ҚАЗАҚСТАН РЕСПУБЛИКАСЫ
ҰЛТТЫҚ ҒЫЛЫМ АКАДЕМИЯСЫНЫҢ

Х А Б А Р Ш Ы С Ы

ВЕСТНИК	THE BULLETIN
НАЦИОНАЛЬНОЙ АКАДЕМИИ НАУК РЕСПУБЛИКИ КАЗАХСТАН	THE NATIONAL ACADEMY OF SCIENCES OF THE REPUBLIC OF KAZAKHSTAN

PUBLISHED SINCE 1944

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JULY – AUGUST 2020

NAS RK is pleased to announce that Bulletin of NAS RK scientific journal has been accepted for indexing in the Emerging Sources Citation Index, a new edition of Web of Science. Content in this index is under consideration by Clarivate Analytics to be accepted in the Science Citation Index Expanded, the Social Sciences Citation Index, and the Arts & Humanities Citation Index. The quality and depth of content Web of Science offers to researchers, authors, publishers, and institutions sets it apart from other research databases. The inclusion of Bulletin of NAS RK in the Emerging Sources Citation Index demonstrates our dedication to providing the most relevant and influential multidiscipline content to our community.

Қазақстан Республикасы Ұлттық ғылым академиясы "ҚР ҰҒА Хабаршысы" ғылыми журналының Web of Science-тің жаңаланған нұсқасы Emerging Sources Citation Index-те индекстелуге қабылданғанын хабарлайды. Бұл индекстелу барысында Clarivate Analytics компаниясы журналды одан әрі the Science Citation Index Expanded, the Social Sciences Citation Index және the Arts & Humanities Citation Index-ке қабылдау мәселесін қарастыруда. Web of Science зерттеушілер, авторлар, баспашылар мен мекемелерге контент тереңдігі мен сапасын ұсынады. ҚР ҰҒА Хабаршысының Emerging Sources Citation Index-ке енуі біздің қоғамдастық үшін ең өзекті және беделді мультидисциплинарлы контентке адалдығымызды білдіреді.

НАН РК сообщает, что научный журнал «Вестник НАН РК» был принят для индексирования в Emerging Sources CitationIndex, обновленной версии Web of Science. Содержание в этом индексировании находится в стадии рассмотрения компанией Clarivate Analytics для дальнейшего принятия журнала в the Science Citation Index Expanded, the Social Sciences Citation Index и the Arts & Humanities Citation Index. Web of Science предлагает качество и глубину контента для исследователей, авторов, издателей и учреждений. Включение Вестника НАН РК в Emerging Sources Citation Index демонстрирует нашу приверженность к наиболее актуальному и влиятельному мультидисциплинарному контенту для нашего сообщества.

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FORMATION OF SCIENTIFIC POTENTIAL
AND QUALITY OF LIFE IN SINGLE INDUSTRY TOWNS
OF THE REPUBLIC OF KAZAKHSTAN
(THE CASE OF ZHEZKAZGAN CITY)

Abstract. The development of methodological approaches and organizational measures to solve the problems of increasing level and quality of life of the population in single-industry towns based on an analysis of the status and development trends of the scientific potential. The methods which were used in this study are logical, statistical analysis and synthesis. The new idea is that the indicator of improving the quality of life of the population in depressed regions is staffing of scientific and innovative activities. The results of this study can be further developed to measure the general level of the status of scientific personnel'straining and the conditions for its growth in the general context of improving the quality of life of the population. A new approach has been formed in the methodology of measuring the level and quality of life of the population. An organizational mechanism for the interaction of science and production is proposed, combining the scientific potential of the university and the industrial city-forming enterprise. The results and conclusions of the study can be used by territorial and state economic management bodies in elaboration of economic development programs and in determining the level and quality of life of the population.

Key words: scientific potential, single-industry town, quality of life, training of scientific personnel, indicators, mechanism, interaction of science and production,

Introduction. Successful implementation of technological modernization of industrial enterprises should solve the socio-economic problems of cities, which is possible if the scientific potential is created and developed in the regions. In single-industry towns, science has not become a productive force that gives the economy innovative development. This problem determines the importance of the study. The problem of single-industry towns is known to almost all industrialized countries. This was primarily due to scientific and technological progress. Such problems as the closure of unprofitable mines, obsolete factories had to be solved by Great Britain, France, Germany, and other countries of Western Europe [1]. In the conditions of an unstable economic situation, searches are constantly being carried out for ways to strengthen economic stability in the regions. The development of scientific and innovative activity can be considered as a long-term fundamental factor in solving this problem [2,3,4,5].

Achieving the goals of improving the quality of life in single-industry towns is associated with the formation of an economy based on innovation. Many countries seek to strengthen global economic competitiveness by building the potential of a "knowledge economy" [6]. We are talking about the

intellectualization of society, increasing the role of science and education [7,8]. The importance of network approaches, capacity building, technology-based entrepreneurship and leadership in the local innovation system is emphasized in the works of Marshall & Dolley, Luc Soete, Bruce A.Weinberg [9,10,11]. For the purposes of this article, the author was interested in the approach of a number of researchers who examined the problems of depressed territories with low indicators of the social status of the population and their conclusions that the increase in investment in R&D mainly affects areas with a routine where low-skilled jobs were created [12,13].

The working hypothesis of this study is consistent with the studies of Lee & Clarke, Gadzhiev Y.A., Styrov M.M., Kolechkov D.V., Shlyakhtina N.V. and the fact that the solution of the problems of single-industry towns is possible through the creation of a high-tech innovative economy and the solution of the problem of assessing innovative potential and determining the main directions of scientific and technical development of regions [14,15].

However, the author considers this approach to assessing scientific potential insufficient and not linked to a general assessment of the level and quality of life in a particular territory. In particular, Quanen Guo and Kemeny & Osman, who investigated this relationship between innovation and income inequality, also pointed to this in their works [16,17].

In addition, an analysis of the available foreign studies revealed the limitations of the approach to the interaction of research institutes with industrial enterprises and / or universities [18], suggesting that bilateral interaction between research institutes and industries can have a more positive impact on scientific activity, both direct and indirect way.In addition, an analysis of the available foreign studies revealed the limitations of the approach to the interaction of research institutes with industrial enterprises and / or universities [18], suggesting that bilateral interaction between research institutes and industries can have a more positive impact on scientific activity, both direct and indirect way. The same opinion is shared by the authors of the study Allison Bramwell, David A. Wolfe [19].

In his study, the author relies on the findings of researcher A. Ibraev about the isolation of domestic sciences from the real needs of the regions [20]. An analysis of the works of foreign and domestic scientists revealed a lack of research on the quality of life of the population and the socio-economic development of single-industry towns through the prism of scientific potential in them, as well as on the formation of an organizational mechanism for the interaction of science and production, combining the scientific potential of the university and the largest industrial city-forming enterprise. This study attempts to fill this gap.

The author sees the solution of the problem in the search for such an organizational mechanism that would make it possible to turn the disparate scientific potential of the industrial single-industry town into a scientific center for fundamental and applied research, with subsequent development into the main element of the regional innovation infrastructure. And the use of an indicator of scientific potential as an indicator of the quality of life in mono-settlements is impossible without a developed methodology for its justification and measurement.

Materials and methods. As a methodological approach, a systematic approach is used, within the framework of which methods of logical, statistical analysis and synthesis are provided. In the study of the state and trends in the training of scientific personnel and the impact of this on the quality of life of the population of a single-industry town, empirical general scientific methods of cognition are used. The method of observation and collection of facts made it possible to assess the current state of training of scientific personnel and the quality of life of the population in a single-industry town, to identify existing problems.

Results. I. An analysis of the status and trends of training scientific personnel in a single-industry city and region (for example, Zhezkazgan) revealed the following:

1. The dominant position in the sectoral structure of the scientific potential of the region is occupied by the higher education sector, where research was carried out by university scientists (table 1). The characteristics of organizations conducting research in the Zhezkazgan single-industry town are presented in table 1.

Table 1 – Number of researchers and organizations performing research and development in the Zhezkazgan region

Research Organizations	2017		2018	
	Number of researchers		Number of researchers	
	Total people	%	Total people	%
Zhezkazgan University named after O.A. Baikonurov	16	59,26	13	50,0
Scientific Design Institute	9	33,33	11	42,31
Mining Institute LLP	2	7,41	2	7,69
Total	27	100	26	100
Note: Compiled by the authors based on the reporting data of the organization				

2. In single-industry towns, science has not become a productive force that gives the economy innovative development. In the territorial structure of the country's scientific and technical potential, there are deep imbalances in the provision of human resources (tables 2 and 3).

Table 2 – Provision of scientific personnel Zhezkazgan University
named after O.A. Baikonurov

The total number of teaching staff	including			Share in the total number of teaching staff,%
	doctors of Science	doctors PHD	candidates of sciences	
116	4	2	44	43,10
Note: Compiled by the authors based on the reporting data of the organization.				

For the period from 2014 to 2019, the scientific potential of Zhezkazgan University decreased 1.72 times, or by 36 people. The main losses of scientific personnel occurred in the indicated period, which was a consequence of a decrease in the standard of living in a single-industry town, and a lack of prospects for career and personal, professional growth in a scientific province.

Table3 – Provision of scientific personnel of Zhezkazgan University
named after O.A. Baikonurov from 2010 – 2019

Years	2009	2014	2019
The indicator of availability of scientific personnel,%	49,24	49,14	43,10
Note: Compiled by the authors based on the reporting data of the organization.			

It can be stated that today the personnel potential of science at Zhezkazgan University is only 43.10% compared with the 2009 level. At the same time, we can conclude that there is the scientific potential of university science to study regional problems of an intersectoral nature. Unfortunately, in modern science and practice there is no methodology for measuring, analyzing and comparing data on the level of the scientific personnel potential of the region. In order to use the indicator of scientific personnel potential in the format of an indicator of the socio-economic development of a single-industry town, it is necessary to determine the possibilities for measuring it.

II. The list of indicators for measuring the scientific personnel potential of a single-industry town.

The authors consider it appropriate to use the following indicators for statistical and sociological measurement of the level of training of scientific personnel in the region and the conditions for its growth in a single-industry town (table 4).

The above mentioned indicators for assessing the level of training scientific personnel in the region and the conditions for its growth in a single-industry town are not strictly defined, some indicators can be changed, reduced, and their expansion is permissible. The main task of their application is to ensure the

consistency of a group of indicators for comparing data both in dynamics and with similar objects (for example, with others with average values for the region). Subject to these conditions, the identified integrated assessments will comprehensively reflect the state of scientific potential in the region (city).

Table 4 – The list of indicators

Indicator name	
Statistical indicators of the level of scientific personnel potential	- the number of researchers in % of the population;
	- the number of organizations performing research and development;
	- the number of doctors of sciences, doctors of philosophy (PHD), candidates of sciences, including the ones that carry out research and development;
	- the dynamics of the number of doctors of sciences, doctors of philosophy (PHD), candidates of sciences for a five-year period;
	- the number of University graduates engaged in scientific research;
	- the dynamics of the number of applicants to master's and doctoral programs;
	- the percentage of graduates who have chosen scientific activity as a profession.
Statistical indicators of conditions for the development and growth of scientific personnel potential	- the ratio of the average salary of researchers to the salary of employees in organizations
	- the ratio of the average salary of researchers to the average salary in the region
	- the amount of research funding from government agencies and other organizations
	- the level of average monthly income per a member of a researcher's family
Sociological indicators of scientific personnel support	- the self-assessment of the general standard of living (material well-being);
	- the self-assessment of buying opportunities of researcher's family income;
	- the assessment of the standard of living of single-industry town residents;
	- the assessment of the relevance of the poverty problem of the life in a single-industry town.
Sociological indicators of conditions for the development and growth of scientific personnel potential	- general life satisfaction
	- the generalized assessment of living conditions of the population
	- the assessment of the own health and the health of family members
	- satisfaction of researchers with the activities of state science and education management bodies and local executive authorities
	- satisfaction with medical services
	- the assessment of natural and climatic conditions of the living area
	- satisfaction with environmental conditions
	- accessibility and satisfaction with the work of preschool institutions
	- satisfaction with the quality of education in general education institutions
	- satisfaction with the work of educational organizations of secondary special education and higher education;
	- satisfaction of a researcher with the work and its various conditions;
	- satisfaction with housing conditions (state, area, amenities).
Note: Compiled by the authors based on the organization's reporting data.	

III. The organizational mechanism of the interaction of science and production, forming a regional innovation infrastructure. The scientific and technical potential of the region, including human resources, will have its socio-economic effectiveness only if it is used in the real sector of the economy. This effect is a function of the organizational mechanism of interaction between science and production in the region.

We propose the creation of an organizational form that would make it possible to accelerate the diversification of the economy in a single-industry town, which is fully within the power of the universal potential of university science.
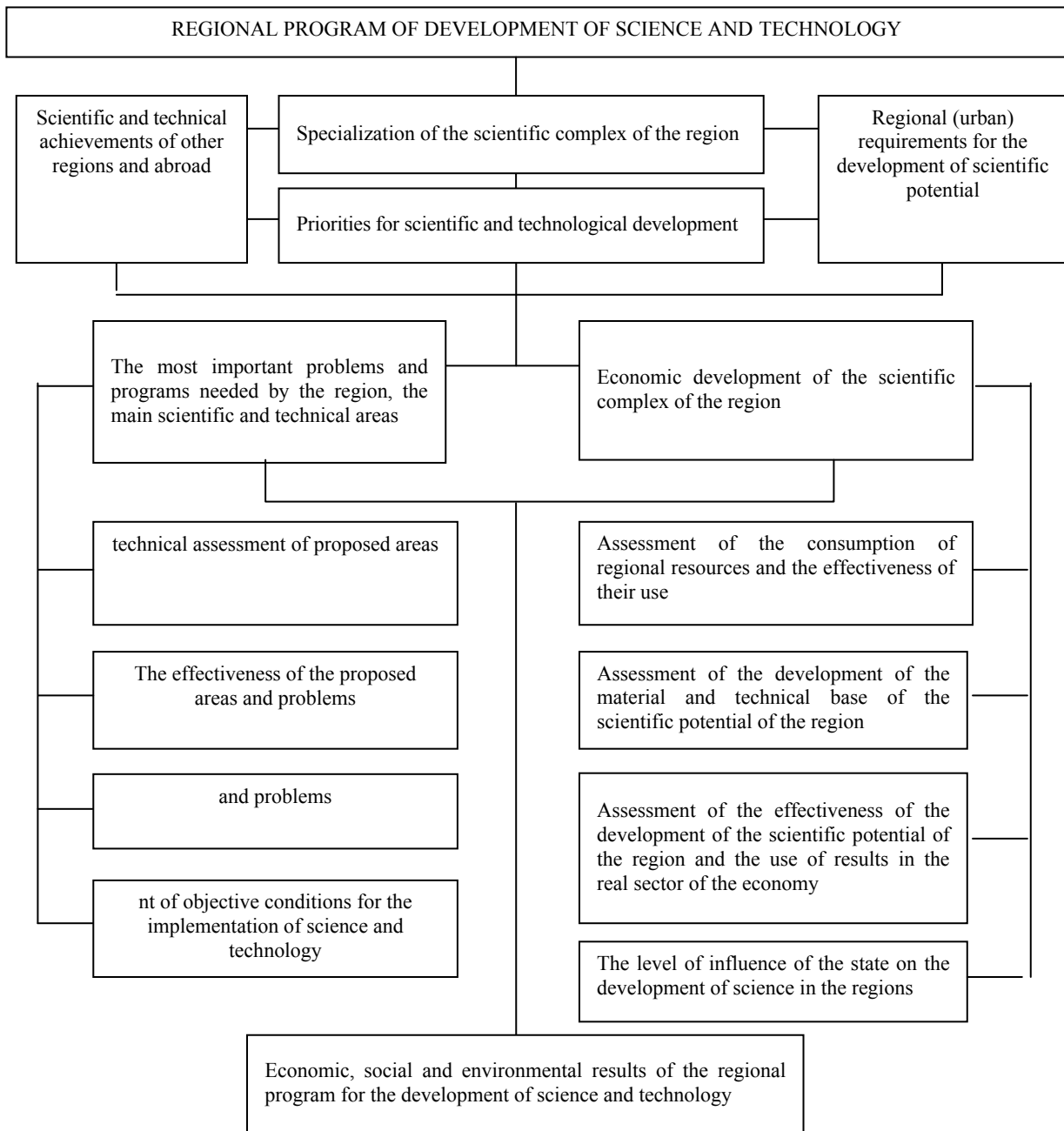
Figure 1– Block diagram of the development of a regional program for the development of science and technology

Since this organizational form provides for the development and distribution of new equipment and technologies without reference to one industry, its successful functioning is impossible without the development of a regional program of scientific and technological development. The goal of such a program would be to ensure:

- a real transition of the economy of the city and the region with mono-industrial specialization to the innovative path;
- solving accumulated social problems among the city population;
- development of the scientific potential of the region, aimed at solving the problems of a particular

region.

In such a regional program, it is possible to justify the priority areas for the development of science, taking into account the characteristics of its resource, production and scientific and technical potential. The program will make it possible to use the scientific potential of the region, taking into account its scientific and industrial specialization, which is of no small importance at the initial stages of the program. Such a program will provide a real link between science and production and lead to a knowledge-based economy and will be developed taking into account the specific needs of the city and the region as a whole. Figure 1 shows a block diagram of the development of a regional program for the development of science and technology. The importance of regional science development lies precisely in the possibility of combining intersectoral approaches to innovation with industry systems.

For a more complete use of territorial factors in the development of science, namely, the ability to concentrate the scientific forces of a regional university and an industrial enterprise on the territory of a city (region), to establish intersectoral relations between them, it is advisable to create a new organizational form - a regional research and production center. Such a center will solve the problem of establishing an effective connection between science, education and production, the intersectoral dissemination of scientific results, and the achievement of the introduction of new equipment and technology.
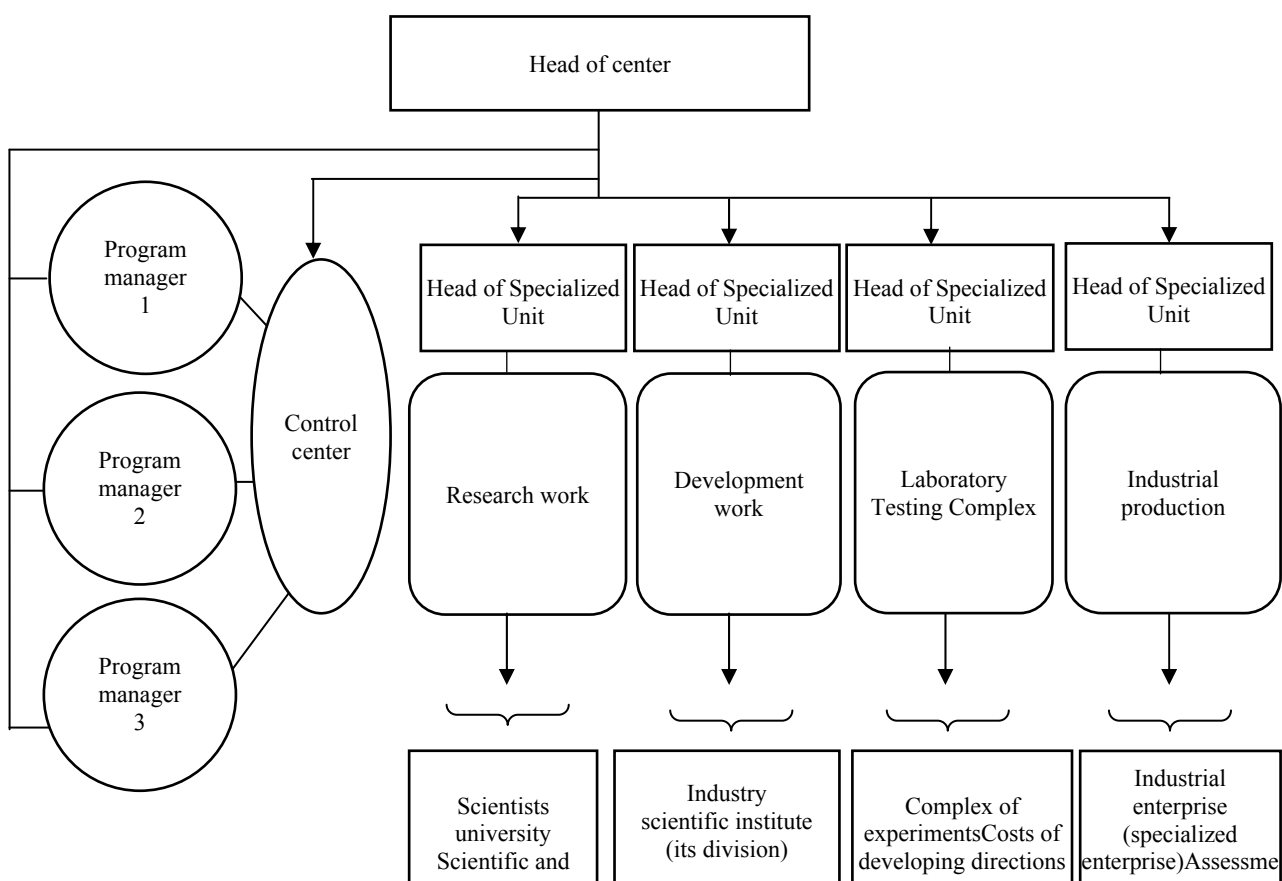
Figure 2 – Organizational chart of a regional research and production center

Based on the revealed results, a new approach has been developed in the methodology of measuring the level and quality of life of the population, which:

– firstly, it justifies the use of indicators of scientific personnel potential in the overall assessment of the quality of life;

– secondly, it is interlinked with the socio-economic problems of single-industry towns.

The practical implementation of the approach is based on the proposal of an organizational mechanism that is fully implemented in the conditions of an industrial single-industry town, which allows to begin the process of economic diversification in it. Thus, an analysis of the status and trends of training scientific personnel in the single-industry region revealed negative trends in the development of scientific human resources.

Conclusion. 1. A new approach has been formed in the methodology for measuring the level and quality of life of the population, based on the use of indicators of scientific personnel potential in the overall assessment of the quality of life.

2. The state and trends of training scientific personnel were first considered as a factor in improving living standards in the context of solving the socio-economic problems of single-industry towns and depressed territories.

3. Indicators are proposed for assessing the level of training of scientific personnel, followed by the determination of integral estimates.

4. An organizational mechanism for the interaction of science and production is proposed, in the form of a research and production center that is of an intersectoral nature and contributes to the diversification of the economy. A significant advantage of the proposed organizational mechanism is the unique opportunity to use the existing backlog in the form of technologically advanced production of a city-forming enterprise and university research potential.

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ҚАЗАҚСТАН РЕСПУБЛИКАСЫНЫҢ МОНОҚАЛАЛАРЫНДАҒЫ ҒЫЛЫМИ ӘЛЕУЕТТІҢ ҚАЛЫПТАСУЫ ЖӘНЕ ӨМІР САПАСЫ

Аннотация. Өмір сапасын арттыру ғылыми әлеуетті арттыру арқылы инновациялық экономика дамыту және диверсификацияға негізделуі керек. Сонымен қатар, оның өлшеу әдіснамасы мен ірі кәсіпорынның өндірістік әлеуетін және ЖОО ғылымын пайдалануда ұйымдастырушылық механизм қалыптаспаған. Зерттеудің мақсаты – ғылыми әлеуеттің қазіргі жағдайы мен даму қарқынын талдау негізінде моноқалалардағы тұрғындардың өмір сапасын және деңгейін арттыру мәселелерін шешудің ұйымдастырушылық шаралары мен әдіснамасын өңдеу. Жаңа идея депрессивті аймақтардағы халықтың өмір сүру сапасын жақсартудың индикаторы ғылыми және инновациялық қызметті кадрлармен қамтамасыз ету болып саналады.

Әдіснамалық база ретінде өңірлерде (моноқалаларда) халықтың өмір сүру сапасы мәселелерін, сондай-ақ ғылыми-техникалық прогресс пен өңірлердің ғылыми әлеуетін дамыту мәселелерін зерттейтін ғалымдардың еңбектері пайдаланылды. Әдіснамалық тәсіл ретінде жүйелі тәсіл қолданылды, соның шеңберінде логикалық, статистикалық талдау және синтездеу әдістері қарастырылған. Талдау негізінде өңірдің ғылыми әлеуетін дамыту үрдістері анықталды, барлық факторлардың синтезі негізінде тәсілдің көмегімен ғылым мен өндірістің өзара қатынасын ұйымдастырушылық тетігі құрылды.

Ғылыми кадрларды даярлаудың жай-күйі мен үрдістерін және оның моноқала халқының өмір сүру сапасына әсерін зерттеу кезінде танымның эмпирикалық жалпы ғылыми әдістері қолданылды. Бақылау әдісі және фактілерді жинау, үдерістерді нақты қабылдау арқылы мақсат ретінде, олардың ғылыми кадрларды даярлау және халықтың моноқаладағы өмір сүру сапасының жағдайын нақты түрде зерделеу ағымдағы мәселелерді анықтауға мүмкіндік берді. Қаланың (өңірдің) ғылыми әлеуетінің жағдайы мен деңгейін зерттеу осы базада депрессивті аймақтағы әлеуметтік-экономикалық тұрақтылыққа қол жеткізу тәсілі ретінде инновациялық экономика талаптарына сәйкестік дәрежесін анықтауға мүмкіндік берді.

Өңірдегі халықтың өмір сүру сапасының кешенді көрсеткішін анықтау үшін оның ғылыми әлеуетін ескере отырып, статистикалық (объективті) және әлеуметтік (субъективті) көрсеткіштерді біріктіретін жүйелі тәсіл қолданылды. Осылайша, индикаторларды жүйелеу негізінде моноқалалардағы ғылымның кадрлық әлеуетінің жай-күйі мен дамуын бағалауда олардың басымдығын анықтауға және кейіннен тиімділікті бағалаудың интегралдық көрсеткішін анықтауға мүмкіндік беретін жаңа тәсіл әзірленді.

Моноқаланың әлеуметтік-экономикалық тиімділігін арттыру үшін сценарийлік әдіс қолданылды, ол белгілі бір кезеңде халықтың өмір сүру деңгейі мен сапасына әсер ететін негізгі факторларды бөліп көрсетуге және осының негізінде факторлар иерархиясының әртүрлі нұсқаларын әзірлеуге мүмкіндік берді.

Бұл әдіс әрбір нұсқаны талдау мен бағалауды, оның құрылымдық ерекшеліктерін зерделеуді және іске асыру кезіндегі ықтимал салдарды болжап көрсетеді. Модельдеу әдісі өңірдегі ғылым мен өндірістің өзара қатынасының ұйымдастырушылық тетігін қалыптастыру кезінде қолданылған, бұл моноқалалардағы өмір сүру сапасын арттыруды басқару тетігіне барабар түзету жүргізуге мүмкіндік береді.

Зерттеу нәтижелері ғылыми кадрларды дайындау жағдайының жалпы деңгейін және тұрғындардың өмір сүру сапасын арттырудың жалпы көрінісінде арттыру жағдайын өлшеу үшін пайдаланылуы мүмкін. Тұрғындардың өмір сүру сапасын өлшеуді жаңа тұрғыдан қарастыру ұсынылады. Ғылым мен өндірістің өзара әрекеттесуінің ұйымдастырушылық механизмі өңделді, ол университет пен өнеркәсіптік ірі кәсіпорын-ның ғылыми әлеуетін ұштастырды.

Зерттеудің нәтижелері мен қортындысы экономиканы басқарудың аймақтық және мемлекеттік органда-рымен экономиканы дамыту бағдарламаларын өңдеу барысында және тұрғындардың өмір сүру сапасы мен деңгейін анықтауда пайдаланылуы мүмкін.

Зерттеуде экономикасы өнеркәсіптік индустрияға негізделген елдер алдында тұрған өзекті әлеуметтік мәселені шешудің жолдары қарастырылып ұсынылған. Қоғамға ықпалы депрессивті аймақтардың экономикалық дамуын жеделдету және ғылыми әлеуетті нығайту негізінде өмір сапасын арттыру болып табылады. Өмір сүру сапасын қадағалау және өзгерту аймақтың әлеуметтік-экономикалық жағдайын монито-рингілеудің маңызды құралы мен параметріне айналады.

Түйін сөздер: ғылыми әлеует, моноқалалар, өмір сапасы, ғылыми кадрларды даярлау, индикаторлар, механизм, ғылым мен өндірістің өзара іс-қимылы.

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ФОРМИРОВАНИЕ НАУЧНОГО ПОТЕНЦИАЛА И КАЧЕСТВО ЖИЗНИ В МОНОГОРОДАХ РЕСПУБЛИКИ КАЗАХСТАН

Аннотация. Повышение качества жизни должно основываться на развитии инновационной экономики и диверсификации через повышение научного потенциала. При этом отсутствует методология по его измерению, нет организационного механизма использования имеющегося потенциала современного произ-водства градообразующего предприятия и вузовской науки. Цель: разработка методологических подходов и организационных мер к решению проблем повышения уровня и качества жизни населения в моногородах на основе анализа состояния и тенденций развития научного потенциала. Новая идея состоит в том, что индикатором повышения качества жизни населения в депрессивных регионах выступает кадровое обеспе-чение научной и инновационной деятельности.

В качестве методологической базы были использованы труды ученых, исследующих вопросы качества жизни населения в регионах (моногородах), а также проблемы научно-технического прогресса и развития научного потенциала регионов. В качестве методологического подхода использован системный подход, в рамках которого предусмотрены методы логического, статистического анализа и синтеза. На основе анализа выявлены тенденции развития научного потенциала региона, с помощью подхода на основе синтеза всех факторов создан организационный механизм взаимодействия науки и производства.

При исследовании состояния и тенденций подготовки научных кадров и влияния этого на качество жизни населения моногорода использованы эмпирические общенаучные методы познания. Метод наблюде-ния и сбора фактов, заключающийся в целенаправленном восприятии процессов в их реальном виде, позволил изучить текущее состояние подготовки научных кадров и качества жизни населения в моногороде, выявить имеющиеся проблемы. Изучение состояния и уровня научного потенциала города (региона) дало возможность определить на этой базе степень соответствия требованиям инновационной экономики как способа достижения социально- экономической устойчивости в депрессивном регионе.

Для определения комплексного показателя качества жизни населения в регионе с учетом его научного потенциала был применен системный подход, объединяющий статистические (объективные) и социологи-ческие (субъективные) показатели. Таким образом, выработан новый подход к оценке состояния и развития кадрового потенциала науки в моногородах на основе систематизации индикаторов, позволяющий определить их приоритетность и выявить в последующем интегральный показатель оценки эффективности.

Для повышения социально-экономической эффективности моногорода применен сценарный метод, который позволил выделить ключевые факторы, влияющие в определенном периоде на уровень и качество жизни населения и разработать на этой основе различные варианты иерархии факторов. Этот метод предпо-лагает анализ и оценку каждого варианта, изучение его структурных особенностей и возможные последствия

при реализации. Метод моделирования применен при формировании организационного механизма взаимодействия науки и производства в регионе, что позволяет проводить адекватную корректировку механизма управления повышением качества жизни в моногородах.

Результаты данного исследования могут быть в последующем развиты для измерения общего уровня состояния подготовки научных кадров и условий для его роста в общем контексте повышения качества жизни населения. Сформирован новый подход в методологии измерения уровня и качества жизни населения. Предложен организационный механизм взаимодействия науки и производства, объединившим научный потенциал университета и промышленного градообразующего предприятия.

Результаты и выводы исследования могут быть использованы территориальными и государственными органами управления экономикой при разработке программ развития экономики и при определении уровня и качества жизни населения. В исследовании рассмотрены и предложены пути решения важнейшей социальной проблемы, остро стоящей перед странами с экономикой, основанной на промышленной индустрии. Влияние на общество заключается в ускорении экономического развития депрессивных территориях и повышения качества жизни на основе усиления научного потенциала. Отслеживание состояния и изменения качества жизни станет важнейшим инструментом и параметром мониторинга социально-экономического положения территорий.

Ключевые слова: научный потенциал, моногород, качество жизни, подготовка научных кадров, индикаторы, механизм, взаимодействие науки и производства.

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