

**Communication**

# Knowledge Based Partnership for Digital Product Development

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**Abstract:** Today Republic of Uzbekistan is facing complex social and economic challenges to create the national innovative system (NIS) taking into account international experience and as well as country's economic, political, social, cultural and spiritual peculiarities and traditions. The major problem is creation of competitive economy which should follow the world tendencies and the logic of its own development essentially and what is more important, is promptly changing even in comparison with the rather near past. It is obvious that in today's world the advantage in competitive fight is ensured not by the size of the country, the rate of natural resources or the might of the financial capital, but the quality of human resources — spiritual, moral, educational and professional level of citizens. At the beginning of the 21st century in the leading countries the share of education more than 20% of the growth of the national income.

**Keywords:** Education, Innovation, Digital Product, Research, Industry

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## 1. Introduction

In some 10-15 years there is forecasted a new scientific-technical and technological revolution in the basis of which there will be scientists synthesizing achievements of such directions as bio - and nano-technologies, genetic engineering, membrane and quantum technology, photonics, micromechanics, thermonuclear power all that will ensure the transition of the advanced countries to essentially a new model of management of society, the economy and the state [1].

The basic option can become the way of innovative rather than inertial development of the country. Will Uzbekistan be able to carry out such an innovative breakthrough in the situations of a difficult crisis in the sphere of high technologies? In Uzbekistan there is surplus of breakthrough researches and developments in the field of crucial technologies practically in all directions of the 4-th technological structure. That is where it is necessary to concentrate personnel, financial, organizational resources lest the efforts should be wasted for the development of those directions in which other countries have already advanced too far and it forces to borrow world achievements.

## 2. Innovation Processes in the Engineering Education

The state policy is urged to play the defining organizational and substantial and ideological role in creation and development of national innovative system within the framework of which the system of education and, first of all, the higher technical education holds the specific place in an interlinking chain "science - education - production". Taking into account market oriented economic model, the concept "production" is more often replaced with the concept "business". For the It is necessary to consider traditions, to estimate the developed mechanisms of integration and the results achieved to make the choice of optimal solutions to the problem of integration of science, education and production. While reformation of the higher education of the 70-ies of the 20-th century can be characterized as scientific and technological and transformations in the end of 1980-ies and 1990-ies as organizational and administrative, the present stage of modernization of the higher education should be

considered as social and technological. In modern society there is noted the lack of coordination of the educational system with the labor market. The educational system is still striving to give fundamental knowledge though the market requires first of all competence from workers (the sum of knowledge and skills) [2].

Today there is the need of maximum approach of educational institutions of all levels to requirements of the labor market so that to avoid overproduction of knowledgeable but not enough skillful people with diplomas. The lack of reasonable strategy of the development and placement of productive forces, as well as mechanisms of monitoring of the requirement of labor market while training the personnel can slow down formation of the state system of training of specialists and fail to adapt it to the market conditions. The establishments of professional education have stable relations with employers, who are involved into working-out professional educational programmes, participation in trustee (supervisory) councils of educational institutions, formation of systems of corporate personnel training. The improvement of the quality of education and its innovative nature could be achieved through the introduction of new educational technologies, the development of interactive forms of education, wide use of the designing methods and tools allowing imitating real situations, and also due to the modern training programs. The present-day stage of the development of system of engineering education allows concluding that higher educational institutions are at different stages of innovations. There are differences as to the intensity of transition from an "old" condition to the updated one. Innovations are distributed unevenly and in various directions of researches. All these processes are closely connected with updating of administrative structure of higher educational institutions. If the monitoring system isn't modernized, then, as a rule there are difficulties in realization of innovations. Today the role of leaders in innovative infrastructure belongs to the training of highly qualified specialists of level in the sphere of production management. Experience of modernization of the advanced higher educational institutions allows to come to the conclusion that the most crucial task in the cause of integration of science with education lies in the creation of the effective innovative infrastructure providing the transfer of the results from the sector of scientific researches and developments to the local economy. The realization of the state policy in the sphere of interaction "science — education — production" will enable to create: firstly, balanced, steadily developing sector of researches and developments which would have optimal institutional structure and would ensure extensive reproduction of knowledge being competitive in the market; secondly, an effective innovative system which would be inserted into the innovative system to provide interaction of the sector of researches and developments with the business sector so that to correlate with innovative systems of the advanced foreign countries on the key parameters [3-4].

Meanwhile, in our opinion, the management of innovative processes in the technical education should concentrate efforts

on the comprehensive study of the international experience of modernization of engineering education.

Among other priorities one should point out the following:

1. to reorganize the multichannel system of financing;
2. to carry out market researches on the demand for the educational and other services provided by higher educational institutions;
3. to coordinate the efforts of all the links of the system of engineering education for the improvement of the structure and content of multilevel training, updating its content of the higher technical education taking into account the international and national experience;
4. to further develop the of system of postgraduate education, professional retraining, to put into life additional, parallel, distant education;
5. to provide an optimum ratio of different types of training;
6. to work out innovative methods of training, to improve of the system of teaching, to develop personal educational trajectories of training.

Complex training of engineer-innovators assumes enhancement of conventional cultural and humanitarian orientation of the education, its universalization and rejection of a techno creatizm, deepening of social economic training, formation of the expert with market social-psychological sets, capable of honest entrepreneurship, businesslike activity, working in team.

The graduate of the higher technical school should have the skills of researching, designing, production and administrative activity, possess mobile features, should be able to change the field of activity and to be retrained during the course of life, to serve as a link between the engineering, science and culture, should be the generator and the conductor of ideas of modernization.

The process of training and the requirement to students should be adequate to the requirements of time. But during reorganization and restructuring it is inadmissible to forget the best traditions of national engineering school: its fundamental nature, high public status of the engineer and scientist, their social responsibility [5].

During the last twenty years' economic tendencies in Uzbekistan testify to a sharp positive tendency of economic growth and stable withdrawal from agricultural orientation towards industrial one, due to the export of energy carriers and, in particular, the services sector. Since the middle of the 2000-ies economic growth by the average rates exceeding 8% annually years has promoted the transformation of Uzbekistan from generally agrarian state into the country where the sector of services dominates - which accounts for over 50% of employment in the country and in which 45% of the gross domestic product (GDP) is produced. [6]

The system of the higher education and higher educational institutions can urge on development and growth of the Uzbek economy, supplying the country with the graduates who have got qualitative and highly qualified education as well as the innovative ideas and who can take decisions adapted to the national economy context.

However, while the labor market in the country has undergone considerable transformations for the last two decades, the educational system of the country has reacted to changes slowly - that has set the difficult task for the leadership of Uzbekistan: to bring results of activity of an educational system, especially regarding the higher education, into compliance with the new requirements of the labor market.

Economic growth will change also further considerably change the shape of labour market and the economy of Uzbekistan in general, and the country is facing the problem of meeting the requirements of labour market so that to maximize benefits from this impressive growth. Having relied on reforms of educational sector — with a special emphasis on improvement of access to the higher education and on education financing reforms - the country could take a considerable step forward the question of ensuring its future, the cornerstone of which will be made up of well-trained and educated population applying the skills trained at university in their professional activity — for the benefit of the society of Uzbekistan at large.

### 3. Digital Production Development Project

Development of industry and the response of the higher education to the demands of the industry play an important role in defining the right scenarios for implementing new collaborations in education, research, and industry. One important aspect in this context is the fact, that solutions to given problems are not realized by one single person anymore, but within a networked team, spread over the whole globe. This holds true for industry and for institutes as well. This net-based collaboration is not only a domain of the so-called “global players”, but with an increasing amount also of small and medium enterprises, which could be part of a supplier network for instance.

The goal of the project which will be established in Tashkent university of information technologies (TUIT) is to set up center for customer orientation and productivity that design and deliver products, systems and services to local and regional markets. The project is in particular targeted knowledge based partnership with small- and mid-sized enterprises (SME). The project strives to increase the diversity of the research activities related to the themes, as well as the quality of applied research.

Digital Product development concentrates on technologies listed below and applications for those technologies. A crucial objective is to use the technologies to intensify cooperation across educational and entrepreneurial boundaries, as:

1. tools for innovative management;
2. tools and toolkits for the early stages of product development, concept design and problem-solving;
3. new ways of using engineering system file formats;
4. applications for new modeling and simulation technology: product simulation/real-time simulation;

5. product control;
6. managing the product lifecycle information;
7. standards in the digital product process.

Introducing an IT-support for digital product processes in the field of engineering also results in a modification of those processes. Unaware of the benefits and being insecure about the application fields of the new technology, the users often have acceptance problems.

During the first phase of the project there will be a program of activities, in order to prepare TUIT facilities collect information. These activities will help develop an understanding of the structure and content of international digital product development process and of modern approaches to learning, teaching and manufacturing.

Where TUIT is may achieve first hand experience of others’ practice, through, for example, participation in meetings, seminars and classes. Materials collected from these activities will be translated and domesticated for use and evaluated by local businesses. TUIT as institution will share the experience gained during these visits with their colleagues training.

Having refined the understanding of the requirements of the TUIT through consideration of others’ experience, new curricula will be developed in consultation with local businesses and the external consultants. TUIT build equipped with appropriate hardware and software and it will be establishing a centre for the dissemination of good practice, the TUIT Digital Product development Centre.

In the second phase TUIT will study methods for the development and management of digital product development. The learning materials will be developed, piloted and evaluated by partner universities and industry.

The process of disseminating the results of the project will be started through, for example, holding a conference at the TUIT Digital Product development Centre.

1. The development of the two new courses.

These courses will address the needs identified for digital product curricula that emphasize practical and project management skills, and which also develop skills in research and independent learning.

The new centre will be evaluated by local businesses and the State Departments of Employment.

2. To internationalize and modernize learning and teaching approaches.

This involves an evaluation of the international partner’s experience of delivering an internationally relevant digital product development curriculum in a manner that facilitates independent, learning and self-study skills. While it will clearly be important to identify the strengths of the approaches adopted by international partner.

In order to meet this need, it will also be necessary to:

1. Provide with modern hardware and software for digital product engineering;
2. Provide training for TUIT in relevant learning and teaching approaches, through visits to partner institutions;
3. Also to provide training and technical support in the development and management of digital product

process resources, through visits and training.

4. To address the shortage of appropriately skilled digital product engineer-professionals in Uzbekistan:
  1. developing the Digital product development Centre in engineering education for the dissemination of information on the project's activities through online conferencing and discussion forums;
  2. further disseminating the project's results through a book, "Digital product processing: An International Approach". This will describe the new internationally based approach to building a digital product development including approaches to learning and teaching and quality management.

The target groups of the project are:

1. an academic staff
2. Students in the IT field
3. Regional industries of Uzbekistan
4. Academic staff of the engineering faculties at Uzbek universities

Direct beneficiaries are Engineering and IT faculties/departments, and hence their students.

Indirect beneficiaries are:

1. Uzbek technical universities wishing to implement internationally based digital product development curricula
2. Regional industries of Uzbekistan

The Digital product development Centre -DPDC based at TUIT will be the key place for the following dissemination activities:

- 1) sharing the experience gained during the development of internationally based digital product development courses in IT curricula with Uzbek and US universities;
- 2) providing training for teachers from Uzbek universities in international curricula, learning and teaching methods and Quality Management;
- 3) providing a consultancy service for the development of the best practice in digital product processing for Uzbekistan;
- 4) partners will write and publish a book "Digital product processing" which will reflect on experience gained during the project, analyze problems and identify likely future developments. This book, together with teaching materials, will be distributed at the conference held to mark the conclusion of the project.

The Website will provide an important means for the ongoing dissemination of information and will be linked to the web-sites of the participating universities. It will provide also on-line forums for Digital product developers, IT teachers and business representatives. The participating partners will provide press coverage within their regions to ensure local communities, particularly the business community dealing with digital product processing and information technologies are kept informed of new developments.

The IT related industry today is one of the most rapidly growing industries in Uzbekistan. The Uzbek Government has adopted the concept of Information Technologies Development for the period up to 2021, aiming to convert Uzbekistan into a high-tech country. At the same time

business in Uzbekistan demands an increasing number of IT specialists. Only in the Tashkent region has respectively about 35,000 companies (including small businesses). Hence the demand for specialists working with IT field is more than Uzbekistan universities can meet [6].

The education of professional IT specialists is thus becoming a key task for Uzbekistan universities. At the same time the Bologna Process demands the updating of current IT curricula in line with international standards, the implementation of ECTS, which will foster a significant improvement in Uzbekistan IT education and make possible the exchange of international students.

The IT professions are the most popular today among 16-18 year-old entrants to universities. At the same time research into the Uzbekistan IT labor market shows that there is a real gap between the knowledge of IT university graduates and the demands of employers. Market research in Tashkent shows that employers demand concrete practical IT skills in such areas as digital product development, databases, net technologies, web programming and multimedia. Among 98% of the employers surveyed also considered knowledge in project management necessary for the modern engineering.

Usually a university graduate has to study additional professionally-based IT engineering courses at authorized IT training centres in order to pursue a successful career.

## 4. Conclusion

One of the other problems of Uzbekistan industries is connected with less CAD&CAM related engineering and correspondingly to increase the expected time increasing for product development. This requires the implementation of modern effective digital product development strategies including e-learning and more facilitative, project-based styles of education.

The Uzbekistan in the proposed project provides Uzbekistan universities and establishing on this base Digital product development Centre. These problems can be addressed by additional training to the existing 4-year curricula of Bachelor training program.

It is intended that the project will draw on existing international educational experience in IT and engineering education, itself deriving from the international nature of engineering business.

The long-term objective of the project is to develop a strategy for higher education in IT related engineering in Uzbekistan based on international experiences, to bridge the gap between university education and market needs and to provide recognition of Uzbekistan graduates both locally and internationally.

The proposed Digital product development centre in IT Education will disseminate the new strategy for IT education, including updated curricula, to other Uzbekistan universities and will assist easily mutual recognition of student's skills in many sectors of industry. Web resources will help to enhance global communication within the education and digital product developers.

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