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RESULTS OF THE FORSAITE RESEARCH ON THE SYNERGETIC INTEGRATION OF HIGHER EDUCATION AND PRODUCTION

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Abstract. The work presents research results on developing mechanisms for the interaction of production and educational institutions in the development of the mechanical engineering sector, improving the quality of education and implementing personnel training, and forming a strategy for the development of technologies in the region, taking into account their impact on the future of Uzbekistan in education and public administration until 2030.

Keywords: Forecasting, research, synergetics, integration, higher education, mechanism, interaction, production, and strategy.

Introduction. Over the last 15-20 years, the global machine-building industry has changed radically. The innovative component of development began to acquire increasing importance, as without implementing scientific developments into production, it was no longer possible to maintain product competitiveness in most cases. Currently, American companies invest an average of 3-4% of their working capital in R&D, Chinese companies - 3%, and European companies - 7-10%. Based on international experience, the forum participants reached a consensus: it is necessary to increase contributions to R&D and work on the development of technology parks.



Fig. Development Strategy for the Automotive Industry
(http://uzavtosanoat.uz/struktura-i-strategiya-razvitiya-kompanii.html)

This trend is directly driven by the technological development of this area, and it also fully aligns with the national program for the development of the automotive industry (Fig. 1).

Uzbekistan is currently actively implementing a policy to increase the country's competitiveness level based on technical and technological breakthroughs in the real sector of the

economy. The leading role in this process should be played by mechanical engineering, the development of which is a symbol of the country's industrial progress. Taking into account the experience of advanced and economically developed countries, it is necessary to increase the machine-building industry; this solution will ensure the technical re-equipment of the entire industry every 10 years. In economically developed countries, the share of the mechanical engineering industry ranges from 30 to 50% of the total volume of industrial production, and through the state company "Uzavtosanoat," a number of global brands in various segments have already been localized, including passenger cars such as LCV (General Motors), trucks (MAN, ISUZU), buses (ISUZU), and others. Today, the demand for passenger cars in the domestic market is covered by 60-70%. Also, 50% of trucks. The country's government is actively working to attract foreign direct investment into the automotive industry as an independent production for the development of competition and industry production.

The goal of the foresight study is to develop mechanisms for interaction between production and educational institutions to develop the mechanical engineering field, improve education quality, and implement personnel training.

Research methodology. Foresight is an intelligent technology for jointly designing the future, a communication format that allows participants to construct their desired future and manage a conscious movement toward it.

Rapid Foresight (fast foresight) is a version of the foresight methodology that allows for achieving representative results in a shorter timeframe than classic foresight technologies.

Research results and their discussion. The main machine-building industries of the region are: "Uz-SeMung Ko" JV, "Uz-Koram Ko" JV, "GM Powertrain Uzbekistan" JV CJSC, "UzKoji" JV, "AVTOCOMPONENT" JSC, "UZ-DONG YANG COMPANY" LLC, "Uz-Dong Von" JV, "UZ-TONG HONG KO" JV, "UzChasis" JV LLC, "O'ZAUTO-AUSTEM" JV LLC, "DAZ" JV, "AVTOSANOAT-CEPLA" JV LLC, and others.

Based on the information provided, the main driver in this field in the region is **JSC "UzAuto Motors"**. Its total area is 72 hectares, while the production area is 192 thousand square meters.

Production capacity:			
Enterprise name	**Location**	**Unit of measurement**	**Production volume**
UzAuto Motors JSC	Asaka city	Thousand a/m	250
UzAuto Motors JSC Branch	Pitnak city	Thousand a/m	40
UzAuto Motors JSC Branch	Tashkent city	Thousand a/m	10

Currently, vehicles under the **"Chevrolet"** (Chevrolet) brand are produced at 3 production sites of **"UzAuto Motors" JSC,** specifically the Cobalt, Onix, and Tracker models at the main production facility in Asaka, the Malibu model at the Tashkent branch, and the Damas and Labo models at the Pitnak branch (Fig. 2).

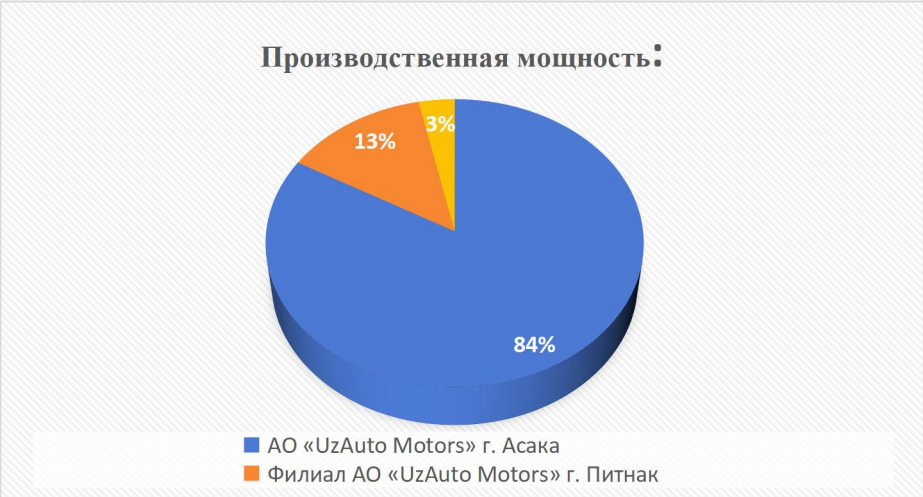


Figure 2. Production capacity

In order to reduce foreign exchange costs, increase localization levels, and support local manufacturers, **UzAuto Motors JSC** is continuously working to localize imported components (Fig. 3).

Forsight studies have established the enterprise's significant contribution to the employment of citizens. The number of employees at **UzAuto Motors JSC** as of April 1, 2020, exceeds 10,000 people. At the same time, it should be noted that the number of suppliers, including sub-suppliers, is more than 100, the main ones of which are "GM Powertrain Uzbekistan," "Uz SeMyung," "Uz Koram," "Uz Koje," "Avtokomponent," "Uz Dong Yang," "Uz Hanwoo," "Uz Dong Won Ko," "Uz Dong Ju Paint," "Uz Tong Hong Ko," "Uz Chasis," "Uz Sangwoo," "UzAuto Austem," "Uz Minda," "Jizzax Akkumulyator Zavodi," "Uzerae Alternator," "Uzerae Climate Control," "Uzeraeacable," "Uz Hanwoo Engineering," "Kwangin Autosystems," "Avtooyna."



Table 2. Localization process

The work also examined the region's primary scientific potential.

The scientific potential of the Andijan State University (ADU) is shown in Figure 3, and the Andijan Institute of Agriculture and Agrotechnologies is shown in Figure 4.

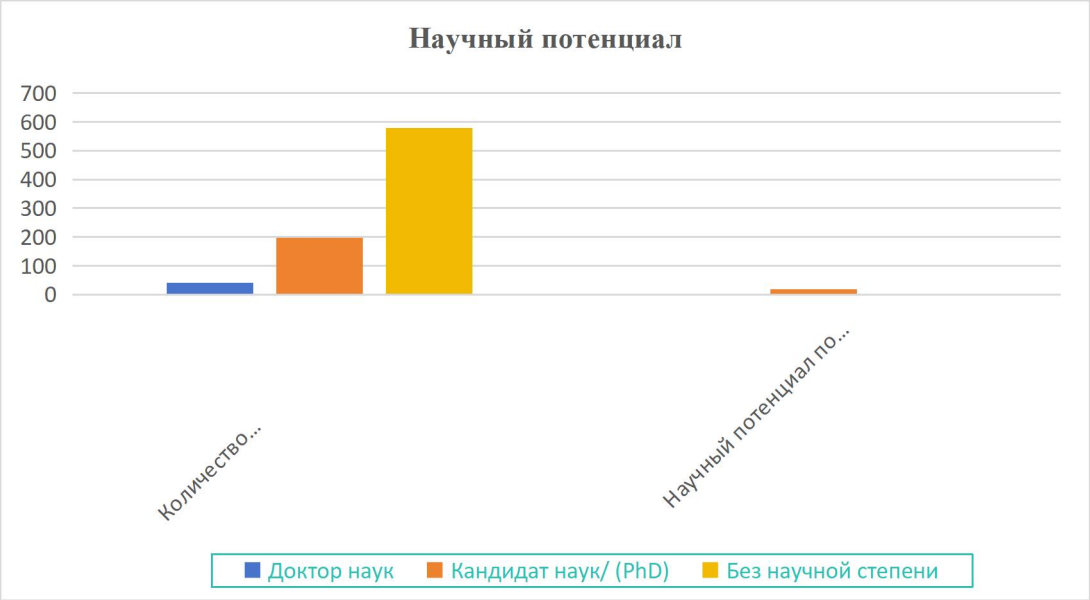


Figure 3. ADU's scientific potential.

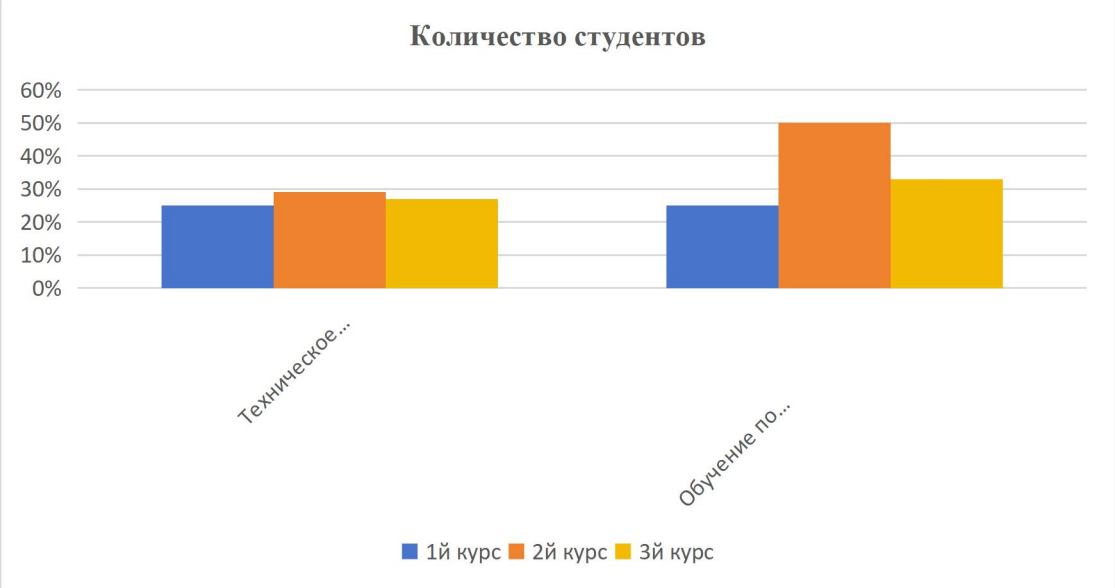


Fig. 4. Number of students in AISKh and AT

Andijan State Technical Institute - the institute's scientific potential:

Table 5.

Number of faculty members (in the main staff)

Total amount:	Doctor of Sciences/ (DSc):	Doctor of Philosophy/ (PhD):	No academic degree:
263	**57**	**93**	**113**

Based on the data reviewed for the machine-building enterprise, several faculties of the Andijan State Technical Institute have been identified, the development of which is a priority for the university. Specifically, the faculties of mechanical engineering, mechatronics and robotics, electricity and energy conservation, energy and internal combustion engines, and mechanical technology, equipment, and automation of mechanical engineering will remain relevant in 10 years. It was also noted that faculties such as life safety are not a priority for the university and will not be relevant in the next 10 years.

Conclusions and proposal. Thus, based on the conducted foresight studies, the following interaction mechanism is proposed (Fig. 5):

The principle of complementarity. Relationships built within the cluster should facilitate the manufacture of products and services by enterprises, organizations, and universities within the cluster in the shortest possible time and at the lowest cost.

The principle of slow competition. Enterprises, organizations, and universities belonging to the same cluster should not enter into confrontation, but should carry out mutually beneficial cooperation, satisfying the needs within the cluster and the external requests coming to the cluster.

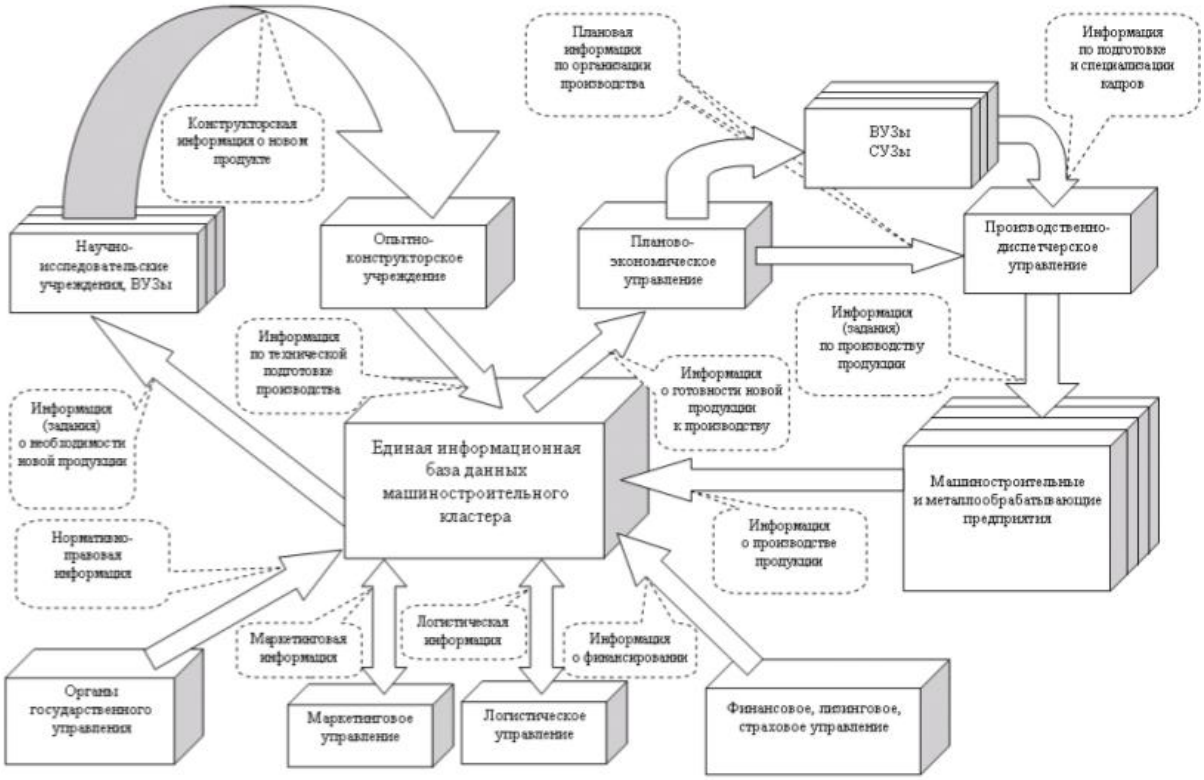


Figure 5. Interaction mechanism

Accessibility principle. The cluster must support the development of the industry by attracting new ideas for the implementation of internal projects and by attracting new partners who offer more effective solutions to internal tasks.

The principle of full connectivity. Enterprises, organizations, and universities within the cluster must not only focus on their own development by searching for more profitable partners, but also maintain horizontal connections within the cluster. Support projects aimed at developing the cluster as a whole.

Integrity principle. Relationships between various groups of enterprises and universities must have cooperation agreements, not just paper-based ones. The heads of enterprises and organizations forming the cluster must develop a general direction for the development of the cluster.

Compliance principle. The activities of the cluster entity as a whole, as well as the enterprises and organizations within the cluster, must correspond to the direction of the state policy being implemented.

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