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## ORGANIZATIONAL STRUCTURES IN MANAGEMENT OF RESEARCH DEVELOPMENTS IN LABOR-INTENSIVE BRANCHES OF INDUSTRY IN UZBEKISTAN

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### Abstract.

At the present stage of strategic development of the Republic of Uzbekistan, the integration issues of education, science and production are acquiring more and more practical significance. Science and technology, constituting an element of the productive forces of society, are one of the basic conditions of social progress, and science becomes in full measure a direct productive force. In this paper, we aim to investigate the effects of organizational structures and learning organization on the integration of education, science and industry contributes to the formation of new social relations. Furthermore, we explore advances in science and technology in a number of industries and methods to characterize the nature of workers' labor.

**Key words:** government, intensive labor, management, microeconomics, science.

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### INTRODUCTION

The issues of integration of education, science and production have been in the center of hot topics during the last decades not only in the Republic of Uzbekistan, but also worldwide and acquiring more practical significance than used to be. Science and technology, constituting an element of the productive forces of society, are one of the basic conditions of social progress, and science becomes in full measure a direct productive force. Integration of education, science and industry contributes to the formation of new social relations. Advances in science and technology in a number of industries are gradually changing the nature of workers' labor. Labor in production turns into a function of managing complex systems of machines and assemblies and becomes the most important principle of society (Ağar, C.C. 2012). If we want the achievements of science and technology to be quickly introduced and, accordingly, to apply new methods of labor, it is necessary that the economic bodies, the Academy of Sciences, and the ministries not only promote them, but identify and eliminate specific difficulties that hinder scientific and technological progress. In this regard, the creation of the Ministry of Innovative

Development in the Republic of Uzbekistan was timely and expedient. It helps to introduce the achievements of science and scientific research into production much faster. Thanks to the introduction of new technical means into production, the most effective and reasonable use of material goods and labor resources of society is ensured (Rose, R.C., Kumar, N. & Pak, O.G. 2009; Chursin R.A. 2021). This, in turn, helps to improve the efficiency of all sectors of the economy. To improve the efficiency of sectors of the economy, it is necessary to ensure that the results of production grow faster than the costs of it. For this, science and production should merge into a single channel complementing each other. From this point of view, the problem of integration and its expedient direction is of particular importance (Bergiel, E.B., Nguyen, V.Q., Clenney, B.F. & Taylor, G.S. 2009; Ng, T.W.H. & Feldman, D.C. 2010).

On the other hand, attention must be paid to the scientific organization of labor, to the methods of planning research work. Methods of planning research work, a system of material incentives and the organizational structure of management of research and development should contribute to the connection of science with production (Naoum, S. 2001; Armstrong, O.E., & Rasheed, A. 2013; P. Kanten et al. 2015 ). This problem and its development are inextricably linked with the study of issues of organizing the management of R&D (research and development) in higher educational institutions, research institutes, design bureaus and at experimental enterprises. The acceleration of scientific and technological progress puts forward as one of the urgent tasks the development of issues of improving the organizational structure of management in relation to academic research institutes, design bureaus and the corresponding directions of higher educational institutions. This means that higher education was in the same chain with science and production. Within the framework of this study, economic aspects seem to be especially important, bearing in mind the choice of the most rational ways to improve quality results and reduce costs based on improving organizational structures, especially since these issues are not sufficiently developed in the economic literature (Egan, T.M., Yang, B. & Bartlett, K.R. 2004; Chen, J.R., Chou, T. & Wang, T., 2010; ). At present, in the Republic of Uzbekistan, special attention is paid to the development of instrument making and microeconomics. In particular, the Institute of Semiconductor Physics and Microeconomics is aimed at creating sensitive receiving-converting and other elements for microelectronics, photonics and microelectromechanical systems. However, to ensure high rates of production growth in these most important industries of the Republic, it is necessary to accelerate the introduction of the latest scientific and technical achievements that affect all aspects of the production process and, above all, reduce the unit costs of labor and materials in the production of products. Today, special emphasis is placed on the production of imports of replacement devices and materials.

## **THEORETICAL FRAMEWORK AND CONCEPTUAL MODEL**

The purpose of our study is to provide scientifically grounded recommendations for improving the organizational structure of management of academic institutions with design bureaus and education based on the integration of their functions within a single cycle, which will accelerate the introduction of research achievements into production and increase its efficiency in the studied sectors of the economy of the Republic of Uzbekistan. To achieve this goal, using the

example of the Research Institute of Semiconductor Physics and Microelectronics at the National University of Uzbekistan, we set ourselves the following tasks:

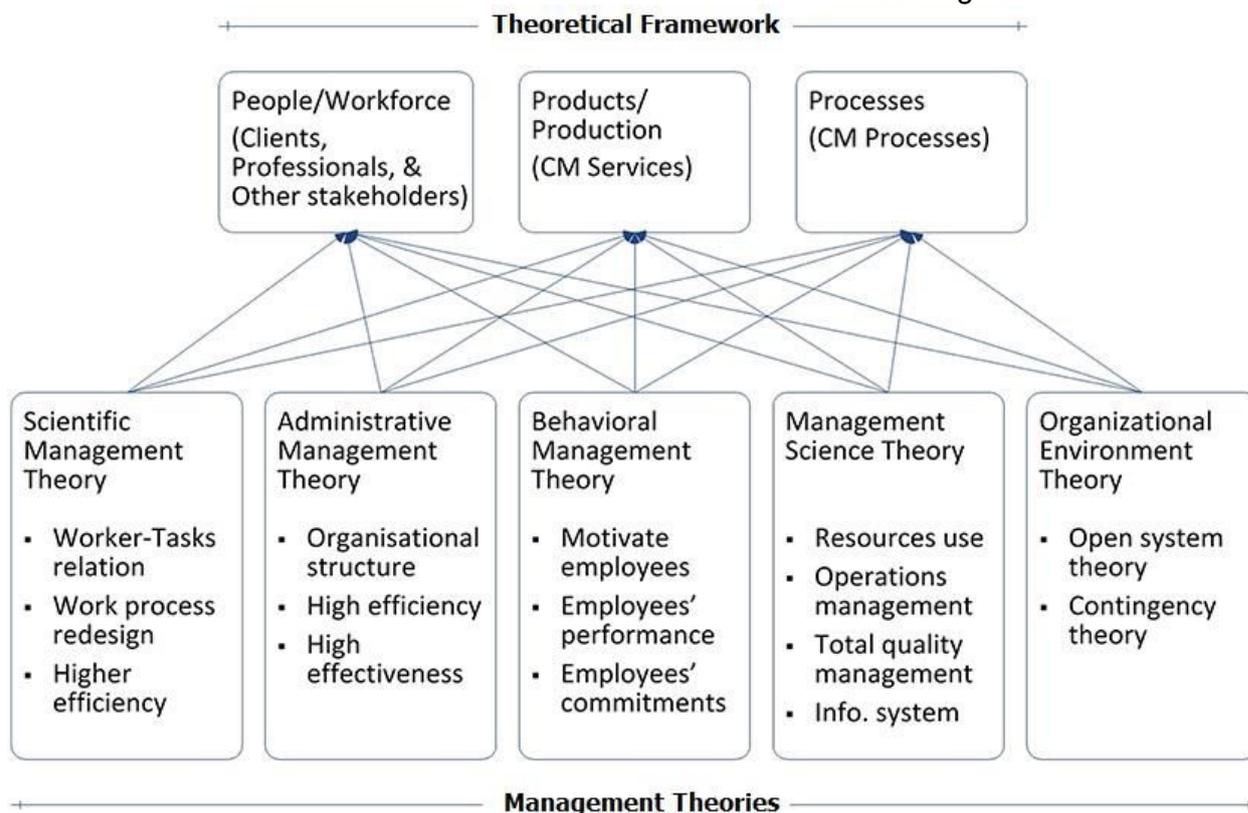
1. efficiently and interconnectedly organize the management structure of the entire chain: education - scientific research - development - implementation - production, so that the harmony of all these areas is obtained. This, in turn, significantly improves the quality of the manufactured products and, accordingly, their cost price will decrease;
2. development of methodological issues of the formation of an organizational management structure for an academic institute and a related design bureau on the basis of the consistent implementation of the principle of integration of the main, auxiliary and managerial functions performed by them, determination of its impact on production efficiency in the studied sectors of the country's economy.

To solve the first problem mentioned above, we carried out the following work in 3stages:

- research the corresponding labor-intensive sectors of the economy of the Republic, determine their needs for our scientific developments;
- it is necessary to select talented students from among the students of the universities of the Republic studying in these areas in order to prepare them in-depth for this qualification;
- for further in-depth training of young specialists in the field of semiconductor physics and microelectronics, to create on the basis of NIIFPM "Basic Department of Semiconductor Physics and Microelectronics".

The practice of advanced research, design and engineering and technological institutions shows that one of the most important sources of increasing the efficiency of their work is the improvement of organizational structures. The possibility of using progressive forms of division and cooperation of labor of researchers and developers, the correctness of their arrangement, and also increases the efficiency of using their labor, largely depends on the degree of rationality of the organizational structure (Schermelele-Engel, K., Moosbrugger, H., & Müller, H. 2003; Widianto, S., & Abdullah, R. 2013; ).In this regard, an urgent task is the transition to such organizational structures of these institutions, which provide a reduction in the time and improvement of the quality of research and development while reducing the cost of their implementation.

Increasing the efficiency of the organizational structure of management, improving various forms of communication between education, science and production require the development of teaching materials and standards for the management of the entire cycle of "education - research - development - management - production" as summarized in Figure 1. In order for this whole chain to work interconnected and synchronously in one amplitude, a clear complex scientific and technical program is required, which takes into account this entire mechanism as a whole.



**Figure 1.** Entire cycle of 'education - research - development - management - production'.

It should be noted here that in sectoral research institutes they are mainly engaged in applied research, in contrast to them in academic research institutes and design bureaus, research is of an exploratory nature and requires a larger number of experiments, samples of new equipment and technology and requires for its solution a very operational approach to the course of action, and the existing organizational structures of management came into conflict with new requirements (Shabanov D.M. 2020).

## METHODOLOGY

To overcome the problems stated in the previous section, we formed a "Portfolio of orders" for future (prospective) projects in all labor-intensive sectors of the Republic. To this end, we created a working group, which included the heads of laboratories and heads of department and specialists from each organization of the national branches. Thus, the Databank of initiative projects for the development of the republic was created. Based on this, a project was planned to create a Microelectronic Center at NIIFPM, which consists of two parts, and a research laboratory. The next step was to prepare proposals for joint work between research institutes and managers of organizations in labor-intensive sectors of the economy.

The next step is the formation of a "Map of needs" of the sectors of Uzbekistan with a list of:

- approximate functional orientation of products required by industries (with a description of the consumer value of the product);
- approximate technical characteristics of these products;

- development of new control methods or solutions to similar problems;
- relevant R&D for the development of new devices and sensors, as well as controlled automated systems based on them;
- experimental and design developments for the provision of devices and systems;
- possible serial production of a number of microelectronic products or discrete devices;
- -updating training courses and programs;
- formation at the Institute of an experimental research base for students, graduate students, doctoral students.
- organization of the cluster form for the implementation of research projects;
- drawing up a set of requirements for equipment and technologies in order to create standardized laboratories for the transition to ROC in the future.

Since the main direction of NIIPPM is the creation of modern semiconductor devices for various functional purposes with stable and reproducible parameters, which are in demand in high-tech areas of various sectors of the economy, as well as the development of technologies and the study of the parameters of multilayer structures, which are the basic elements of microelectronics and photonics. In addition, the institute creates interactive educational laboratories and classrooms. A database on the profile of the research institute and ongoing scientific work will be formed. This ensures the relationship of science, education and production. Ensuring close integration of the sphere of science and scientific activity with the information space forms an environment of aspiration for science and its attractiveness, attracting young people to scientific activities, training young talents. In order to familiarize students with scientific news of this profile, scientific seminars are held at the institute every week. In the future, NIIFPM will take a basic position not only in fundamental, applied research, but also in the development of innovative activities in the region. A laboratory center for collective use with unique scientific equipment is being formed at the institute; a technological line will be developed, common to all laboratories, which can be used by each of these laboratories as needed. This line provides services for the use of unique equipment and instrumentation, software systems for scientific laboratories, young scientists, and academic institutes, universities, and industrial enterprises.

The practical significance of the study lies in the fact that the research results can be used by planning and business organizations in the development of current and long-term plans for the development of production in the studied sectors of the economy, and also makes it possible to streamline the number of researchers by a parallel volume of work with a corresponding topic, allows you to follow the progress work of individual groups and laboratories, transfer specialists to other departments to speed up the work carried out by research and development and quality control and their introduction into production.

## **CONCLUSION**

Based on the proposed methodology, it turned out that for this system to work interconnected with production, it is required to develop a classification of scientific research and IT works covering the entire cycle of "education - research - development - implementation", including fundamental research conducted by an academic institution. For this, the existing classification of research and engineering work in research institutes and design bureaus was required to be rebuilt in relation to labor-intensive industries, and thus we solve the second task we set. Based

on the developed classification, it is possible to scientifically substantiate the feasibility of incentivizing employees of research institutes and design bureaus for the final results of their activities, taking into account their contribution to improving the technical level of products and for performing work with a smaller number. As a result of the study, we put forward and substantiated the idea of creating a new type for the Republic of Uzbekistan, an organizational structure for managing research and development carried out by an academic institution in cooperation with a university and design bureaus on the basis of the principle of integrating their functions, and also studied the economic aspects of implementing this idea.

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