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High-tech projects of Kazakhstan: problems and prospects

The paper discusses the domestic high-tech projects, the successful implementation of which will enhance the competitiveness of the economy. As is known, high-tech projects implement in the field of complex technical systems and have different knowledge-intensive, high technical risks and unpredictable results. In this regard, the implementation of domestic high-tech projects faces a number of obstacles that can solved with the help of the integrated use of project management methods. The study found that many domestic rather promising projects in the first stage of development provide significant results, but then after influences of various factors lose their previous pace and lagging behind in terms that exceed a predetermined budget or lead to other disastrous results. The authors proposed a number of ways that will help improve the situation in the market of high-tech projects.

Key words: high technologies, project, project management, risks, innovation.

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Қазақстанның жоғары технологиялық жобалары: мәселелер мен перспективалар

Зерттеу жұмысында ел экономикасының бәсекеге қабілеттілігін арттыруға мүмкіндік беретін отандық жоғары технологиялық жобалар қарастырылған. Жоғары технологиялық жобалар күрделі техникалық жүйелер саласында жүзеге асырылып, ғылыми толымдылығымен, техникалық тәуекелдердің жоғары деңгейімен және нәтижелердің алдын ала нақты болжануының қиындығымен ерекшеленеді. Осыған орай жоғары технологиялық жобаларды жүзеге асыру көптеген кедергілерге ұшырап, жобаларды басқару әдістерін қолдану арқылы шешіледі. Зерттеу барысында көптеген отандық жоғары технологиялық жобалар бастапқы кезеңдерде айтарлықтай жақсы нәтижелер беріп, алайда кейін түрлі факторлар әсеріне орай бастапқы қарқындарын жоғалтып, мерзімдерінен кешігіп, не құны белгіленген бюджеттен артып, басқалай да теріс нәтижелерге әкелетіндігі анықталды. Авторлармен отандық жоғары технологиялар саласындағы жағдайды жақсартуға мүмкіндік беретін бірқатар іс-шаралар жиынтығы ұсынылды.

Түйін сөздер: жоғары технологиялар, жоба, жобаларды басқару, тәуекелдер, инновациялар.

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Высокотехнологичные проекты Казахстана: проблемы и перспективы

В работе рассмотрены отечественные высокотехнологичные проекты, успешная реализация которых будет способствовать повышению конкурентоспособности экономики страны. Как известно, высокотехнологичные проекты реализуются в сфере сложных технических систем и отличаются наукоемкостью, высоким уровнем технических рисков и непредсказуемостью результатов. В этой связи реализация отечественных высокотехнологичных проектов сталкивается с рядом препятствий, решить которые можно с помощью комплексного использования методов управления проектами. В ходе исследования было выявлено, что многие отечественные достаточно перспективные проекты на первой стадии разработки дают существенные результаты, но затем в виду различных факторов теряют свой предыдущий темп и отстают в сроках, превышают заданный бюджет или же приводят к другим плачевным результатам. Авторами были предложены ряд мер, которые помогут улучшить ситуацию на рынке высокотехнологичных проектов.

Ключевые слова: высокие технологии, проект, управление проектами.

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HIGH-TECH PROJECTS OF KAZAKHSTAN: PROBLEMS AND PROSPECTS

Introduction

The concept of creating high-tech projects is one of the main stages of the transition to an innovative economy. To date, one of the important directions of the state policy in the sphere of economic security is to increase its competitiveness in the geopolitical space. The orientation of the economic system to innovate is one of the driving forces of social and economic development and forms the competitiveness of the national economy. The sectors of the Kazakh economy which use high technologies, are key sectors for the sustainable growth of the economic system through the widespread introduction of leading technologies and creating products with high intellectual labor costs.

High-tech projects classified as projects during development uses the latest achievements and results of research and developmental works in priority sectors of the economy. The main component of such projects is latest high-end technologies.

As a rule, high-tech projects realizes in the field of complex technical systems. They can`t be well-structured by methods of project management due to the fact that they differ in knowledge-intensive, they have high level of technical risk and unpredictability in the results.

Experimental part

Theory and practice of high-tech project management presented in the works of researchers like D. Archibald, A. Dhebar, Weilong L., Bing Feng and in informational-analytical materials of Statistical Agency of the Kazakhstan Republic.

The methodological basis of the study are as a general scientific methods (modeling, analysis, classification, system approach), as well as special methods of cognition (statistical methods).

Results and discussion

The development of high-tech projects quite long and expensive process, which involves high risks. High-tech projects at all stages of the life cycle characterized by a high degree of uncertainty. There are situations, when project which successfully passed the stage of testing and implementation of the product can`t be accepted by the market and further its production should be suspended**.**

Many quite promising projects in the first stage of development provide significant results, but then in conditions of increasingly un-

certain prospects they close. There should note that it is not immune to failures, even the most successful high-tech projects: at any time of their life cycle, there is a possibility of visiting the competitor with more advanced technologies. [1]

In our country, high-tech projects realized in the following areas: bio-engineering technology, nanotechnology, aerospace, cellular technologies, technologies for renewable and new energy sources, prevention techniques and emergency situations of natural and man-made disasters, information technology, control, navigation systems, etc.

The following figure shows the level of use high technologies in the Republic of Kazakhstan by regions.

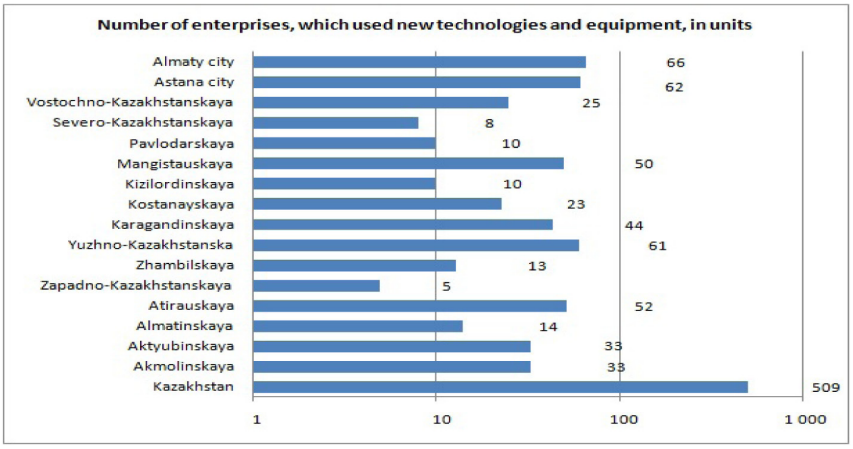

Figure 1 – Number of companies with new technologies in KR [5]

As can be seen from the figure, the regions with the highest rate of active enterprises, which implement in their activity high-tech Almaty, Astana, South Kazakhstan, Mangystau and Atyrau. This due to the fact above mentioned cities industrial-production, oil-producing, commercial and financial centers with great potential and investment attractiveness.

Main large companies that implement high-tech projects in Kazakhstan are: JSC "NC" KazMunayGas "(6 projects), JSC" NC "Kazakhstan Temir Zholy" (6 projects), JSC "NAC" Kazatomprom "(4 projects)," Kazpost '(1 project), JSC "KEGOC's" (1 project), JSC "Kazakhtelecom" (1 project). Among them are a high-tech company "Kazatomprom" project called "the Smart Mine." The project designed to create a new generation of pilot smart mines "Smart-mine".

Practical goal of the project is the organization and construction of uranium-mining new generation complex for testing and adaptation in the industrial scale of new technological, technical and design solutions, providing decrease of 10 to 30% from the current level of cost of production and processing of natural uranium by underground leaching.

As a placement of Smart Mine selected land "Ortalyk" field "Mynkuduk". Project work expected to carried out in a period of six years. Estimated actual performance Smart Mine 200-250 tons of uranium per year, with a nominal production capacity of 450-500 tons of uranium per year.

If we consider the domestic high-tech projects by industry, it is worth noting that they implement in many areas as industry, construction, nanotechnology, IT-technologies, replacing energy technology and nuclear industry.

For example, in the nuclear industry, two high-tech projects are implementing today. So, this year started the construction of the Center of Nuclear Medicine and Biophysics at the Institute of Nuclear Physics of RSE "National Nuclear Center of Kazakhstan." Currently under construction industrial building and made a cyclotron. In Kurchatov created material fusion reactor Tokamak. [6]

In "PAVLODARENERGO" puted into operation a new central control room management of the power system of Pavlodar region, warning emergency situations early on. Also on the basis of Pavlodar energy company opened a modern data center is the largest private electricity company in Kazakhstan – JSC "Central-Asian Electric Power Corporation" (hereinafter – JSC "CAEPCO").

The new central control station (hereinafter – CCS) enables real-time tracking down all power generation sources in the region, shows the flows of electric power to the power lines, the work of

all sub-stations in real time. "Introduced today at work CCS significantly increases the reliability of the entire power system, because it allows the early stages to prevent possible emergency situations. In cases where the emergency shutdown does occur will minimize the time to search for the causes and elimination of violations in the system of Pavlodar region power.

Another high-tech project, opened in Pavlodar – new data center. This data center will ensure smooth operation of modern information systems in enterprises belonging to the group of "CAEPCO," in Pavlodar, North Kazakhstan and Akmola region, Astana and Almaty cities. Reliable operation is provided by the introduction of modern technologies: cloud storage data and virtual servers. In the data center servers, software installed Ellipse, which is EAM-decision (Enterpise Asset Management). The information system is designed to manage enterprise asset, from procurement planning process up to the automated planning of maintenance processes and repairs of all production assets of the group. Automated system Ellipse of "PAVLODARENERGO" with such functionality was introduced for the first time in Kazakhstan.

As part of the investment program for the modernization, implemented throughout the group of companies JSC "CAEPCO" enterprises "PAVLODARENERGO" introduced innovative IT projects: in 2015, there is complete unification of all "subsidiary" companies into a single information network through fiber-optic communication lines. These technologies will improve the work of all departments' PAVLODARENERGO "through the introduction of modern software, use of standardized network equipment, as a result improve the quality of services rendered to the population. [7]

The following figure shows the quantitative indicators of high technology used in the regions of Kazakhstan.

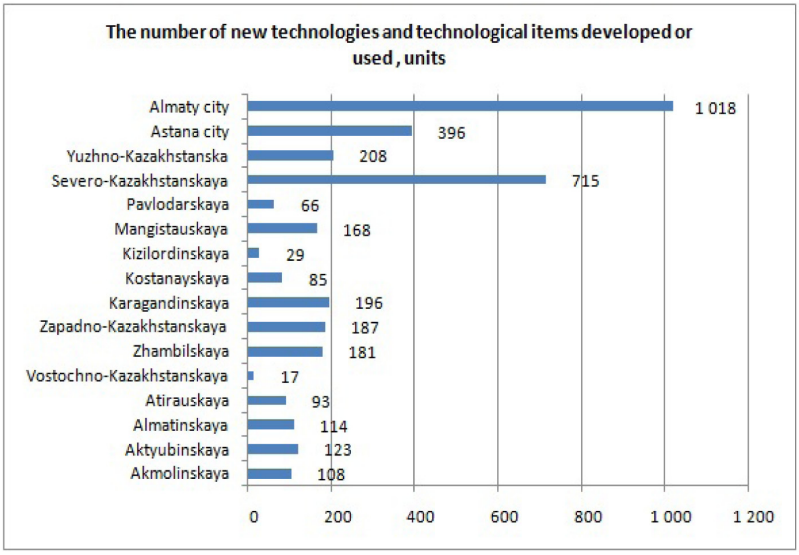

Figure 2 – Rang of regions in using new technologies [6]

This figure suggests that the greatest number of innovations used in Almaty, North Kazakhstan and Astana. It is also associated with a number of different factors. For example, in Northern Kazakhstan are developing engineering infrastructure, metallurgy, which require the application of new technologies and regular improvements.

It is worth noting that was created the Kazakhstan Association of high-tech, energy-efficient and innovative companies in Kazakhstan.

The Association aims to develop energy-efficient technologies and products, the introduction of energy efficient technologies, equipment and materials in the production, distribution and consumption, promotion of the state policy of accelerated industrial-innovative development of the country.

In the environmental context, the activities of the Association aimed at reducing energy consumption and greenhouse gas emissions; to promote an increase in the share of renewable energy in the

manufacturing and residential sectors; to contribute to an overall increase in the quality of life by reducing the impact of anthropogenic factors on the environment.

Managing high-tech project is difficult professional task of management. Content of managing high-tech projects are significantly different at different stages of its creation and implementation. In this regard, efficient selection and application of methods and tools for the project management largely depends on the performance of work that performed at intervals of certain time project.

Managing cost, risks, resources and project team depends on the specifics of the project life cycle, characteristics of transition from one stage to the next project, organizational, managerial and economic content of the selected stages of the project. The uncertainty of the market of science-intensive sectors of the economy makes it different from other market sectors output to market innovative products in an environment where the reaction of potential users is still unknown. However, the closer the development of new innovative technologies and new products to the real needs of the market, the corresponding risk becomes smaller. A specific type of risk of high-tech businesses is difficult managing.

Another most crucial challenge is that the implementation of such projects in Kazakhstan often more expensive cost. Usually this is due to various factors (inflation, devaluation, political, etc. Factors) that should be considered during the planning projects.

The lack of highly qualified specialists is also a negative factor. As a rule, most innovative tools, new technologies are adopted from foreign countries. Domestic specialists often do not have the appropriate qualifications for their management.

Therefore, to solve these problems, first of all, it is necessary to solve the staffing problem.

High-tech projects require continuous improvement of human resources. At the stage of scientific research and experimental design works a team of professional project managers have to know not only the scientific and technical side of the implementation of high-tech project, but also have the necessary skills in the management of innovation and technology commercialization. One of the major risk factors reduce the development and implementation of high-tech project is the selection of an effective management strategy in accordance with the level of qualification and management skills. In order for the project was a success on a broad sales market among consumers of the project leaders are required to have sufficient experience and knowledge of the specifics of the activity. Initially properly thought-out strategy will determine the actual degree of risk and then provide options for its reduction.

Above it was mentioned that most of the high-tech projects are faced with the problem of cost overruns. This problem can be solved by referring to foreign experience. For example, when a nuclear power plant in Limerick, Pennsylvania, started commercial supplies of electricity, it turned out that its construction was canceled a number of records. While many nuclear power plants are being built on a regular basis with a significant excess of the budget and deadlines, the object in Limerick was built 8 months ahead of schedule in 49 months and saving 400 million with a total project budget of 3.2 billion dollars. The power plant in Limerick and has set a new start in the industry.

The secret of this success is the following – when construction began, the aim was to complete the project for eight months before the scheduled date. It would also keep the costs within the prescribed limits. To achieve this ahead of schedule several innovative approaches were used. The two most important of which is to accelerate the process of recruiting staff and the active use of the second shift. The second change has received a good allowance, and its staff was equipped with not only the workers, but also engineers and managers. As a result, the productivity in the second shift was not lower than in the first. Reduce time and costs helped other decisions and actions. For example, with the construction contractor has been concluded stimulating agreement by which the contractor received the benefits from the lead time and cost savings. With such attention to the goal of early completion of the project with a budget saving the team from 3000 thousands of workers from the very beginning was the work diligently and with great enthusiasm, which made it possible to complete the four-year project for three years with little. [8]

We do not set ourselves the main goal of early completion of projects, but with reference to the above experience, you can adjust it to the conditions of Kazakhstan market and used for the delivery of projects on time and on budget within stated.

Conclusion

Domestic high-tech projects are not yet fully able to ensure the competitiveness of Kazakhstan on the geopolitical space. Because high-tech projects which implemented in the field of complex technical

systems and can`t be well-structured by design methods due to the fact that they differ in knowledge-intensive, they have high technical risks and unpredictable results. Therefore it is very important to develop a methodology of project management in the high-tech direction, study foreign experience and adapt it to the conditions of the domestic market and be more careful and seriously during selection of projects. The important role played by the participation of the state, or more precisely, the state support of domestic high-tech projects. In general, we believe that the integrated use of the above measures will help to achieve positive results in the implementation of high-tech projects.

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