TECHNOLOGICAL KNOWLEDGE – CONDITION FOR THE DEVELOPMENT OF BORDER AREA

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Abstract: It is no longer in disputed that the twenty-first century will be the century of further rapid development of civilization in which are the basis of technological change. Also, it is not disputed that the base of the large number of technological changes will find knowledge. Among other things, this will have far more impact on the regional development of each country and the wider spatial entities, and even continents. Particularly interesting will be the impact on the development of border areas at a time when it comes to so-called soft limits, on the other hand, areas along the border are becoming more and more demographically empty and technologically lagging.

Keywords: technology, knowledge, development, border area.

1. INTRODUCTION

It is very known that knowledge, beloved and priceless gift of nature, has always been the only power which increases by its usage, so people tend to conquer it and persistently keep it when they get it. If that treasure is made of pure matter, it will never rot, because it occurred in the form of the explosion of light that blinded the whole world around it and left it in doubt with an open question, which is actually, what moves it. The answer was given by Victor Hugo, saying: “What leads and controls the world is not locomotives, but ideas”, because the locomotive itself was created thanks to an idea.

Ideas were transformed into actions and created the various technical perfections - television, radio receivers, computers, robots... The ideas have led to a sharp rise and stood one step next to the future, they have enabled the human race to meet the impossible, to reach infinity and be familiar with new space, that was very unknown by then. However, along with a magnificent upsurge into "the sky", people still have not solved many problems, which are inherited from the ancient, not quite vanished epoch. Hunger, poverty, wars, a variety of diseases, unjustified social differences, and many other problems cannot be solved only by the technical and technological development, no matter how impressive it is. To solve these problems there are some other technologies, which in addition to technical and technological requirements and many other conditions and restrictions on the development of man as civilized beings, technology in which a man is center of the world, starting and finishing point of life in general. And in order to survive and remain in that world, we should hear and follow the ideas and sagacity of those who have created so long ago, and whose works still live.

“ASK AND IT WILL BE GIVEN TO YOU; SEEK AND YOU WILL FIND; KNOCK AND THE DOOR WILL BE OPENED TO YOU.”

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2. THE FIRST - THE RIGHT THINGS

2.1. The feedback of technological and manmade changes

A new epoch of the civilizational development is called scientific and technological revolution. The essential features of the third technological revolution, as its modern phase, reflects in the fact that automation and robotics replaces the physical functions of human being, and Intellectual-executive function is replaced by informatics and telematics. It is sometimes identified with the IT revolution, as futurologists announce that this millennium will have the fourth technological revolution that will be based on knowledge - scientisation. The transformation (of technical progress into the scientific revolution) occurs on the basis of fundamental and radical changes in the content and conditions of human work, and ways of organizing and managing production. Cadres as a defining and imitating factors of development, high technology as a reflection of technical progress, science as a fundamental productive force, and modern organization as a generator and the resultant administrative-management relations are the segments of civilizational changes in scientific and technological revolution.

The global economy could not be recognized. The new tools of communication are stunning us. Family is not any more the fundamental group unit of the society. Children begin to have their own income in their early youth in their homes. Traditional economic and political theories become outdated. The century-old foundations of industrialism are being broken. The mass society of industrial period, relying on mass production, mass education, mass communication and mass political thought, begins being no more mass. The uniformity of the industrial world is beginning to replace the diversity of values, forms of life, communication, spiritual activities etc. Manifestations of the third technological revolution take an increasing hold, and act in terms of new institutions, associations, unions, transnational alliances etc. All of this cause the appearing of un homme nouveau (the new man).

The debate of the future of our civilization, which belongs to the new "mileu" of so far unimagined and unprecedented scientific-technical progress, is more and more "inflaming" around. The future of human being and civilization becomes a major preoccupation of all "creators" of the development. It is expected that primary industrial branches, which will radically restructure the entire economy, in the future include:

- electronics with extreme attention on microelectronics, microprocessors, etc.,
- universe exploration,
- exploration of the seabed in the function of providing new sources of food,
- robotics and
- biotechnology and genetic engineering.

In a word, the third technological revolution will be really different from the previous ones. It surely derives from the knowledge and education. Moreover, if the first technological revolution was put forward by the technical services, (technology dominated), the second by financial services, (the power of capitalism), but the third technological revolution will be presented by personnel services, therefore, the knowledge
will rule. A qualitative improvement in the level of productive forces will be far greater than the transformation of the ox-drawn carts and manual production to internal combustion engines and electrical equipment. So, scientific and technological development is becoming a basic condition for economic and social development. ²

Technological responses to the civilizational crisis of classical industrialism have been characterized in two ways since the Sixties. At the first stage, a tendency, carried out by the development of microelectronics, telecommunications and transport container mainly, was manifested toward the fragmentation of complex production processes into narrow segments, which can perform low-qualified staff. The second stage, thus, labor-intensive processes are transferred by the system of transnational corporations into those parts of the world where the working potential is, with equal productivity and quality, from 5 to 15 times cheaper than in the developed countries.

Big structural changes in technology and manufacturing are happening in this entire process. The main material prop of scientific and technological revolution becomes the basic technology. Different terms, as well as high-tech, generic, propulsive, super technologies, nowadays are used to describe similar content of which determination is important. These technologies are determined by two bases: first, how they are being created and produced; second, what their effects on other productive activities are and other spheres of society (e.g., services, administration, consumption, etc.). In fact, it is considered that these are technologies that have characteristics such as:

- above-average scientific intensity of production and products,
- shortness of validity of products and processes,
- little or none of harmful effects on the natural environment,
- high flexibility of consumption by profit.

However, according to the usage, they cause the following effects:

- possibility of wide application and diffusion in very different branches of production and both economic and non-economic activities,
- improving the quality of the products' functionality which are built in,
- increasing efficiency and reliability of the system,
- reducing consumption of energy and materials per unit of product,
- reducing the destruction and pollution of the environment,
- increasing humanization of work,
- decrease in production costs per unit.

There are four types of characteristic of modern technological development.

First, it developed unexpectedly many new directions which are made or could make technological changes in the whole range of areas, and thereby created the possibility of satisfying various criteria that can be set by the various operators in the technology choice.

Second, it has been directed and oriented towards military and space necessities and commercial criteria, and satisfying the broad masses’ needs determine far less criteria of development. Everything indicates that technological changes do not occur by accident and they cause cumulative effects (occurring in clusters).

² Peter Drucker – Managing in the Next Society, New York, 2002, (13)
Third, until recently, completely unrelated areas (e.g., biology and electronics) produce and will produce in the future, an entirely new technically unpredictable solutions and products, thus realizing a synergetic effect. In one word, "everything depends on everything."

Fourth, all the technology, just like technological hypothesis, connect into the unit to which any factor is relevant on principle of already mentioned synergistic effect. This causes very big organizational changes at all levels throughout the whole society.

Scientific and technological revolution has not only resulted in the creation of new manufacturing industries and products. It is including the basic top technologies in traditional industrial branches (e.g. automobile, textile, leather and footwear industries) started the process of revitalization in which it is proceeded from the rationalization of the consumption of material, energy and labor and ended with their completely techno-economic and organizational transformation. In this process it should especially mark automation and robotization of production, individualization of products and establishment of permanent and returning link between producers and users.

2.2. With the knowledge to the (new) technologies

The general development of every specific environment primarily depends on the impact of new knowledge which is constantly getting rich and being fulfilled by brand-new innovations, by which demographic growth, capital accumulation and economic resources as a factor of development, put aside. The strongest weapon of each country is reached wanted rate of economic growth, which basically depends on the expansion of manufacturing industries and effective use of new technologies. New technology, if is successfully used in the economy, will show ways of further progress, which will even less-developed countries lead to expansion and open their doors of the "technology age", which represents the future for all.

At the time when the modern world is at the crossroads of civilizational course, and when we walk into the new millennium by larger steps, without any modesty, we can say that we used knowledge to run over time and to go in front of it. The new age begins in the spirit of progress, which every day gives birth to new achievements in all fields of human activity.

Computerization and robotization, as synonyms of the third technological revolution, are only part of what has been achieved and what characterizes new world, because technological innovations have got into all aspects of life and work. There are significant innovations in the fields of electronics, telecommunications, robotics, the universe, but the value of biotechnology, genetic engineering, and new materials, which will change the world, must not be underestimated.3

2.3. The knowledge in technology, as a factor of overall economic development

Scientific research and development article, and development of science, as basic levers of development, now represent one of the strategic aims of overall development and conditions of permanent transformation of economic, social and cultural life of modern humanity.4

For the overall progress, of particular interest is the economic function of science, as a direct productive force, where productive assets for labor, raw materials, energy,

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3 More about this I wrote in my textbook National Economy, Faculty of Science, Nis, 2011, (75 -85)
4 See: Dr S. Pokrajac – Menadžment, Alfa-graf, Novi Sad, 2011
technology, organization and management are based on. Through scientific research we can find out about the needs of customers and market; using scientific methods we can research possible directions of development; Science is the foundation of needs for personnel profiles, educational content, methods of assessment of business performance; Using science we discover new products and services, new activities i.e. new "fields of labor". Science, as a force of production, is not only its element of particular importance and power, but also an integral part of all other elements of the force; It is not just a process of cognition of objective laws of nature and society, the process of acquiring knowledge, but also the process of educational activities of people, and along with it, the technology becomes a set of knowledge and a way of materialization of scientific achievements in the economic and general life in society. Scientific, technological and economic progress, along with the population, capital and natural resources, and already known dynamic factors of economic development, provide to entrepreneurs a new logic of choice in developing and satisfying the needs. By making decisions about the use of available resources in ensuring rapid economic development, many new factors, including a particularly strong technological factor, the factor of knowledge and education, require the possession of a new logic and philosophy of progress, require knowledge and ability most of all, to use it for fast growth, "growth in depth", growth per capita.  

By the progress, our world is in a very short period of time, changed, and reduced its size. Reduction of distance, speed of spreading of information, access to knowledge, comparisons of critical analysis by the enlarged number of scientists and policy-of-development makers, significantly increased the chances for dynamic progress in all areas, technology and organization of progress in all areas seem to be rational, so that skip over even dozens of years and enter the world of the future, using the experiences of those who have had ideal initial conditions of development, and those who have "used wisely" these conditions. While on the one hand there are still regions that are privileged, due to different historical conditions, by abundance, and on the other hand, they are deficient and not favored, the world in general is "convicted" of progress, growth, development and prosperity. The only problem is in the change in the way of thinking and decision making about the speed of the progress which creates a dramatic gap between the opportunities offered by science and the real possibility that it reaches, to participate in its courses and achieve optimal development. Inequalities in scientific and technological efforts, along with the historical conditions by which nations have developed, not only caused huge differences in wealth, but also crucial for the dynamics of further growth, which, by all the advantages of science and technology, threatens to make the gap between developed and underdeveloped countries.

That is why the prerequisite about achieving accelerated growth and prosperity through knowledge, the existence of a general creative mentality organized and creative environment, is very important, because, new dimensions of science and its opportunities in achieving overall growth do not allow the existence and operation of the traditional concepts.

In order for economic development achieved up with the pace of change, modern economy should be subordinated to the development and transfer of new technologies especially among strategies of their own development. Appropriate transfer of technology requires first of all highly developed their own knowledge and also creative environment where advanced technology can be created. No country in the world is able to provide new technological developments on its own and also without the transfer of technology from

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5 Dr A. Dedijer - *Za napredak, pomoću napretka u znanju*, "Tehnika", Beograd (81)
6 More about this: Dr V. Stefanović - *NT promene i razvoj*, Nis 2000
other countries. That is why nowadays technology transfer takes place internationally, among developed countries, where the main channels of circulation are gigantic economic organizations - transnational companies. As the country is more developed, import and export of technological knowledge is increasing, and by that, the prices of imported technology is covered by increased productivity of work, by quality, by new products, by modern organization and by rationalization of work processes. By the transfer of technology among developed and developing countries, developed countries are motivated by strengthen competitive abilities of the economy, while the main motive for of developing countries is more rapid industrialization and technological higher quality, which is mainly based on imported technology. An efficient, functional, balanced and, above all, dynamic economic development, it is not possible to provide without accurate and timely responses to questions about who will choose the technology, then, how the choice will be made, what technology to choose, which aims and for what time, what changes it needs to cause, and on what scientific sources its development will be drawn.

Problem of choosing a particular technology, one of the most important existential questions for the majority of people in all countries, especially in developing countries, will depend on many circumstances, which are defined by economic, social, international political, cultural and other occasions, and basically starts of overall development goals. “The choice, among technological alternatives, traditional and new, indicates the possibility of compromising solution, where reconciled extreme alternatives and found the best ways of enriched and increased development will be reconciled, if not always individually, but at least it all together.”

In order to achieve a fusion of "scientific world" and "developing world", it is necessary to make in all areas enormous efforts which should ensure the dynamic equilibrium between "securing the present" and "preparing the future" on the basis of achieving the goals which basically define the progress and overall development. Concern to provide the best general development, is the concern where future developments anticipate and upgrade new discoveries that can be expected, and that could increase its chances for securing to the highest possible level.

3. THE SECOND - THE RIGHT THINGS AGAIN

After a decline in religion and contempt for politics, the whole humanity turned and focused on the development of science, so that it subordinates all the social processes to itself and its needs. Thus, the basis of science and technology were created, based on mental and physical strength of people who are about to create a new world order, modeled by the latest technological measures. But the goal has not been reached yet, because the fronts of that infinite space are too wide, and new technical and technological possibilities seek new knowledge, more science and much creative ability, in order to give much more than what they provide now. The exceptional efforts to balance the advantages and disadvantages are still needed, and thus give a chance to knowledge to become basis for prosperity and for the common good, which will be within reach to all. That is why the main goal in all countries, regardless of the different objectives of development, physical features, culture and tradition, is training an increasing number of people for change, which will bring a better future for the majority, and on the field of expansion and adoption of new knowledge and beliefs, as basic connecting link and cooperation at the global level.

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7 Dr S. Pokrajac – Tranzicija i tehnologija, TORU, Belgrade, 2000
8 Dr S. Pokrajac – Tehnologizacija i globalizacija, SDPublik, Belgrade, 2004, (10)
“- El diablo sabe mucho, porque es viejo” (- The devil knows much, because he is old) - It is an old Spanish proverb, which for centuries has pointed up years and age as an advantage, but nowadays, things have a different look, innovations are brought into life everyday, and everything that is old is used only as a real guide mark to the future. Challenges of the "new" have powerful influence on the man, so the code of success on the way to technological and scientific excellence is in the benefits of the new beyond the old and traditional. Thus the civilization at the edge of the new millennium is on the verge of technological climax.

Modern science has many information systems which are able to collect data themselves, so they can deliver those data to those who are useful for further development of theory and plans for scientific system and its subsystems and their mutual relations, and also connection among them and other social systems. New institutions, associations, federations and transnational companies represent a new form of the third technological revolution, of which products are mass production in industry, quick and easy transmission of news from one to the other side of the world and the increasing use of machines instead of physical human labor. The door leading into the new era has just been opened, and this era's synonymous are scientific and technical boom, and its one and only indicator is intellect of personnel, their ability and readiness to change this world, but also to discover another one.

Along with technological sphere, the transition also occurs in the mental sphere of man, which involves the transition of value judges, value of tradition and experience, value of customs and habits, value of principles and aims and everything that form intellectual, moral, cultural, political, esthetic, and even religious profile of modern man, whereby it becomes a fundamental thimble in the chain that links science, as the embodiment of knowledge and new technological developments and also their all interactional relationships.

At the present stage of development, it is certain that the world of the 21st century will be the world of information, which will be transferred by electronic media as the latest technological developments. Computerization of almost all production and business brings a new resource in all areas of human activity, which is unlike other traditional resources not spent, but even increased, and this is information.

In order to provide effective exchange of information, it is necessary to have a huge number of computers, which are slowly entering into all areas of human life and work, and properly connect them, because the behavior and the relationship between the entities, and way of their life and activity depend on efficient communication links. Computerization allows the storage and processing of information, telecommunications allow their universal availability, and robotization in the manufacturing process enables the submission of information to pass from human to robots, while a human will have creativity and invention.

Therefore, the decisive factors in the development of modern conditions are made by the development of science and technology, management, theory and practice of the use of information, organization of work, and especially the development of human capabilities, capacity, cooperation and the characteristics of modern human personality, which placed a double task to a man.

The first task is to train and educate personnel for work in IT systems, and the second is related to the minimum knowledge required for optimal use of information, because each worker, in not so distant future, will be able and will have to read on the monitor and to always stay informed of all stages. Human-computer ratio in the last
decades has changed much in the direction of the increasing liberation of man and many other functions, whereby he has always changed himself too.

However, the most powerful computers are still just machines that even the most complicated operations do pretty fast, but only if they are data-supplied by man and only if a man “orders” what to do, in one word, only if a man operates with their immense power.9

4. THE THIRD - SERBIA AND THE RIGHT THINGS

During the 21st century, modern societies are becoming societies that pave the way forward in the present, because from past to future can and must go through the present, in which the abundance of ways only separate certain roads as real ones, and give a chance for success and a shortcut. The key to their proper choice is the ability and capability to develop and use knowledge and thus, faster and richer conquer their future. With the assistance of science and technology are included in the new, preferred and exemplary social and economic content, in the new and richer future. So, to reach and keep pace with countries of which pace is more rational, faster, and longer, all its forces Serbia must bind to progress in knowledge, science and technology.

While “time flows like a river”, Serbia seems to have more time than others, like its sclerotic, and unable to open a perspective future better and richer than the present, and it seems like Serbia has no ability and strength to fight for the right goals and to achieve them successfully. Although the impact of knowledge, which is constantly getting rich by increasing number of innovations, the only alternative for the selection and advancement of the developed countries, Serbia's creativity, science and technology are still perceived as events that take place inside the “black box”.10 However, historical circumstances did not allow Serbia to take advantage of the first industrial revolution, and the second, scientific-technical one, it only partially utilized, and it is at the threshold of the third technological revolution, which must not be missed. It must be confronted with all innovations given by science and technology, and fully overcome the old-fashioned concept based on a naturally predetermined continuation of linear growth, where reproduction flows have been built, simply, must go the way of progress in knowledge and education.

Serbia, as one of developing countries, hasn't achieved the level of highly developed countries, which can be considered as centers of making progress. That is mainly caused by its closure to the outers, because of some, already known, political reasons. That is why, in recent years, it has been forced to establish its development on its own strengths and resources. One might say that in terms of the need to win the future, our forces are so weak, but to ensure a better future, it is necessary to have much more work, knowledge, skills but also creativity. We have a large amount of raw materials, energy, requirements for food production, but to move in step with the world we should make significant transformations in the field of social reproduction, the current economy, the structure, power relations of development. However, when it comes to scientific research, only forces are insufficient, because science is a creative activity that has an international character and its results have to be public domain.

Serbia is known for the number of young scientific personnel, but also for “exodus of brains”,11 which has been abruptly increasing in recent years. On our way towards a

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9 More about this: Dr V. Stefanović – NT promene i razvoj, Nis, 2000
11 More about this: Dr V. Stefanović - Produktivnost znanja, magazine: Opredeljenja, Sarajevo, 11/ 89
better future, all restrictions on the growth and development will still depend on the psychological, cultural and organizational factors, or on the general, international, adverse relations in exchange of goods, but also on the development and use science and new technologies. Therefore, all our attention should be paid to scientific and technical knowledge and their increased use as a basic source of power, and according to them to reduce dependence on limited national and local sources of other resources necessary for development. Economic development should be generated by increasing investments in research and development, branching technology and institutions, as well as industrialization and modernization on a global scale, in order to be able to perform at "world market".

The following condition of progress is the increasing role of literacy and role of formal education and an increasing number of intellectual activities and activities of those who prepare and make decisions, as well as behaviors based on knowledge, as opposed to direct personal experience and classical work.

Serbia has always conflicted with many problems on all sides and in all dimensions, from technological to off-technological objective and subjective, but it has always, in a more or less creative way, found a way out and provided a progress, so there is no reason not to be like this in the future.

So, the words of Professor Ostojic could be our guide to the future:12

- we cannot have more money if we do not work more;
- we cannot print more money if we do not produce more goods;
- we cannot have more jobs if we do not invest more;
- we cannot invest unless we can create greater savings;
- we cannot have greater savings if we do not trust in Dinar;
- we cannot trust in Dinar if we do not have sound Dinar;
- we cannot have sound Dinar if we spend above our capabilities;
- but, we cannot improve our capabilities if we do not work more.

Instead of conclusion

If people do not deal with science, or if they deal with it but with no success, they should not despair and should not stop; if people do not ask enlightened people about some things that they do not know, or if they ask but they do not get enlightener, they shouldn't despair; if people do not differ right and wrong, or if they differ them but have no clear idea about them, they should not despair; ; if people do not make good things, or if they do but not devote them all their strength, they should not despair; what others could do in once, they would do in ten times; what others could do in hundred times, they would do in thousand times.

The one who will keep this rule to always make efforts, no matter how letterless he is, he will surely become enlightened; no matter how weak he is, he will surely become strong; and no matter how unhallowed he is, he will inevitably become virtuous.

CHINESE WISDOM

12 Dr Slobodan Ostojić - Zbornik radova I konferencije o produktivnosti, Sarajevo, 1981, (881)
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