Ministry of Education of the Republic of Azerbaijan
Azerbaijan State Oil and Industry University

"Confirmed by"

The Rector of ASOIU
_____ Professor Mustafa Babanli
24.11.2021

Development Strategy of the Scientific Research Activities of the Azerbaijan State University of Oil and Industry

"Processed by"

The Vice-Rector for Scientific Affairs of ASOIU
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It has been approved by
the Scientific Council of ASOIU
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1. GENERAL PROVISIONS

While developing the strategy for the advancement of scientific research activities at the Azerbaijan State Oil and Industry University, the university's overall development strategy for the period of 2021-2030, along with its main purpose, mission, and objectives, has been taken into account, and in accordance with the relevant legislation, state programs, and strategic documents that reflect the necessary directions of activity at all levels and stages of education, including the "State Strategy for the Development of Education in the Republic of Azerbaijan" decree issued by the President of the Republic of Azerbaijan on October 24, 2013.

As stated in the "State Strategy for the Development of Education in the Republic of Azerbaijan" document, "The next strategic task facing the country is to ensure sustainable economic development and improve the standard of living of the population through further modernization of socio-economic life and its alignment with advanced international practices. Modernization is primarily related to the successful application of advanced technologies, management methods, and innovations created based on scientific achievements to the socio-economic life of the country. To achieve this, the priority direction, along with accelerating the integration of the national economy into the global economy, is the development of human capital in the country and ensuring that individuals acquire modern knowledge and skills. Issues such as the formation of human capital and the creation of a new education system, environment, and mechanisms based on the knowledge economy, etc, are also reflected in the Strategic Roadmap for the prospects of the national economy of the Republic of Azerbaijan, approved by the President of the Republic of Azerbaijan on December 6, 2016. As stated in this document, "The specialists trained at higher education institutions actively participate in the management of the state and companies, in the creation of added value, in economic growth, and in increasing labor productivity. " To achieve this, reforms aimed at improving the quality of higher education, integrating it into the global educational space, meeting the demand for highly educated personnel, and aligning higher education with the requirements of the information society and the knowledge-based economy will be accelerated. Currently, the level of youth enrollment in higher education in Azerbaijan is low. This could hinder the country's competitive and sustainable development in the long term.

Therefore, the demands placed on the training of specialists in technical higher education institutions have begun to change dramatically, and these changes highlight new trends in specialist training at both the institutional and academic levels, requiring the implementation

of new approaches. Especially in an era marked by industrial revolutions and the rapid development of digital technologies, technical universities are tasked with a new mission.

1. INNOVATIONAL SCIENTIFIC RESEARCH ACTIVITY

The research activities, goals, and objectives of ASOIU (Azerbaijan State Oil and Industry University), as well as its management mechanisms and promotion, align with the overall development strategy planned until 2030.

The strategy specifically highlights the connection between the educational process and research, the emphasis on providing practical knowledge, and the consideration of research outcomes from ASIIN and FIBAA in the teaching process.

The strategic document reflecting scientific and innovation activities includes important provisions for ongoing discussions with external partner universities and the implementation of joint project programs.

During the preparation of the strategy, a working group was formed, the opinions of relevant university faculties and institutes were gathered, the demands of the labor market and industry were discussed in scientific council and working meetings, special emphasis was placed on university-industry collaboration, students' interests were considered, and participation from all stakeholders was facilitated.

The level of participation of stakeholders (academic staff, industry representatives, etc.) in the development of the scientific research strategy, the creation of a research university in line with the university's goals, the enhancement of research potential, the realization of the entrepreneurial university concept, the promotion of university-industry collaboration, and the establishment of a technopark and startup ecosystem were included and prioritized in the provisions.

1.1. Organization of publications and conferences in international-level scientific journals.

The access of ASOIU's research scientists to various scientific networks is facilitated through publication in high-ranking scientific journals included in international databases and participation in various projects. From 2017 to the present, ASOIU employees have published 5,623 articles, of which 1,753, or approximately 32%, were published in high-ranking journals

included in international databases (1,132 in Web of Science and 621 in Scopus). During the specified period, articles published in journals included in the Web of Science and Scopus databases have received over 8,600 citations. The results of the scientific research conducted by the faculty members at ASOIU are not only published in the well-recognized scientific research journal "News of Azerbaijani Higher Technical Schools" ("Azərbaycan Ali Texniki Məktəb- lərinin Xəbərləri") but are also featured in journals such as "Baku Mathematical," "Azerbaijan Journal of High Performance Computing," "Innovations in Chemistry in Azerbaijan," ("Azerbaycanda kimya yenilikləri") and "Equipment. Technologies. Materials," ("Avadanlıqıar. Texnologiyalar. Materiallar") which operate under the faculties and have gained a reputable standing in the scientific community. The goal of some of these journals is to be included in international databases such as Web of Science or Scopus within the next five years. To achieve this goal, serious efforts are being made at ASOIU to strengthen the material and technical base of the existing scientific journals to ensure their publication at the required quality.

One important platform for enhancing the reputation of scientific publications is the organization of high-ranking International Scientific Conferences. During the academic years 2017-2022, the university organized a total of 44 conferences, including 11 national and 33 international-level conferences. Looking at the information about the conferences held, examples include the 11th International Conference on Theory and Application of Soft Computing, Computing with Words and Perceptions (ICSCCW 2021) in Antalya, Turkey, the 15th International Conference on Applications of Fuzzy Systems, Soft Computing and Artificial Intelligence Tools (ICAFS-2022) in Montenegro, and the 12th World Conference on "Intelligent Systems for Industrial Automation", WCIS-2022, in Tashkent ICAFS, WCIS, and ICSCCW. The organization and implementation of such scientific events contribute to the enhancement of international ranking of ASOIU.

2.2 Conducting work on the application of scientific research in production.

In recent years, targeted efforts have been planned at ASOIU for the application of scientific research results in production. For the first time in the university's history, the "UNIVERSITY PROJECTS" competition has been held. The funding for six projects that passed the competition has been provided through ASOIU's internal resources. The purpose of implementing these projects is to support innovative scientific research, stimulate the scientific activities of creative research teams engaged in solving relevant and contemporary scientific

problems, and provide them with additional opportunities for creativity. This includes achieving high scientific results, ensuring the publication of these results in reputable journals included in international databases, and implementing practical measures for the application of these results in industry. Within the framework of the completed projects, 32 articles have been published in reputable journals included in international databases, and testing has been conducted to apply the obtained results in industry, with relevant reports prepared. Under the project "Scientific Foundations of Developing a Straight Valve Structure Operating in an Aggressive Environment under High Pressure," three valves were produced in factory conditions, two of which successfully passed tests under 550 atmospheres of pressure in compliance with local standards, while one valve was tested by the international company "HYDRASUN" at 70 MPa and received a certificate of compliance with API standards. The ISO quality-certified MMS100x65 valve, which has received an API compliance certificate, has successfully passed tests in the production environment at "Umid Babek International Operations" Company. A contract has been signed between ASOIU and Makvelsan Company for the series production of the MMS100x65 valve, and the production of a physical model has commenced.

The knowledge gained and experience accumulated from the practical application of scientific research have laid the groundwork for preparing and implementing an action plan for organizing necessary educational and training courses aimed at the commercialization of future research conducted at the university.

2. UNIVERSITY-INDUSTRY COLLABORATION, ESTABLISHMENT OF UNIVERSITY TECHNOPARKS, AND DEVELOPMENT OF STARTUP ECOSYSTEMS.

2.1. University-industry collaboration.

The level of participation of stakeholders (academic staff, industry representatives, etc.) in the preparation of the scientific research strategy, the establishment of a research university aligned with the university's goals, the enhancement of research potential, the realization of the entrepreneurial university concept, the facilitation of university-industry collaboration, and the creation of technoparks and startup ecosystems were included and prioritized in the provisions.

Meetings have been held with companies such as Turkey's "Makvelsan," TUBITAK, BP, Turkish Petroleum, METAK, etc., to identify collaboration opportunities for the implementation of joint projects, develop the scientific and material-technical infrastructure, determine dissertation topics that align with current demands at the master's and doctoral levels, and establish effective connections aimed at securing employment for graduates.

Based on the memorandum signed between ASOIU and ATE NAU LTD, the "Building Automation and Intelligent Control Systems" laboratory has been established with the technical support of the American company CRESTRON, named after Honored Scientist Professor Isa Abdullayev.

With the organization and technical support of ASOIU and “Ixun Lasertechnik GmbH,” a "Laser" Center has been established at ASOIU, marking the first center created in the Commonwealth of Independent States (CIS) region. This center is equipped with modern technological equipment valued at hundreds of thousands of dollars, enabling the acquisition of new coating materials for various purposes and the restoration of working surfaces of industrial equipment exposed to wear and this has positively influenced the creative level of scientific research through the application of innovative technologies.

In the development strategy of scientific research at the Azerbaijan State Oil and Industry University, the aim is to enhance the accumulated experience related to university-industry collaboration by:

continuing targeted efforts toward the establishment of joint laboratories and training centers with the participation of government agencies, research centers, and industrial entities;

establishing specialized design technology centers within the university's structure to adapt the results of scientific research with practical significance to meet the requirements necessary for commercialization and application in industry;

carrying out efforts to strengthen the university's material and technical infrastructure with modern research equipment to achieve the application level of scientific research in industry;

planning for successful representatives of the business world and top managers from local and foreign companies to conduct lectures and seminars at ASOIU.

2.2. Development of the technopark and startup ecosystem.

The "Eazi Start" Startup and Innovation Center under the Azerbaijan State Oil and Industry University primarily operates to support the transformation of innovative ideas from young people into business structures. The institution's goals include not only the development of projects and products for Azerbaijan but also at a global level. Therefore, in the next phase, it is planned for this center to expand beyond the university framework to be accessible to everyone (Azerbaijani citizens and foreigners), as well as to establish branches and enterprises in various regions of Azerbaijan.

ASOIU's startups have won several international competitions. They were presented at the traditional "Sikorsky Challenge 2022" startup festival organized by the National Technical University of Ukraine in Kyiv. Out of the four projects presented at the "Sikorsky Challenge 2022" festival, three had presentations in different categories. One of the center's startups was awarded in the "Most Interesting Business Plan" nomination. At the "Teknofest 2022" Aerospace and Technology Festival held in Baku from May 26 to 29, 30 teams from the Azerbaijan State Oil and Industry University presented their projects in the finals. Three teams from the Azerbaijan State Oil and Industry University won 1st place, and three teams secured 2nd place. Additionally, one of the university's startups was selected as one of the top 10 out of 276 startups in the TakeOff Baku competition. A member of the team that won 1st place at the Smart Karabakh Hackathon is a doctoral student at ASOIU.

As part of the "Skills for the Future" project implemented by the Innovations Center under the State Agency for Citizen Services and Social Innovations of the Republic of Azerbaijan, 10 faculty members from the Azerbaijan State Oil and Industry University have joined the "Mentorship Specialization Program." Training sessions on various modules have been conducted for these teachers for over six months. Within the framework of this program, 10 faculty members of the university have fully started functioning as mentors for startups. Additionally, the "Tusi" incubation phase, which is the second component of the project, has begun at the university, offering entrepreneurship courses for 50 of our students.

Three projects from the "Eazi START" startup and innovation center of the Azerbaijan State Oil and Industry University have applied for a startup support grant in collaboration with Kazan State Energy University in Russia, and one of the university's startups has won the grant.

The selected ASOIU startup from the Take Off Baku competition participated in the Istanbul Bootcamp held in Istanbul from August 15 to 19. During the visit, the creator of the HealWith project from the Azerbaijan State Oil and Industry University (ASOIU) got closely acquainted with Turkey's startup ecosystem for five days and participated in six training sessions aimed at developing the startup. They visited incubation and acceleration centers operating in Istanbul and familiarized themselves with their regulations. The creator of the HealWith project visited environments such as Information Valley (Bilişim Vadisi), Promotional Presentation (Tanıtım Sunumu), 42 Kocaeli School, TOGG, Center for Commercializing Information (Bilgiyi Ticarileştirme Merkezi), and Lonca acceleration center to gather information about them. At the same time, the HealWith startup was presented to investors.

However, certain challenges remain regarding the development of technoparks, innovation centers, and the startup ecosystem in the country. One of these challenges is the lack of relevant legislation that allows research and higher education institutions to establish fully-fledged technoparks and startup centers and attract residents to them.

Considering the existing academic capabilities of ASOIU, the following strategic objectives have been established for the period from 2020 to 2030:

Expanding opportunities for students and other young individuals to realize their innovative ideas through an ecosystem that includes a startup school and business incubators;

The establishment of the Accelerator Center.