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THE MODELS OF COMMERCIALIZATION OF SCIENTIFIC DEVELOPMENTS

Abstract

The article discusses the challenges and opportunities of commercialization of scientific developments in our republic. The authors studied the domestic market of scientific research and identified the main factors affecting the result of commercialization. The study touched upon a very relevant topic, since the successful commercialization of innovations contributes to the development of innovation and the economy as a whole. A product that has undergone successful commercialization will provide a production or company with a competitive advantage and will benefit not only the seller, but also the buyer, thereby contributing to the improvement of the life of the population, creating favorable conditions for life. The article identifies factors that influence the effective commercialization of innovations, analyzes the existing commercialization models, and provides recommendations for successful commercialization using the tools of project management. During the study, the authors identified key barriers to the commercialization of scientific research and covered various commercialization models. According to the study, government support plays an important role in the commercialization of scientific research. During the study, the authors identified shortcomings in the legal support of the process of commercialization of innovations, which, in turn, hinders the development of commercialization of scientific research. The authors proposed to adapt them in accordance with the conditions of the local market. The results of the study allowed the authors to suggest a series of measures to improve the mechanism for the commercialization of scientific research in the country.

Key words: project management, tools, commercialization, research, models, innovations, competitiveness, legal support.

Innovations simplify our life and they are necessary for the development of different fields of economy. Innovations often made by scientific developments, which bring production to a new level. Therefore, most leading countries invest lot of recourses for creation of scientific developments.

We would like to note that there is an urgent need to find a way for efficient commercialization of technology in Kazakhstan in the conditions of the emerging economy based on knowledge and entrepreneurial talent. The main factor for further development and success in competition is not natural resources and traditional production.

The driving factors are ideas and innovations especially those that have taken the form of scientific developments. Scientific developments that becomes one of the most important factors of production. They are components that provide the added value of any product or service.

An important aspect in the development of innovation is their commercialization. Projects should bring profit to their stakeholders. No more than 10% of projects successfully implemented in most countries. There are many difficulties on the way of commercialization. For example, to patronize your scientific development. This process can take up to a year. Then it is necessary to decide to implement the project independently, to sell a license or to sell all the rights. But such project may bring amazing profit if the project goes through all the difficulties and is successfully implemented in practice. Therefore, authors pay attention to these challenges and try to explore the ways of “right commercialization”.

Paper discuss the challenges and opportunities of commercialization of scientific developments in our local markets. The goal of this study is to identify the main factors that affect to commercialization of scientific developments, and find a way of efficient commercialization.

Many authors investigated the commercialization of scientific developments [1, 2, 3]. Some of them claim that particular commercialization mechanism known as the “spin-out funnel” is applied by most Technology Transfer Offices at universities [4, 5]. But less of them explored the models of commercialization of scientific developments.

The commercialization of innovation consists the joint work of developer of the idea and the customer.

The process of commercialization begins with the stage of identifying commercial prospects and ends only at the stage of realization and profit from the newly introduced product. Commercialization of the result of scientific and technical activity consists in the transfer of the results obtained to a product or service, and their subsequent implementation on an industrial scale [6].

Authors suggest the structure of stakeholders of commercialization process for better understanding of essence of commercialization.

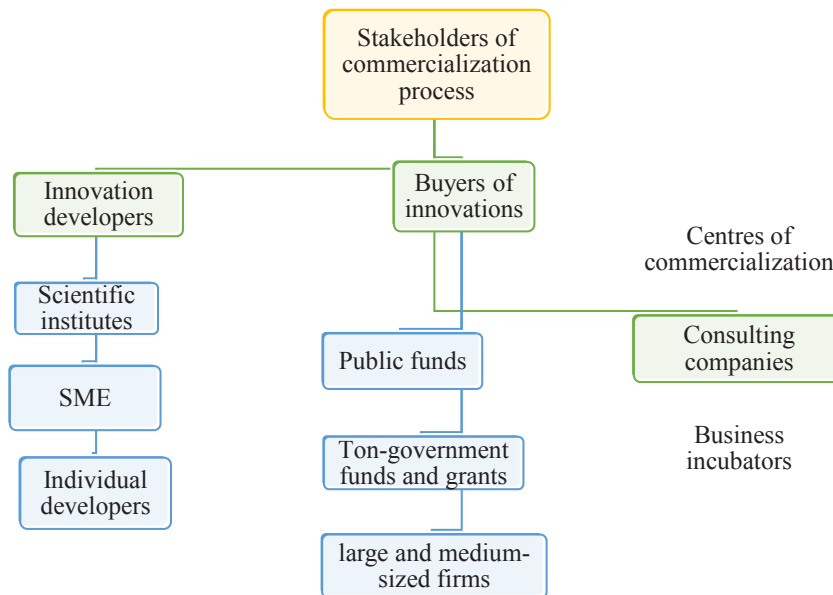


Figure 1 – Stakeholders of the process of commercialization of scientific developments

Note – Designed by authors.

Figure 1 shows that commercialization process includes many stakeholders in different level. And it's important to participation of all members of this structure. Because it helps to achieve general success during commercialization of project or scientific development. But it's not enough to complete participation of all stakeholders. Important factor is to choose right and suitable method for commercialization.

The enterprise has a choice: independently to commercialize the project and to pass all the stages listed above, or it is possible to sell the license, or completely all the rights. Each method provides developers with sample opportunities for implementation. Amount of profit from the project also depends on the project itself. It may sold if you create the equipment. The enterprise can provide engineering services if you come up with managerial or technological innovations. You can just sell a license for your innovation or rent it out. For these purposes, if it is necessary, the enterprise can send its employee to the aid of a partner for the transfer of secrets. Sometimes it is possible to apply several methods of commercialization of innovations.

In Figure 2 depicted the basic ways of commercialization of innovations and scientific developments.

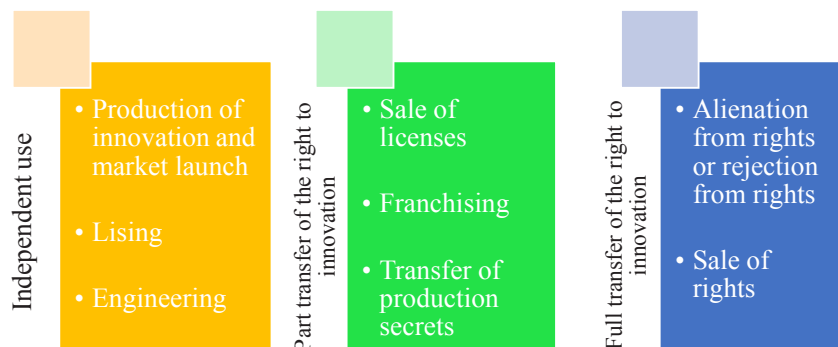


Figure 2 – Ways to commercialize the scientific developments

Note – Designed by authors.

Before choosing the method of commercialization, you need to consider each and choose the one that is best suited for this situation and for this project. Because chosen method may be unsuitable for your scientific development or project and negatively affect to completion of work. Nowadays specific models are used for systematic support of the process of commercialization of technologies. Many of these models depicted in the Figure 3.

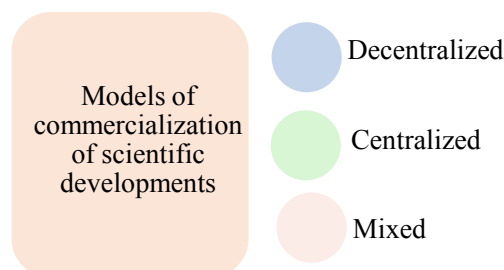


Figure 3 – Models of commercialization of scientific developments

Note – Designed by authors.

Commercialization of the use of research results, which is carried out at the expense of budgetary funds in universities and scientific organizations, can be realized using decentralized, centralized and mixed models. Within the framework of a decentralized model, an enterprise that conducts research activity independently looks for directions for commercialization and investors for this process, using the most commercialized methods of economic, social and informational effectiveness. In a centralized model, the methods of commercialization are determined by a higher-level organization, and the developer organization carries out only the author's supervision of the products, in a number of cases, recycles scientific and technical products in order to give it certain consumer properties. In a mixed model, some of the most important developments for the state are commercialized on a centralized model, less important developments are transferred to the full competence of the development organization.

The advantage in using the decentralized model is the high degree of interest of the enterprise-developer in the effective commercialization of products, which is the most in demand from the market point of view. The disadvantage may be a possible lack of funds and investors to bring the products to production and the end user. In a centralized model, the advantages and disadvantages are directly opposite to the decentralized model: the availability of financing to advance development to the market, but the less intense interest of the developer enterprise in the results of the commercialization of scientific and technical products. Using one of these models provide practitioners with good results during commercialization, because they tested and adopted to particular organizational structures [7].

With a high level of activity of the state in the field of transferring the economy to an innovative channel, the level of legal, organizational and economic mechanisms of interaction between science, production and the market is still lacking. So far, there are no single mechanisms that can assess and also select projects and programs with high potential for production and market, which would attract additional capital of both Kazakhstani and foreign investors in the domestic economy.

Authors identify the next challenges in commercialization of scientific developments in Kazakhstan.

1. The insufficient elaboration of the problem of the commercialization of intellectual property in the domestic science, the incompleteness of legislation in this field pose this problem in a number of the most unexplored. In connection with this, for today, an urgent task is to determine the mechanisms for optimizing the process of commercialization of intellectual property objects, allowing its owner to competently select and implement the commercialization strategy.

2. The main problem of commercialization in the initial stages development is the lack of attention to patent research, technology audit, market research, marketing research. This entails the irrational use of intellectual and financial resources. Therefore, people who interested in this field faces with lack of research and detailed information.

3. The insufficient elaboration of the problem of the commercialization of scientific developments in the domestic science, the incompleteness of legislation in this field pose this problem in a number of the most unexplored, leading ultimately to some backwardness of the theory from practice. In connection with this, for today, an urgent task is to determine the mechanisms for optimizing the process of commercialization of intellectual property objects, allowing its owner to competently select and implement the commercialization strategy.

4. The problem of finding the necessary financial resources for development and investors who will be ready to assume all the risks associated with this process. Because some scientists with good ideas and developments couldn't find any recourses for realization of their ideas.

5. The problem of an adequate assessment of the commercial attractiveness of technology due to the fact that the practice of searching for opportunities for the commercialization of scientific and technical products is not yet sufficiently developed in post-Soviet countries [8]. Accordingly, each developer is looking for potential buyers and investors, produce or invest in its revision to a species that will be of interest to consumers.

These problems may be solved by government and another interested stakeholders participation. Government should protect and support scientists by flexible law and programs. The authors highlight the features of the commercialization of scientific and technical products in Kazakhstan. They suggest the next model for optimizing commercialization of scientific developments.



Figure 4 – The model for efficient commercialization of scientific developments

Note – Designed by authors.

By this model depicted in figure 4 authors determined the objects-participants that interact in the process of financing, creating and marketing the results of scientific developments to the market with commercial purpose. Project management is the one of the ways of improving technics of commercialization. Based on the analysis, we can conclude that for effective commercialization of instrument products should pay much attention to the choice of the method of commercialization, because it affects the size of the effect that the developer receives in the future.

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Аңдатпа

Мақалада Қазақстандағы ғылыми эзірлемелердің коммерцияландыруындағы қиыншылықтар мен перспективалары қарастырылды. Авторлар ғылыми эзірлемелердің отандық нарығын зерттеді және коммерцияландырудың нәтижесіне әсер ететін негізгі факторларды анықтады. Зерттеу қазіргі таңда өте өзекті болып саналатын тақырыпты қозғады, себебі сәтті коммерцияландыру инновациялық қызмет пен жалпы экономиканың дамуына ықпал етеді. Сәтті коммерцияландыру жолынан өткен өнім өндіріс немесе компанияны бәсекеге қабілетті өніммен қамтамасыз етіп, кәсіпкерге де, өнімді тұтынушы халыққа да пайда әкеледі, осылайша халық өмірін жақсартуға, өмір үшін қолайлы жағдайлар жасауға ықпал етеді. Мақала енгізілімдерді тиімді коммерцияландыруға ықпал ететін факторларды анықтап, коммерцияландырудың қолданыстағы модельдеріне талдау жүргізілді және жобаларды басқару құралдары арқылы табысты коммерцияландыру үшін ұсынымдар берілді. Зерттеу барысында авторлар ғылыми эзірлемелерді коммерцияландырудың негізгі кедергілерін анықтап, коммерцияландырудың әр түрлі үлгілерін қарастырған. Зерттеуге сәйкес, ғылыми эзірлемелерді коммерцияландыруда мемлекеттік қолдау маңызды рөл атқарады. Зерттеу барысында авторлар инновацияларды коммерциялау процесін заңнамалық қамтамасыз етудегі кемшіліктерді анықтады, бұл өз кезегінде ғылыми эзірлемелерді коммерцияландыруға кедергі келтіреді. Авторлар оларды жергілікті нарық шарттарына сәйкес бейімдеуді ұсынды. Зерттеудің нәтижелері авторларға елдегі ғылыми эзірлемелерді коммерцияландыру механизмін жетілдіру бойынша бірқатар шараларды дайындауға мүмкіндік берді.

Тірек сөздер: жобалық басқару, инструментарий, коммерцияландыру, ғылыми эзірлемелер, үлгілер, инновациялар, бәсекеге қабілеттілік, заңнамалық қолдау.

Аннотация

В статье рассмотрены проблемы и перспективы коммерциализации научных разработок в Казахстане. Авторы исследовали отечественный рынок научных разработок и выявили основные факторы, влияющие на результат коммерциализации. Исследование затронуло очень актуальную тему, так как успешная коммерциализация инноваций способствует развитию инновационной деятельности и экономики в целом. Продукт, прошедший путь успешной коммерциализации, обеспечит производство или компанию конкурентоспособным преимуществом и принесет пользу не только продавцу, но и покупателю, тем самым способствуя улучшению жизни населения, создавая благоприятные условия для жизни. В статье выявлены факторы, которые оказывают влияние на эффективную коммерциализацию нововведений, проведен анализ существующих моделей коммерциализации, а также даны рекомендации для успешной коммерциализации с применением инструментария проектного управления. В ходе исследования авторами были выявлены ключевые барьеры коммерциализации научных разработок и охвачены различные модели коммерциализации. Согласно результатам исследования государственная поддержка при коммерциализации научных разработок играет важную роль. В ходе исследования авторами были выявлены недостатки в правовой поддержке процесса коммерциализации инноваций, что, в свою очередь, препятствует развитию коммерциализации научных разработок. Авторы предложили адаптировать их в соответствии с условиями местного рынка. Результаты исследования позволили авторам подготовить ряд мер по улучшению механизма коммерциализации научных разработок в стране.

Ключевые слова: управление проектами, инструментарий, коммерциализация, научные разработки, модели, инновации, конкурентоспособность, правовая поддержка.