

## Use of Information Technologies in the Pharmaceutical Industry

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Information technologies have become an integral part of almost all areas of human activity in the last 20-30 years. The development of computer technology has given humanity a lot: to calculate various mathematical systems instantly without spending a large amount of resources, to store an incredible amount of data and to send any amount of changed data to any distance at a speed comparable to the speed of light.

Information technology has allowed the pharmaceutical industry to automate many processes that require the use of many highly skilled workers: today thousands of typists, shopkeepers, librarians, secretarial staff and others have disappeared.

This article examines the most important aspects of the use of information technology in the pharmaceutical industry:

1. Creation of new drugs
2. Formation of new methods of sale of pharmaceutical products
3. Quality control systems for marketed drugs.

### *Information technology for chemistry and biology*

At the outset, it should be noted that no important research in chemistry or biochemistry can be carried out without the use of computer calculations in quantum chemistry or molecular dynamics, which have developed over the past hundred years. The information obtained in this way gives the researcher a lot, at least it is possible to know the chemical properties of the resulting drugs, their form, their behavior depending on the environment, and a lot of statistical information on possible analogues. Computing options double in price roughly every 3-4 years, and their potential never ends.

Data from larger objects, such as the parameters of a living cell, the characteristics of the surface of a piece of tissue, are obtained using various methods of light and electron microscopy, the images of which are, for obvious reasons, easier to analyze and store digitally. The data of the last generation atomic force microscope initially represents a table of numbers tied to certain coordinates, if necessary, you can get a photo likeness, or you can not work depending on the changes in some set of points taken in real time.

### *Online pharmacies, incident analysis*

Once you understand the use of computer technology in research work, you can begin to analyze a phenomenon such as online pharmacies. In fact, this phenomenon, according to the author, is the quintessence of computer technology in the field of drug distribution. Let's see what this online pharmacy is all about.

In fact, these are the same pharmacies, there can be several dozen in each city, there is one small "but", they do not exist in the real world. More precisely, it is not even true at all, they exist, but they are a collection of images, numbers and texts in the form of a single database on the Internet, a kind of semblance of a showcase, the content of which can be evaluated without leaving home. Thanks to modern technologies that are becoming easy and convenient to use, the effect is the same.

There are a number of mechanisms that simplify the work of such "virtual" pharmacies, making them as democratic and cost-effective as possible compared to classical ones:

1. One person is enough for the operation of each such pharmacy, of course, more is better.
2. There is no need to maintain retail warehouses that operate directly from a wholesale warehouse unless they provide such an opportunity. The courier comes to the warehouse, receives the finished package and delivers it to the consumer. In addition, the courier does not need any special clothing or equipment, and the weight of standard "order" drugs rarely exceeds 5 kilograms. He can carry the package in his car, on the subway, or on foot. The courier may not even know exactly what he is carrying, suddenly he is not interested and does not care what is written in the documents.

One warehouse can serve any number of online pharmacies, for example, 15 different sites. The user may not even know how they work, although sooner or later he will find out by looking at similar assortments of different companies. This is an ideal market in its purest form.

There may be licensing issues, but who is stopping them from fully controlling the hundreds of companies that exist in this country, often for a year, that is an impossible task for government agencies in their current form.

The costs of organizing its production are minimal: standard state duty, the cost of online pharmacy support equipment is a phenomenon that is the quintessence of computer technology in the field of drug distribution; the economy of the industry is about a thousand rubles a month (it can't even be a full server, but it can rent five percent of its full load), the salary of employees is still about a hundred thousand rubles a month.

With the development of technologies for cashless payment of medicines, the presence of online pharmacies is more justified. Currently, there are dozens of ways to pay for purchases over the Internet. The most popular and easiest way is to pay with bank cards, the most developed payment systems in the world are Visa and MasterCard. To make a payment, you just need to enter the details of your plastic card and in some cases confirm the payment in some way, enter the code sent to your mobile phone via SMS or enter an additional password.

You can pay both with the money on the card and with the money taken from the bank using a credit card. It is completely transparent from a legal point of view, where the money came from, where it went and the goods purchased are known. This is convenient for keeping statistics and state control of the retail market by enterprises engaged in this business. Information about such operations can be stored forever.

Pharmaceutical products can also be paid for using other payment systems: Yandex-Money and Web Money; PayPal is widely used abroad. That is, these are the same banks or banking systems optimized for working on the Internet, where funds can be entered in cash (often anonymous and limited amounts of deposited funds) and through money transfers or from a linked bank card, reporting in them according to the same principles as in standard banks is stored.

#### *Distribution of medicines to patients*

Automated mechanisms for dispensing drugs to patients bypassing pharmacies are another way to provide drugs to patients directly through medical facilities, bypassing intermediaries.

It can be organized as follows - the state buys medicines through its own channels and distributes them to those in need through pharmacies or medical institutions, depriving consumers of the opportunity to directly choose the medicines they need. Lists of manufacturers, suppliers of foreign products, consumers are provided by state contractors of services that issue prescriptions for drugs from relevant medical institutions, simultaneously register them in electronic databases, and license and control the production and import of drugs.

The main problem of such a system is irrational spending of funds. If the standard exchange of drugs in pharmacies for consumer banknotes, the consumer decides how much he can afford to pay and tries to choose cheaper analogues that are always available, if the state spends money, it is the most accepted, taking into account the possible political or macroeconomic effects that consumers do not care about, will go to the regions.

To evaluate such activity, the following study was considered. Usually, drugs are purchased according to the results of the auction. Where the price is low, they will buy, which, by the way, is the only criterion for choosing the winners. It often happens that previously known unique suppliers are allowed to participate in such auctions, and others are not allowed, in this case, the auction turns into a farce, in which the state spends serious money on mediocre drugs, enriching the manufacturer, in a better way than the state budget. could be spent.

An analysis of about 100 auctions was carried out, the declared "value" of which was reduced by an average of 10% compared to the nominal value. In half of the cases, two to seven bidders were announced, while in the other half there was only one bidder for each auction, which, as a rule, indicates that cashless payment technologies for drugs are not developed; online pharmacies are more justified without any competition, which completely blocks the initiative. Most often, the nominal value is taken "out of the blue", which is enough for everyone involved in the activity. If you want, you can also calculate the money spent on organizing the selection area.

### *The role of the state*

Speaking about the state control over the pharmaceutical industry, they talk about the possibility of state control over the prices of drugs in the retail market, statistics on drugs and consumption. In fact, the existing information technologies allow to control almost all the processes taking place in this field.

### *The conclusion*

The introduction of computer technology continues for the following reasons:

- 1) installation and subsequent use of all systems is very cheap compared to the cost of the entire production;
- 2) training of employees is often not required - a properly designed system does everything by itself;
- 3) supervisory bodies using reports in digital form work more efficiently - if there are any shortcomings, the system itself will point them out;

### *Literature*

1. Махмудова Н.Р., Мухаммадиев С.И. Инновационные технологии в образовании // Вопросы науки и образования.-2019.-№11(57). – С.53-58
2. Махмудова Н.Р. Развитие информационных технологий в сфере расширения образовательных пространств // Вопросы науки и образования.-2018.-№10(22). – С.190-193
3. Махмудова Н. Р. Информатика и информационные технологии в преподавании в высших учебных заведениях Узбекистана //Наука, образование и культура. – 2018. – №. 3 (27). – С. 12-15.
4. Махмудова Н. Р. Система дистанционного образования и техническое оборудование //Проблемы современной науки и образования. – 2020. – №. 6-2 (151). – С. 34-37.
5. Makhmudova N.R. THE ROLE OF INTELLIGENT EDUCATION IN THE DEVELOPMENT OF THE INFORMATION SOCIETY //E Conference Zone. – 2022. – С. 142-145.
6. Makhmudova N.R. Computerization of the Learning Process is the Main Problem of Our Modern Society // Texas Journal of Multidisciplinary Studies. 10-04-2023/ С. 6-8
7. Махмудова Н.Р. Талабаларни ўқитишда ахборот технологиядан фойдаланиш, Педагогик ва психологик тадқиқотлар журналі, ОАК, Т: 2024, №1, 31-36 бет.
8. Махмудова Н.Р. Роль информационно-коммуникационных технологий в медицине и фармации, Илмий амалий анжуман материаллари, Т: 2023, 25-26 апрель, 413-415 бет.

9. Makhmudova N.R. The Role Of Information Technologies In Medicine, Journal of Pharmaceutical Negative Results, Volum 14, 2023, 2514-2517.
10. N.R. Makhmudova, K.K. Ismailov, N.T. Kodirova, K.K. Shadmanov and D.Z. Narzullaev Information technologies in the agricultural economy, E3S Web of Conferences, 2023