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## Technology Management as a tool of innovative strategy of education and cognitive management

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### Abstract

The paper studies the use of technology management for advanced innovative personnel training for effective scientific, technological, economic and social development of countries, describing cognitive strategies in the sixth and seventh technological cycles. Competency building approach in the new formation of the sixth technological cycle requires the control of cognition process, methods of creating of broad education from information assigned to the subject of knowledge. Cognitive technologies of the sixth technological cycle are oriented to pure cognitive processes and belong to the field of psychology, pedagogy and knowledge, while socio-humanitarian technologies refer to the person, practice, society, ethics, morals, values and culture. It appears in the seventh way of subjectivity environment, subjectivity culture, specially organized and reflective-active environment, making new forms of life on the planet. Historical traditions of the Russian culture and mentality give reasons to be one of the first countries to try to get into the seventh technological cycle

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*Keywords:* technological cycle, technological management, cognitive technologies, academic and socio-humanistic technologies, subjective reflective learning environment

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### 1. Introduction

The paper substantiates the use of technology management for advanced training of innovative personnel for effective scientific and technological, economic and social development of the state. It is well known that the process of entering the number of developed country of the world, as a rule, is implemented in the phase of growth of the next technological cycle. Technological cycle is a number of technologically allied industries. Over two centuries, since 1770, the economies of the leading countries have passed five technological cycles. According to the theory of the Russian economist Nikolai Kondratieff, the scientific and technological progress is cyclical, with the cycle length of approximately 50 years. The life span of a technological cycle includes four

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phases: depression, revival, prosperity and recession (Syryamkin, 2012). It is important for a country to be in the phase of prosperity of a technological cycle.

In Russia, about 10% of production can be related to the fifth and nascent sixth technological cycles. Transition to a new technological cycle will be made by means of a regular technological revolution, increasing the effectiveness of the main industries of the economy. For the present moment Russia is in the process of industrial recovery.

The key areas of the formation of the cutting edge technological cycle are biotechnologies, based on advances in molecular biology and genetic engineering, chemical technologies and nano-materials, artificial intelligence systems, global information networks, security, space, military and mechatronic systems, intelligent medicine, cognitive sciences, socio-humanitarian technologies and their convergence.

Technology management is administrative science, linking technical, economic, psychological, legal, patent and managerial subjects in order to achieve strategic and tactical goals of the company as well as planning, development and commercialization of innovations.

Technology Management implements the following innovative strategy in education and cognitive management: science → innovations → production → competitive products → market → profit → science. The meaning of the chain is the following: without science there is no innovation, without innovation there is no production, without production there are no competitive products, without competitive products there is no profit, without profit there is no science. This is the algorithm of performing scientific research results and production of competitive products, ensuring self-sufficiency of a company. Thus, innovative technologies and trained personnel should work efficiently and satisfy the requirements of the market (Zinov, Kozik, Tsyganov and Syryamkin, 2010).

The structure of technology management has the following educational units: business strategy in a high-tech enterprise, identifying and evaluation of engineering capacities, transfer and commercialization of new technologies, marketing, intellectual property, legal protection strategies commercialized scientific research results, research planning and management of a high-tech enterprise, the methods of economic evaluation of innovative projects, regulatory authorities and cooperation with them, export control of technologies, international co-operation, the basis of economic and technological security.

The strategy of technology management involves technology audit (assessment of opportunities and competitiveness of technologies, structure and effectiveness of a company), quality review, implementation of quality management system in universities, risk minimization and adjustment of the strategic plan of a company.

Implementation of the technology management provides an innovative principle of personnel training is «lifelong education», when on the basis of flexible and uninterrupted educational trajectories the following levels and components of the educational system can be formed: basic and additional, formal, non-formal and informal education, when the rigid framework of the education system is eroded by new «non-systemic» educational institutions: corporate universities and mobile forms of supplementary education.

Thus, in the transition of the global economy to the sixth technological cycle it is necessary to identify indicators (emerging technologies) and the segments of the global market «attractive» for Russia, to assess the possible capacity of market segments, find out long-term major players, as well as a new technology base, including new products and services and, with regard to the interaction of education with innovative industrial enterprises, to determine the real need for specialists of different qualifications and the quality of their training. Specialists' qualifications should meet the needs of an individual, society and the state (Catch the wave, 1999).

Promotion and commercialization of technologies require technicians and managers «of a new breed», therefore, teaching methods should be redefined. «High education» is becoming one of the leading areas of activity in the sixth technological cycle, in which the value of a complexly organized person increases significantly. Therefore in personnel training special attention must be paid to «creative practice». Such a drastic renewal of education requires modern dealing with knowledge including a variety of translation techniques, the main focus is on the «synergetic development of the personality» and the most important resource is a person (Kuzminova, Frumina, 2008).

Therefore, another key difference the new model of education is a practical recognition of the principle of high-value talent. Motivation and interests of students are considered to be the key and most expensive resources for education efficiency (Petrova, 2012). In this educational paradigm the system of cognitive management is updated and specified. In the traditional system of education cognitive management aims to «encyclopedic knowledge accumulation by an individual», while the competency building approach in the new formation of the sixth technological cycle requires the control of cognition process, methods of creating of broad education (the so-called «softpower») from information assigned to the subject of knowledge. High-hume is intellectual power and cultural imperative. The information part will be mostly delegated to technical devices along with innovative methods of education and development, with the forms of social and cultural activities. Education is becoming the reflection and creative way, of modified knowledge application in an increasingly changing and complex practice.

Russian education still lags behind in global trends: mobility of students (2% of the total number of foreign students); representation in the education system of e-learning (in the West 90% of institutions use the electronic form of training, in Russian institutions are starting to absorb these new technologies); development of the scholastic debates and the method of «learning by doing» are still weak and emerging (Freeman, 1982).

In the sixth technological cycle education is considered as an evaluation criterion of country potential in terms of human capital development. The United States define themselves as a global educational center, while in Russia the process of the renewal of education systems is currently being updated, the problems of export of Russian education are being discussed.

Recently, the development of the world transnational academic and student community in the cross-border environment is being updated. Not only that encourages formation of new educational technologies, but also the socio-cultural environment of the new transnational elite. The university campus as a way of life, where environment, social capital, the nature of the relationship between students and teachers are important and substitute a platform on which the other elements of the educational process are mounted. The campus structure is an educational model that is replicated on a global scale as a model attitude to the surroundings (Kuzminova, Frumina, 2008).

Priorities for the development of education in the sixth technological cycle allow to imagine the development of cognitive strategies in the seventh technological cycle. As we see it, in the depths of the sixth technological cycle the search for new ideological orientations different from the ideals of industrial civilization has already begun. Axiological issues becomes extremely relevant for the progress of the mankind. The main value is a «human being» and safeguarding the civilization. It is no coincidence that the seventh technological cycle is called cycle of socio-humanitarian technologies. Cognitive technologies of the sixth technological cycle are oriented to pure cognitive processes and belong to the field of psychology, pedagogy and knowledge, while socio-humanitarian technologies refer to the person, practice, society, ethics, morals, values and culture. It appears in the seventh way of subjectivity environment, subjectivity culture, specially organized and reflective-active environment, making new forms of life on the planet. Socio technologies are focused on maintaining and even growing a variety of socio-cultural formations in the world (Thomas, Robert, 2004).

Historical traditions of the Russian culture and mentality give reasons to be one of the first countries to try to get into the seventh technological cycle.

In addition, Russia is situated in the West and in the East, therefore the Russian mentality has its national mental traits (tendency to reflection, patience, high emotionality, altruism, tolerance, community) and includes the features of Western (pragmatism, rationality) and Eastern (family priorities, the hierarchical relationships) mentalities. So far, it is well placed to play a lead role in establishment of world order technologies in the seventh technological cycle.

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