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RESOURCE SUPPORT OF ADAPTATION CAPABILITIES OF THE PHARMACEUTICAL INDUSTRY UNDER COVID-19 PANDEMIC

The object of research in this work is the pharmaceutical complex as one of the most important elements of the «antiviral strategy», formed both at the global level and at the level of national states. These strategies are a new direction of management and, as the practice of their implementation shows, the effectiveness of these strategies is low due to the lack of a clear vision of the possibilities of their resource provision. This prevents the pharmaceutical complex from successfully adapting to the current situation.

It is determined that the pharmaceutical industry is currently struggling to address the challenges posed by the COVID-19 pandemic. These problems are associated with a lack of experience in operating in the context of a sharp surge in morbidity and with excessive commercialization of the production of vaccines and antiviral drugs, which gives rise to competition between firms and brands, which in some cases is unfair. And also with an insufficient intellectual component of the pharmaceutical industry, which is manifested in the absence of «breakthrough solutions» and scientific discoveries in this area. These circumstances significantly reduce the ability to counter a pandemic, require appropriate solutions, in particular, the adaptation of the pharmaceutical complex to current conditions.

Through the use of the method of analysis, generalization and classification, the existing resource base of the pharmaceutical industry is considered in the work.

The analysis shows that the «financial resources» and «human capital» of the pharmaceutical industry are currently hardly able to solve the problem of COVID-19. At the moment, the only resource that can really change the situation for the better are organizational resources that allow influencing positive solutions to the indicated problem at the lowest cost and in a relatively short period of time.

The paper provides a list of areas that form the «field of organizational resources», provides the appropriate arguments that allow to recommend them for practical use.

Keywords: *pandemic problems, pharmaceutical complex, antiviral strategy, externalization, adaptive capabilities, resource provision model.*

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1. Introduction

In a globalized world, the rapid spread of a new crisis, caused primarily not by financial or economic, but by biological and physiological factors, actually began on December 31, 2019. On this day, the World Health Organization (WHO) was informed a little belatedly by the competent authorities of the People's Republic of China (China) on the discovery in the country of several dozen cases of a new disease caused by a viral pathogen.

From that moment on, a dangerous virus begins to spread uncontrollably in the world, which has a negative impact on all spheres of civilizational development. Despite the fact that the whole world has been looking for a solution to the pandemic problem for more than a year, there is no need to talk about its final resolution (even taking into account the advances in vaccine development).

At the same time, the fight against the pandemic requires more and more resources, as well as the adaptation of medical and pharmaceutical care management systems to current extreme conditions.

Therefore, a study that concretizes the direction of adaptation of the pharmaceutical industry to the conditions of the COVID-19 pandemic from the standpoint of resource provision of this process is relevant.

2. The object of research and its technological audit

The object of research in this work is the pharmaceutical complex as one of the most important elements of the «antiviral strategy», formed both at the global level and at the level of national states. These strategies are a new direction of management and, as the practice of their

implementation shows, the effectiveness of these strategies is low due to the lack of a clear vision of the possibilities of their resource provision. This prevents the pharmaceutical complex from successfully adapting to the current situation.

3. The aim and objectives of research

The aim of research is to consider the possibilities of resource provision for the adaptive capabilities of the pharmaceutical industry in the context of the COVID-19 pandemic. In accordance with the purpose of the study, the following tasks are set in the work:

1. To identify problems that reduce the effectiveness of the adaptation capabilities of the pharmaceutical industry in the context of the COVID-19 pandemic.

2. To develop a model for finding opportunities for resource provision for the development of the pharmaceutical complex in a pandemic.

3. To determine the directions of resource provision for the adaptation of the pharmaceutical industry in the context of the COVID-19 pandemic.

4. Research of existing solutions to the problem

Over the past year, the problem of the impact of the pandemic on the general development of civilization has found a response in scientific research. As a rule, scientific papers talk about the need to improve medical practice in the fight against COVID-19. Among the main directions for solving this problem are recommendations to improve the efficiency of medical institutions through the creation of special «antiquated services» [1]. And also due to a number of preventive measures [2] and increasing the intensity of medical measures [3].

The authors have proved the need for a prompt response of health systems to the current epidemiological situation, but the question of practical provision of «efficiency» remains.

In the works [4, 5], the importance of creating a state strategy to combat a pandemic is noted, the experience of creating such a strategy in Asian countries is disclosed. However, the recommendations given in this work are hardly possible to be used in all regions of the world, given the difference in population, size of territories, level of development of medicine, etc.

At the same time, the issues of the formation of a new direction of medical practice are actualized in the scientific literature [6]. This area can be described as «medicine of viral danger», which is formed at the intersection of traditional medicine and emergency medicine in emergency situations.

A number of researchers' works are devoted to the development of health protection policy in a pandemic [5, 7]. The authors touch upon the financial aspects of the fight against the pandemic, as well as the readiness of the health care system to confront the global epidemic. The value of the study [7] lies in the fact that it provides convincing arguments refuting the possibility of solving the problem with the help of finance. And in work [5], the data presented indicate the unavailability of national medical systems to resist a pandemic.

The study [8] shows and substantiates a non-linear trend in the development of the incidence of COVID-19. This work convinces that one should not expect a sig-

nificant decrease in the incidence in the coming years. Even widespread vaccination will not solve the problem. However, this work does not reveal the ways to solve the problem, this author only indicated the need for their solution. The study of research data shows that today there are a number of recommendations that, however, will not help in solving the problem of COVID-19.

As for the adaptation of economic systems to dynamically changing environmental conditions, in recent years a number of researchers have addressed this problem, for example, in [9, 10]. However, most research has focused on micro-adaptation. The issues of adaptation at the meso-level remain outside the field of vision of researchers, which complicates the solution of the indicated problem. Also not disclosed in the scientific literature are the problems of increasing the effectiveness of pharmaceutical care, as an important direction in the fight against the pandemic.

5. Methods of research

To solve the objectives, the following methods were used in the work:

- analysis of the problems associated with ensuring the adaptive capabilities of the pharmaceutical industry in the context of the COVID-19 pandemic;
- classification of these problems by the nature of their occurrence;
- generalization of the results of the study of problems and the formulation of directions for resource support for the adaptation capabilities of the pharmaceutical industry in the context of the COVID-19 pandemic.

6. Research results

Currently, an important task for almost all economic entities is to adapt to the new economic reality, which unexpectedly emerged in 2020 and continues to affect all spheres of socio-economic life.

Of course, it is possible to talk about the COVID-19 pandemic and the problems associated with it, among which are the decline in business activity, the efficiency and profitability of the activities of many enterprises and organizations, constant psychological stress, a decrease in the quality of life, etc.

The COVID-19 problem is unlikely to be resolved in the short term. In this regard, it is important to adapt to the conditions that determine the current situation around the world.

It should be said that the concept of adaptation of economic systems, as a part of management theory, developed at the end of the twentieth century and today is considered by researchers from the standpoint of the ability of an economic entity to somehow adapt to the conditions of the marketing environment [9, 11]. In fact, it is possible to talk about the «adaptive capacity of the economic system», which is defined as the ability of an economic entity to change the parameters of its own activities in order to achieve the best economic or social result.

This definition is true for all levels of economic systems (micro-, meso-, macro-), since, in general, the set of variable parameters itself is limited and universal (economic growth, efficiency, profitability, competitiveness).

At the same time, it should be understood that any activity aimed at the formation of the adaptive capacity

of the economic system requires appropriate resources, the search for which is difficult due to the presence of significant socio-economic problems.

Speaking about the adaptive capabilities of the pharmaceutical industry in the context of the COVID-19 pandemic, it should be said that even a superficial analysis suggests that there are significant problems in this area.

Studies show that currently in the global pharmaceutical industry, a number of negative phenomena can be identified that, in principle, call into question the ability of global pharmaceutical industry to cope with the challenges that the COVID-19 pandemic generates today. Without pretending to be an exhaustive list of these problems, let's nevertheless list those that today are those externalities that can't be passed by:

1. Problems associated with the low adaptive ability of the pharmaceutical complex to quickly respond to the conditions of the «explosive» spread of infection:

- a complicated, long and expensive procedure for registration of vaccines and documenting their compliance with national standards;
- lack of a clear understanding of the effectiveness of vaccination and possible side effects;
- lack of an established system of information interaction between national developments and vaccine manufacturers, unfair competition leading to discrediting manufacturers of trademarks and brands.

2. Problems associated with the low adaptive ability of the pharmaceutical complex to intensify production activities in a pandemic:

- lack of production capacity for the production of vaccines;
- lack of technologies to increase the production of vaccines and effective antiviral drugs at the available capacities;
- lack of logistic infrastructure, meaning the prompt delivery of vaccines and the need for «high-quality storage».

3. Problems associated with the low adaptive capacity of the institutional conditions of the pharmaceutical complex:

- lack of a system of operational contractual interaction between states in a pandemic;
- lack of a developed system of vaccination of the population, which allows for promptly and in the shortest possible time to vaccinate the population of regions and countries;
- lack of skills in the operation of a pharmacy chain in a pandemic, taking into account the need to control prices and quality of antiviral drugs.

The above externalities are just a part of the problems that show the «vulnerability» of the pharmaceutical industry in terms of its ability to solve global problems, to act effectively in emergency situations on a global scale.

To solve these problems, the pharmaceutical complex, as well as the institutes of pharmacy management, must activate the reserves of scientific, production, logistics, state management activities. It is also necessary to activate global and national reserves aimed at increasing the ability of the pharmaceutical complex to effectively operate in a pandemic. And also to form an effective anti-virus strategy that can (in contrast to the existing ones) really affect the epidemiological situation in the world.

The objectives of this strategy should be:

- availability of vaccines and antiviral drugs for all countries and regions of the world;

- increasing the production of effective antiviral drugs and vaccines;
- reduction of the terms of development and introduction into medical practice of antiviral drugs and vaccines, creation of institutional conditions for prompt vaccination of the population;
- operational expertise and admission of antiviral drugs and vaccines to the market, reduction of administrative barriers and bureaucratic procedures.

Having designated these goals, it is necessary to answer the question: how can these goals be achieved? In other words, it is necessary to identify reserves that will make it possible to «rebuild and adapt» the pharmaceutical complex, bearing in mind its key place in solving the global problem of mankind, to which, of course, the COVID-19 pandemic can be attributed.

Economic science and management science allocate a very limited space in which it is possible, in fact, to search for reserves that increase the efficiency of the economy at the meso-level. These are financial reserves that allow increasing investments in the industry and ensuring scientific and technological progress (STP).

Also, among the reserves, organizational reserves (including management, marketing, logistics) can be distinguished, which make it possible to increase the efficiency of the use of financial resources and achieve socially significant results. In this case, a decrease in the level of morbidity, mortality among the population of regions and countries.

The reserves of «human capital» are also important, which determine the possibility of developing science, technology, parameters of production activity.

Actually, it is in these areas that the search for additional resources should be carried out, without going beyond the outlined area (Fig. 1), since «a wide range of search» will only distract from the actual identification of additional reserves.

Undoubtedly, this model demonstrates a certain «ideal» situation, when the «managers» have financial resources at their disposal, as well as «human capital» that allows them to solve this global problem. At the same time, the «limited resources», which is the main «economics», determines the complexity of their generation in the amount necessary to solve the problems of the pandemic.

In this regard, one should immediately finally decide that it is hardly possible to «flood» the COVID-19 problem with financial injections (even multibillion-dollar). Today in the world there is no such amount of financial resources that, if invested, can solve the problem of the pandemic. Suffice it to say that in the United States alone, the costs associated with contact tracing and population testing can reach 175 billion USD per year [7]. At the same time, the very cost of creating a vaccine and its implementation (for example, in the European Union) reaches 8 billion dollars. The United States, therefore, on a global scale, solving the problem of COVID-19 will require investment of trillions of US dollars, given, for example, the fact that by mid-2020 the G20 countries have mobilized 10 trillion USD to overcome the pandemic, which, in general, brought dubious results [7].

Speaking about overcoming the pandemic on a global scale, in these conditions of the world economy (in connection with the same pandemic problem) it is hardly possible to generate the necessary amount of financial resources. These are the resources that should be devoted to anti-epidemiological activities, testing, vaccine development, production, vaccination, etc.

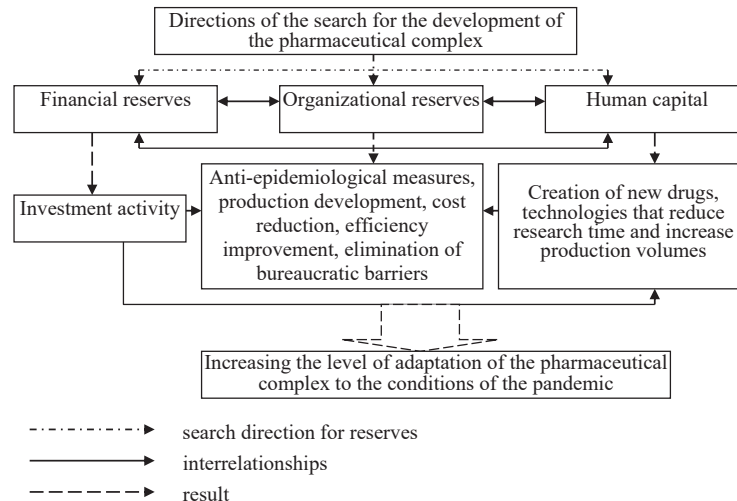


Fig. 1. A model of searching for opportunities for resource support for the development of the pharmaceutical complex in a pandemic

In addition, one should take into account the fact that multi-billion dollar investments in the pharmaceutical sector of the economy ensure its high economic efficiency. However, these investments do not always determine the innovative nature of pharmacy. Modern pharmacy is focused on the production of generics, without creating really effective drugs that can radically change the quality of human life.

Actually, this argument is of the dubious nature of scientific and technological progress in the global pharmaceutical industry, which is currently focused on reducing costs, competition, technological re-equipment, but certainly not on solving «global problems of mankind». This is indirectly confirmed, for example, by the fact that, according to Forbes' estimates, 50 new billionaires have appeared in the healthcare sector in 2020, including W. Sahin and S. Bansel, who participated in the development of two vaccines against coronavirus (Pfizer, Moderna). At the same time, these developments also enriched those who had only an indirect relationship to this scientific achievement, in particular, the Italian entrepreneur Se Stevanato, the owner of the private company Stevanato Group, became a billionaire thanks to the production of ampoules for vaccines [12].

The global pharmaceutical industry also benefited, for example, after the concern Inovio Pharmaceuticals announced that it was accelerating the development of a vaccine against coronavirus, the value of the company's shares in three months of 2020 more than tripled [13].

At the same time, pharmaceutical companies have abandoned the production of other vital drugs, today antimalarial drugs, anti-HIV drugs, drugs for the treatment of cancer patients are in short supply.

The given data indicate that the pharmaceutical industry, against the background of the inability to ensure an effective fight against the pandemic, at the same time creates problems for other categories of patients who can't receive the necessary pharmaceutical care.

The possibility of the pharmaceutical complex to solve the problems of COVID-19, relying on its own intellectual potential, is also problematic. Without trying in any way to diminish the intellectual capabilities of drug developers, let's nevertheless note, for example, the fact that pharmaceutical scientists dropped out of the list of Nobel laureates, which indicates the absence of truly breakthrough ideas and scientific developments of universal significance [14].

The quality of vaccines created by pharmaceutical companies is also debatable. Today it is difficult to talk about their true effectiveness.

The presence of side effects, possible long-term effects on the body of the vaccinated, re-infection, etc. become obvious.

In this regard, the expectation that some kind of «intellectual breakthrough» is also, although desirable, but still hardly achievable.

Accordingly, the logic of the study quite objectively leads to the conclusion regarding the need to search for reserves for the development of the pharmaceutical complex in the field of organizational support, to increase its organizational adaptive capabilities in a pandemic.

This reserve, of course, does not reject the need for investment, innovation and management of «human capital», however, determines the most important fusion of the search for reserves and their activation to increase the adaptive capabilities of pharmacy.

Next, let's consider the organizational reserves that the pharmaceutical industry currently actually has and the use of which can create conditions for increasing its adaptive abilities in the context of solving the COVID-19 problem (Table 1).

These recommendations form a corresponding «field of organizational resources», which together form the adaptive capacity of the pharmaceutical industry to solve the COVID-19 problem.

This approach is relatively low-cost, does not require global investment and innovative solutions, is based on the already existing achievements of the pharmaceutical industry in countering the pandemic, and is capable of reducing the incidence rate in the foreseeable future and increasing the overall efficiency of the pharmaceutical care system.

Of course, in order for these recommendations to acquire real practical content, an appropriate political will of world leaders, leaders of individual states and international organizations is needed.

Increasing the social responsibility of pharmaceutical companies, their willingness to lead the fight against the pandemic, sharing the burden of problems caused by it with the population and the state, is also becoming an essential element for the implementation of the designated areas.

Table 1

Resources for increasing the adaptive capacity of the pharmaceutical industry in the context of the COVID-19 pandemic

No.	Problem	Provisions for solving the problem
1	Complex, long and expensive procedure for vaccine registration and documentation of their compliance with national standards	Further simplification of the registration procedure for vaccines and antiviral drugs, development of procedures for mutual recognition of drugs, development of a network of laboratories involved in the registration of vaccines
2	Lack of a clear understanding of the effectiveness of vaccination and possible side effects	Establishment of a vaccination monitoring service (within WHO), continuous monitoring (based on reports from the national health system) of the effectiveness and efficiency of various vaccines
3	Lack of an established system of information interaction between national developments and vaccine manufacturers, unfair competition leading to discrediting manufacturers of trademarks and brands	Creation of a coordinating council (within WHO), developing rules for access to information related to national developments, objective assessment and informing the world community about the level of vaccine efficacy, vaccination status, availability of various vaccines from global manufacturers on the market
4	Lack of manufacturing capacity to produce vaccines	Organization of production of vaccines and antiviral drugs in countries that do not have their own developments, but have the appropriate capacity for the production of vaccines
5	Lack of technologies to increase the production of vaccines and effective antiviral drugs with the available capacity	Widespread digitalization of the pharmaceutical industry, widespread transition of national manufacturers to the concept of Pharma 4.0
6	Lack of logistics infrastructure, meaning the prompt delivery of vaccines and the need for its «high-quality storage»	Development at the WHO level of a logistic concept for the development of the pharmaceutical industry in emergencies of an epidemiological nature; creation of appropriate infrastructure for storing vaccines in the world's largest transport hubs
7	Lack of a system of operational contractual interaction between states in a pandemic	Development by international organizations and conclusion of a multilateral agreement on access to vaccines and antiviral drugs, on the terms of bilateral and multilateral transactions in the global pharmaceutical market
8	Lack of a developed system of vaccination of the population, which allows for promptly and in the shortest possible time to vaccinate the population of regions and countries	Creation of operational field teams (including with the participation of trained volunteers, military doctors) participating in the vaccination campaign. Expansion of the number of stationary vaccination points. It is also necessary to create a strategic national stock of antiviral and antibacterial drugs. Such experience already exists in the world – in 1999, the United States created the Strategic National Reserve, which is designed to eliminate the consequences of epidemics and pandemics. For its storage, a national warehouse has been created, logistic schemes have been developed for the delivery of drugs to settlements throughout the United States within a time frame not exceeding 12 hours [15]
9	Lack of skills to operate a pharmacy chain in a pandemic, taking into account the need to control prices and quality of antiviral drugs	Development of a pharmacy network on the principles of public-private partnership, involvement of regulatory authorities in the constant monitoring of the quality of vaccines and antiviral drugs. An important measure to prevent the emergence of an epidemic is the development of regulations for the possible over-the-counter dispensing of broad-spectrum drugs at the request of the patient for emergency prevention of infectious diseases. A similar regulation has already been adopted by the National Health Service of Great Britain and Wales (Great Britain) in 1997. It obliges pharmacies to maintain the so-called «emergency» stock of antiviral and antibacterial drugs and dispense them without a prescription at the request of the patient in the face of the threat of an epidemic

7. SWOT analysis of research results

Strengths. In work based on available factors:

- the main problems that reduce the effectiveness of the pharmaceutical industry in a pandemic are identified;
- practical recommendations for solving each of the identified problems are developed.

Weaknesses. It is possible to check the effectiveness of the proposed measures only after their implementation.

Opportunities. The conducted research allows to:

- formulate a strategy to combat the pandemic at the national level;
- develop strategic directions for managing the pharmaceutical sector of the economy.

Threats. The main threats to the resource provision of the adaptive capabilities of the pharmaceutical industry in the context of the COVID-19 pandemic may be related to:

- lack of a strategic vision of the directions of countering the pandemic;
- lack of a clear understanding of the need for global efforts to counter the pandemic;
- a long-term nature of adaptation of pharmaceutical industry enterprises to the conditions of the COVID-19 pandemic.

8. Conclusions

1. It is revealed that the pharmaceutical industry is currently experiencing difficulties in solving the problems caused by the COVID-19 pandemic. These problems are associated with a lack of experience in the field of a sharp surge in morbidity. There is also an over-commercialization of the production of vaccines and antiviral drugs, which creates competition between firms and brands. It should also be recognized that the intellectual component of the pharmaceutical industry is insufficient. These circumstances significantly reduce the possibility of countering a pandemic, require appropriate solutions, in particular, the adaptation of the pharmaceutical complex to current conditions.

2. It is shown that any activity related to adaptation requires appropriate resources. The search for resources is complicated by the fact that it is carried out in the limited space of «adaptive capacity» of the pharmaceutical industry. These abilities are defined as the ability of an economic entity to change the parameters of its own activities in order to achieve the best economic or social result.

3. The analysis of the available resource base showed that the «financial resources» and «human capital» of the pharmaceutical industry are currently hardly able to solve

the problem of COVID-19. Currently, the only resource that can really change the situation for the better is organizational resources that allow influencing a positive solution to the indicated problem at the lowest cost and in a relatively short period of time. The paper contains a list of areas that form the «field of organizational resources», provides the appropriate arguments to recommend them for practical use.

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