996601	0,734953322	
Total	4	1,470594618		

	Coefficients	*Standard Error*	*t-statistic*	*P-value*
Y-intercept	0,009138671	0,326985242	2,79498848	0,001277636
Labor force	-0,319587706	0,282172008	-0,01132559	0,991991584

Source: Student's calculations

The effect of the total labor force was also tested via regression. However, we got the p-value more than 0.99 (i.e., 1.033). Hence, it makes us conclude that labor force has a significant impact on overall pharmaceutical firm sales.

Figure 3. Total labor force correlation plot



Source: Student's computed

Table 6. Manufacturing GDP and pharmaceutical firm sales Regression Analysis Results, 2013-2017

Dependent Variable: Manufacturing

Regression Analysis	
Multiple R	0,295344
R-squared	0,087228
Adjusted R-squared	0,36916
Standard Error	2,811195
Observations	4

ANOVA

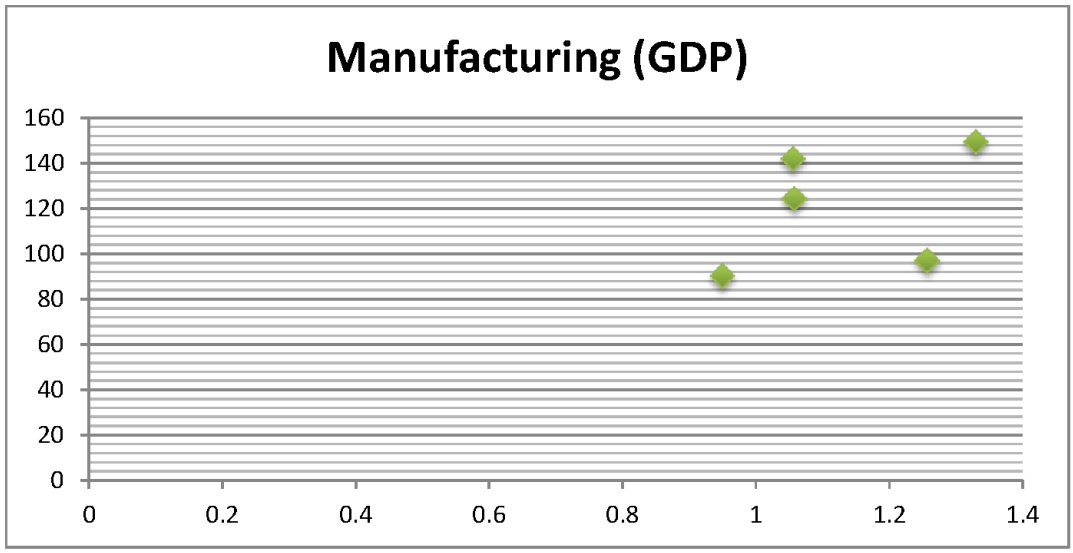
	Df	*SS*	*MS*	*F*
Regression	1	15,10448	15,10448	0,191127789
Residual	2	1,580564	7,902819	
Total	3	17,31609		

	Coefficients	*Standard Error*	*t-statistic*	*P-value*
Y-intercept	6,683117	1,072172	0,623325	0,596680691
Manufacturing	4,045165	2,925282	0,437182	0,795656006

Source: Student's calculations

The Table 6 shows the relationship between manufacturing and firm's sales. Here again, we take a look at p-value, which is definitely low than 1.033. Simply speaking, manufacturing does not significantly affect economic develop of pharmaceutical firm.

Figure 4. Manufacturing (GDP) correlation plot



Source: Student's computed

Table 7. Export and pharmaceutical firm sales Regression Analysis Results, 2012-2016

Dependent Variable: Export

Regression Analysis	
Multiple R	0,791899678
R-squared	0,6271051
Adjusted R-squared	0,44065765
Standard Error	1,588261126
Observations	4

ANOVA

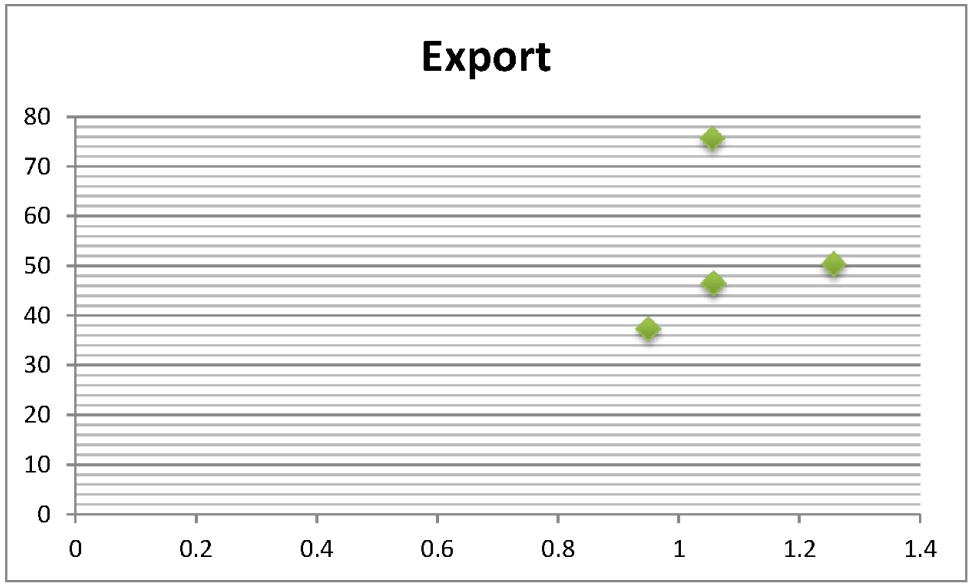
	Df	*SS*	*MS*	*F*
Regression	1	8,484528194	8,484528194	3,363441549
Residual	2	5,045146806	2,525273403	
Total	3	13,529675		

	Coefficients	*Standard Error*	*t-statistic*	*P-value*
Y-intercept	-8,180579443	7,768786783	-1,053006045	0,402781909
Export	1,312018463	7,153984652	1,833968797	0,027800322

Source: Student's calculations

It is regression shows us the relationship between export and pharmaceutical firm sales data of Kazakhstan. According to the results, p-value in this case is 0.027 and this also says that the correlation between these two variables is significant as we thought it would be.

Figure 5. Export correlation plot



Source: Student's computed

Table 8. Import and pharmaceutical firm sales Regression Analysis Results, 2012-2016

Dependent Variable: Import

Regression Analysis	
Multiple R	0,962447936
R-squared	0,92630629
Adjusted R-squared	0,889459043
Standard Error	4,3462259962

Observations	4

ANOVA

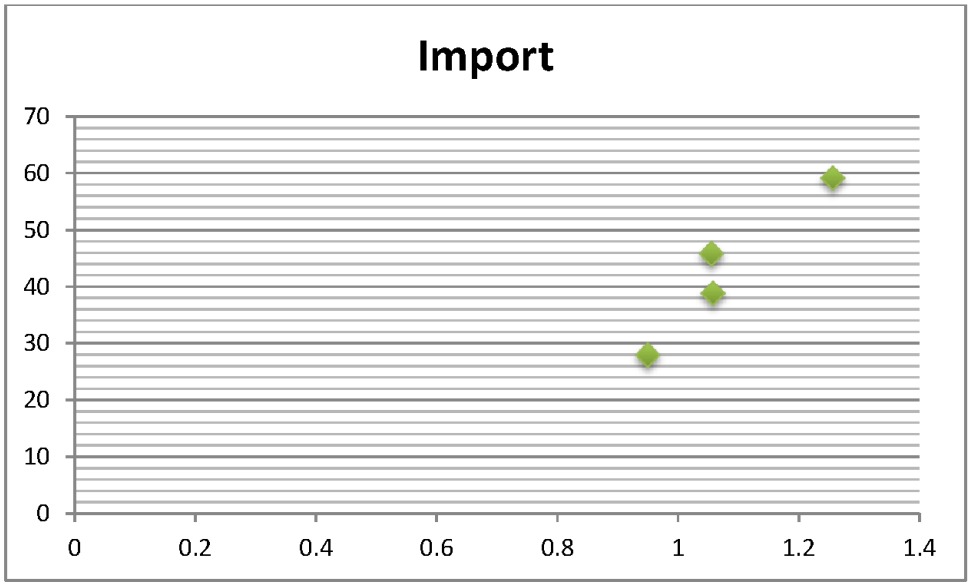
	Df	*SS*	*MS*	*F*
Regression	1	4,748800487	4,748800487	2,513926208
Residual	2	3,777995131	1,888997565	
Total	3	7,51266		

	Coefficients	*Standard Error*	*t-statistic*	*P-value*
Y-intercept	-6,313331389	2,125920379	-2,969693242	0,097148205
Import	8,156272958	1,957680419	5,013906868	0,037552064

Source: Student's calculations

While carrying out regression analysis, the first thing that should be carefully examined is p-value or significance F value – which is exactly the same number. In this case, what we have is 0.037 for the p-value, which is definitely approximately than 0.04. Therefore, this makes us to conclude that import does significantly affect pharmaceutical firm sales.

Figure 6. Import correlation plot



Source: Student's computed

5. CONCLUSION

The main feature of the pharmaceutical industry in Kazakhstan it is high import dependence and extremely low export orientation. The share of exported products is about 6% of the total production produced in our country, having increased almost twice times since 2012. Despite the annual growth in production, the market of production of the main pharmaceutical products of Kazakhstan at the end of 2016 provides up to 0.6% of the volume of production of the manufacturing industry and 0.2% of the volume of industry, as a whole.

For the pharmaceutical industry in Kazakhstan's GDP was about 0.1% in 2017, according to the rating Agency of the regional Financial Center of Almaty, the value will remain at the same level by the end of 2018. In the sector there are about 80 companies, employing around 3.6 million people. For the period 2016-2017 there is a significant increase in production volumes in value terms, amounting to an average of 39.59%. Significant growth in the manufacturing production of the main types of pharmaceutical products falls on the period of this year, when the rate of decline amounted to an average of over 27.41% for the period 2015-2016 years.

The main trend of the pharmaceutical industry over the past 5 years is the continuous growth in almost all major product groups. Despite the decline in investment in the pharmaceutical industry, one of the factors of increasing production today is the increase in production capacity of the associated labor resources. In 2015, the average annual production capacity for the production of drugs reached its minimum value and amounted to 30.9%. At the end of 2016, the average annual production capacity continued to increase and increased to 42.3%, which provides a direct link with the annual increase in the number of labor resources of the country. The increase in the population growth is associated with the increasing domestic demand for pharmaceutical

products, the growth of which is due to the positive effect of various state development programs ("The state program of Industrial and innovative development of the country" SPIID 2010-2014, "The state program of Industrial and innovative development of the country" SPIID 2015-2019, "Densaulyk" 2016-2019), as well as the increasing volume of public procurement of medicines for the whole population of the country.

In terms of the structure of production of basic pharmaceutical products by types in real terms, the leading position is the production of drugs and other pharmaceutical products (up to 99%), the share of antibiotics and vitamins accounts for up to 1%.

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