

The wave of radical transformations sweeping through the world since the end of the 20th century, has put before the economic science a lot of fundamentally new questions. Answers to these burning questions are offered in the book of a well-known Russian economist and the leader of the modern school of Russian cyclism Yuri Yakovets. It reveals laws, tendencies and prospects of transformations based on the wave of epochal innovations in the 21st century radically transforming the economic life, in conjunction with radical changes in socio-demographic, energy- ecological, technological, geopolitical and socio-cultural manifestations of modern civilization. It addresses the premises for the inertia-based and innovative-breakthrough scenarios of transformations in the first half of the 21st century. The book comprises a lot of original ideas and new points, is a step forward in the study of complex processes of deep transformations of society and will be of a real interest not only for scientists, educators, business leaders, politicians and statesmen, but also for the new generation, who has to give strategic responses to the challenges of the new century.

The Global Economic Transformations Of The 21st Century



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# **THE GLOBAL ECONOMIC Transformations of the 21st Century**

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The wave of radical transformations sweeping through the world since the end of the 20<sup>th</sup> century, has put before the economic science a lot of fundamentally new questions: what are the radical transformations, what place they occupy in the cyclical dynamics of society? What are the laws and tendencies of these transformations? What is their content and prospects? What awaits the humanity in the coming decades?

Answers to these and many other burning questions are offered in the book of a well-known Russian economist and the leader of the modern school of Russian cyclicism Yuri Yakovets. It reveals laws, tendencies and prospects of transformations based on the wave of epochal innovations in the 21<sup>st</sup> century radically transforming the economic life, in conjunction with radical changes in socio-demographic, energy- ecological, technological, geopolitical and socio-cultural manifestations of modern civilization. It addresses the premises for the inertia-based and innovative-breakthrough scenarios of transformations in the first half of the 21st century, and it validates recommendations on consolidation of the driving forces for transforming the economy and society for the implementation of the innovative-breakthrough scenario for the future development, the establishment of an integral economic system, socially, noospheric and innovation oriented.

The book comprises a lot of original ideas and new points, is a step forward in the study of complex processes of deep transformations of society and will be of a real interest not only for scientists, educators, business leaders, politicians and statesmen, but also for the new generation, who has to give strategic responses to the challenges of the new century.

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## FOREWORD TO THE ENGLISH EDITION

The readers are offered the corrected English edition of the monograph published in Moscow by “Ekonomika” publishers in 2011.

As it has passed a few years from the imprint date of the monograph, the years which were overflowed with global crises and transformations, it would be advisable to supply the publication with some comments and additions.

**First**, you have the result of the development of modern scientific school of Russian cyclicism before you - one of the lines of formation of a new paradigm of social sciences. Few people know that this paradigm is being formed in Russia, integrating the legacy of world-renowned scientists of the 20<sup>th</sup> century - Nikolai Kondratieff, Joseph Schumpeter, Simon Kuznets, Fernand Braudel, Pitirim Sorokin, Vladimir Vernadsky, Nikita Moisseev, Wassily Leontief. It gives a new look to the regularities of cyclic-genetic dynamics of civilization that is reflected in the amount of books: "The Regularities of Scientific and Technological Progress and Its Planned Use" (1984, also published in Berlin and Bratislava), published in the U.S. the monograph "Russian Cyclicism: a New Vision of the Past and the Future "(1999), "The Past and the Future of Civilizations" (2000), in Russia the monograph "At the Sources of a New Civilization" (1993, in Russian and English), "Cycles. Crises. Forecasts" (1999)," Globalization and Interaction of Civilizations" (2003), "The Epochal Innovations of the 21<sup>st</sup> Century" (2011), etc.

On this theoretical basis it was prepared and published in 10 parts the Global Outlook "The Future of Civilizations" for 2050 submitted to the UN 27.10.2009, the paper "Foundations of a Long-term Global Strategy for Sustainable Development Based on Partnership of Civilizations" (delivered at the UN Conference on 27.06.2011 and at the Conference on 13-17.06.2012 Rio+20), and in 2013 - report to the Group-20 Summit in St. Petersburg “Scientific Foundations of the

Strategy for Surmounting the Crisis of Civilization and Entering the Path of Global Sustainable Development. "

Thus, the English-speaking reader is able to familiarize himself with the summary work of the internationally recognized Russian scientific school on the most pressing problems of the present and the future.

**Second**, in the monograph it is given for the first time the scientific substantiation of the integral theory of cycles, crises and innovations. For each of the components of the triad it is published many a monograph, however, the author brings together this triad into the general theory of transformation that involves two things: a deep crisis at the sunset of the outgoing long-term or super long-term cycle and a wave of epochal and basic innovations in the establishing period of a new Kondratieff or civilizational cycle. It is this transformation of humanity is experiencing in the first half of the 21<sup>st</sup> century. A lack of a definite diagnosis of the crisis of civilization and the desire to prolong the agony of the obsolete cycle leads to major strategic errors as we are seeing now in abundance.

**Third**, before the readers there is not just theoretical reflection of a wise man "in the ivory tower". Karl Marx has wisely noted that there is nothing more practical than a good theory. Our theoretical points made the basis for the substantiation of a long-term strategy to surmount the crisis and taking the path of global sustainable development and partnership among civilizations. This strategy being now ignored by the national and international ruling elite, sooner or later, will find its way. This is due to the severe consequences of mistakes made in the anti-crisis policy and the inevitable process of generational change, including in the ruling elite. This monograph is exactly addressed to the leaders of the new generation.

I did not start introducing corrections and additions to the published monograph, but attach new materials of 2013 to it for the update of the ideas stated and recommendations. It is a paper representing the scientific foundations for a global strategy to

surmount the civilizational crisis and entering to the trajectory of global sustainable development, as well as a short essay "The Paradoxes and Prospects of Civilizational Dynamics."

I can clearly imagine that not all of the points of this monograph will be met with understanding, especially those that are contrary to the views of the now dominant paradigm. I am looking forward to reviews and comments, and even objections for the truth is born of arguments.

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***February 2014***

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## **INTRODUCTION. THE HARD TIME OF RADICAL CHANGES**

Since the end of the 20<sup>th</sup> century the world economy has entered a long period of radical changes, global crises and epochal innovations. The chaotic state of dynamics has increased, the habitual foundations are crumbling, people and corporations have lost their vision and confidence in the future (Alvin Toffler called this state "future shock"). The ideas of the unpredictability of future have increased; the authority of science that has been unable either to foresee deep crises, or make a definite diagnosis, or to offer a reliable way of movement in the future, is falling.

The world turned out in a state of escalating chaos, increasing uncertainty, unpredictability of occurring sudden changes. However, in this chaos, according to Iliya Prigozhin, the outlines of the future order, post-industrial economic, social and geopolitical system is gradually taking shape. Wisdom of a scientist, business leader, politician and statesman is that to define three contending elements and to determine their attitude towards them in such chaos. First, it is the elements of the prevailing industrial system outlived its life and becoming less creative and efficient where the phenomena of decay and parasitism are increasing, threatening the future of humanity. Second, these are the sprouts of a new, post-industrial, integral by its content system, which are still weak, but quickly gaining momentum and will determine dynamics of the economy and society since the second quarter of the 21<sup>st</sup> century. Such elements must be fully supported and strengthened. Third, the core of economic and civilizational genotype accumulated for centuries and millennia which are necessary while freeing from the outdated and enriching with the new elements corresponding to the realities of the 21<sup>st</sup> century to preserve, protecting from destruction in the thick of deep transformations, and to transmit to future generations.

The period of transformation has turned out to be difficult for all levels of society. Difficult for heads of major corporations and banks who suddenly found themselves in a crisis condition. Difficult for government leaders and international organizations which are forced to take emergency measures to rescue the economy and support the growing number of unemployed and hungry. Difficult for the population due to rising unemployment, the tangible loss of income, increased poverty and hunger in many countries, a loss of confidence in the future for themselves and their children. Difficult for the scientists who had to get rid of the neo-liberal illusions about the omnipotence of market mechanisms and to see the unreliability of their own tenets and forecasts.

But not all is as hopeless as it might seem at first glance. A cluster of crises is a prerequisite and momentum for a wave of epochal and basic innovations, culminating in the establishment of the postindustrial, humanistic-noospheric, integral society with the social, economic and geopolitical system more harmoniously and sustainably developing which is inherent to it in the second quarter of the 21<sup>st</sup> century. Crisis generates energy of changes and transformations. The corner stones of the post-industrial scientific paradigm laid as far back as in the 20s and 30s of the 20<sup>th</sup> century: the theory of foresight and the doctrine of cycles, crises and innovations of Nikolai Kondratieff and Joseph Schumpeter, theory of noosphere of Vladimir Vernadsky and Nikita Moisseyev, civilizational approach to the history and future of economy and society of P. Sorokin, Arnold Toynbee, Fernand Braudel, balance method of macro forecasting of Wassily Leontief. Based on this heritage a group of Russian and Kazakhstan scientists developed a "Global Forecast "The Future of Civilizations" for 2050 which gave the diagnosis of the crisis upheavals hit the world and validated the partnership strategy of civilizations for the implementation of an optimistic, innovative, breakthrough scenario of development of economy and society in the first half of the 21<sup>st</sup> century and presented it in October 2009 at a roundtable within the 64<sup>th</sup> session of the UN

General Assembly. Its points are expounded at World Universal EXPO 2010 in Shanghai at the 4<sup>th</sup> Civilization Forum "Prospects of Development and Partnership Strategy of Civilizations" in October 2010.

The purpose of this book is to present for discussion by the scientific community, businessmen and politicians concerned, representatives of the present and future generations based on the new paradigm a view on the essence and prospects for radical transformations of economy and society in the first half of the 21<sup>st</sup> century; to validate the ways out from a cluster of global crises on the basis of a high wave of epochal and basic innovations on the path to a post-industrial, humanistically noospheric civilization.

The way of the author to this book was a long one. Starting researches into the theory of cycles in 1976, he presented the results of these studies in the monographs in 1978<sup>1</sup>, 1984<sup>2</sup> and 1988<sup>3</sup> anticipating many of the subsequent transformations.

A deep systemic crisis, which in the early 90s led to the collapse of the USSR, Comecon and the world socialist system and adversely affected the economy, technological and social development of Russia and other former Soviet countries prompted the authors to get down to the theory of crisis and transformations. Basic points on the diagnostics and foresight of crises were laid out at the interdisciplinary discussion in early 1991, then expounded and supplemented in the monographs of 1996<sup>4</sup> and 1999<sup>5</sup>. Exacerbation of contradictions between civilizations and highlighting the problem of preventing a clash of civilizations prompted the author to consider the problems of cycles, crisis and innovations in the civilizational aspect. These issues were examined in the report at the International Conference in 1992

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<sup>1</sup> *Sitnin V.K., Yakovets Yu.V.* The Economic Mechanism of Efficiency of Production. M.: Ekonomika, 1978.

<sup>2</sup> *Yakovets Yu.V.* Regularities of Scientific-Technological Progress and Its Planned Use. M.: Ekonomika, 1984. The book is also published in Germany and Czechoslovakia.

<sup>3</sup> *Yakovets Yu.V.* Acceleration of Scientific-Technological Progress. Theory and Economic Mechanism. M.: Ekonomika, 1988.

<sup>4</sup> *Yakovets Yu.V.* Russian Economy: Changes and Prospects. M: MFK, 1996.

<sup>5</sup> *Yakovets Yu.V.* Cycles. Crises. Forecasts. M.: Nauka, 1999.

dedicated to the 100<sup>th</sup> birth anniversary of N.D. Kondratieff<sup>1</sup>, in the monograph "History of Civilization"<sup>2</sup>, "Russian Cyclism: a New Vision of the Past and Future"<sup>3</sup>, "The Past and Future of Civilizations"<sup>4</sup>, "Globalization and Interaction of Civilizations"<sup>5</sup>, "Epochal Innovations of the 21<sup>st</sup> Century"<sup>6</sup>.

Regularities, trends and prospects for transformation of economy and society were researched into in several books written jointly with B.N. Kuzyk: monographs of 2004<sup>7</sup>, 2006<sup>8</sup>, 2007<sup>9</sup>, 2008<sup>10</sup>, and 2010<sup>11</sup>. The report at the 15<sup>th</sup> World Congress of the International Economic Association (Istanbul, June 2008) states a new approach to the establishment of the integral economic system as one of the global transformations of the 21<sup>st</sup> century<sup>12</sup>. Such approach was expounded in the report at the 27<sup>th</sup> Cross-Disciplinary Discussion of the 4<sup>th</sup> Civilization Forum "Prospects of Development and Partnership Strategy of Civilizations" (Shanghai, EXPO-2010, 12– 14 October 2010)<sup>13</sup>.

Thus, within a quarter of the century, the foundations of a new

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<sup>1</sup> *Yakovets Yu.V.* The Establishment of the Post-industrial Civilization. Report at the International Conference dedicated to the 100<sup>th</sup> birth anniversary of N.D. Kondratieff. M.: ANH, 1992.

<sup>2</sup> *Yakovets Yu.V.* History of Civilizations. M.: Vladar, 1995.

<sup>3</sup> *Yakovets Yu.V.* Russian Cyclism: A New Vision of the Past And Future. The Edwin Mellen Press, 1999.

<sup>4</sup> *Yakovets Yu.V.* The Past and Future of Civilizations. The Edwin Mellen Press, 2000.

<sup>5</sup> *Yakovets Yu.V.* Globalization and Interaction of Civilizations. M.: Economics, 2001-2003.

<sup>6</sup> *Yakovets Yu.V.* Epochal Innovations of the 21<sup>st</sup> Century. M.: Ekonomika, 2003. Published also in English.

<sup>7</sup> *Kuzyk B.N., Yakovets Yu.V.* Russia 2050: Strategy of Innovative Breakthrough. M.: Ekonomika, 2004. Published also in English and German.

<sup>8</sup> *Kuzyk B.N., Yakovets Yu.V.* Civilizations: Theory, History, Dialogue, and the Future. M.: INES, 2006. Vol. 1, 2. Published also in English.

<sup>9</sup> *Kuzyk B.N., Yakovets Yu.V.* The Global Energy-Ecological Revolution of the 21<sup>st</sup> Century. M.: INES, 2007. Published also in English.

<sup>10</sup> *Kuzyk B.N., Yakovets Yu.V.* Civilizations, the Past and the future. Textbook. M.: INES, 2008. Published also in English and Arabic.

<sup>11</sup> *Kuzyk B.N., Yakovets Yu.V.* Civilizations: Theory, History, Dialogue, and the Future. Vol. 6. The Establishment of the Integral Civilization. M.: INES, 2010.

<sup>12</sup> *Kuzyk B.N., Yakovets Yu.V.* The Establishment of the Integral Economic System as a Global Transformation of the 21<sup>st</sup> century. M.: INES, 2008. Published also in English.

<sup>13</sup> Prospects of Development and Partnership Strategy of Civilizations. Materials for the 4<sup>th</sup> Civilization Forum. Shanghai EXPO-2010, 12-14 October 2010, M.: SKII, 2010.

approach to the problems of dynamics of cycles, crises, innovations in the transforming society of the end of the first half of the 20<sup>th</sup> and 21<sup>st</sup> centuries were laid resting on the classical scientific heritage. These views passed a multiple checking in discussions at 27 cross-disciplinary discussions (since 1988), Kondratieff international conferences, four civilization forums, presentations of writings at the headquarters of the UN and UNESCO.

This gives reasons to formulate the foundations of the holistic concept disclosing the contents of the main factors and fields of action, trends and prospects of radical economic transformations in this monograph.

I hope that, although some of the points of this concept will cause criticism from supporters of other trends in economic thought, a wide scientific discussion of these issues will help to develop more specific and practically valuable view on radical transformations of economy and society occurred in the past and coming in the future, and thereby fostering a scientifically validated long-term partnership strategy of civilizations at the upcoming World Summit on Sustainable Development, Rio+20 (2012), consolidation of healthy forces to overcome the cluster of global crises and taking a trajectory of sustainable economic development that meets the realities of the 21<sup>st</sup> century.

It is encouraging that a new look at the creation of civilizations, outlines of the future economic system and the strategy for its formation is opened by the representatives of Russian scientific schools, relying on the powerful shoulders of their predecessors.

# CHAPTER 1. THEORIES OF TRANSFORMATIONS, CRISES AND INNOVATIONS

## 1.1. TRANSFORMATION REGULARITIES OF ECONOMY AND SOCIETY

### 1.1.1. Definition and Types of Transformations

Category Transformation (trans-form -) in the conventional sense means a change in the forms of life activities of social systems at different stages of their life cycle. Three comments should be given to this seemingly simple concept.

**First**, the transformation of the form has as its basis the transformation of the content of a particular social system, its structure and performing functions. The morphological structure meets its functional structure and changes with the latter. External and internal conditions of economic and social systems change - its content and its form are subject to change, more or less profound transformation.

**Second**, the very notion of transformation involves a certain willful, deliberate origin. The transformation of social systems by people is the result of their collective actions, though sometimes the result is largely unexpected for the participants in this process, although it is objectively determined by regularities of social development, its interaction with the dynamics of nature.

**Third**, the depth and duration of transformation are not the same for different economic and social systems and for different cycles of their dynamics. Some transformations are short-term and go relatively easy and painless, while others are more radical in nature and require significant changes in the structure, contents and forms of economic and social relations, third, the most profound, painful and prolonged may continue over decades and even centuries and lead to the most significant changes in the structure of society in changing super-long, centennial cycles.

Accordingly, we can propose a ***classification of transformations*** based on various factors. By the *sphere of action* transformations cover the whole society, its subsystems (economy, technology, ecology, demography, geopolitical relations, and socio-cultural system) or components of these systems (for example, sectoral and industry-based structure of reproduction, the ratio of market and non-market sectors of economy, composition and ratio of economic orders, etc.).

By the *depth and duration* it can be identified: short-term transforming lasting a year or two within the medium-term economic and social cycles, without affecting the foundations of the prevailing order, relatively less deep and painful; deeper, lasting several years – transformations of the structure of economy and society in the change of long-term Kondratieff cycles approximately every half a century accompanied by strong crisis shocks, the deepest transformations lasting for decades, leading to radical changes in the structure of economy and society in the change of superlong, centennial cycles, world civilizations, for example, during the industrial revolution of the late 18<sup>th</sup> - early 19<sup>th</sup> century or the post-industrial revolution at the beginning of the 21<sup>st</sup> century.

All these transformations are linked and influence each other. This influence can be of three types: resonant effect, deepening crisis shocks and increasing the depth of transformation at the downward stages of long- and super-long cycles; the damping interaction at the down stages of long- and super-long cycles when the depth and painfulness of transformation of a lower system is mitigated by the fact that the system of a higher level is at the upward stage of the cycle, distorting impact when drastic changes in the dynamics of interacting economic, social, political and environmental systems lead to a breach of the regular course of cycles and transformations in one or another system (for example, during the world wars, major emergencies and disasters, sudden changes of climate, etc.).

The very notion of transformation as a certain period of cyclical dynamics of economy and society involves and unites three-phases of

medium-, long- and super-long term cycles: the phase of the crisis of the outdated, but still prevailing system, the phase of depression, the relative equilibrium relations between the obsolescent and emerging elements of the system, the phase of the innovative update when the strengthened elements of the new system or a new development stage of the system are rapidly expanding and strengthening, ousting and replacing the outdated elements of the system. After completion of the transformation period, when, according to A. Bogdanov, the system is in a state of disorder, the effect of system is less than the sum of effects of its constituent parts, the system changes to the state of evolutionary development for a certain period of time, when an additional, synergistic effect resultant from the interaction of unidirectional elements of the ordered system manifests itself.

The transformation theory of systems is the most deeply studied in the classic work of A.A. Bogdanov on tectology<sup>1</sup>. Among contemporary publications the writings on transformation of economy of I.I. Lukinov<sup>2</sup> and V.I. Kushlin<sup>3</sup> should be noted.

We view the transformations in economy and society as a sum of two consecutive stages: the crisis of the prevailing system and its innovative renewal or replacement with a newer, more viable system.

### **1.1.2. Transformation Cycles**

Like all processes of dynamics in society, transformations are subject to cyclical fluctuations. It is valid to distinguish *transformation cycles* spreading in time (of various duration), in space (by geographical phenomenon and distribution) and by the object of transformation (civilizations, their genetic components and individual elements, activity types, etc.).

What are the properties of transformational cycles?

**First**, they are a constituent part of cycles in society encompassing the painful periods of cycles change, expressing the content of the

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<sup>1</sup> Bogdanov A.A. Tectology. The Universal Organizational Science. M.:Ekonomika, 1998.

<sup>2</sup> Lukinov I.I. Evolution of Economic Systems. M.:Ekonomika, 2002.

<sup>3</sup> Kushlin V.I. Trajectory of Economic Transformations. M.: Ekonomika, 2004.

transitional period and including two phases (stages): a period of decline, crisis of the leaving cycle and period of innovative establishment of a new cycle in a particular area. You can add two more phases: the latent period of accumulation of the prerequisites of the crisis of the leaving cycle in its maturity phase and the period of diffusion, the spread of a new cycle based on innovations, their extension in space and by activity areas. Consequently, the matter in question is a four-stroke transformation of cycles in the general flow of civilizational dynamics where transformations perform a mission of "transition bridge" in the change of cycles.

**Second**, depending on the duration of successive cycles the transformation periods are divided into short-, medium- and super-long term (in change of millennial historical super-cycles in dynamics of global civilization) lasting one to two centuries (in ancient times much longer).

Up and down waves of cycles of different duration are overlaid on each other that provides a resonant effect of their interaction.

**Third**, transformational cycles vary in the space of their action. They can be point (within an enterprise, group, and municipality), local, regional, national, can cover a space of one civilization or several civilizations, be global (for example, during the industrial revolution of the late 18<sup>th</sup> – early 19<sup>th</sup> century or during global transformations of the late 20<sup>th</sup> - early 21<sup>st</sup> century.).

**Fourth**, transformational cycles vary considerably depending on their object: whether it is a constituent part of the genotype, civilization (ecological, socio-demographical, economic, political, socio-cultural), industry or activity, etc. In adjacent areas transformational cycles interact forming a synergistic effect (with a minus sign in times of crisis and with a plus sign in the period of innovative renewal).

**Fifth**, the transformational crises vary in intensity and depth of transformation of its objects. High waves of transformation roll over the world from time to time, transforming the world in the change of historical eras. Followed by periods of relatively less deep

transformations in the change of long- and medium-term cycles.

The nature of the transformation was studied into by Alexander Bogdanov and Iliya Prigozhin. In the phase of maturity, sustainable development the system moves along an inertial trajectory; it needs a lot of effort to change a little the trajectory of its dynamics; the effect of the system is greater than the sum of its components (additional, synergistic effect increases).

However, the period of transformation begins, and the picture changes. The system becomes unstable, inorganized in the period of crisis chaotic fluctuations arise and wherefrom in the period of innovations a new order develops, a small push is enough to change the trajectory of the system dynamics and one or another scenario of a wide-open fan of possible trajectories will be chosen. The system is ineffective, its effect is less than the effects of its components, as a part of their energy is spent on the adversarial elements of the outgoing and incoming cycles. As a result of this battle and a wave of innovations one of the possible trajectories is elected, and the system again becomes stable and orderly.

### **1.1.3. Genetic Regularities of Transformations**

The action of genetic regularities is seen in the dynamics of transformations - heredity, variation and selection.

Transformations have its limit determined by *heredity* regularity. If a transformation is carried out in a single system, in the transition from one stage to another within its life cycle, as a result of transformations hereditary components of its genotype will persist. If there is a change of systems, the life cycle of a system ends and the life cycle following that system begins, then it persists only a hereditary kernel of supra-system which consists of two systems changing each other.

In periods of revolutionary transformations, this restriction is often violated; damage is caused to the hereditary kernel, so the revolutions or periods of radical reforms are followed by periods of rollback, restoration of the broken balance in the system or supra-

system.

Transformations are the main instrument of *hereditary variation*, adaptation of the system (supra-system) to significant changes in internal and external conditions of development. Thus there is a purification of the hereditary kernel (genotype of the system) from obsolete elements that do not meet new conditions in the development of the system and enrichment of the genotype with new adapted elements. Therefore, it is a false assertion that the genotype is unchanged, always persists in the same condition. The transformation depth of its components is different but if you fall behind with the transformation or conduct it in the wrong direction, it can result in the lethal outcome for the system, it will come down from the stage of history (as happened with the USSR).

The choice of this or that direction of transformations is carried out by people, their collective bodies - spontaneously or purposefully. At the early stages of development of society spontaneous nature of transformations prevailed. The same nature of transformations persists in the market economy. Hardly any of its subjects hungers for crisis, but as a result of their joint actions crisis occurs from time to time, which is surmounted by focused actions of innovators.

In the world today the actors of transformations are:

- active agents of the market, corporate executives, TNC taking and implementing strategic solutions that contribute to adaptation to the changes occurring in society;
- states, international organizations, international communities defining the strategy of transformations and participating in its implementation;
- scientists and scientific communities that are more or less successfully foreshadow the content, time and direction of transformations, and develop forecasts and programs to implement the optimal scenario.

Transformations are performed on the basis of the opposing forces representing the incoming and outgoing systems, activist figures in the conduct of radical innovations and transformations. The elite of

the outgoing systems tries to prolong its existence and dominance, performing pseudoinnovations. The effect of transforming the existing system on the new turn of the spiral of cyclical dynamics depends on the ratio and activity of the opposing forces.

**Tab. 1.1. Classification of transformations in society**

<b>Transformations in society</b>		
<b>By object of action</b>	<b>By depth and duration</b>	<b>By space and distribution</b>
<ul style="list-style-type: none"> <li>- System-wide:</li> <li>- In the structure of civilization</li> </ul>	<ul style="list-style-type: none"> <li>- short-term, current</li> <li>- medium-term, in the change of mediumterm cycles</li> </ul>	<ul style="list-style-type: none"> <li>- pin, within an individual collective body, enterprise</li> </ul>
<ul style="list-style-type: none"> <li>- Socio-demographic, in the structure and dynamics</li> <li>- In the energy-ecological dynamics</li> <li>- In the technological structure of society</li> <li>- In the economic system</li> <li>- In the state-political and geo-political order</li> <li>- In the socio-cultural system</li> </ul>	<ul style="list-style-type: none"> <li>- long-term, in the change of Kondratieff cycles</li> <li>- super-long-term, in the change of centennial, civilizational cycles</li> <li>- in the change of millennial, super-historic cycles</li> </ul>	<ul style="list-style-type: none"> <li>- local, within one locality</li> <li>- regional, within one region of the country</li> <li>- national, within national economy of the country</li> <li>- cross-country covering a group of interrelated countries or local civilizations</li> <li>- global covering all space of the globe</li> </ul>

## **1.2. CRISES AS A THE INITIAL STAGE OF TRANSFORMATIONS**

### **1.2.1. A General Theory of Crises**

The most complex and controversial period in the dynamics of any system is the phase of crisis which ends either by a transition of the system in a qualitatively new state (the crisis of growth), or its destruction and replacement by another system (the crisis of decay).

This is a painful period of breach of established balance, the emergence of a fan of possible alternatives for future development, a torturous realignment. It is therefore important, considering the structure and depth of the crisis, its place in the cyclical dynamics, to choose the most reliable ways out of crisis associated with minimal losses, transition of the system to a new state.

Crises are universal: there is no system in society or nature which would not evolve in the rhythm of cyclical dynamics, experiencing phases of birth, appearance, distribution, maturity, crisis and transition to a new state (or death). And at the same time there are no two exactly alike crises. Every crisis is specific - depending on the sphere of action, duration and depth of cycles, interaction of many endogenous and exogenous factors that determine the trajectory of the wave-like motion.

Of all the works on the theory of crises, we highlight one where the first and most complete (and, perhaps, unsurpassed to this day) formulates the foundations of the theory of crises as a part of a general theory of systems - "Tectology" of A.A. Bogdanov<sup>1</sup>.

Let us briefly dwell on the main points of the theory of crisis of AA Bogdanov.

1. Revealing the contents of the *general notion of crisis* (the Greek word "crisis" means "decision"), the author writes that a crisis usually "means the completion or reversal in the course of a process which has the character of struggle: before "crisis" the fight goes, the situation is uncertain, fluctuating; the moment of crisis is the end of uncertainty and fluctuations - the victory of one party or reconciliation of the two: something new is starting, organizationally different organization than before"<sup>2</sup> or more broadly - a sharp transition, the violation of continuity. A.A. Bogdanov gives a general definition of crisis as a change of *organizational forms of complex* (he understands under the complex what is now called the system), its transition to a new state or leaving the stage. Crises are universal, inherent in the dynamics of any

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<sup>1</sup> Bogdanov A.A. Tectology. The Universal Organizational Science. Book 1, 2. M.: Ekonomika, 1989.

<sup>2</sup> Ibid. P. 208-209.

systems in nature and society. Let us add: cyclical dynamics. A.A. Bogdanov recognized the generality of cyclic or fluctuary processes: "We have already mentioned not once a huge spread of "cyclical" or "fluctuary" processes ... by all line of being we have often to open the moment of cyclicity, repetition or, more precisely, the similarity of the phases separated by an interval of phases of any process where it was not noticed before"<sup>1</sup>.

2. A.A. Bogdanov distinguished *two types of crises* in the dynamics of systems: "Crisis C" - conjugation, connective: the formation of new links, "Crises D"- dividing: breaking the links, creation of new boundaries where they have not been before." However, the boundaries between them are relative: "Every crisis is actually a chain of elementary crises of both types ... The starting point is always C, the final phase is always D. The scheme is always one - CD implying, of course, under each of the two signs not a single elementary crisis but their whole interlocking series"<sup>2</sup>.

3. The crisis is a *disturbance of equilibrium* and the transition to a new equilibrium, such approach helps to diagnose the crisis and to *foresee* its outcome: "The crisis is a disturbance of equilibrium and at the same time the process of transition to some new equilibrium. This latter can be regarded as the *limit of changes* occurring in crisis, or as the *limit of its tendencies*. If we know the trends of the crisis and the conditions under which they evolve, then it is possible to foresee the final result of the crisis - that *certain equilibrium* to which it gravitates"<sup>3</sup>. Hence, the historian can "watching the occurring revolution, taking into account the forces acting in it and its entire environment, indicate in advance what form of organization of society might come of it"<sup>4</sup>.

This position is extremely important as a recognition of the fundamental possibility to foresee the results of critical phases and revolutionary turns in the cyclical dynamics of society, despite all the

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<sup>1</sup> Bogdanov A.A. The said work. P. 270.

<sup>2</sup> Ibid. P. 215.

<sup>3</sup> Ibid. P. 218.

<sup>4</sup> Ibid.

chaos of tectological pictures of social revolutions when "it is observed spontaneous movements of elements and tissues of the social whole and their "disorderly" displacement, less viable groups and classes are disintegrated and broke, more viable are strengthened and relatively increase; finally a new system of social equilibrium is formed from all said"<sup>1</sup>. In this the foresight of final results can be achieved to a large extent independently from the much more difficult foresight of intermediate stages and fluctuations. In other words, the general tendency of the movement as a result of crisis and restoration of disturbed equilibrium can be foreseen more reliably and securely than the current chaotic fluctuations in the course of this process.

4. By the nature of the course A.A. Bogdanov distinguished crises *explosive* and "*fading*." Explosive develop avalanche-like until the complete destruction of the merging complexes (systems), destruction of the original shape. "Fading" develop gradually, lead to fading fluctuary processes in establishing a new equilibrium. "Similarly, the social upheavals flow differently in various conditions. Revolutions eventuated in explosion, then usually, reaching the peak, generate opposing movements of social forces and recede to some "organic balance" ... The course of social crises in general is perceived by us as particularly difficult: avalanche-type and fading series are combined in them in many ways"<sup>2</sup>.

5. A.A. Bogdanov researches into the *internal structure of crisis*, stages through which it passes. At the point of discontinuity between the two systems the boundary layer is formed. Then it begins to transform, acquire other properties; a new structure of the exchange with the outside world is created. After this, the structural changes of the boundary layer are extended to the closest to it inside, then next. As a result, the third stage of transformation leads to a new limit equilibrium. A speed to achieve the limit equilibrium depends on the plasticity of the complex; the degree of similarity with the original form - from the uniformity of their organizational material. In this

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<sup>1</sup> Ibid. P. 222.

<sup>2</sup> Bogdanov A.A. The said work. P. 233.

regard a significant role is played by existing of favorable or unfavorable environment (let us add, and the interaction, resonant or damping, crises in the neighboring areas).

A.A. Bogdanov holds the position of the *generality of crisis concepts*: "Any change ... should be considered as a special crisis. Every "continuity" can be broken down by analysis into an endless chain of crises"<sup>1</sup>. "In the analysis of waves, each of innumerable phases into which the course of wave can be divided into, can be tectologically taken as a special form." A tectological paradox: "*Equilibrium is a special case of crises*. In each such case it represents a *certain crisis* of the movement and marks the synthesis of a tectological form of this movement ... the notion of crisis for tectology is universal"<sup>2</sup>. But we must distinguish between crises of various degrees or orders. Crises are connected with the wave form of movement: "The whole world of *waves* - but it covers a diverse of stages of being and the infinite variety of forms - provides in space identical copies of temporary transitions and in time - spatial"<sup>3</sup>.

### **1.2.2. A Theory of Economic Crisis**

Let us formulate the main points of the general theory of economic crises as a part of the doctrine of cyclical development of economy.

1. *Inevitableness of crises*. Crises are inevitable: regular, regularity-based recurring crises (they will be exactly discussed below) are an indispensable phase of cyclical development of any system. They begin when the potential progress of the main elements of the prevailing system is already largely exhausted and at the same time the elements of the new system which represents a future cycle, are born and begin to fight. In this period, supra-system, according to classification of AA Bogdanov, becomes disorganized, its effectiveness decreases sharply and becomes less than the sum effect of its parts, since the elements of

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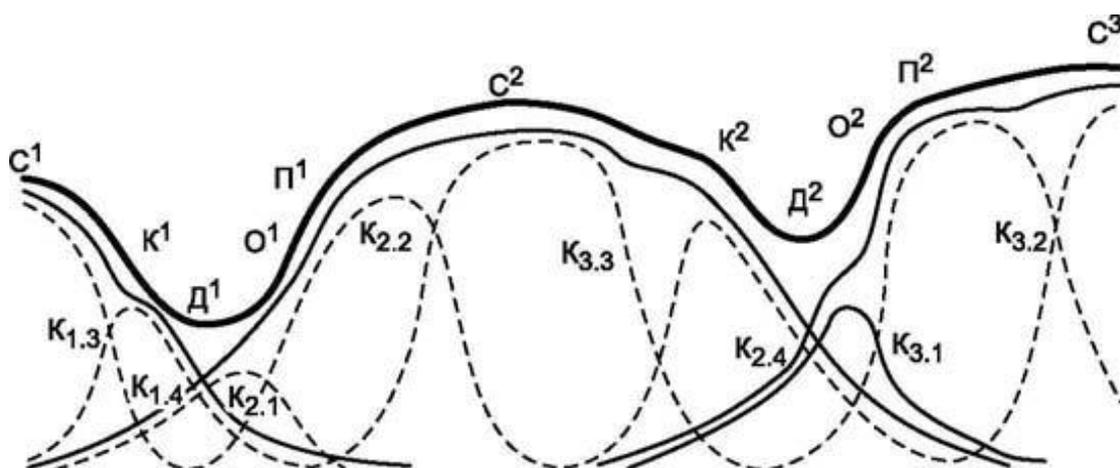
<sup>1</sup> Ibid. P. 253.

<sup>2</sup> Bogdanov A.A. The said work. P. 254.

<sup>3</sup> Ibid. P. 257.

old and new systems, opposing each other, damp a part of the total energy. The crisis creates the preconditions for the transformation of the system or its transition to a new qualitative state, or death, disintegration and replacement with the new, more efficient system. The place of crisis may be shown in the cyclical rhythm of the fluctuations by the example of social reproduction (Fig. 1.1).

In the dynamics of reproduction as supra-system recurrent phases of cycles may be identified: stable development ending by crisis, drop in production and deteriorating economic indicators, destruction or partial transformation of the outdated elements of the system, depression - a short equilibrium of old and new systems when the economic situation is not already deteriorating but still not improving; revival - the beginning of the accelerated spread of elements of the new system, expansion of production, decrease of unemployment, improvement of the indicators of the barometer of economic dynamics; a rapid upturn, triumph of a new cycle, which is gradually becoming predominant, normal and at the same time ceases to be new; a period of relative stability, the upper stable equilibrium (phase, which in the studies of the industrial cycles is usually omitted); it ends with another crisis, the prerequisites of which ripen in the previous phase.



**Fig. 1.1. Phases of crises in the structure of cycles**

$K^1, K^2$  — crises in long-term cycles of supra-systems;  $K_{1.3}, K_{1.4}, K_{2.1}, \dots$ ,

$K_{3.2}$  — crises in medium-term cycles of systems;  $C^1, C^2, C^3$  — phases of stable dynamics of supra-system;  $K^1, K^2$  — phases of crises in dynamics of supra-system;  $D^1, D^2$  — phases of depression;  $O^1, O^2$  — phases of revival;  $\Pi^1, \Pi^2$  — phases of upturn.

This is just typical, basic five-phase diagram of the dynamics of the cycle; a concrete picture changes under the influence of external factors, the cycle may be deformed. But then, after eliminating the disturbing effects rhythm of cyclical dynamics is restored. The peak of each successive rise is usually higher than previous; these are the steps up. But the amplitude of fluctuations, depth of crises vary, depending on the interaction of cycles of different duration.

2. *Functions of crises.* Crises, in spite of their painfulness, are progressive. In the dynamics of wave-like, controversial motion of systems crisis performs three major functions:

- drastic weakening and eliminating (or qualitative transformation) of obsolete elements of dominant, prevailing system but already exhausted its potential -*destructive* function;
- clearing the way for the establishment of originally weak elements of the new system, the future cycle -*creative* function;
- Strength-testing, cleaning, enrichment and transfer as a legacy of those elements of the system (these are usually concurrent remaining elements of supra-systems and super-systems), which gather, accumulate, move into the future (sometimes partially modified) - *hereditary* function.

Consequently, the crisis, with all its painfulness is a necessary element of progress.

3. *Dynamics of crisis.* The crisis passes several stages in its dynamics:

- *latent, hidden period*, when its prerequisites are maturing but not yet break out; this period coincides with the final stage of the phase of stable development (maturity) of the outgoing cycle and the beginning of the nascence of the next cycle in its depths;
- *collapse period*, explosion, rapid aggravation of all the

contradictions, sharp deterioration of all indicators of quantitatively dominant, but already doomed system within the supra-system. In this period elements of the next system representing the future gain strength, openly manifest themselves and take up the struggle. Stability is disturbed and the alternativeness of the suprasystem development options increases. Zigzags, retreats, delays in the recovery from crisis are possible;

- *easing period of crisis*, creation of prerequisites for its overcoming, transition to a phase of depression, which provides a temporary equilibrium (at the lower level) between the system lost its previous power and established new system showed its new power which in the revival phase (when crisis and depression are already behind) becomes dominant, prevailing and gets ready for another jump in its recovery, prosperity.

The duration of these periods, as well as the crisis itself is not the same, the outcome can not be considered exactly predetermined in advance. As in any struggle, there may be options, but on the path of progress because the arrow of time, as noted by Nobel Laureate I. Prigozhin, is irreversible.

4. *Generality and individuality of crises*. Crises are universal, they are inherent in any system of animate and inanimate nature, in society, because without cycles there is no development and the system is dead without development (there are virtually no completely dead, stationary unchangeable system). The notion that with the victory of socialism society enters a period of a crisis-free development has turned out to be utopian and harmful; in fact the deferring in crisis turned into its deepening, more destructive force. And at the same time there are no two absolutely identical crises: each of them are individual, unique, has its own set of reasons and factors, their incomparable with anything similar features. But this statement is not absolute; one can not find the two crises, which does not show the similarity of certain features. This gives rise to the typology of crises, their classification on a particular base (criterion).

5. *Classification of crises*. Crises can be classified on the basis of

several criteria.

By *object* where the regularity of cyclical development operates, it should be highlighted the crises in society (economic, socio-national, political, in the sphere of culture, ideology, science and technology), in the animate and inanimate nature and in its relationship with society (natural, natural-economic, ecological). While the crisis in society reflect relations of people and are under their influence, then natural-ecological crises either fully or partially are dependent on human activities, but have an influence over it.

By *their nature* crises may precede a new stage in the development of a system or its death, decay; act in isolation, relatively independently of other crises – or coincide, interact with them, which causes a resonance effect; act as an inevitable, regularity-based, recurring phase of the cycle –or as an incidental result of natural disasters, accidents, and major error.

By duration crises can be classified into short-, medium-, long- and super-long, which is associated with the duration of the cycle.

6. *Interaction of crisis.* As a rule, crises interact and influence each other.

Crises of different periodicity in one area, partly coinciding in time, complement and deepen each other, making the crisis state longer, devastating, exactly such a coincidence, a major, painful transformation of society is observed at the turn of the third millennium of the common era.

Crises in the related fields, developing concurrently, get a synergistic effect, deepen as a result of interaction but lead to a comprehensive renewal of the group of interconnected systems.

The course, depth, and duration of the crisis could be impacted by the crises in remote areas, as well as occasional crises (e.g. the Chernobyl accident, environmental catastrophes in the Aral Sea areas or the Gulf of Mexico).

7. *Mechanism for Crisis Recovery.* Crises are finite (optimistic conclusion). Any crisis ends sooner or later. It is important to understand the nature and features of each crisis, to help mitigate

them, the utmost quick recovery from it. Recovery from crisis is that the outdated elements of the outgoing system (or it is as a whole, in its main content) loses its force, are relegated to the background (although some persist for some time in the next phase), and their place is occupied by elements of the new systems growing in strength, which for some time find themselves in a state of equilibrium in the confrontation of two systems so that then finally to win and spread rapidly in all areas.

At the same time it should be taken account of the uniqueness of crises, many-sidedness of reasons and factors causing them, as well as the interaction of cycles require picking very specific keys to recover from every crisis, accumulating experience. It is important to separate the outdated, dying elements of the outgoing system fiercely resistant, decaying and hindering the progress from the still weak but growing in strength elements of a future cycle, requiring any kinds of support and from those elements of the supra-system, which must not be destroyed but upon slight modification, be preserved and transmitted as the legacy to the future. Hence, the viciousness of the slogan repeatedly put forward in times of revolutionary storms: "Let us destroy everything to the ground, and then ..."

8. *Implications of crisis.* The most important end result of the crisis is a qualitative leap, transition to a new stage in the development of the system or to the new system; in which case the crisis precedes the revolution, becoming its beginning. However, the nature of rise from crisis is uneven, depending on the phase of supra- and super-cycle: if the crisis falls to the distribution phase - the rise is steeper in nature, each successive peak is much higher than previous, and if to the phase of stability - the gap between the neighboring peaks decreases; if to the downward (crisis) phase, the crises become more protracted, and the peak of the next cycle can be below the previous peak. This trend in the interaction of large and medium-sized cycles was noted by N.D. Kondratieff.

With regard to the nearest implications of crises, then they combine the destructive, negative seeds with positive, constructive,

and in the most acute period of crisis the first is clearly dominated, contradictions and conflicts are sharply aggravated, and then creative seeds prevail.

1. From the standpoint of *heredity*, preservation of the genotype, the hereditary nucleus of the system it can be distinguished two types of crises: transforming and destructive. The first transforms the system, removing its outdated links and enriching it with new, helping it to adapt to environmental conditions changed, shifting to a new life cycle. Under the medium in this case, according to A.A. Bogdanov it is understood "a set of external impacts, under which the system is but taken exactly *in relation to it*. Therefore, a different system - a different environment"<sup>1</sup>. Another type of crisis is expressed in the destruction (one-time or gradually, stage by stage) of the hereditary genotype of this system, if it outlived its time and failed to ensure viability in the external environment sharply changed. Even when the shell of the system already died persists for a certain period of time, giving the appearance of its continued existence, the new hereditary nucleus of other system coming to replace it is formed (which, in turn, can be regarded as another stage in the crisis of the first type within the supra-system).

2. The crisis is the main instrument of *hereditary variation*. It makes clear a discrepancy of outdated elements of the system with altered conditions of development, reveals their non-viability and gives an impetus to an active seek for new forms, outburst of mutations, some of which may be useful. Crisis explodes conservative stability of the prevailing system outwardly seeming longlasting, generates a state of instability, uncertainty, and randomness. This state acts on the representatives of different systems in different ways: some fall into a passive contemplation, feeling the inevitable death, thus contributing to it; it is observed a burst of energy with others, vitality, active search for effective ways for overcoming the crisis, a quick search of possible options; the third - and they are the majority - continue to do their own

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<sup>1</sup> Bogdanov A.A. The said work. P.110.

job as if nothing had happened.

3. In the periods of crises a *selection* of the most viable and promising mutation becomes more active, a division of the system elements into four streams: representing a hereditary nucleus, which should be insured from destruction by extremist forces, while at the same time, clearing of outdated elements and to adapt to new conditions of development; useful changes that should be maintained and fixed, thus enriching the genotype and thereby to enhance the viability of the entire system; outdated, condemned elements of the system that should be quicker and less painfully removed to clear the way for new; harmful mutations, false innovations that represent mimicry of the obsolete, and attempt to revive the stages of development passed already long ago, or get ahead, trying to impose on the system that it is not ready to perceive. In this differentiation - and it takes place both spontaneous and deliberately - is the most interesting and crucial moment of crisis in the social system. When the choice is made, the old elements and false innovations are discarded, the genotype is enriched, the elements of new are established themselves - functions of the crisis are fulfilled, the system goes into a stable dynamic equilibrium (of course, only for a certain period until the next crisis).

These are the basic tenets of the theory of economic crises from a position of cyclic-genetic patterns. Of course, this is only general principled approaches that should be filled with specific content with respect to each field where a crisis manifests itself, each major stage in the dynamics of such field. There are no absolutely identical crises, as there are no two absolutely same patients with identical course of a disease. Diagnosis of the crisis is of prime significance in the theory of crises (such as a disease diagnosis in medicine) and the choice of adequate ways and means of overcoming the crisis with minimal losses and in the shortest time possible. No less important, based on experience, is to be able to anticipate the approaching crisis, put a correct diagnosis in advance and choose reliable means to overcome it.

### 1.2.3. Foundations of Anti-Crisis Regulation

Every unhappy family is, according to the apt remark of Leo Tolstoy, is unhappy in its own way. Likewise, two identical crises do not happen: each of them is remarkable for a unique combination of different factors and manifestations. Nevertheless, there are possible realistic classifications of crises, a selection of essential features, typification, modeling, foresight, and hence the impact on the course and consequences of the crisis.

At first it was not realized: the economic crises were treated as natural disasters - earthquakes or volcanic eruptions. But the global crisis of 1929-1933 happened to be so destructive and dangerous that a scientific thought rushed to develop the theoretical foundations and mechanisms of crisis regulation. Thus was born the theory of state-monopoly regulation of the economy - a book by John Maynard Keynes "General Theory of Employment, Interest and Money." Thus the government programs for recovery from crisis - from the New Deal of Franklin Roosevelt to totalitarian-militarist program of Adolph Hitler. And many states have succeeded in anti-crisis regulation: they succeeded in not bringing the crises to catastrophic dimensions of the crisis phase of 1929 - 1933, and to dampen the falls on stock markets.

Of course, it is far from the formation of a comprehensive, fairly complete theory of crises and ways out of them (the "crisis of medicine") - as the studied subject is very diverse, contradictory, and whimsical. But it is possible to identify a few basic assumptions, generalizing the observation of hundreds of trajectories for recovering from economic crises and results of theoretical research.

1. The movement of cycle, transition from phase to phase is most clearly expressed in "the dynamics of the investment": "The driving force is investment. And when it starts to work, it entrains all the other industries of economy, including industries producing consumer goods"<sup>1</sup>. "Phases of the industrial cycle are determined not by the laws

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<sup>1</sup> The classics of Keynesianism. Vol. 2. *Hansen A.* Business Cycles and National Income. M.: Ekonomika. 1997. P. 87.

of consumption, but investment laws. Fluctuations in size of investments thus dominate the cycle and control it; while consumption also rises and falls as a result of these fluctuations. This is an original to the utmost degree and, in essence, a new theory for that time theory put forward by Tugan-Baranovsky"<sup>1</sup>. Consequently, for crisis recovery, we must first promote the creation of conditions for scaling up the sizes of investment; it is the starting point of the program of anti-crisis regulation.

2. However, there is another point of view: the cornerstone of change in phases of cycles and fluctuations in investment is the change in demand, especially demand for the end product (consumer goods and services, military products, etc.). "A growth in demand for consumer goods generates significantly larger fluctuations in demand for fixed capital ... The upward movement in industries producing consumer goods cause the upward movement in the industries producing capital benefits"<sup>2</sup>.

The practice of crisis recovery confirms that usually revival begins with the expanding demand for consumer goods and services, growth of orders for housing construction; this creates an increased demand for manufacturing of means of production for these sectors, increase in investments, employment - and hence, additional expansion of consumer demand. A chain mechanism for revival of economy is launched, the "domino effect" with the opposite sign.

3. Investments in the transition from depression to revival can fulfill their role in the event that they are aimed at implementing *basic innovations*. "Innovations tend surge as a tidal wave and then retreat ... The economic cycle is thus reduced, essentially to the ebb and flood of innovations and those consequences that result therefrom"<sup>3</sup>. "Innovations are that take the system out of equilibrium and lead it to a boom in capital investment"<sup>4</sup>. Gerhard Mensch, a modern follower of

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<sup>1</sup> The classics of Keynesianism. Vol. 2. Hansen A. Business Cycles and National Income. M.:Ekonomika. 1997. P. 90.

<sup>2</sup> Ibid. P.159, 161.

<sup>3</sup> Ibid. P. 101.

<sup>4</sup> Ibid. P. 106.

Kondratieff and Schumpeter, has formulated this idea more clearly and briefly in the title of his book: *Innovations Overcome the Depression*.

More deeply the role of innovations aimed at the renewal of fixed capital was disclosed by Karl Marx. He believed a mass renewal of fixed capital is a material basis of periodic industrial crises with an average term of about ten years: "Embracing a number of years, a cycle of mutually interrelated revolutions, in which capital fixes by its main constituent part, a material basis of periodic crises is given, and in the course of cycle business life consistently experiences periods of easing, average revival, swift spread, and crisis ... Crisis always forms the starting point for major new capital investments"<sup>1</sup>.

N.D. Kondratieff linked the frequency of "long waves" of economic dynamics with a mass renewal of fixed capital (including its passive part) on the basis of major technological inventions and discoveries, deep changes in technology of production and exchange. "For about two - two and a half decades before the start of an upward wave of a large cycle it is observed a revival in the field of technical inventions. A widespread application of these inventions in the field of industrial practices associated clearly with the reorganization of production relations, coincides with the beginning of the upward wave of big cycles"<sup>2</sup>.

In modern parlance, the recovery from the crisis phase of the medium-term cycle is based on the development of next-generation technology, long-term cycle - based on the transition to the dominance of the next technological order. This ensures product competitiveness by improving its technical level and reducing costs, opens the way for a revival phase of the next cycle.

4. Fluctuations of "mirror" (and sometimes "through the looking-glass" developing according to its own quirky trajectories) economy - in the *monetary sphere*, on the stock market (area of fictitious capital), on the one hand, reflect the trends of cyclical fluctuations of the real sector of economy but on the other hand - have an effect - sometimes

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<sup>1</sup> Marx K., Engels F. Collected Edition Vol. 24. P. 151.

<sup>2</sup> Kondratieff N.D. Selected works. M.: Ekonomika. 1993. P. 54.

resonant (exacerbating the crisis) - on them, as it happened with the global economic crisis of 2008-2009. The level of inflation, interest rate has an effect on the circulation of loan capital. The crisis usually begins with a stock market crash. Speculation on the stock markets provokes a crisis. Therefore, the anti-crisis programs include active use of these regulators. But we should not absolutize them, exaggerate the role in recovery from crisis: a transition to recovery is impossible without radical changes in the structure and technical basis of the real sector. The "Achilles' heel" of monetarists is in ignoring this.

5. *State* is not a passive outside observer of cyclical fluctuations; it suffers from the crisis and is interested in as rapid transition as possible to revival of economy. It becomes the initiator and engine of the anti-crisis programs. In this regard it is interesting the Employment Act of 1946 (USA), which declared a permanent policy and responsibility of the Federal Government in the coordination and use of all of its plans, functions, and resources to achieve the main goal - to maintain employment, production and purchasing power. The law demanded that the President annually submits to the congress the Economic Report describing the achievement of this goal, established, within the executive office of the President, the Council of Economic Advisers to prepare a report analyzing the achievements and make recommendations to the President aimed at avoiding economic fluctuations or to reduce their influence and maintain the level of employment, production and purchasing power; created a joint commission of the Congress on the Economic Report (seven representatives from each of the chambers), which considers the report of the President and gives the conclusion on its main recommendations.

The government anti-crisis regulation is also determined by a variety of long-term programs, implemented with the budget support, which become an impetus to revival of economy: "just in the period of weakening consumption of private capital can be best "to afford" government and public improvement plans and programs for a rise in

welfare that society needs"<sup>1</sup>.

Although the functions of the state, the mechanisms of its coordinating role in the economy have changed significantly over the last couple of decades but, as noted in the report of the World Bank, without an effective government "can not be sustainable development in both economic and social sphere ... the State is situated in the heart of economic and social development but not as a direct source of growth, and as a partner, catalyst and facilitator"<sup>2</sup>.

#### **1.2.4. Foresight of Crises**

As crises are quite a painful, destructive phase in the cyclical dynamics of society that carries a lot of sufferings and losses to people, it is important to anticipate in advance the time of their occurrence, nature, depth, triggering factors, to prepare for crisis situations, to mitigate as far as possible the negative impacts, to reduce the terms of a crisis phase, to accelerate the dying-away of obsolete and establishment of new.

But the forecast of crises is an extremely difficult and even dangerous affair. Erroneous forecast of the crisis can initiate it, cause panic; an unexpected crisis is even more dangerous, flowing down like an avalanche, or mudflow, sweeping away everything on its path (as happened with the crisis of 1929). It often happens that the crisis has already broken out but they do not recognize it or put an erroneous diagnosis, and the anti-crisis measures hit off the target.

Relying on the theories of cycles and crises, on the study of historical experience of similar type turmoil repeatedly arisen in the past, on the measurements of length and depth of cycles crises may be anticipated – M.I. Tugan-Baranovsky, A.A. Bogdanov and N.D. Kondratieff were convinced in it. But you need to rely on a modern methodology of forecasting crises, rich statistical database, on the

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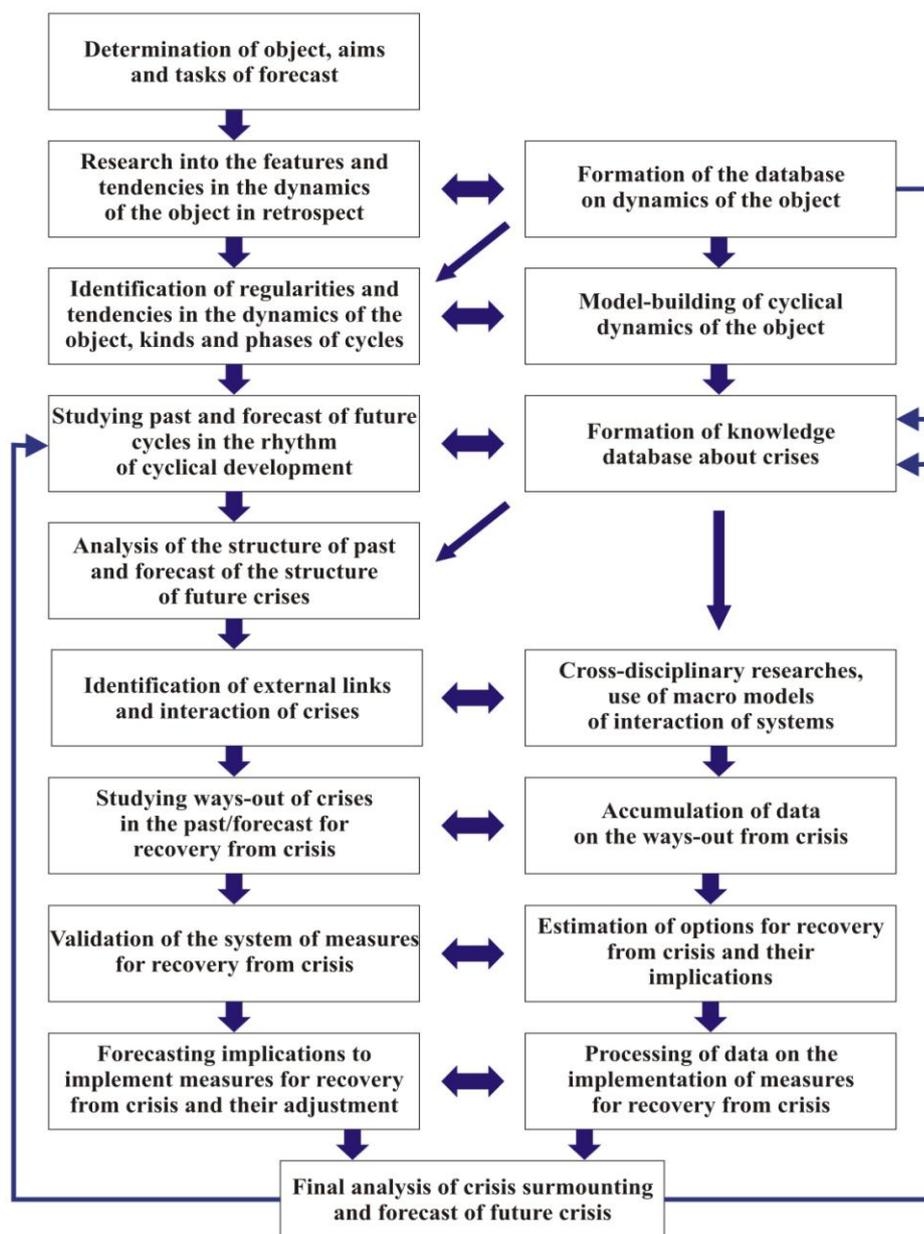
<sup>1</sup> The classics of the Keynesiasm. Vol. 2, *Hansen A. Business Cycles and National Income*. M.: Ekonomika, 1997, P. 342.

<sup>2</sup> World Bank. *World Development Report 1997. The State in a Changing World*. M.:Prime-TACC. 1997. P.2.

precise organization of the forecast services, and qualified personnel.

Theoretical positions that characterize the place of crises in the rhythm of cyclical development, their structure, system, interaction and outcome, allow developing scientific approaches to methodology and technology of forecasting crises and ways out of them. These approaches are shown in [Fig. 1.2](#) in a block diagram form.

1. First of all, it is important to clearly define the *objectives* and *limits* of crises forecasting. Such a forecast is needed not at all in order to overcome the crisis, avoid or postpone them, as experience shows, including the experience of the economic policy of the USSR in the 80s, it is hopeless, and sometimes dangerous. A different approach seems more correct: it should be described in advance the signs of an impending storm to better prepare for it, to limit negative effects, to accelerate the renewal of the system, to facilitate its utmost rapid transition into a qualitatively new state, or replacement with a new system.



**Fig. 1.2. Block diagram of crisis forecasting**

In the face of the coming crisis, there are two possible positions: a rabbit in front of a boa or an active fighter. In the first case – a paralysis of will and desire in every way, to the extent it is possible, to postpone the painful shocks, to longer ignore them, and when they did come - a bustling search of all possible measures, belief in a panacea, which ultimately turns to be an illusion; this only deepens and prolongs the crisis, makes it more devastating. Other - courageous position of captain, who, foreseeing the impending storm, carefully examines it, finds the surest way out of it with the least losses, with a firm hand paves the only right course and carries a team by example. In such a case the losses are the least, the creative function of the crisis is quickly gaining momentum.

This applies not only to the captain of the ship of state, but also to entrepreneurs, functionaries, individual employees as the recovery from crisis can be found and implemented only through collective efforts, each should understand its maneuver in a storm and perform it the best way.

2. But it is not enough to want to overcome the crisis, to go to meet it. It is important to be familiar with the *causes, essence, nature* of a particular crisis, its place in the overall rhythm of cyclical development, accumulated previous experience at a great cost to recover from crisis situations. Hence the need for an in-depth study of regularities and trends of cyclical development of such object for as far as possible a longer retrospective period to identify the inherent frequency and depth of the rhythm, to quantify the cyclical fluctuations of different levels, duration and phase changes, to examine the past crises and understand the mechanism and experience of recovering from them. It is clear that this will require the accumulation of large amount of knowledge, to create a bank of statistical and factual data, a thorough mathematical treatment using different methods.

3. The next step in forecasting cyclical crisis - the determination of its *structure*: what exactly elements of the dominant cycle are obsolete, requiring replacement or radical transformation; what elements of the system (possibly after some modifications) remain for the future; what is the core of the future system, requires the fullest support, and the utmost rapid distribution. It is important not to be mistaken, because an error could deepen and prolong the crisis.

The matter is that each system has several floors. On its surface there are constant, largely chaotic fluctuations of a number of parameters reflecting both the impact of short-term cycles and their mutual intertwining, and the current fluctuations caused by random factors. At some depth there are elements of the system expressing the essence of the medium-term cycle, and subject to replacement or major reconstruction during transition to the next. Even deeper – there are the elements of supra-system, long-term cycle, which remain, only

partially modifying, in the transition to the next long-term cycles. Finally, at the very depths there are the elements of super-system, which are almost not affected by the medium-term cycles but react to long-term by partial modification.

The depth and extent of the crisis, the number of elements of the system that it replaces or transforms, depend on whether this is an independent crisis within the cycles of a higher level or it coincides, combined with the crisis phases of long-term and even super-long cycles. It is such a coincidence explains the depth, scale and duration of the crisis that is now in our country and in some neighboring states.

Identifying the structure of the crisis can anticipate the content of the structural realignment of the forecast system, to identify the growth points of future system (more exactly, a complex, set of interconnected points reflecting the frame of the future cycle) and those links of the accustomed, dominant system which should be assisted to quickly transform itself or leave the stage clearing the way for the future.

4. Another section of the analysis of the structure of the crisis is the identification of the field of its action, subsystems and primary blocks involved by it, forms of their resonant interaction. We can show this by examples of the structure of crises in science and technology, in political relations and culture. Crises in science usually begin with aging and the infertility of the prevailing paradigms, their inability to explain new data and give the key to solving the accumulated contradictions and puzzles. This becomes the impetus to new ideas, hypotheses, some of which, after passing theoretical and practical test, become the starting point for new theories, inventions, designs of machines, etc. But in order the most radical of them are embodied in life, it is needed a technological crisis covering the areas of innovations, production and use of technology and leading to a periodic change of generations of machines, scientific and technical directions, technological modes of production.

The structure of the crisis in the socio-political sphere and culture is more complicated. Crises of social and ethnic relations (which are

largely triggered by economic crises) lead to sharp political conflicts, changes in the extent of their influence, the role and number of parties, forms and mechanism of implementation of political power, in legal and foreign policy spheres. This, in turn, generates a crisis turmoil in the fields of culture and ideology, where the dynamics of change is more complicated, independent in many ways (figures of culture are more sensitive to the ripening latent crises, they often predict future shocks before scientists are able to comprehend them and politicians - to understand).

5. It is necessary to study *external factors* in the evolvement of a future crisis, the interaction of cycles, external environment in which the cyclical development of the successive systems of such areas occurs; to evaluate the strong and weak interactions, their synchronization and resonant effects.

6. The next step -*forecast the ways out from crisis*. But again you will have to start from analyzing experience - both domestic and foreign - of ways, mechanisms, recovery stages from crises similar in depth and scale. It is important not to make an error in the selection of analogs, carefully analyze them, to select that useful that can be of use in recovery from this crisis. At the same time it should be clearly understood that once every crisis is unique then the key to recovery from it is individual; not mechanically copy the past or experiences of others, you need to rework it creatively. It is best to have several options for overcoming the crisis; each of them must be an integral system of measures, although in some parts they may overlap. One of those options is then taken to be basic but one should have also spare in the event of a significant change in the situation or an error in the forecast.

What the steps to recover from the crisis should be included in the forecast? This is, first, the promotion of an accelerated replacement of the outdated elements of the system, the nascence of a new system, and second, prevention and mitigation of painful phenomena, negative trends that particularly painfully hit the vulnerable section of society. It should be noted that these two approaches are contradictory in

many respects. For the sake of protection against the ills of crisis they often advocate to delay the liquidation of the accustomed elements of the old and the introduction of a frightening new. And if this trend prevails, the crisis could be protracted, end fatal to the system.

Developing options of a system of measures to overcome the crisis and mitigate its painful manifestations is the most critical part of forecasting crises. It depends primarily on how benign previous stages were conducted, internal and external factors of the crisis were identified, and its structure. The computer-based variants calculations using large amounts of diverse data should contribute to validation of measures for recovery from the crisis and mitigation of its adverse effects.

7. Forecasting crises is not completed by the adoption of this or that option of the system of recommendations for overcoming the crisis on the basis of the forecast, validation of the anti-crisis program. In doing so it is necessary to foresee the steep changes in the situation (both internal and external), to identify the inevitable errors in the forecast so that to *make corrections* in a timely manner, to respond in a timely manner to previously unknown factors.

Regard is to be had to that, while it is not accumulated enough experience to anticipate crises in the context of rhythm of cyclical dynamics and interaction of cycles, the situation during the crisis turmoil is changing rapidly. Any forecasts and the programs for recovery from the crisis - the global experience of the late 1970s - early 1980s, the Soviet experience in the late 1980s - early 1990s - are conditional and relative, it is dangerous to dogmatize them, they need in timely adjustments. Therefore we cannot finish up the work with a study into alternative ways of overcoming the crisis and recommendation of the most desirable option; this most crucial section of the forecast requires continuous attention and constant adjustment, the availability of replacement options that may be offered to individuals and decision-making authorities in critical situations.

8. The last, final stage is *analysis of lessons from crisis* when it is already behind, revealing the extent to which the actual course of

events met the envisaged forecast options, based on this – making adjustments to the methodology and techniques of forecasting, recording analysis results in the knowledge about crises bank constantly updated and development on this basis the next long-term forecast of the coming crises (or introducing adjustments to the previous forecast, if its horizon was fairly long).

Thus, the efforts to forecast crises and recovery from them must be carried out practically continuously, though its heat varies in different periods. This involves the identification of specialized teams of highly skilled scientists and engineers to predict crises in the structure of forecasting organizations and groups. It is appropriate to have such collective bodies at different levels - from large corporations, associations, regions to the scale of the country, as well as in international organizations. Constant communication, exchange of information, experiences and ideas is required between these groups but without the rigid subordination to one center and with maintaining conditions for a creative contest.

The proposed methodology of forecasting crises as a constituent part of integral macro forecasting methodology developed by Russian scientists is successfully applied in practice. For example, the nature and the epicenter of the global economic crisis of 2001-2002 broken out soon was fairly accurately defined in a small book “Forecasting Cycles and Crises”<sup>1</sup> published in March 2000 (to the 10<sup>th</sup> anniversary of the association "Forecasts and Cycles"). In the second volume of the monograph “Civilizations: Theory, History, Dialogue and the Future”<sup>2</sup> and the report at the 15<sup>th</sup> World Congress of the International Economic Association (Istanbul, June 2008)<sup>3</sup> it was predicted the inevitableness of the global economic crisis of 2008 – 2009 and given the scientific analysis of it. The global forecast “The Future of

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<sup>1</sup> *Yakovets Yu.V.* Forecasting Cycles and Crises. M.: MFK, 2000.

<sup>2</sup> *Kuzyk B.N., Yakovets Yu.V.* Civilizations: Theory, History, Dialogue, and the Future. Vol. 2. The Future of Civilizations in a Geocivilizational Dimension. M.: INES, 2006.

<sup>3</sup> *Kuzyk B.N., Yakovets Yu.V.* The Establishment of an Integral Economic System As a Global Transformation of the 21<sup>st</sup> Century. M.: INES, 2008.

Civilizations" by 2050 predicts the crises in the economy and other spheres of society in the first half of the 21<sup>st</sup> century<sup>1</sup>.

Thus, currently it is developed and tested in practice a fairly reliable base for forecasting crises as the initial stage of transformations in the economy and other spheres of society.

### **1.3. WAVES OF INNOVATIONS AS A COMPLETION STAGE OF TRANSFORMATIONS**

#### **1.3.1. Diversity of Innovations**

The wave of innovation is the completion stage of radical transformations in the economy and society.

In itself, the concept of innovation (novelty) is paraphrased quite simple: it is introducing new elements (kinds, methods) that increase the effectiveness of this activity in a variety of human activities of. However, the seeming simplicity of this concept is multifaceted.

Let us consider these facets, aspects of innovations.

*Impetuses to innovate.* Innovations violate customary lifestyle and mode of action and entail a considerable risk, often fail and large losses and sometimes death (literally or figuratively) of an unlucky innovator. What prompts millions of people to rush again and again into this unknown future, full of risk? It is hardly worth to reduce it to the enterprising nature of human who are tired to do a routine matter and who is tend to the adventure, though it might also be the case. The main thing is in different. Needs of people in any business grow at priority rates pace (compared to the possibilities of their satisfaction) from year to year with the increase in the number of population. The unmet needs give rise to conflicts. It is necessary again and again to strain the intellect to invent new ways to meet these needs. In such a case the law of contest comes into force (competition in a market economy). The one who has the first and most successfully carried out the overdue innovation is rewarded with super profit in technological

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<sup>1</sup> The Forecast of Economic Dynamics of Civilizations and Transformation of Globalization./ The Global Forecast "The Future of Civilizations." Ch. 6. M.: SKII, 2009.

or economic innovation, or political or socio-cultural success, victory in war, etc. Consequently, innovations are a sociological regularity, engine and motive for progress of society in all its facets.

***The sources and initiators of innovations.*** Innovations exist many thousand years. Our ancestors who applied stone tools, bows and arrows, mastered cattle-husbandry, farming, handicrafts, construction, built the state, began to use money, built religious systems, etc., were involved in epochal, or basic innovations changed the face of society and advanced it forward. And this was long before science emerged and a small layer of scientists separated. Therefore it would be rash to say that science is the only source of innovations. And in the last century when the innovative explosion occurred (or rather a series of explosions) of the industrial age, it were not always scientists who initiated major innovations: it is enough to recall Watt, Tcherepanov, and Thomas Edison. The initiators of innovations were entrepreneurs (e.g. Ford), politicians and statesmen, architects, artists, and musicians.

In the modern era initiators of innovations can be:

- scientists who have discovered new regularities in the development of nature, society, technology, and who have proposed effective ways to use these regularities;

- inventors (scientists but not always) who have managed to offer the novelty with no direct analogues in the world, a method of applying it in practice, applied for a patent;

- entrepreneurs, managers, bankers, investors who generates new forms of organizing production, business activity and management of the firm, investing in the implementation of innovations;

- people of creative professions contributing to the renewal of the spiritual sphere: scientists putting forward new hypotheses, concepts, theories, and making scientific discoveries, writers, artists, architects, musicians, film and television people, etc., forming new artistic styles and schools; teachers and organizers of education who have proposed and use its new forms and methods: the founders of new ethical

doctrines and religious movements;

- politicians and statesmen who create new political parties, the forms of political struggle, state formations, legal rules, forms of inter-state relations;

- military leaders and experts who have offered more effective ways of war-fighting, organization of wars, and use of weapons.

There is no sphere of activity where the inventive human mind would not but seek to increase its efficiency through innovations.

***Types of innovations.*** By the area of application of innovations the following classification of them may be proposed:

*Technological* innovations aimed at expanding the range and improvement of quality of goods and services produced (innovation-product) or technologies using in this (innovationprocess). They are the basis to satisfy the growing, increasingly diverse personal, production and other needs, saturation and renewal of markets of goods and services, improving production efficiency, change of models and generations of equipment, technological orders and technological modes of production.

*Environmental* innovations provide efficient, more prudent use of natural resources involved in production, more effective methods of their reproduction (for prospecting and exploration of mineral deposits, forest cultivation, irrigation and land reclamation, etc.) and reduction of harmful emissions into the environment. This kind of innovations is closely linked to technological innovations and could often be seen as their kind but it has its special target function.

*Economic* novelties find their expression in the use of more efficient forms of organization, specialization, cooperation, concentration, diversification of production, methods of work organization, new financial and credit institutions and instruments, types of securities, management methods of economic processes, forecasting their dynamics and changes in market conditions, etc.

*Socio-political* innovations include new forms of organization of social movements and political parties, assistance to the unemployed, pensioners, children, health organizations, etc.

*State-legal* innovations are represented by the use of new forms of organization of state power (legislative, executive, and judicial) and management at the municipal, regional, national and interstate levels, acceptance or adjustment of legal documents, organizing elections and renewal of government authorities, etc.

*Innovations in the spiritual sphere* are expressed in scientific discoveries, inventions, hypotheses, concepts, theories, design ideas, artistic, musical, literary and architectural styles, theater, film- and television novelties, the use of more effective forms of education (pedagogy, methods, and organization), nominating and fixing new ethical, religious doctrines, ideological aspirations.

*Military innovations and innovations in the law-enforcement area* include new methods of armored warfare, organization of armed forces and forces of law and order, maintaining security of citizens and the state, fight against criminal organizations, crime prevention, etc.

**Novelty level of innovations.** Novelties fundamentally different in nature, level of novelty, duration and effects of innovation are united under the common name "innovations"

*Epochal innovations* are performed once every few centuries, last for decades, lead to profound transformations of this or that spheres of society life and mark the transition to a new technological or economic mode of production, socio-cultural system, and the next world civilization. Mastering of farming and cattle-breeding, the emergence of writing, formation of the state, industrial revolution, scientific-technical revolution, spread of globalization, development of fire and thermonuclear weapons, etc. may be given as examples.

*Basic innovations* are expressed in radical changes in the technological base and ways of organizing production, state-legal and socio-cultural system, spiritual life, etc. In the recent centuries waves of basic innovations are observed about once every half century in the transition to the next technological order, Kondratieff cycle, radical transformations in other spheres of society within the dominant world civilization (or its stage), technological and economic mode of production, political and socio-cultural system, etc. Examples include

the formation of joint stock companies, monopolies, and state-monopoly capitalism within the industrial mode of production. Basic innovations find also their expression in the creation of new industries, forms of production organization, public-legal institutions, scientific and art schools, etc.

*Improving innovations* are aimed at the development and modification of basic innovations, their distribution in different areas, taking into account their specifics. The flows of improving innovations follow the waves of basic, they are orders of magnitude more numerous but they are remarkable for much less novelty and a shorter life cycle. Effect brought by each of them is usually much smaller than that by basic innovations but because of their mass character the total amount of effect is highest. It is in improving innovation reflected the spirit of innovation inherent in the millions of leaders in various spheres of society.

*Micro innovations* are aimed at improving individual parameters of products manufactured, technology used, economic, social, political systems, etc. and usually do not bring any significant effect.

*Pseudo innovations* are the category distinguished by Gerhard Mensch. It expresses the false path of human ingenuity and enterprise aimed at partial improvement and extension of the agony of technologies, social systems and institutes basically old and convicted for leaving the historical arena. As an exception pseudo innovations can breathe a new life into an outdated institution, induce it to the next spiral turn of its life cycle. But it is usually generated by force of habit, conservatism of action, is doomed to failure, and inhibits social progress. Pseudo innovations are usually spread at the final phase of the life cycle of the outgoing system when it mainly exhausted its potential but strongly resists a replacement with a more progressive system, seeks to preserve its niche in the new world using the seeming renewal.

*Anti-innovations* are the category introduced by us to identify those innovations that are reactionary, mean a step back in this or that sphere of human activity.

***Spatial area of innovations.*** Innovation has a different territorial field. Epochal and basic innovations gradually are covering, spreading from the epicenter, almost the entire populated area of the planet, deeply transforming it. The action field of improving innovations may be confined to the country, region, city, and the smallest of them are confined to one enterprise, organization, collective body (point innovations).

Thus, a diverse array of innovations, as measured by area and field of action, depth of changes, novelty and duration, is a pulsating force of progress of society and ensure its vitality and development, resolution of the arising contradictions within society and in its interactions with the environment .

### **1.3.2. Formation and Development of the Theory of Innovations**

A powerful cornerstone to the foundation of the theory of innovation was laid by *N.D. Kondratieff*. Setting forward the doctrine of big cycles of about a half-century duration conditions he validated the regular connection of the upward and downward waves of these cycles with the waves of technological inventions and their practical use: "Before the beginning of an upward wave of each big cycle, and sometimes at its very beginning, significant changes are observed in the major conditions of economic life of society. These changes are usually expressed (in varying combinations) in the deep changes in technology of production and exchange (which in turn is preceded by significant technical inventions and discoveries), in changes in conditions of monetary circulation, strengthening the role of new countries in the world economic life"<sup>1</sup>. In essence, the point at issue is a wave of technological and economic innovations.

N.D. Kondratieff links these waves with radical changes in other spheres of society life: "Periods of the up waves of big cycles tend to be much richer in major social upheavals and turns in society

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<sup>1</sup> *Kondratieff N.D. Big Cycles of Conjuncture and Theory of Foresight. M.: Ekonomika, 2002. P. 370-371.*

(revolutions, wars) than periods of the down waves"<sup>1</sup>. And further: "Thus, both wars and social upheavals are included in the rhythmic process of development of big cycles and turn to be not the sources of the forces of such development and a form of its manifestation. But, once emerged, of course, they in turn have a powerful, sometimes perturbation-like impact on the pace and directions of economic dynamics"<sup>2</sup>.

Thus, it can be concluded that N.D. Kondratieff laid the foundations for a general theory of innovations encompassing not only technology and economics but also socio-political sphere, and also revealing the mechanism of interaction of innovations in various spheres of society.

Joseph Schumpeter who received and developed the basic ideas of N.D. Kondratieff in this area is considered the founder of the theory of innovations. Schumpeter focused his attention on economic innovations, highly estimated the role of the entrepreneur - an innovator in the economic progress. "The function of entrepreneurs is to reform or revolutionize the production using inventions or, more generally, using new technological solutions to produce new products or production of old products a new way, opening up new sources of raw materials and materials or new markets, reorganizing the industry etc. The start of construction of railways, power generation before World War I, energy of steam and steel, car, colonial enterprises - all these are brilliant examples of a large family of events, including as well a countless more moderate representatives - up to the release of new varieties of sausages and original toothbrushes. It is this kind of activity is the main reason for the periodic "booms" that revolutionizing the economic organism, and periodic "busts" arising from the imbalance in the production of new products or application of new methods. It is always difficult to do something new, and implementation of innovations reflects the independent economic function, first, because everything new is beyond the routine tasks

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<sup>1</sup> Ibid. P. 374.

<sup>2</sup> Ibid. P. 383.

clear to all and, second, since it is necessary to overcome the resistance of the environment”<sup>1</sup>.

I have given this long quotation because it concisely expresses the foundations of the theory of innovations of J. Schumpeter: innovative activity as the prime function of entrepreneurs; differentiation between innovations-products and innovations- processes, radical (basic) and improving, technological and economic innovations; a place of innovations in the cyclical dynamics of economy; inevitability of overcoming inertia and resistance of the environment.

A friend and supporter of N.D. Kondratieff *Pitirim Sorokin* laid the foundations of the theory of innovations in socio-cultural sphere understanding it in the broadest sense - not only as art and culture, social and political relations but also the dynamics of scientific discoveries and inventions, interstate and civil wars. In the four-volume book published in 1937-1941 “Social and Cultural Dynamics” he researched among other things into trends in dynamics of technical inventions for more than five millennia of history of society, as well as most major innovations that had been observed for millennia in other spheres of the spiritual life of society. Noting the existence of long-term fluctuations in the socio-cultural dynamics expressed in the alternate predominance of ideational, sensory and integral socio-cultural types, Pitirim Sorokin denied the existence of the general trend of historical progress, considered these variations (fluctuations) pointless that is difficult to agree to. They are given quantitative estimates of the waves of innovations in a number of areas of spiritual reproduction.

From the above observations we can conclude that for three decades of the 20<sup>th</sup> century the fundamentals of the theory of innovations, particularly technological and socio-cultural were laid.

*The second stage* in the development of the theory of innovations - from the 40s to mid-70s - is not characterized by such fundamental breakthroughs in this field of knowledge. This was prevented by the Second World War and the post-war arms race when efforts were

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<sup>1</sup> *Schumpeter J.* Capitalism, Socialism and Democracy. M.: Ekonomika. 1995. P. 183-184.

focused on the development and dissemination of basic innovations of the 4<sup>th</sup> Kondratieff cycle and technological order adequate to it; researches were of more practical, applied nature. However, the theory of innovation was significantly advanced.

Among the fundamental works of this period it should be noted a major monograph of the outstanding British scientist *John Bernal* "Science in History" published in London in 1954 and in the Soviet Union in 1956. The focus of attention of the researcher is the progress of scientific knowledge for all historical periods. He reveals the inextricable connection of this progress with the development of technology, starting with the Paleolithic. J. Bernal notes a change of the period of rise and decline in the development of science and its technological application: "Progress in science is anything but not uniformity in space and time. Periods of rapid rates of its development alternate with longer periods of stagnation and even decline. Over time the centers of scientific activity moved and usually rather followed the movement of the centers of commerce and industry, rather than directed it. Babylon, Egypt and India were the centers of ancient science. Greece became their common successor, and there, as we know, a rational basis for science was first developed... . In Rome, the science received little attention, and it was totally absent in the Western European kingdoms of barbarians. The legacy of Greece once again returned to the East, whence it came. In Syria, Persia and India and even in faraway China the new trends in science were felt, and then blended in a magnificent synthesis in the Islamic countries. And only here, science and technology came to medieval Europe" and led to "a great burst of creative activity"<sup>1</sup>. Science could contribute effectively to changes in industry and transportation using electricity, machinery and chemicals.

The book reveals the relationship between the scientific, technical and social innovations at all stages of the history of society. J. Bernal noted that "the periods of efflorescence in science usually coincide

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<sup>1</sup> *Bernal J.* Science in History. M.: IL. 1956. P.9.

with periods of increasing economic activity and technological progress"<sup>1</sup>. And although at the first stages science rather used innovations than initiated them, in modern society it is scientific innovations serve as the starting point of innovations in equipment and technology and in other spheres of society. And while the first epochal innovations - the use of fire, application of a potter's wheel, weaving, wheel and ship - appeared without the help of science, then "in our age new knowledge and experience in the management of material world are far ahead the development of appropriate forms of cultural, political and economic life"<sup>2</sup>.

However, the progress of science, innovations implemented by its initiative are not only of creative but also destructive nature." And now, in this age of science, how terribly little new knowledge, skill and ingenuity are used for any improvement in the human life conditions and how many - to improve the instruments of destruction"<sup>3</sup>.

In this period, much attention was paid to the relationship of *innovations* with *economic growth*. Nobel Lecture of *Simon Kuznets* he read in December 1917 was dedicated to this issue. He formulated a number of new approaches in it to the theory of innovations developing the ideas of Joseph Schumpeter.

**First**, S. Kuznets introduced the concept of *epochal innovations* that underlie the transition from one historical era to another.

**Second**, the revolutionary acceleration in economic growth rates in the industrial era is due, according to Kuznets, to an epochal innovation: accelerated development of science became a new source of growth. "Massive application of technological innovations constituting to a large extent the essence of modern economic growth is closely connected to further progress in science, which in turn forms the basis for a further technological progress... The application of innovations not only provides additional economic resources for fundamental and applied researches with a long term of development

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<sup>1</sup> Ibid. P. 30.

<sup>2</sup> Ibid. P.663.

<sup>3</sup> *Bernal J.* The said work. P. 557.

and considerable costs of capital but that it should be noted particularly allows you to create powerful new tools for research and provides additional information on changes in natural processes occurring under the influence of changes in production”<sup>1</sup>.

**Third**, discussing the social implications of innovations, S. Kuznets notes that they can be both positive and negative. The state must take part in the prevention and resolution of arising conflicts in this respect. The economic function of the state is to stimulate growth and structural changes, analyze, select or reject legal and institutional innovations offered as ways and directions in the use of the new potential of production. Without the innovations science etiolates and withers; the innovative wave serves as a breeding ground for the flourishing of scientific researches.

**Fourth**, technological innovations are linked to innovations in other areas of society: "The continuous emergence of technological innovations which is characteristic of modern economic growth and attendant social innovations that facilitate the necessary adaptations are the main factors affecting the structure of economy and society", lead to "innovations in the field of law, institutional structures, and even ideology"<sup>2</sup>. This primarily refers to developing countries: "A notable progress in the economic development of developing countries may require changes in existing production technologies, and probably even more significant innovations in the political and social structures"<sup>3</sup>.

Studies of technological innovations were carried out in terms of improving innovations management. One can mention the book of Brian Twiss<sup>4</sup> translated into Russian, the first edition of which was published in 1974. B. Twiss notes the importance of ideas of N.D. Kondratieff for understanding the uneven dynamics of innovations and the crucial role of the latter in ensuring the economic growth. "The

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<sup>1</sup> Kuznets S. Modern Economic Growth: Findings and Reflections. Nobel Lecture // Nobel Laureates in Economics: a

View from Russia, Under editorship of Yakovets Yu.V. SPb.: Humanistica, 2003. P. 110.

<sup>2</sup> Kuznets S. The said work. P. 113.

<sup>3</sup> Ibid. P. 119.

<sup>4</sup> Twiss B. Managing Technological Innovation. M.: Ekonomika. 1989.

nature of technological development changes. In recent years, Kondratieff's works have gained new recognition who suggested the existence of long waves of economic development ... G. Mensch who researched into the frequency of scientific and technological innovations, also confirmed the existence of half a century cycles, active novelties in the phase of the most severe depression. In each case new technologies underlay the formation of new industries providing the acceleration of economic growth. In the light of these ideas the importance of scientific and technological innovations as sources of economic growth increases"<sup>1</sup>.

The book quoted James Brant who characterized the unique role of innovations in the development of society: "The unique process that combines science, technology, economy, entrepreneurship and management is the process of scientific and technological innovations. It embodies the knowledge that a competent manager, effectively working scientist, intelligent official, and just an educated member of society must have tomorrow. This is a process of converting scientific knowledge into physical reality changing society"<sup>2</sup>.

B. Twiss emphasizes the essence of innovation as a process in which an invention or a scientific idea acquiring the economic content, creative nature of innovative activity; identifies the factors determining the success of innovations: market orientation, meeting the goals of corporation, adequate assessment methods, effective project management, creativity, innovation environment and the existence of a "defender of the project"; describes the features of innovations at different stages of the life cycle of the industry, methods for evaluating the effectiveness of innovative projects.

The *third stage* in the development of the theory of innovations dates back to the publication in 1975 of the monograph by the German scientist *Gerhard Mensch* "Stalemate in Technology: Innovations Overcome the Depression"<sup>3</sup>, and followed publications and

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<sup>1</sup> Ibid. P. 25.

<sup>2</sup> *Twiss B.* The said work. P. 30.

<sup>3</sup> *Mensch G.* Das technologische Patt: Innovationen berwinden die Depression. Frankfurt a.M. 1975.

international conferences on the theory of long-wave fluctuations in the economy of Nikolai Kondratieff and Joseph Schumpeter. It should be noted monographs J. van Duijn "The Long Wave in Economic Life"<sup>1</sup>, A. Kleincknecht "Innovation Patterns in Crisis and Prosperity"<sup>2</sup>, Ch. Freeman, Y. Clark, L. Soete "Unemployment and Technical Innovations. A Study a Long Wave in Economic Development"<sup>3</sup>.

In the development of a theory of cycles and innovations the Soviet scientists became actively involved. A series of monographs on these issues were published by Yu.V. Yakovets - in 1978<sup>4</sup>, 1984<sup>5</sup>, and 1988<sup>6</sup>. In these works innovations were viewed as an indispensable part of scientific and economic cycles (medium-term, long-term, and super-long), the basis of the crisis recovery, studied the relationship of scientific, technological, innovative, economic, educational, organizational and managerial cycles and their innovative phases.

A fundamental study of long-term trends in science, technology and economy was performed by Academician *A.I. Anchishkin*. The book which was awarded the State Prize of the USSR<sup>7</sup>, he distinguished in the history of scientific and technological progress three epochal turns that have implemented the clusters of basic innovations: the first industrial revolution of the late 18<sup>th</sup> – early 19<sup>th</sup> century.; the second industrial revolution of the last third of the 19<sup>th</sup> - early 20<sup>th</sup> century; the third industrial revolution that began from the mid-20<sup>th</sup> century and developed into a scientific technological revolution. In the last decades of the 20<sup>th</sup> century as A.I. Anchishkin notes it has begun to develop the signs of a new, second wave of the STR, the main features of which - a radical realignment of production technologies based on

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<sup>1</sup> *Van Duijn J.J.* The Long Wave in Economic Life. I., 1983.

<sup>2</sup> *Kleincknecht A.* Innovation Patterns in Crisis and Prosperity. H.: Macmillan Press. 1987.

<sup>3</sup> *Freeman Ch., Clark Y., Soete L.* Unemployment and Technical Innovations. A Study a Long Wave in Economic Development, L.1982.

<sup>4</sup> *Sitnin V.K., Yakovets Yu.V.* Improving the Efficiency of Social Production. Ch. IV. M.: Ekonomika, 1984.

<sup>5</sup> *Yakovets Yu.V.* Regularities of Scientific and Technological Progress and Its Planned Use. M.: Ekonomika, 1984.

<sup>6</sup> *Yakovets Yu.V.* Acceleration of Scientific and Technical Progress: Theory and Economic Mechanism. M.: Ekonomika, 1988.

<sup>7</sup> *Anchishkin A.I.* Science-Technology-Economy. M.: Ekonomika, 1986.

electronics - biotechnology, automation of complex technical systems, information explosion, the absolute domination of technology based on science, transformation materialization of scientific knowledge in the main source of expanded reproduction.

There were published a review of theories of long-term trends in the capitalist economy<sup>1</sup>, the book of S.M. Menshikov and L. A. Klimenko<sup>2</sup> on this issue, monograph of L.S. Baryutin on technological innovations in the industry<sup>3</sup>, the book of V.I. Kushlin on renewal of production apparatus<sup>4</sup>. The legacy of N.D. Kondratieff was returned to the Russian science - his doctrine of the big cycles of conjuncture and related long-term fluctuations of economic dynamics. In Russia a strong innovative school established that time.

### **1.3.3. Cyclical-Genetic Regularities of Innovative Renewal of Economy and Society**

A periodic innovative renewal of society is an objectively determined process. Therefore, it must have its own regularities. A disclosure of their contents and mechanism of use is the main task of innovatics as an independent branch of scientific knowledge that emerged in the 20<sup>th</sup> century, its fundamental (theoretical) and applied (practical) parts. Let us address these regularities in the form in which they are understood by modern science, and first of all by the Russian innovation school.

1. *Periodic innovation-based renewal is a universal regularity of society and all its constituent systems.* This is explained by three factors. First, any system has its own potential for development, life cycle, and the transition from phase to phase requires a partial renewal. Second, society itself has a general tendency to growth and complexity, increase of volume and differentiation of the structure of needs; to

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<sup>1</sup> Long-term Trends in Capitalist Economy. A Research Review/ Under the editorship of R.M. Entova, N.A. Makasheva. M.: INION, 1987.

<sup>2</sup> Menshikov S. M, Klimenko L.A. Long Waves in the Economy. When Society Changes Its Skin. M.: Mezhdunarodnie Otnosheniya, 1989.

<sup>3</sup> Baryutin L.S. Management of Technological Innovations in the Industry. M.: MGU, 1986.

<sup>4</sup> Kushlin V.I. Intensification of Renewal of Productive Apparatus. M.: Mysl, 1986.

satisfy them, each system must be improved or give way to other system that can meet those needs. Third, the natural environment surrounding society is also subject to change, and society with its inherent systems must undergo changes in order to adequately respond to these external challenges. If society (or any of its component) loses the ability to renewal, then it most often lies in the basis of crises shaking any social systems and terminating either fatal or painful renewal of the ability to renew itself.

The renewal is not continuous. It is followed by a period of relatively smooth, uniform development until the potential of this state and its evolutionary improvement is exhausted. You can not constantly, permanently reform the system: its strength will go, and it will come down prematurely from the historical stage. But it is also dangerous to be delayed with renewal: the effectiveness of the system falls, the delayed renewal will turn to be painful or end with the disintegration of the system (as it happened, for example, with the USSR and Comecon in the early 90s). False renewal (pseudo-innovations as it was termed by Gerhard Mensch) is not less dangerous and can lead to fatal outcome when they are trying by the seeming innovative activity to prolong the agony of the system doomed to a radical transformation or anti-innovations directed backwards.

In fact, the matter in question here is a *universal law of periodic innovative renewal* underlying the transformations in all spheres of development of society. Two regularities of cyclical dynamics of innovations and three socio-genetic regularities follow logically from this law.

2. *Innovative activity develops uneven cyclically, waves of innovative activity changes with recessions.* In the development of equipment and technology, economy, socio-political and sociocultural spheres there are observed clearly expressed *innovative cycles* of different depths and duration. In the crucial period in the dynamics of this or that sphere a wave of basic innovations rise and then generating a flow of innovations that improve and partially correct major innovations made. Then the number of basic innovations falls

but it is overlapped many times by the growing number of diverse improving innovations bringing a significant mass effect to the renewed system. In the third phase of the cycle innovative activity stabilizes but its structure deteriorates: the basic innovations are almost stopped, improving innovations become smaller and less effective, pseudoinnovations appear that are aimed at partial improvement and extension of life period of the system basically obsolete and doomed to a radical transformation. In the next phase of the innovation crisis following it the level of innovative activity drops sharply, a share of pseudo-innovations grows. In the depression phase the innovative activity is at the low level, while preconditions for the next explosion mature, a wave of basic innovations and a spiral of renewal takes another turn, a new cycle of innovation begins.

*3. In the dynamics of innovation activity it is observed mutual influence of innovative cycles of different duration, and their interaction with the cyclical dynamics of related and remote spheres of society.* Let us address this regularity more specifically.

Innovative cycles vary in length and depth. The improving innovations are more massive in the change of short-term cycles, such models of equipment and modifications of technologies. They usually implement small inventions, know-how, rationalization proposals and do not cause any significant changes in society. This is a kind of small ripples on the surface of the sea of economic and other activities. However, in the change of generations of equipment and technology basic innovations underlying them are implemented, innovative waves (relatively small) are observed within the ten-year cycle. These waves, in turn, are overlapped on the up or down waves of long-term (half a century Kondratieff) cycles. On the up wave the height and duration of the innovative upturns are more significant, and declines are less. On the down wave of a long-term cycle it is observed the reverse pattern.

However, the most prolonged periods of the utmost deep changes in society are observed in changing the super-long, centennial (civilization) cycles. Like the decuman wave, waves of basic innovations lead to the establishment of new technological and

economic modes of production, state-political and socio-cultural system, rolling almost over all populated parts of the world, radically changing the ways of lives of the majority of its inhabitants. The instability of social systems significantly increases: one drowns in the stormy sea, while others are born again or rise. Such a flurry of changes was observed in the last third of the 18<sup>th</sup> – the first half of the 19<sup>th</sup> century marking the birth and spread of the industrial world civilization. It was also evolved when it was changing by the post-industrial civilization from the last quarter of the 20<sup>th</sup> century. Naturally, this affects the nature of waves of long-term innovative cycles falling to this period

Another section of the interaction of cycles is the mutual influence of innovative cycles in related and remote areas. For example, the cyclical fluctuations of technological innovations are related to the dynamics of cycles of scientific and inventive, reflect (with some time delay) their trajectory and in turn, determine - with a known lag - a trajectory of economic, ecological cycles and (to a lesser degree), state-political and socio-cultural. In the basis of their dynamics all of these areas have own innovative cycles. Therefore we can talk about the *regularity of interrelation of innovative renewal of various spheres of society* with a common (but distributed in time and space) rhythm of fluctuations. This rhythm of in some way synchronized innovative cycles determines the pace of human history measured by decade, half a century and century scale.

This complex relationship can be illustrated by technological and economic cycles. Economic crises lead to a sharp decline in the innovative activity as the dominant technological order is experiencing a down wave of its life cycle, change in models and generations of technology gives an increasingly less growth effect, while the drop in efficiency leads to a reduction in resources that the economy can allocate to renew the technological base of society. The volume of investments in science, innovations and investments reduce.

But by the end of the depression phase of the economic cycle it

becomes obvious a need of renewal of production through the assimilation of the first generations of the next technological order, a cluster of basic innovations implementing the resource of major inventions accumulated by that time This serves as a starting point for revival of economy, acceleration of economic growth and, consequently, increase in the volume and level of accumulation of mass of resources investing in investments and innovations. Optimistic expectations of entrepreneurs and investors contribute to this. The revival phase of the economic cycle, thus, finds expression in the up phase of the innovative cycle and relies on it. However, the structure of innovations changes: a share of basic innovations decreases, and a share of improving innovations sharply increases.

In the phase of stability (maturity) new basic innovations are repelled because there is a need to recoup the capital invested in the assimilation of a cluster of basic innovations in the previous phase. The flow of improving innovations continues to increase but the returns from them are gradually falling, the rate of return decreases. It becomes apparent the low efficiency, the futility of investing in innovation and a series of stock market crisis follow opening the way for a fall in the rate of growth or recession in production, growth of unemployment, etc.

In studying the interaction of cyclical dynamics of innovation it should be taken into account that this interaction can take place in three main forms: resonant, damping and deforming. For example, the down wave of long-and super-long-cycles has a reinforcing, resonant influence on the fluctuations falling to this phase of the parameters of medium-term crises. The up wave of the Kondratieff cycles renders the reverse, damping (easing) influence. Military or political crises may have a *damping* impact on the course of the innovative cycle. Both the First and Second World Wars occurred at the beginning of the crisis phases of medium-term cycles and interrupted, distorted their subsequent course, sharply reduced the expenses for innovations and reduced many times their number, except for a narrow sphere related to the satisfaction of military needs and conduct of the war.

4. *Waves of innovative activity are unevenly distributed in space; their epicenters and leaders of innovative activity periodically change.* Epochal and basic innovations associated with large investments in the transformation of social systems and require the accumulation within a narrow space of the prerequisites and conditions of such explosions, which are then distributed around the world. Every innovative turn has its original geographical point (epicenter). One or more leading industries, newly-emerged or radically transformed serve as the initiator of the turn. At the epicenter the primary sources of innovative renewal of society can be concentrated. Thus, the share of the UK accounted for only 1.9% to 1750 of world industrial production against 4% in France, 5% in Russia, 33.8% in China and 24.5% in India. However, as a result of an explosion of innovation that became the source of the industrial revolution, its share in world industrial output rose to 9.5% in 1830 and 19.9% in 1860, while the share of France increased respectively by 5.2 and 7.9%, Germany - up to 3.5 and 4.9%, Russia - up to 5.6, and 7%, China's share fell by 29.8 and 19.7%, and India - by 17.6 and 8.6%<sup>1</sup>. In this period Britain was in the lead in the scientific discoveries and inventions, establishment of a bourgeois democracy and parliamentarism, in the development of education and culture. From the end of the 19<sup>th</sup> century the United States is the epicenter of innovative transformations in all spheres of society. In the 50s and 60s of the 20<sup>th</sup> century the leadership passed to Japan and the USSR for a short time in many areas. However, since the 80s it is fixed itself in the U.S. and in certain areas - in Western Europe, which has become a world leader in the formation of the union of many states and civilizations with all its institutions. However, such fixing of leadership and the epicenter of innovative production in the U.S. and Western Europe has not happened forever and in all spheres. Here, contrary to many statements, not the post-industrial but late-industrial society prevails and an ambitious social pseudo-innovation is being

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<sup>1</sup> A Strategic Response of Russia to Challenges of the New Century/ Under the editorship of L.I. Abalkin. M.: Ekzamen, 2004. P.149.

implemented - its extension into the next era under the guise of an information society. The crisis of 2001-2002 showed among other things the ephemerality of such ideas, found out an outdated basis of this transformation serving as an ideological cover for the neo-liberal model of globalization in the interests of TNCs and metropolitan areas nurtured them. We can not exclude that in the next decade new leaders and innovation epicenters will emerge in the innovative renewal of society corresponding to the real content of the humanistically noospheric post-industrial civilization the prevalence of which in the world will probably fall to the second half of the 21<sup>st</sup> century.

*5. In the dynamics of innovations regularities of socio-genetics - heredity, variation and selection – manifest themselves.*

*Heredity* is expressed in the fact that the renewal of the system (or supra-system if the system is doomed to extinction) is not aimed at destroying of its hereditary nucleus and ensures its maintenance and improvement of vitality in a changing external environment. Technological and economic modes of production, political and socio-cultural system may leave the stage, the states and even of civilizations to disappear from the world map but humanity as a whole as a super-system, its biosocial genotype is preserved, transmitted from generation to generation. The hereditary function of innovations is precisely to create the conditions for the preservation and renewal of the genotype of society as a super-system, supra-systems making it, and individual elements.

*Hereditary variation* in the cyclical dynamics of the super-system is precisely the main content and purpose and destination, main function of innovations – epochal, basic, and improving. Society constantly changes, evolves. Changes occur not only in its internal structure but also in the environment, bio- and geo-sphere, in outer space. In order to adapt to changes you need to change.

The most effective of these changes (innovations) are fixed in the hereditary genotype, enrich it and then transmitted to next generations. At the same time all that has outlived its time, lost its

vitality, comes down from the stage of history, and go to the past resisting and trying to prolong its existence. It is therefore natural resistance of these elements doomed to disappearance relying on the inertia force, conservatism, and habits. Innovations do not go smoothly, they require active struggle, persistent faith and the activity of their initiators. Each wave of innovations is an explosion of contradictions in society. This explosion is all the more painful the more the depth of transformation; the deeper and more radical transformation. In such case the basic and the epochal innovations (for example, revolutions in society) often affect a part of the hereditary nucleus trying to destroy everything to the ground. Revolutions and radical reforms are followed by counterrevolutions and counter-reforms, corrective innovations that remove the extremes, a danger of a devastating rushing forward, restore the balance at a new level of development.

*Selection* consists in the selection and correction of the possible composition of innovations. In the change of social systems and stages in their development it emerges the explosion of mutations, potential innovations which purpose is to respond to the challenge of these changes. Among these mutations anti-innovations are observed that are animated at return to the past, offering unrealistic, dangerous-fantastic changes or pseudo-innovations, not giving an answer that is adequate to the challenge and that create only the appearance of an active innovative activity.

Selection in the dynamics of the society does not bear the nature of natural selection because it is always carried out under the initiative and active work of people in the confrontation of social systems. In this sense, the choice and implementation of innovations are, according to the classification of Charles Darwin, *artificial* selection made by humans. Two main varieties may be distinguished in it: *focused* selection performed according to the plan shaped in advance by the social force leading in such selection, and *spontaneous* selection as a result of confrontation of social forces (e.g. in the market competition, confrontation of social forces, political parties, in the clash of states in

the international arena).

Who are the *actors of innovative selection*?

These are first of all the idea *originators* - scientists, inventors, figures of culture and education, entrepreneurs, political, social and religious figures. These are they who first feel and are conscious of the need for changes and suggest ways of innovations in any sphere of society. Sometimes these ideas are fantastic, unrealistic or false, without giving effect or generating pseudoinnovations. But without a broad set of innovative ideas innovations can not be implemented so that to meet the pressing and perspective requirements and providing solution to the contradictions, an adequate answer to the challenge of any scale. Often, innovative ideas are supported and imposed on society by various social forces - communities of scientists and inventors, social and political movements.

The second set of actors are the actual *innovators* (entrepreneurs, investors, politicians, cultural figures) carrying out selected innovative ideas who undertake their implementation, allocating necessary resources for them, assuming an innovative risk and taking the resulting effect in the event of a successful outcome (e.g., innovative super-profit - quasi-rent). Without innovators the idea will remain a beautiful dream, "a cloud in trousers". The larger and more amplitudinous innovation is the more significant resources it requires for its development and spreading, the greater the number of participants, the greater the risk, and the losses are more weighty in case of failure. A competition of innovators (and primarily market competition) in the pursuit of "innovation carrot" - an innovative profit, political or social success, recognition of the creative contribution of a scientist, writer, artist, musician - prompts those thirst for success to the implementation of innovations, despite the risks. Many of them at the same time fail but in the event of achieved success they open up new prospects in their chosen field. The *state* who conducts selection is an important player in the innovation field. It defines the legal rules of game in this field, remarkable for its considerable originality in comparison with current activities, creates a

favorable (or unfavorable - as in modern Russia) *innovative climate*, ensures compliance with established norms and rules of innovative activity. But the role of the state is not limited to it. It must implement a *strategically innovative function*: to support basic technological and economic innovations giving them the initial momentum; carry out for its own expense innovations in the non-market area of economy, and first of all in defense, health care, fundamental science, education, culture; carry out innovations in public-legal sphere, etc. In this regard the government employees are the same innovators as well as entrepreneurs and investors. If the state apparatus is conservative, does not support innovations, and moreover prevent them, conducting anti-innovation policy, then the country is doomed to an innovation crisis, lagging from the general pace of transformations.

It especially increases the importance of innovative functions of the state in crisis situations, in transitional periods when the process of renewal and changing of social systems evolves. In this period social law of the fluctuations of totalitarianism and freedom validated by P. Sorokin is realized: in the crisis situations "the extent and severity of governmental regulation consistently increase, and economy of society, political system, way of life and ideology experience the totalitarian transformation; and the greater the crisis, the greater this transformation. On the contrary, whenever a dramatic crisis in the community decreases, the extent and severity of governmental regulation decreases, and economic, political, ideological and cultural systems are reconverted to peace, detotalitarian, less regulated and freer ways of life..."<sup>1</sup>.

In other words, the scale of innovative activities of the State, its role and responsibility in selecting and supporting the most effective basic innovations in various spheres of society in crisis transitional situations significantly increases. When the crisis is behind, time comes of the prevailing improving innovations. The leadership in their selection belongs to the entrepreneurs - innovators. The truth of this

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<sup>1</sup> Sorokin P.A. The Basic Trends of Our Time. M.: Nauka, 1997.

regularity of innovative dynamics can be confirmed by two historical examples. In the period of the utmost profound crisis of 1929-1933 in the USA the essence of the New Deal of Franklin D. Roosevelt was in a considerable strengthening of governmental regulation of basic innovations in economy and other spheres that allowed taking out the country of crisis and ensuring it the conditions for the global leadership. Example to the contrary: in the large-scale civilizational crisis in the USSR and then in Russia that hit all aspects of the life of society it was declared a course to deetatization of society, withdrawal of the state from economy, it was actually pursued anti-innovation policy, the government supported a number of anti-innovations. The consequence was the collapse of the Soviet Union and the utmost deep crisis of the 90s in Russia, set the country back for decades and deepened the losses and disasters of the population of the country.

It should be noted that the cyclical genetic regularities of dynamics of innovations, regular innovative renewal of all spheres of society are still poorly researched into and insufficiently taken into account and used in forecasting and in the practical activities of innovators, states and interstate organizations (for example, in validation of the strategy for sustainable development in the context of globalization by the UN and states). As a result there are no clear selection criteria and effective mechanisms to support the assimilation and dissemination of basic and improving innovations. They are often carried out with lagging, and even a course is taken to pseudo-innovations. All this leads to major losses in society, as is evidenced by the negative experience of Russia and other post-socialist countries. Therefore, fundamental studies of cyclic-genetic regularities of the dynamics of innovations remain a central objective not only of innovatics but also innovative components of the social sciences.

## **1.4. THE NINTH WAVE OF GLOBAL TRANSFORMATIONS**

### **1.4.1. A New Wave of Global Transformations**

After a relatively stable, albeit interrupted by periodic crises, development of the world in the postwar decades, from the late 80s of the 20<sup>th</sup> century a long period of radical global transformations begins and continue, probably until the middle of the 21<sup>st</sup> century and it will radically alter the picture of the world.

The beginning of this period was laid by a torrent of geopolitical transformations.

With the end of the Cold War steel hoops which tied together the military-political blocs and economic unions at the opposite poles burst. The initiator of the process - the Soviet Union - suffered the most of that: the world socialist system collapsed, the Council for Mutual Economic Assistance and the Warsaw Pact, the Soviet Union, and after it Yugoslavia, Czechoslovakia. The opposite pole led by the sole remaining superpower - the United States - hastened to fill the vacuum there. The NATO bloc began to expand quickly, trying to put under control the entire planet. However, the attempt to build the unipolar world has failed, and it is convincingly confirmed the global financial and economic crisis of 2008-2009. In the chaos of crisis, a new pole of power - China - rose, India, Russia, Latin America and the Muslim world conduct an independent policy. The multi-polar world order has become the reality. The crisis has expanded the area of dialogue of civilizations and the fields of their partnership.

Geo-economic shifts have followed geopolitical. The post-socialist countries embarked on the path of neo-liberal market reforms, according to the recipes of the International Monetary Fund (the "Washington Consensus") found themselves in the grip of a long, deep crisis, were set back for decades, sharply reduced their share in the world foreign trade and world GDP, due to technological degradation they have lost already low competitiveness of their products, and gave

much of the economy under the control of TNCs. It was a massive, epochal anti-innovation transformation with the resulting negative sign, despite some positive aspects of establishing a mixed economy and parliamentary democracy. At the beginning of the 21<sup>st</sup> century the situation changes for the better but the crisis of 2008-2009 showed the weakness of systems that did not find a place for radical innovative renewal of economy.

The second wave of global transformations evolved from the first years of the 21<sup>st</sup> century. It started with the global economic and information crisis of 2001-2002, the next onset of geopolitical tensions as a result of the terrorist attack on the U.S. on 11 September 2001 and was soon supplemented with a long-term global energy-ecological and food crises against the background of a global technological crisis crawled up invisibly and associated with the depletion of the innovative potential of the industrial technological mode of production and its final stage - the fifth technological order. The upper point in the decuman wave of global crises was put by the economic and financial crisis of 2009-2010 which uncovered the lack of prospects for not only the industrial economic system becoming obsolete but also for the industrial civilization as a whole. Although many scientists have proclaimed that from the 70s the vanguard countries entered the post-industrial era, it was an illusion: they shifted to the late-industrial, more and more parasitic society, and only from the second quarter of the 21<sup>st</sup> century under a favorable scenario it will begin a victorious march of the post-industrial humanistically noospheric civilization on the planet, and this process will be completed in the second half of the century only.

Consequently, the first quarter of the 21<sup>st</sup> century is the initial stage of the decuman wave of global transformations at the turn of historical epochs: a change of world civilizations and historical super-cycles. In this case the second quarter of the new century will be a period of a wave of epochal innovations - the final phase of global transformations, which finally determine (probably for a couple of

centuries) the new face of the global civilization and further fate of humanity.

We consider two different scenarios and two possible outcomes of this wave of transformation. Under the *inertia-based scenario* transformations will be slow and painful, with a long dominance of conservative forces, in the acute confrontation between countries and civilizations in the conditions of sharply aggravated geo-economic and geopolitical rivalries. In this case, there is no guarantee of a favorable completion of this process: it can be interrupted, and then humanity will be thrown back.

Another outcome is expected in the implementation of the *innovative-breakthrough scenario* -if a worried civil society entrusts its fate to the progressive forces that are able to develop and implement a science-based strategy for an actual innovative renovation of the world on the basis of partnership of civilizations.

#### **1.4.2. The Structure of the Global Transformations Wave**

The structure of the unfolding wave of radical global transformations can be viewed in three aspects:

- by the contents of changes occurring in society as a whole (in a global civilization) and its constituent parts;
- in space - by 12 local civilizations of the fifth generation, and leading countries;
- in time - by evolving of transformation processes in time.

Let us dwell on the transformations of the first half of the 21<sup>st</sup> century in these three aspects.

**The content of transformation.** By the content, subject of transformations the global transformations can be divided into two groups:

- Transformation of the arrangement of world, local and global civilizations;
- Transformations of six components of the genotype of civilization - natural-ecological, socio-demographic, technological,

economic, geopolitical and socio-cultural.

***Transformation of civilizational space*** is determined by the coincidence in time the changes of three cycles of civilizations:

- The post-industrial, humanistically-noospheric world civilization the prevalence of which falls to the second half of the 21<sup>st</sup> century and the phase of decline, possibly to the end of the 22<sup>nd</sup> century (subject to the law of compression of historical time) is coming to replace more than two hundred cycle of the industrial world civilization which has achieved extraordinary successes in technological and economic development but in the last quarter of the 20<sup>th</sup> century entered a phase of decline, the increasing parasitism;

- The fourth generation of local civilizations that prevailed from the 16<sup>th</sup> century under the apparent domination of the Western civilization is being replaced by a more differentiated fifth generation with a clearly pronounced tendency to shift the center of creative activity of civilizations to the East;

- both these processes are evolving against the background of the transition from the second historical super-cycle comprising a triad of related world civilizations (medieval, early industrial and industrial) and dominant since the middle of the first to late second millennium of the common era, to the third historical super-cycle, which will also include a triad of related post-industrial civilizations and will take a space of 500-600 years.

These three processes are interrelated and influence each other, creating a resonant effect, which is expressed in a greater depth and duration of the crisis phases and the greater height and magnitude of the waves of epochal innovations to overcome the contradictions and crisis situations of the transitional period.

***Elements of the genotype of civilizations*** are also subject to radical global transformations. This refers primarily to a *natural-ecological* component, supply of natural resources and environmental pollution. Each new step in the civilizational process was accompanied by an expansion of the range and scope of involvement in the

reproduction of natural resources and increase of the environmental pollution. By the beginning of the 21<sup>st</sup> century these trends reached their limit and put humanity before the real threat of the depletion of some essential natural resources and adverse climatic changes. N.N. Moisseev termed the need to shift to a noospheric model of harmonious co-evolution of society and nature an ecological imperative. The global energy-ecological crisis broken out at the beginning of the 21<sup>st</sup> century, the growing scarcity of fertile land, fresh water, and rapacious deforestation of tropical forests - all this makes even more urgent a need to implement the epochal innovations in this area, transition to noospheric energyecological mode of production and consumption in the national and global scales not later than the mid-21<sup>st</sup> century. This will be the content of the radical transformation of the sphere of relations of society and nature in the first half of the 21<sup>st</sup> century.

The content of transformation of a *socio-demographic* component of civilization is:

- The evolvment of a modern demographic crisis which is expressed in the spread of depopulation, population aging, falling a share of working-age population and the increase in migratory flows;
- deepening a social polarization of states and civilizations, extreme gap in the level and quality of life;
- irrational structure of consumption (including food and housing), polarization of levels of consumption by civilizations and countries;
- a lack of effective health care system as a whole on the planet, spread of dangerous diseases, not established norms of healthy lifestyles.

Deepening of the crisis processes will require humanization and social orientation of economy and society, increase of the share of investments in the social sector and the consumer sector of economy.

The transformation of the *technological* component of civilization is to overcome the crisis, the industrial technological mode of

production which has largely exhausted its creative innovation potential and has led to a drop in the rate of growth of labor productivity; in the transition from the fifth and technological orders that preceded it to the high-efficient sixth technological order as the first stage of the post-industrial technological mode of production; in humanization and ecologization of technology, and as the main objective, in overcoming the technological polarization of the "golden billion" and the opposite pole of the countries of the planet. This involves the intensive investments in the assimilation and dissemination of new high-efficient generations of technology, modernization of economies of all civilizations.

The transformation of the *economic* component is in the transition from the late-industrial economic system that has exhausted its growth potential, more and more parasitic, fraught with deep crises and with its inherent neo-liberal model of globalization in the interests of and under the control of TNCs and rich countries – to the post-industrial socially, noospheric and innovation-oriented integral economic system under the convergence of levels of economic development of countries and civilizations.

In the geopolitical sphere the essence of coming transformations is in the transition from the current prevailing model of the world order based on the confrontation and struggle of countries, civilizations and their groups with the recurring claims to global hegemony, local conflicts that threaten to escalate into global, to the multi-polar world order which base is the dialogue and partnership among countries and civilizations in response to the challenges of the new century, the creation of institutions and mechanisms of such partnership both on a civilizational level, and globally on the basis of the UN and its institutions, with the permanent demilitarization of the economy and society.

Finally, the transformation of a *socio-cultural* component, sphere of spiritual reproduction lies in overcoming the current global crisis of this sphere, evolvment and dissemination of revolution in science and education on the planet, revival of high culture and humanistic-

noospheric ethics.

It is clear that the transformations of all components are interconnected, must be balanced, have a mutual influence. It is necessary to implement these transformations focused, on the basis of uniform criteria, otherwise it is inevitable the emergence of imbalances and contradictions.

**A spatial aspect of global transformations** is considered through the role of local civilizations and the leading countries in their implementation. Nobody will be left aside from these transformations. It can be distinguished three groups of countries and civilizations: leading, catching up the leaders, lagging, and the composition and the relationship of these groups may be different for various transformations.

In the industrial era the leadership in all areas of transformation belonged to the Western civilization and its enclave on the North American continent, which at the end of the 20<sup>th</sup> century transformed into an independent North American civilization.

In the 50s-60s Japanese and Eurasian civilizations joined the leaders as well as Chinese and Indian. As a result of modern transformations the alignment of forces in the geocivilizational arena has changed dramatically. The European civilization has entered a phase of disintegration and rolled far back. The Chinese civilization has risen followed by the Indian and a part of the Buddhist civilization (South Korea). The Muslim and Latin American civilizations have become more active. The Eastern European civilization is in a state of absorption by Western European within the European Union. The most backward African civilization is experiencing a severe protracted crisis.

A transition in the second quarter of the 21<sup>st</sup> century from the stage of crisis to the stage of epochal innovations will further enhance the differentiation of local civilizations. The Western European civilization relying on the integration processes will keep the lead by a number of key areas of epochal innovations. The Chinese civilization has a strong potential for this. After it the Indian civilization is rising,

although its potential is much weaker. The North American civilization has the greatest technological and economic might but its economy as shown by the crisis of 2007-2009 will face considerable difficulties in implementing the transformation. The Eurasian civilization has good positions in the energy-ecological and socio-cultural spheres but it is extremely behind and largely lost its competitiveness in the technological sphere.

The Japanese civilization has a great potential but its economy is stagnating. The Buddhist, Latin American and a part of the Muslim civilization have a potential for growth. The African (excluding the South African Republic) and most of the Muslim (except for oil exporting countries) civilization are hopelessly behind and will not be able to recover from the crisis situation without the energetic and large-scale international aid on the principles of partnership of civilizations.

The composition and the ratio of the three groups of countries and civilizations discussed above may vary as transformations are implemented.

**By time aspect** it can be distinguished the following periods of modern dynamics of global transformations.

At the first stage - from the late 1980s until the late 1990s - it is occurred a sudden transformation of the geopolitical sphere as a result of the collapse of the socialist world system, the Warsaw Pact, USSR, Yugoslavia and at the same time - a neo-liberal transformation of economy, especially harmful to the post-socialist countries.

At the next stage - from 2000 to 2007 - a new relation of forces began to establish, the pace of transformations slowed, the rise of China continued under the absolute leadership of the triad - the U.S., Western Europe and Japan (although the latter began to give up positions).

The third stage began with the financial and economic crisis of 2008 soon engulfed the whole world. It was accompanied by a sharp aggravation of the whole range of crises: energy-ecological, food, technological, gaining imbalance and acceleration of transformation

rates, change of leaders (China is clearly added to them). This stage will likely last until the 2020s, including a regular cyclical crisis of the second half of the 2010s. At this stage it will begin the assimilation of a wide range of basic innovations of the sixth technological order. In parallel, there will occur a change of generations of people; an active part of the generation of the 20s of the 21<sup>st</sup> century will come to the leadership.

At the next stage in the 2020s-2030s we can expect a breakthrough in the trends of implementing the transformations, a large-scale assimilation and dissemination of a new wave of epochal and basic innovations under the leadership of the generation of the 2020s. Faster economic growth rates and improvement in labor productivity will be achieved, significant successes in overcoming the technological, economic and social polarization of countries and civilizations.

It can be expected that in the 2040s it will be reached a maturity phase of the sixth Kondratieff cycle, the pace of transformations will noticeably decrease, an innovative impulse will weaken. The preconditions for the next, seventh Kondratieff cycle will begin to mature but the intensity of the transformation will turn out a significantly lesser in the transition from stage to stage of the post-industrial integral civilization already prevailing economic system.

The structure of cycles, crises and innovations of the first half of the 21<sup>st</sup> century is shown in [Tab. 1.2](#).

### **1.4.3. Innovative Waves in the Past and Future**

It can be expected two waves of the epochal and basic innovations in the 21<sup>st</sup> century. One of them will cover the first half-century, be the highest by level (comparable to the wave of the late 18<sup>th</sup> - early 19<sup>th</sup> century which became the foundation of the establishment of the industrial world civilization) and will contain a cluster of epochal innovations that will transform the face of the world. This will be the establishment period of the post-industrial world civilization - the

seventh civilizational cycle and the beginning of the third historical super-cycle<sup>1</sup>.

What is the *structure* of waves of epochal and basic innovations in the 21<sup>st</sup> century?

To understand deep transformations now occurring and to anticipate their development is impossible without a long historical retrospective, since the roots of the present and future are in the past. Generalizing researches made on the history of civilizations let us construct the scheme of the epochal and basic innovations of the past eras and try to define this structure in the 21<sup>st</sup> century. (Table 1.3). Let us start with two innovative fields occurring at the interface of man and nature: *demographic* (it is not shown in the table) and *ecological*. Human species (*Homo sapiens*) emerged from nature expanded the niche occupied by him in hundreds and thousands times thanks to epochal and basic innovations and began to build his own regularities and trends of development. It was observed a slow growth of world population in the first seven millennia of history: according to the figures provided by Fritz Baade, from 10 to 160 million people - 16 times<sup>2</sup>. The growth rates were slightly higher in the first 19 centuries of the common area when the population grew about 10 times. The average life expectancy was increasing slowly. However, in the 20<sup>th</sup> century the formed trends were violated, a demographic explosion occurred: the number of the earth inhabitants grew from 1,630 billion to 6,055 billion - in 3.7 times for one century. In the 21<sup>st</sup> century a pendulum will swing to the other side. With the overall increase in population (as predicted for 2050 in 1.5 times), about 50 countries will found themselves in the state of depopulation, decreasing and aging of population, fall of its innovative activity. By the end of the century it is expected a stabilization, and in the next century it is possible the distribution of the trend towards depopulation of humanity as a whole.

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<sup>1</sup> *Kuzyk B.N., Yakovets Yu.V.* Civilizations: Theory, History, Dialogue and the Future. Vol. 6. The Establishment of the Integral Civilization. M.: INES, 2010.

<sup>2</sup> *Braudel F.* The Grammar of Civilizations. M.: Ves Mir. 2008. P. 25.

This can be assessed as an epochal anti-innovation. However, it is possible that people will be able to avoid it by maintaining moderate rates of population growth, optimizing its niche in the biosphere.

**Tab. 1.2. Cycles, crises and innovations of the first half of the 21<sup>st</sup> cen.**

<b>Global Cycles</b>	<b>Global Crises</b>	<b>Epochal Innovations</b>
<b>Civilizational cycles</b>	Decline of the industrial civilization	Establishment of the post-industrial humanisticallu noospheric civilization
	Differentiation of the 4th generation of local civilizations	Formation of the 5th generation of local civilizations
	Completion of the 2nd historical cycle	
<b>Demographic cycles</b>	Depopulation and ageing of population	Balanced dynamics of human population
	Migration crisis	Regulation of migratory flows
<b>Ecological cycle</b>	Global energy-ecological crisis	Establishment of noospheric energy-ecological mode of production and consumption
	Crisis of water supply	Rationalization of water supply
	Food crisis	New "green revolution"
<b>Innovation-technological crisis</b>	Technological crisis, decline of the industrial technological mode of production and the the 5th technological order	Establishment of the post industrial technological mode of production, 6th technological order
	Technological polarization of countries and civilizations	New model of globalization
<b>Economic cycles</b>	Crisis of industrial economic mode of production, decline of the 5th Kondratieff cycle	Establishment of integral economic system, 6th Kondratieff cycle
	Economic polarization of countries and civilizations	Economic partnership of civilizations
<b>Geopolitical cycles</b>	Decline of the industrial geopolitical system, conflicts of civilizations, terrorism	Establishment of multi-polar world order based on partnership of civilizations
<b>Socio-cultural cycles</b>	Crisis of sensual socio-cultural system, science, education, culture, ethics	Establishment of integral socio-cultural system, revolution in science and education, revival of high culture, humanistically noospheric ethics

**Tab. 1.3. Epochal and basic innovation by historical eras and innovative fields**

<b>Periods</b>	<b>Technological innovations</b>	<b>Ecological innovations</b>	<b>Economic innovations</b>	<b>Socio-political innovations</b>	<b>Innovations in culture</b>
Mesolithic (10-8th millennia B.C.).	Bow and arrows, canoes and nets, ceramic tableware.	Beginning of growing grains, domestication of wild animals.	The dawn of the reproductive economy.	Construction of housing and settlements, territorial communities .	The flowering of rock painting, animistic worldview, collectivist ethics.
Neolithic (74th millennia B.C.).	Establishment of agriculture, animal husbandry, handicrafts, construction . Specialized tools.	Productive use of land and pasture land. Slash farming.	The establishment of the reproductive economy. Surplus product. Intercommunity exchange, money. Inequality.	Monogamy, family, tribal associations, tribal system. Veche democracy. Urban Revolution.	The dawn of applied sciences. The system of myths, the priests. Ritual music and dance. Decorations from ceramics pottery. Writing.
Early class-based civilization (3rd – beginning of the 1st millennium B.C.).	Melting metals (copper, bronze, gold). Irrigated agriculture. Plow, metal weapons, wheeled cart.	Irrigated agriculture. Mines and mineral production. The energy of animals.	Slave systems. Private and state property. Exploitation. Mixed economy. Taxes. Commodity production, and markets. International trade.	The emergence of classes, state, law, army, war. Large cities. Local civilizations.	Construction of palaces, temples, pyramids. Applied sciences. Schools of scribes. Professional artists, poets, musicians and dancers. A turn in ethics. Religious systems.

*Continuation table 1.3.*

<b>Periods</b>	<b>Technological innovations</b>	<b>Ecological innovations</b>	<b>Economic innovations</b>	<b>Socio-political innovations</b>	<b>Innovations in culture</b>
Ancient civilization (second half of the 1st millennium B.C. - first half of the 1st millennium A.D.).	Development of iron. Iron tools and weapons. Steel. Differentiation of tools.	Bogharic agriculture. Seashipping, sails, energy of wind, water wheels.	Ergasteries and latifundia. Banks. Market economy poleis, empires. Multi-sectoral economic structure.	Poleis. Democracy. Freedom. Colonization. World empires.	Philosophy. The emergence of abstract sciences. Schools of Philosophers. Plato's Academy, the Lyceum of Aristotle. The efflorescence of art (sculpture, dramaturgy, architecture). The emergence of world religions, ethical systems. "axial age". The integral system.
Medieval civilization (6th-14th centuries)	Three-field system. Windmills, clocks. Firearm. Compass, multideck ships.	Power of wind and falling water. Mills.	The feudal system. Guild organization of crafts. Free cities, trade unions. Fairs. Feudal rent.	Feudal disunity. The personal dependence of the peasants, the leading role of the clergy. Feudal and religious wars.	The domination of religion. Ideational-socio-cultural system. Book-printing. Universities. The domination of religious morality. The spread of Islam.

Continuation table 1.3.

<b>Periods</b>	<b>Technological innovations</b>	<b>Ecological innovations</b>	<b>Economic innovations</b>	<b>Socio-political innovations</b>	<b>Innovations in culture</b>
Early industrial civilization (15th — middle of the 18th century).	Blast furnaces, coal. Specialization of tools at the manufactories. Artillery, rifles, pistols.	Great geographic discoveries.	Manufactory production. Hired labor. Capitalist system, the exchanges. Paper money.	Hired labor and capital. Political parties. Parliament. Absolutism. Bourgeois revolutions. Free cities.	The great scientific revolution. Establishment of sensual sociocultural system. The Art of the Renaissance. Secular education.
Industrial civilization ( the last third of the 18th – end of the 20th century).	Machines. Mechanical Engineering. Steam engine. Industrialization. Railways. Electricity, internal combustion engines. Aviation. Nuclear power, nuclear weapons. Computers. Internet.	The assimilation of steam power, electricity, nuclear energy. The beginning of space exploration. Genetic engineering. Beginning of ecology.	Industrial Revolution. Factories, plants. Joint-Stock Companies. Monopolies. Capitalism. Socialism. Planning. The state sector of economy.	Bourgeois democracy. Separation of powers. Proletarian revolutions. Totalitarian state. World Wars. The world socialist system.	The rise of science. The secularization of society. Universal primary and higher education. Cinema. Television. The decline of the sensual system. Mass anti-culture.

Continuation table 1.3.

<b>Periods</b>	<b>Technological innovations</b>	<b>Ecological innovations</b>	<b>Economic innovations</b>	<b>Socio-political innovations</b>	<b>Innovations in culture</b>
Post-industrial, integral civilization (21st – 22nd centuries) (forecast).	Post-industrial technological mode of production. Sixth and seventh technological orders. Humanization and ecologization of technologies. Reduction of military technologies.	The formation of the noosphere. Implementation of the concept of sustainable development. Replacement of natural raw materials. Renewable energy sources.	The integral economic mode of production. Mixed economy. The revival of small business. Market regulation. Globalization and demilitarization of economy.	Democratization of the state system. Priority of civil society. Termination of wars. Suprastate national associations. Multipolar world. Dialogue and partnership among civilizations.	Integral socio-cultural system. New scientific paradigm. Global information flows. Life-long learning. Humanization of ethics. Revival of religions.

Thus, there appears a chance to mitigate a threat of depletion of limited natural resources and reduce a demographic load on the environment if it is managed to simultaneously limit the growth rates of needs and per capita consumption. The prime epochal innovation in this field will be the transition to the noosphere, to its positive option ensuring a harmonious co-evolution of society and nature, widespread use of renewable energy sources, waste-free and low-waste technologies, a consistent substitution of natural sources of raw materials with artificial. This will overcome the trend to orientation at technological innovations polluting the environment and nature wasteful, established within the millennia and especially intensified in the industrial age. The transition to the noosphere will transform all aspects of society life, will cause a wave of environmental basic and improving innovations.

This can happen only through radical transformations in the *technological* and *economic* innovative fields. The establishment of post-industrial technological and economic modes of production, the

sixth and then seventh technological orders and Kondratieff cycles adequate to it will be the epochal innovations here. Humanization of economy and technologies will be expressed in the increase in the number of basic and improving innovations in the production of goods for personal consumption and services for population and the share of these sectors of economy will increase due to a sharp reduction in the militarization of economy and technology. It will also be an epochal innovation violating the trend prevailing over millennia. It will be ensured an optimal ratio of market and non-market sectors of economy, market self-regulation and government regulation. Globalization of economy and technology, acceleration of attaching a global nature to basic innovations in these fields of, and most importantly - overcoming the technological and economic gap between countries and civilizations rapidly increased in the industrial society and the beginning of the trend to their convergence will also be the epochal innovation. It will be needed the uniting efforts for a global dissemination of basic innovations.

The innovative transformation will radically change the face of the upper two floors of the pyramid of civilization – *state-political* and *socio-cultural* fields. Here the epochal innovations will be the establishment of the integral socio-cultural system (instead of decaying sensual system in the West and ramshackle ideational in the East) and the multi-polar world order based on dialogue, cooperation and partnership of civilizations and nations, eliminating wars between states and civilizations. It finds expression in a cluster of basic innovations aimed at establishing a new general scientific paradigm (a new picture of the world), at the creation of a system of lifelong learning with humanistically noospheric orientation, at preservation of cultural diversity and world cultural heritage, humanization of ethics and religious teachings, the spread of culture of peace and nonviolence. Basic innovations will affect state-political and geo-political spheres providing a rational combination of democratic rights and personal freedoms and responsibility of each to the family, collective body, society, the subordination of the state apparatus to civil society

institutions, the formation of inter-state (civilizational) associations and elements of the statesmanship with the global bodies which responsibility for ensuring international peace and security, conflict resolution and surmounting of international terrorism, the maintenance of global sustainable development will increase substantially with the powers and resources necessary to implement such powers.

Let me reiterate that the above structure of innovations in the 21<sup>st</sup> century is real only under the implementation of the optimistic scenario. This does not mean that it is utopian, is the sum of good wishes. There are real preconditions for each of the above epochal and basic innovations as well as social forces interested in its implementation. But there are reverse preconditions and forces struggling not only against innovations but also for anti-innovations. Epochal and basic anti-innovations are also not excluded, and one must clearly understand their roots and danger to prevent the implementation of the pessimistic scenario under which the biggest epochal *anti-innovation* -self-destruction of humanity as a result of a global clash of civilizations similar in strength and implications of a man-made disaster or world epidemic - could become a reality There are three forces that can carry out an optimistic scenario of innovations and impede the pessimistic scenario of anti-innovations of the 21<sup>st</sup> century.

**First**, it is *scientists* who should turn away from petty concerns and ambitions and to develop a real picture of the possible innovations and anti-innovations of the new century scientifically validated and understandable for the majority of the population, acceptable to the progressive layers, the conditions and ways of the implementation of the optimistic scenario of the global sustainable development.

**Second**, it is *teachers, educators, journalists* who must communicate this clarity of vision, the essence of choice, necessity and way of realization of the optimistic scenario of the global innovative development to the active layers of society and first of all to the

younger generations who are prone to innovations and able to them in the active period their life cycle.

**Third**, it is *progressive social, public and political movements* (both national and international) which most sensitively perceive long-term interests of civil society, are ready to support and implement long-overdue innovations. This is especially important that the forces opposing to these innovations, defending narrow-minded self-interests, and considerable; key resources and often political power are concentrated in their hands, and they will defend their interests without regard to anything else.

The outcome of this struggle between the forces of epochal innovations and anti-innovations determines the fate of humanity - and in the not too distant future. No one will manage to sit behind a high fence or in the ivory tower. Everyone must make a conscious strategic choice casting aside the hustle and bustle of everyday affairs and concerns. The choice of each of the living earth inhabitants determines the fate of humanity. Such is the imperative of the new century.

## **CHAPTER 2. A SOCIO-DEMOGRAPHIC BASIS GLOBAL ECONOMIC TRANSFORMATIONS**

### **2.1. THE MAIN SOURCE AND MAINSPRING OF ECONOMIC TRANSFORMATIONS**

#### **2.1.1. The Primary Source of Economic Transformations**

What induces business people and politicians of different ranks to take a path of economic transformations rich in risks, to compete in expanding sizes of markets, disturbing the customary pace of life and course of action? The main trigger for this is demographic factors: population growth, expansion of its needs. Let us address each of these factors.

*Population growth* is on the one hand an increase in the number of customers, market size of final products but on the other - an influx of new hands that need to be employed and be used for the development of production, creation of new productions, and development of new territories. It is a powerful incentive. Suffice it to say that in the second half of the 20<sup>th</sup> century the world population increased 2.4 times. There were reached record in the history of humanity population growth rates - 1.93% yearly average with a concurrent record growth rates of GDP - 4.90% in 1950-1973 and 2.92% per capita (Table 2.1).

It is obvious a close relationship between population growth and GDP growth – both in their rise, and in their fall, and in general for the world, and by local civilizations - from Table 2.1, even without the use of correlation analysis:

**Tab. 2.1. The average annual rate of population growth and GDP,% (1 - population growth rates; 2 - GDP growth rate in prices of 1990; and 3 - the same per capita)<sup>1</sup>**

		<b>1000 1500</b>	<b>1500 1820</b>	<b>1820 1870</b>	<b>1870 1913</b>	<b>1913 1950</b>	<b>1950 1973</b>	<b>1973 2001</b>
<i>World</i>	1	0.10	0.27	0.40	0.80	0.93	1.93	1.62
	2	0.15	0.32	0.93	2.11	1.82	4.90	3.05
	3	0.05	0.05	0.54	1.30	0.85	2.92	1.41
<i>Western Europe</i>	1	0.16	0.26	0.69	0.77	0.42	0.71	0.32
	2	0.29	0.40	1.68	2.11	1.19	4.79	2.21
	3	0.13	0.14	0.98	1.33	1.76	4.15	1.88
<i>Former USSR</i>	1	0.17	0.37	0.97	1.33	0.38	1.44	0.54
	2	0.22	0.47	1.61	2.40	2.15	4.84	-0.42
	3	0.04	0.10	0.63	1.06	1.76	3.35	-0.96
<i>USA</i>	1	0.09	0.50	2.83	2.08	1.21	1.45	1.06
	2	-	0.86	4.20	3.94	2.84	3.93	2.94
	3	-	0.36	1.34	1.82	1.61	2.45	1.86
<i>Latin America</i>	1	0.09	0.07	1.25	1.63	1.96	2.73	1.96
	2	0.09	0.23	1.22	3.08	3.42	5.38	2.89
	3	0.01	0.16	-0.03	1.82	1.43	5.58	0.91
<i>China</i>	1	0.11	0.41	-0.12	0.47	0.61	2.10	1.33
	2	0.27	0.41	-0.37	0.56	-0.02	5.02	6.72
	3	0.06	0.00	-0.25	0.10	-0.62	2.86	5.32
<i>India</i>	1	0.08	0.20	0.38	0.43	0.45	2.11	2.05
	2	0.12	0.19	0.38	0.97	0.23	3.54	5.12
	3	0.04	-0.01	0.00	0.54	-0.22	1.40	3.01
<i>Japan</i>	1	0.14	0.22	0.21	0.95	1.32	1.14	0.55
	2	0.18	0.31	0.41	2.44	2.21	9.29	2.71
	3	0.03	0.09	0.19	1.48	0.88	8.06	2.14
<i>Africa</i>	1	0.07	0.15	0.40	0.75	1.64	2.37	2.69
	2	0.07	0.15	0.75	1.38	2.57	4.43	2.14
	3	-0.01	0.00	0.35	0.57	0.92	2.00	0.19

Another finding is in the variability of these indices, their significant fluctuations by the phases of super-long (civilizational) cycles.

The third finding is a significant differentiation of these indices for various local civilizations: when some grow, others may be in the opposite phase of cyclical dynamics. However, in the 20<sup>th</sup> century it is

<sup>1</sup> Maddison A. The World Economy Historical Statistics. Paris: OECD, 2003. P. 257, 260, 263.

observed a trend to synchronization of cyclical fluctuations: the fall in the period of 1913-1950 years. (two world wars, world economic crisis of 1929-1933); a record growth in 1950-1973; a slowdown in the last quarter of the 20<sup>th</sup> century.

**Growth in population needs.** Another demographic factor prompting to innovations is the growth in population needs. This is evidenced by the fact that, as seen from Table. 2.1, over the millennia, as a rule, the GDP growth outstripped population growth resulting in increased production of GDP per capita (although there are exceptions to this rule - in times of crises in the civilizations of the Chinese, Indian, and Eurasian civilizations). And in the pre-industrial era growth rates of needs, judging by the growth rate of GDP per capita, were low (0.5% yearly average in 1000-1820), then they rose to a record 2.92% in the third quarter of the 20<sup>th</sup> century and decreased in the fourth quarter of the century to 1.41%.

The growth of needs and the average annual GDP growth stand still in the phases of crisis and stagnation of civilizational cycles and reach a maximum level in the phases of the post-crisis recovery and growth.

**The age structure of population.** The third demographic factor that has a significant impact on the economic performance is a change in the age structure of population, and first of all the share of working-age population in its total number. This figure varies by phases of civilizational cycles and is differentiated by countries and civilizations subject to specifics of their demographic and civilizational dynamics. Generally in the world, the share of population aged 15-59 years increased from 57.7% in 1950 to 59.8% in 2000, and in connection with the growing share of elderly population it will decline in 2050 to 57.3 % and the share of population aged 60 and older will increase from 9.9 to 21.8% more than double.

In a growing number of countries in a state of depopulation it will be observed a significant absolute decline in working-age population, the decline of its share in the total number of population leading to an

increased population load on employed in the economy and a growing share of GDP allocated to pensions. This becomes all the more noticeable limitation of economic growth.

**International migration.** The fourth factor in the relationship of demography and economy is the level and dynamics of international migration. The influence of this factor increases with increasing polarization of the demographic dynamics of the world population. In countries and civilizations in a state of depopulation or close to it, it is felt a growing shortage of labor resources.

At the opposite pole there are countries of Africa, Latin America, India and other Asian countries with high population growth rates and excess labor. This creates a fertile ground for a flow of labor from labor-redundant to labor-shortage countries. This trend exacerbates by the polarization of income levels: a part of the population in poor countries tends to rich countries in hope to find a job and to send part of the earnings to their families. In 2005, 114.1 million emigrants were in the high-income countries; the amount of remittances from these countries in 2007 reached 194 billion US dollars<sup>1</sup>.

Consequently, the flows of international migrants and their remittances are one of the factors that significantly affect the economic dynamics, and in the long term the importance of this factor will increase.

### **2.1.2. The Impact of Economy on Demography**

It should be noted however a weighty economic impact on demographic processes.

If the rates of economic growth (GDP) are significantly higher than the rate of population growth, then it opens the possibility of not only a significant increase in income of working but also creates favorable conditions for increasing the birthrate, reducing the mortality, improving the level of nutritional status of families. In 2007, according to the World Bank, the countries with high income were able to spend

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<sup>1</sup> 2009 World Development Indicators. Washington. The World Bank. P. 306.

on consumption of population the main part of 36,340 US dollars average per capita income and low-income countries - of 1,489 US dollars, i.e. 24.4 times less. The average per capita expenditure on health in the first group of countries in 2006 amounted to \$ 4,033 (in the U.S.A - 6,719 U.S. dollars), while in the second - \$ 23, i.e. 125 times less estimated for GDP at PPP - 24.2 times less<sup>1</sup>.

However, the reverse relationship was observed in the rate of natural population increase: in 1990-2007 they were 0.7%, for the first group of countries, and for the second - 2.4% (3.4 times higher); birthrate per thousand people of population was 12 and 33 persons respectively, the mortality rate - 8 and 11. The demographic burden on the working population was, in 2007, in rich countries 48 people per 100 people of working age (including 26 younger and 22 older than working age), in poor countries - 69 people (63 younger and 6 older than working age)<sup>2</sup>. This ratio makes even more difficult the possibilities to accelerate economic growth and to eliminate poverty reduction for lagging, poor countries.

Consequently, the relationship of economic and demographic dynamics is multifaceted and contradictory, but it is beyond doubt.

### **2.1.3. Cyclical Fluctuations of Demographic Dynamics**

Demographic indicators as well as other aspects of society are governed by cyclic-genetic regularities. Super-long civilizational (many century) and long-term (about half a century) cycles can be clearly seen here. However, the demographic dynamics is more stable than an economic one, and there medium-term (decadal) cycles manifest themselves weaker. In return in the demographic dynamics it can be identified approximately 30-year cycles associated with the change of generations of people in active working age. For all types of demographic cycles (except for the change of generations) it can be revealed a tendency to reduce their average length as a manifestation of the law of compression of historical time. However, due to the

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<sup>1</sup> 2009 World Development Indicators. Washington. The World Bank. P. 16. 100.

<sup>2</sup> 2009 World Development Indicators. Washington: The World Bank. P. 42.

increase in life expectancy and the average age of population, especially in the second half of the 20<sup>th</sup> century it is observed the trend of growth of the length of the active work of generations.

In the change of historical eras, the world civilizations and historical super-cycles it is observed long-term demographic crises expressed in a slowdown in growth rates and even decline of population size. It was the case in the change of the ancient civilization by medieval and transition to the second historical super-cycle in the middle of the 1<sup>st</sup> millennium of the common era, to a lesser extent - in the transition from medieval to early industrial and from the latter - to the industrial world civilization. A similar trend is observed at the end of the 20<sup>th</sup> - the first half of the 21<sup>st</sup> century in the transition to the post-industrial world civilization and the third historical supercycle in the dynamics of the global civilization. As shown above in the analysis of Table. 2.1, these demographic trends are one of the prime factors in long-term and super-long-term fluctuations of economic dynamics.

Demographic cycles and crises are more pronounced in the dynamics of local civilizations. In the transitional periods there are observed demographic crises, elements of depopulation caused by wars, epidemics and other external and internal factors, manifest them. In the phases of revival and the rise of civilizational cycle the birthrate increases, the mortality decreases, GDP and household incomes increase. True, the link is ambiguous. For example, in Western and Japanese civilization, in spite of the high income, the birthrate is low; in the African, Muslim, Indian civilizations the picture is reversed. In 1990-2007, the average annual population growth rate, according to the World Bank in the Euro area amounted to 0.4%, in Japan - 0.2%, whereas in sub-Saharan Africa - 2.6%, in India - 1.7% in Middle East and North Africa - 2%; in some countries of the Eurasian and East European civilizations it is observed depopulation.

Cyclical fluctuations in demographic dynamics will also be observed in the future. It can be expected that contrary to the UN

population projections a slowdown of population growth and depopulation will ease by the middle of the 21<sup>st</sup> century, it will be made a transition to a new demographic model, which supports roughly stable level of population with less than now, amplitude of fluctuations by different countries and civilizations. The UN population projections anticipates (medium variant) a slowing down of the natural population growth rate on the Earth from 1.37% in 1995-2000 up to 0.36%, while according to the low variant depopulation will acquired a global nature from 2040-2045. (-0.04%) and in 2045-2050 it will reach -0.17%. The extension of this trend to another hundred years would mean a dramatic aging, degradation and gradual degeneration and ousting of Homo sapiens species from the planet that anticipate some demographers. It seems that humanity, realizing the mortal danger of such prospect will be able to reverse the emerging negative trend and optimize the size and dynamics of population, its age structure.

## **2.2. THE GLOBAL DEMOGRAPHIC CRISIS AND PROSPECTS FOR ITS SURMOUNTING**

### **2.2.1. The Global Demographic Crisis of the 21<sup>st</sup> Century**

A demographic sphere, as well as other spheres of society life develops under the laws of cyclical dynamics: some long-term and super-long-term cycles follow the other; their change is accompanied by crises, reversals in the prevailing trends. These reversals are less noticeable in the change of long-term (Kondratieff) cycles. But the crisis phases of super-long cycles, civilizational shifts acquire a deep, protracted nature, entail radical changes in the lives of generations of people, in the whole structure of society, and the pyramid of civilizations.

It is an exact picture observed in the last quarter of the 20<sup>th</sup> – first quarter of the 21<sup>st</sup> century when all socio-demographic sphere is undergoing profound transformations in the decline phases of

industrial and nascence of the post-industrial world civilization. This is a period of utmost profound and painful transformations of socio-demographic sphere which find expression in the following trends (forms, manifestations of the global socio-demographic crisis):

- transition from a record in the history of humanity growth rates and rejuvenation of the population in almost all local civilizations to the fall of growth rates in the world in general, the growth of depopulation and aging of population in a growing number of countries and civilizations while maintaining the trend of overpopulation in the poorest countries and civilizations;

- increase in migratory flows between countries and civilizations as a modern form of migration of people generating contradictions between and inside civilizations;

- increasing polarization of countries and civilizations by the level and quality of life: higher income, life expectancy and health care, wasteful consumption at one pole under poverty, pauperism, high morbidity and mortality, low level of consumption - on the other. Let us dwell on in more detail these forms of the bipolar global socio-demographic crisis and its consequences.

The idea of population growth rates and its average age gives Table. 2.2 made on the basis of the UN population projections.

In the postwar period it is observed a demographic explosion which in some measure was a response to population-losses and disasters of the Second World War but also a concurrent consequence of the general improvement in living standards and hope that the era of wars is completed, the new generation will have a more prosperous life. The peak was reached in 1965-1970. When the world population growth rate reached 2.04%, and in the Latin American civilization and most of the civilizations of the East (except Japan and India) it exceeded this level.

Concurrently the average life expectancy in the world (10 years per decade) grew at high rates, and a decline in the average age of the population was observed for all civilizations.

The turning point of the trajectory of population dynamics began

in the 70s of the 20<sup>th</sup> century. The growth rates of population fell rapidly in the world and in all civilizations, and under the UN medium variant of projections they will reach 0.38% by the mid-century - below the level of 1500-1820 (0,40%). By the beginning of the 20<sup>th</sup> century a new trend emerged - depopulation, declining in population, which by the middle of the 21<sup>st</sup> century will cover the civilization of Europe, Japanese, Chinese civilizations, and by the end of the century, if current demographic trends persist, it will become global; the process of depopulation turned into a global epidemic, will lead to a drop in population to the level of the beginning of the 21<sup>st</sup> century - 6 billion people - by the middle of the 22<sup>nd</sup> century. Population growth rates of African (from 2.88 to 1.32%), Indian (from 2.28 to 0.32%), Latin American (from 2.57 to 0.22%), Buddhist and Muslim civilizations will sharply reduce for the first half of the 21<sup>st</sup> century.

**Tab. 2.2. Dynamics of growth rates of population, average life expectancy and average age of population**

(a - average annual population growth rates, %; b - average anticipated life expectancy, years; c - average age in the last year of the period, years; UN projections - medium variant)<sup>1</sup>

		1950-1955	1965-1970	1973-1980	2000-2005	2020-2025	2045-2050
<b>World</b>	a	1.81	2.04	1.73	1.21	0.85	0.38
	b	4.65	5.62	59.6	65.4	70.0	75.1
	c	2.35	2.22	23.1	26.8	32.8	37.8
<b>Civilizations of Europe</b>							
<b><i>Western European</i></b>							
Western Europe	a	0.66	0.70	0.15	0.25	0.04	-0.15
	b	67.6	71.3	73.1	78.9	81.5	84.1
	c	33.6	33.2	34.5	40.7	49.4	46.6
Southern Europe	a	0.83	0.68	0.80	0.45	-0.17	-0.40
	b	63.3	70.1	73.0	78.4	80.9	83.7
	c	27.6	31.0	31.9	38.9	41.9	43.7
Northern Europe	a	0.40	0.56	0.20	0.34	0.31	0.11
	b	69.2	71.8	79.1	77.9	80.7	84.5
	c	33.8	33.2	34.1	38.9	41.9	43.7
<b><i>Eastern European and Eurasian</i></b>							
Eastern Europe	a	1.48	0.70	0.64	-0.49	-0.62	-0.76
	b	64.5	69.9	69.5	67.9	71.1	75.4
	c	26.4	30.8	31.6	37.5	43.0	47.2
Including Russia	a	1.63	0.57	0.65	-0.46	-0.59	-0.59
	b	64.9	70.1	69.0	65.4	68.2	72.9
	c	26.5	30.6	31.3	37.9	41.7	43.5

<sup>1</sup> World Population Prospects. The 2006 Revision. Vol. 1. New York. U.N., 2007.

Continuation table 2.2.

		1950 - 1955	1965- 1970	1973- 1980	2000- 2005	2020 2025	2045- 2050
Kazakhstan	a	3.52	1.92	1.08	0.28	-0.15	-0.69
	b	55.1	61.5	64.2	63.2	68.0	72.5
	c	23.3	21.8	23.5	29.4	36.5	42.1
<b>Civilizations of America and Oceania</b>							
Northern American	a	1.71	1.10	0.97	0.97	0.68	0.38
	b	68.8	70.5	73.3	77.6	79.9	82.7
	c	29.9	27.9	30.0	36.3	38.8	41.5
<b>Latin American</b>							
Latin America and the Caribbean	a	2.65	2.57	2.33	1.42	0.87	0.22
	b	51.4	58.8	63.0	71.5	76.0	79.5
	c	19.8	18.9	20.0	25.9	32.3	39.9
<b>Oceanic</b>							
Oceania	a	2.15	1.98	1.48	1.32	0.95	0.45
	b	60.4	64.5	67.4	74.0	77.9	81.2
	c	27.8	25.3	26.8	32.3	36.4	40.5
Philippines	a	2.99	2.93	2.70	1.84	1.10	0.37
	b	47.8	56.4	60.1	70.5	74.9	78.6
	c	17.5	17.4	18.1	22.2	28.8	37.9
<b>Civilizations of Asia and Africa</b>							
<b>Japanese</b>							
Japan	a	1.43	1.07	0.93	0.17	-0.36	-0.49
	b	63.9	71.1	75.5	81.9	86.0	88.3
	c	23.6	29.0	32.6	44.4	51.3	52.3
China	a	1.87	2.61	1.49	0.65	0.24	-0.35
	b	10.8	59.6	65.3	71.5	74.4	78.7
	c	22.5	19.7	22.1	32.6	39.5	44.8
<b>Indian</b>							
India	a	2.00	2.28	2.08	1.55	0.93	0.32
	b	38.7	48.0	52.9	63.1	71.0	75.9
	c	20.5	19.9	20.6	24.3	30.4	38.7
<b>Buddhist</b>							
Republic of Korea	a	2.55	2.25	1.55	0.41	0.03	-0.65
	b	17.5	57.6	64.8	76.8	81.1	84.4
	c	19.8	19.0	19.0	38.0	47.8	53.9

Continuation table 2.2.

		<b>1950-1955</b>	<b>1965-1970</b>	<b>1973-1980</b>	<b>2000-2005</b>	<b>2020-2025</b>	<b>2045-2050</b>
Vietnam	a	1.87	2.49	1.99	1.37	0.87	0.18
	b	40.4	45.4	55.8	70.4	75.3	78.9
	c	23.7	19.3	18.6	23.1	33.4	41.3
<b>Muslim</b>							
North Africa	a	2.30	2.51	2.67	1.79	1.20	0.53
	b	42.9	49.0	54.2	67.1	72.0	76.8
	c	19.0	17.6	18.2	23.0	28.9	36.1
Pakistan	a	2.15	2.59	2.99	2.04	1.60	0.84
	b	43.4	49.8	54.0	62.9	69.5	75.4
	c	20.7	18.7	18.5	21.5	29.7	33.3
Indonesia	a	1.67	2.37	2.21	1.26	0.61	0.06
	b	37.5	46.0	52.7	68.5	72.0	76.9
	c	20.2	19.0	19.6	26.5	33.6	40.5
<b>African</b>							
sub-Saharan Africa	a	2.18	2.65	2.88	2.28	1.93	1.32
	b	37.4	43.4	47.2	45.9	53.1	63.6
	c	18.6	17.6	17.2	18.0	20.3	26.0

From the position of environmentalists such trend may be welcomed because it means a significant reduction in population load on the environment. But in reality, depopulation threatens degradation and degeneration of the human race *Homo sapiens* species. A further increase in the average life expectancy and reduction of birthrate will lead to an increase in the rate of population aging. The average age of people in the world (medium variant UN projection) will increase from 22.2 years in 1970 to 37.8, in 2050 - by 70%, in Japan it will reach 52.3 years, Southern Europe - 50.1 years, Eastern Europe - 47.2 years. At the same time, this means a fall in the proportion of the population in innovation-active age and a significant increase in the number of pensioners in proportion to the number of working that already leads to a conflict of generations in some European countries.

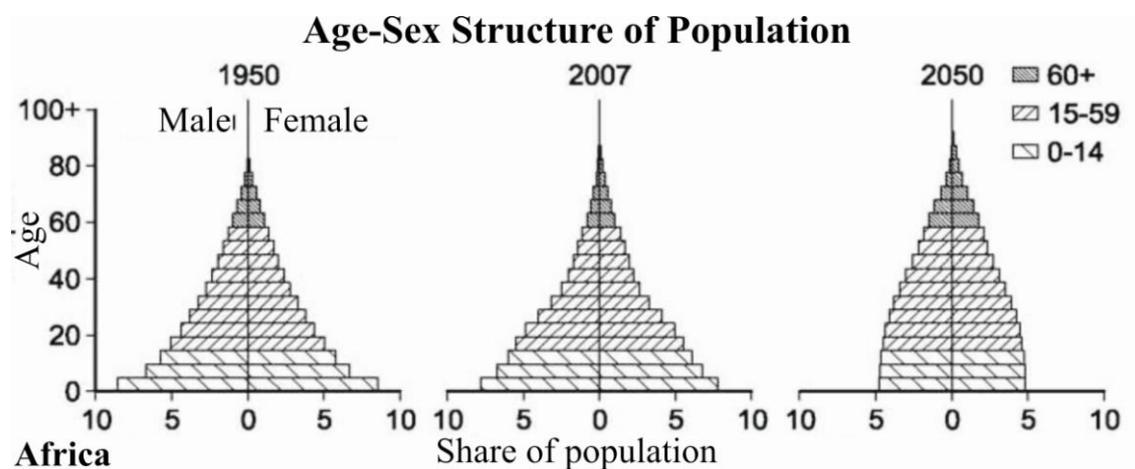
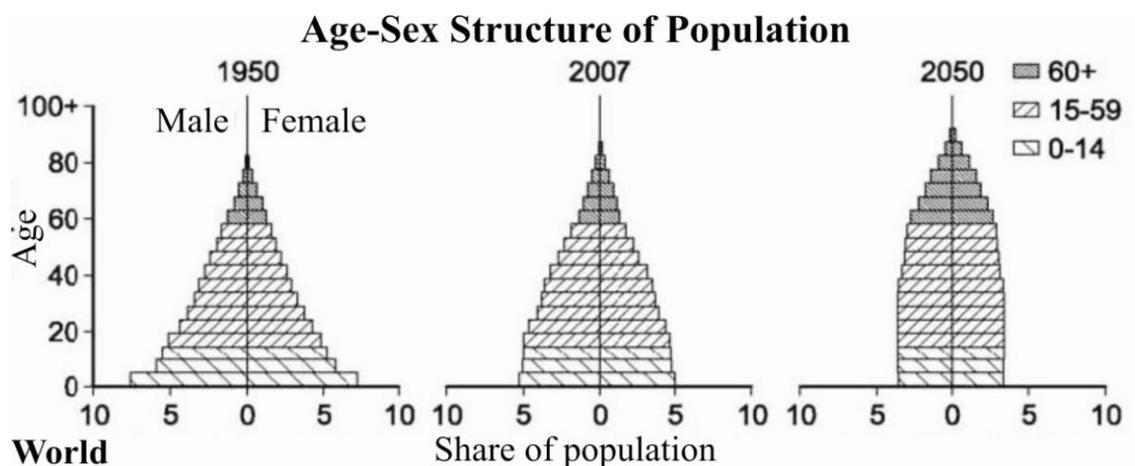
In the increasing number of countries and civilizations the signs of an impending demographic crisis are growing, not less dangerous in its consequences than the threat of a global environmental catastrophe that is the focus of world public and policy.

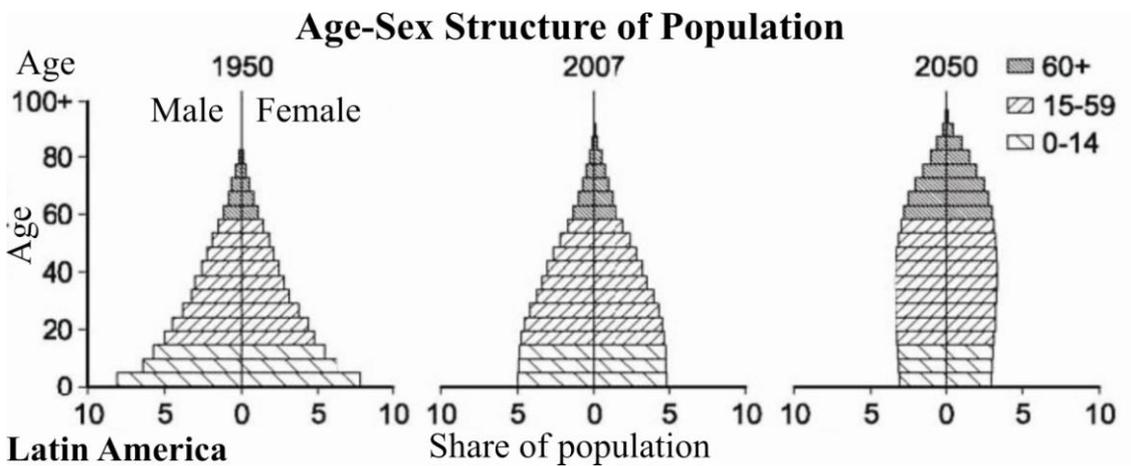
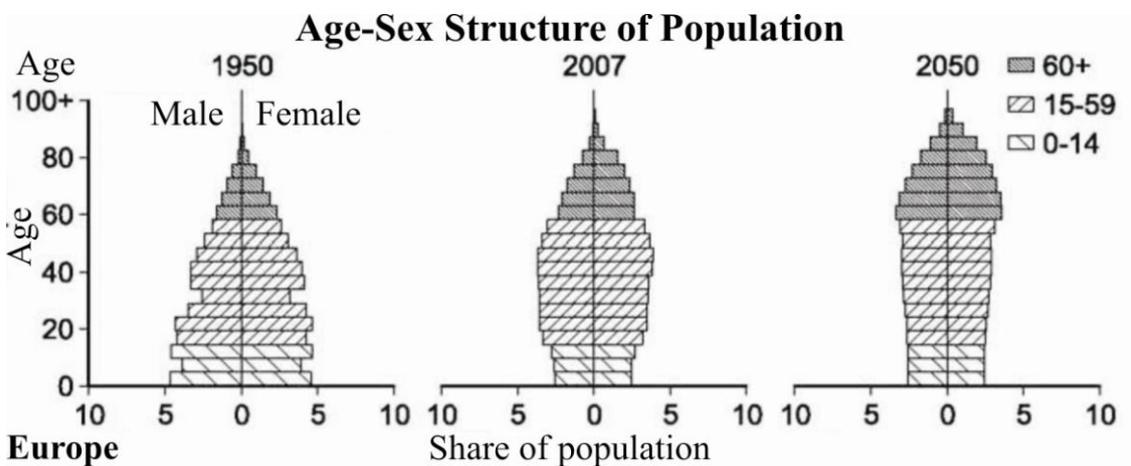
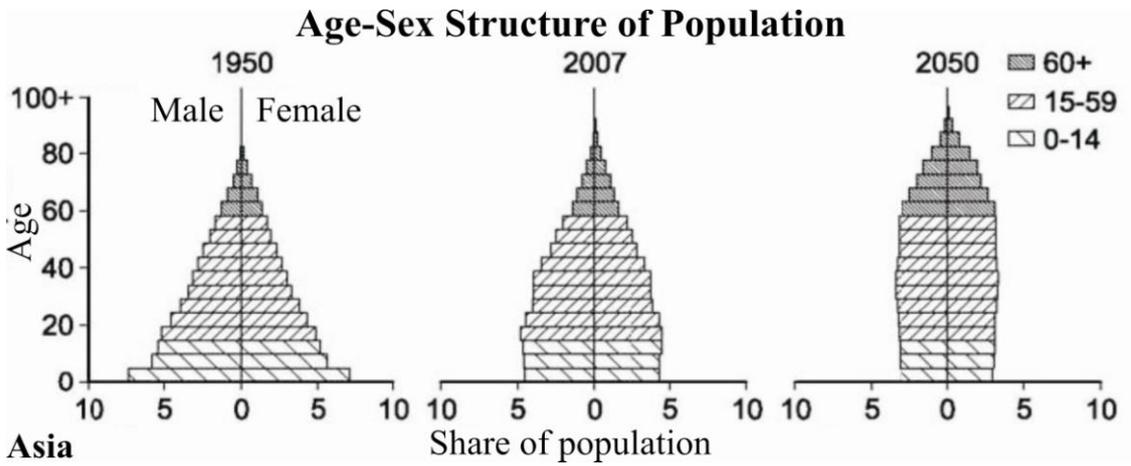
**Depopulation in the 21<sup>st</sup> century becomes a global critical**

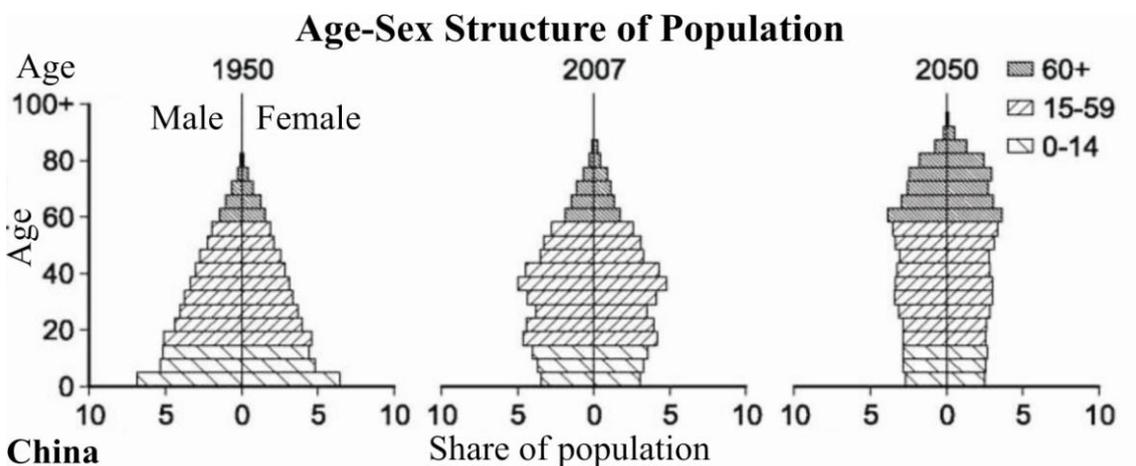
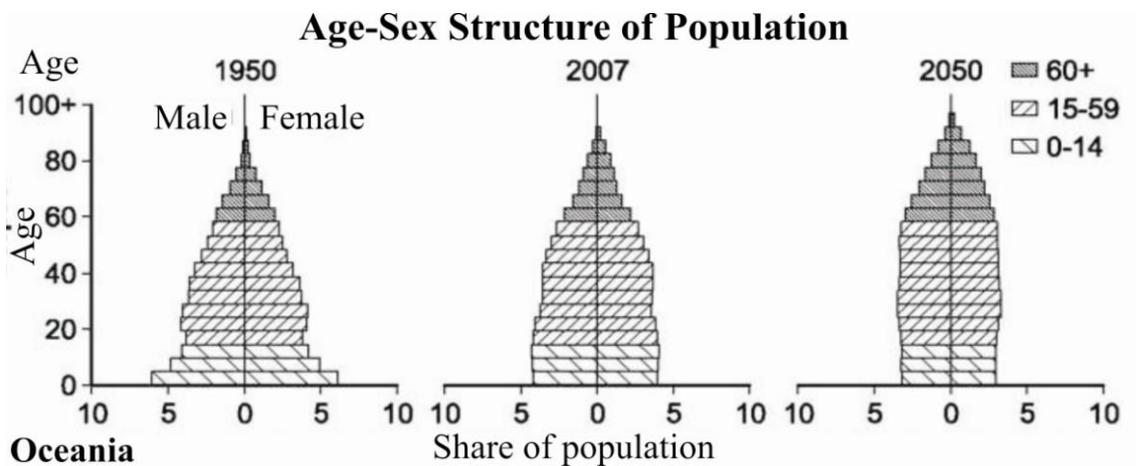
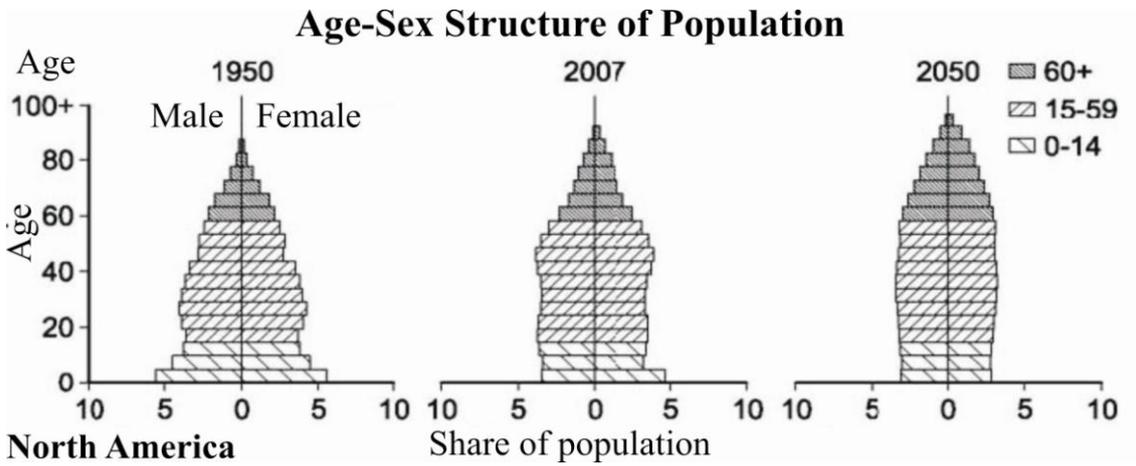
**situation** that will have to be aware of and resolved by the generation of 20s of the new century (the period of the active part of the life cycle - 2010-2040s).

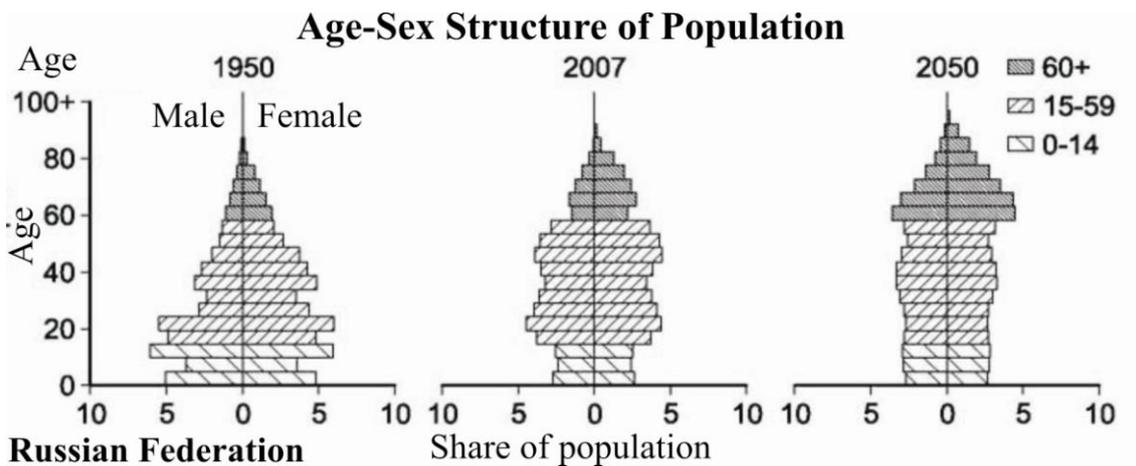
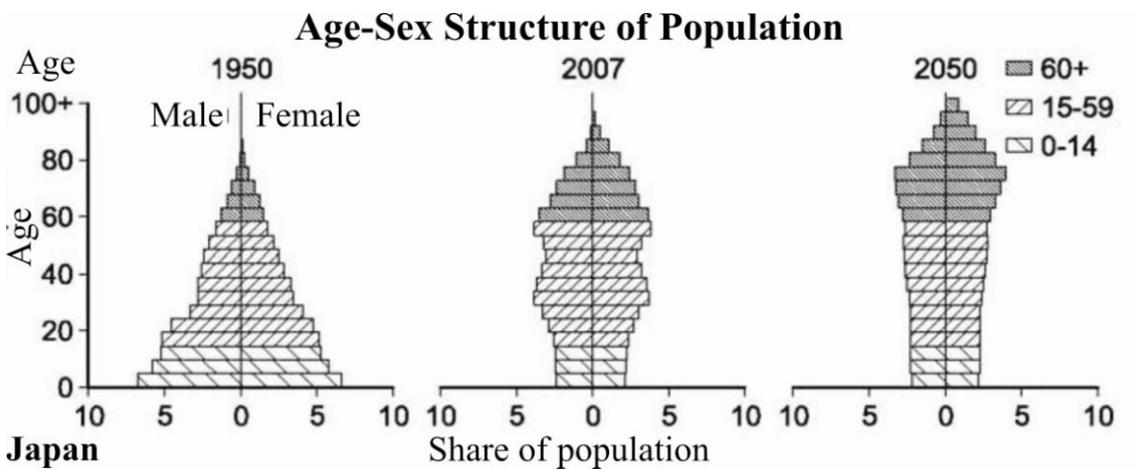
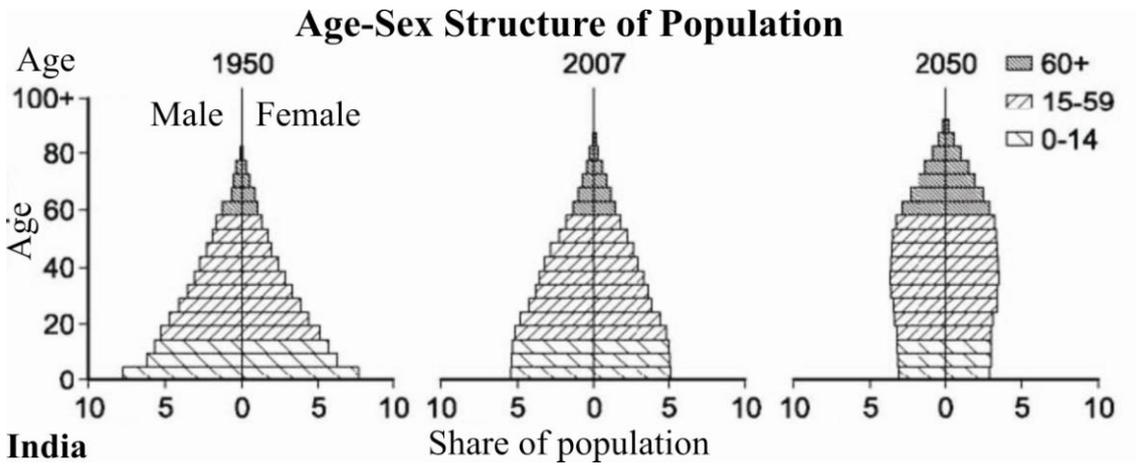
What are the implications of the demographic crisis?

The process of aging of the population that has gripped the whole world, the vast majority of countries and civilizations. A share of population under 15 y.o. falls; a share of working-age population decreases; a share of population aged 60 years or older increases, and at the same time - the demographic load on the employed population. A known "population pyramid" in an increasing number of countries and civilizations takes the form of a "population column", and then a "baby mushroom" when senior old groups prevail in the population structure (Fig. 2.1).









**Fig. 2.1. Age-Sex Structure of Population in other countries and civilizations**

In general for the world, and especially for developed countries,

the transformation of "population pyramid" into the "population column" will complete by 2050. Only in the least developed countries the signs of "pyramid" still persist but with a noticeably compressed base. Most clearly a "pyramid" persists in Africa, where the crisis of overpopulation rages. The signs of "population mushroom" most vividly manifest themselves in a larger part of the Eurasian civilization, as well as Japanese, Chinese and Western European civilizations.

The relation of generations changes. A proportion of elderly in the population grows that becomes a hindrance to the innovative transformations in conditions of an increasing rate of changes (the law of the compression of historical time). At the same time a share of generation in the innovative active age decreases significantly in most countries and civilizations. This becomes one of the major contradictions of the era. The population on the planet is aging: its average age from 1965-1970 to 2045-2050 will increase from 22.2 to 37.8 years - up to 70% for 80 years; if such aging rate persists, the average age of the population on the Earth will reach 64 years over the same period, i.e. surpass the current retirement age. This will be the planet of the old - with a sharp reduction of the share of economically active population maintaining them. It is obvious that this trend will have to be broken, and to find, on the one hand, the possibility of overcoming the depopulation and reducing in the aging rates of population and, on the other - to use the reserves of active longevity, decent standard and level of life for the elderly population. The concept of "old age" will be gradually moving away in time.

### **2.2.2. The Increase in Migration Flows**

The uneven population dynamics and inequality of economic conditions give rise to a growing labor shortage in some civilizations with excess labor with others and become a source of strengthening *international migration* - both between and inside civilizations. The figures of Table 2.3 show the extent and trends of this phenomenon.

From the figures of Table 2.3. we can draw the following conclusions about the trends of international migration.

**First**, the flows of international migrants in the late 20<sup>th</sup> – early 21<sup>st</sup> century increase, and the number of accumulated migrants - from 154.7 million people in 1990 to 190.2 million in 2005, or 3% of world population – increases on average in the world. With account of illegal migrants these figures would be much more impressive.

**Second**, the causes of migration are primarily economic in nature.

With the help of migration the gap between rich and poor nations and civilizations is somewhat reduced. The volume of monetary remittance of migrants grew from 68.6 bln. US dollars in 1990 to 262.5 bln. in 2005 in the world (3.8 times – 9.4% of the average growth) where the volume of payments received by countries with low-income is 48.2 bln. US dollars, medium income – 144.7 bln., and the volume of payments for countries with high-income – 140.5 bln. US dollars.

**Tab. 2.3. Tendencies of international migration dynamics<sup>1</sup>**

	Net migration, thous. People			Accumulated migration, thous. People			Share of population, %
	1990-1995	2000-2005	Growth, %	1990	2005	Growth, %	
<b>World</b>				154 688	190 206	123	3,0
Low-income countries	-3280	-4000	122	31 745	27 120	85	1,2
Medium-income countries	-9673	-11 987	124	51 290	50 804	99	1,7
High-income countries	12 929	15 970	124	71 653	11 2282	157	11,1

**Third**, while in low-and medium-income countries the accumulated migration decreases and amounts to a minor share of population (1.2 and 1.7% of population respectively), then in high-income countries the accumulated migration has grown over 15 years by 57% (3 % if the average annual growth) and reached 11.1% of the

<sup>1</sup> World Development Indicators, 2008; Washington: The World Bank, 2008.

population size (in the Eurozone - 9.7%, USA - 13.8% Canada - 19.1%). This means that the developed countries can no longer ensure the reproduction and satisfaction of needs of its population in goods and especially in services without an influx of migrants.

**Fourth**, the intensified migration leads to the emergence and expansion of the enclaves of other civilizations in countries with high rates of immigration, to the rise of conflicts between civilizations within these countries (which is particularly strong felt in the Western European civilization), to the emergence and strengthening of xenophobic moods and support of nationalist parties. This has manifested itself vividly in countries with high levels of immigration (France, Germany, Belgium, and the Netherlands).

The lowest level of the accumulated migration is in the civilizations of the East - in China (0.05% of the population), India (0.5%), Japan (1.6%) in the Latin American Civilization (1%); it is the highest - in the north American civilization (13.4% of the population), the oceanic civilization (Australia - 20.5%). And also in Russia (8.5%), Ukraine (14.5%), Kazakhstan (16.7%). In the future, with increasing numbers of migrants contradictions between civilizations within countries can grow and lead to military clashes, as happened in Kosovo. With the economic crisis of 2008 the immigrants primarily lost their jobs.

***What are the prospects for migration development?*** The UN population projections assume that the influx of (net) migrants in the countries with high income will drop from 2.3 million people in 2005-2010 to 2.2 million in 2010-2015 and will remain at that level until the middle of the century; a stable outflow of immigrants will continue for the less developed countries and it will grow for the least developed from 46 to 223 thousand people in 2010-2015 up to 270 thousand people in 2015-2020 respectively and it will then stabilize at this level until mid-century.

It is difficult to accept these projections. Already in 2000-2005, according to the World Bank, the net migration to the high-income countries reached 16 million people and has a tendency to increase.

We can expect that in the long run, especially under the inertia-based scenario and continuing gap in economic development levels and trends of population dynamics, this flow will increase, and the related conflicts will intensify. To stabilize the process, for the implementation of the innovation-breakthrough scenario it will be required radical innovations in both national and global socio-demographic and migration policy. This strategy should facilitate both the reduction of migration flows based on the mitigation of reasons for migration (to reduce the gap in levels of economic development, population growth rates or depopulation by countries and civilizations), and the improvement of the adaptation of immigrants to the conditions of the country and civilization where they arrived and better integration of civilizational diversity in the national policy.

The increase in international migratory flows is one of the manifestations of a sociodemographic crisis, and has two main reasons: polarization of the population growth rates under which in some civilizations and countries the excess of the working-age population grows, while in others – deficit; the polarization of levels of life pushing people in poor countries and civilizations under the pressure of hunger and poverty to rush to rich countries for earning money and for a decent life for themselves and their families. As a result, a mixture of civilizational composition of the population occurs in the host countries and contradictions increase.

Overcoming the global socio-demographic crisis also appears twofold: on the one hand, the convergence of population dynamics rates in different countries and civilizations, overcoming, or at least easing the depopulation and overpopulation; on the other - the convergence of living standards and quality around the globe in order to weaken the inducements for moving to other civilizations. The mobility of population will still persist but it will get a more moderate and organized, less painful and controversial nature.

### **2.2.3. Polarization in the Level and Life Quality of Population**

The third manifestation of the global socio-demographic crisis is

the growing polarization in income levels and quality of life of people of different countries and civilizations.

In 2007, according to the World Bank figures, the gap in levels of per capita income between high-income countries (1,056 million people) and low-income countries (1,296 million people) amounted to 65.5 times at the current exchange rate and 24.4 times in terms of purchasing power of currencies.

This indicates the two forms of manifestations of the global socio-demographic crisis in the level and quality of life of population. At one pole – *crisis of overconsumption* in the "golden billion" countries manifesting in the excessive consumption of food and energy by a significant part of population, providing families with housing and personal vehicles, inflated costs for commercialized health care and social services. At the other – *crisis of underconsumption* in the poorest countries with a population of about 2.5 billion people, hunger and poverty of hundreds of millions of people, a lack of decent housing and utilities, vegetation, and a joyless future for the children.

Overcoming this manifestation of the socio-demographic crisis should be based on a differentiated strategy in the field of consumption, level and quality of life, development, promotion and dissemination of the rational consumption model and reduction of the excessive gap in the level and quality of life between countries and civilizations. On the one hand, it will be required to spread a more rational and economical consumption model in wealthy countries and civilizations, reduction of luxury and the unnecessaries imposed by advertising profitable to monopolies of demand for extra housing and excessive rise in prices for health services. On the other – to establish decent living conditions for more than a third of the population in poor countries through a partnership of civilizations in order to overcome hunger and poverty on the planet. An important role is to play by the United Nations and international organizations, NGOs, media, science, culture and religion encouraging healthy and economical criteria of life style and its spread across all countries and civilizations, all social strata.

## **2.3. PROSPECTS FOR SURMOUNTING THE GLOBAL SOCIO-DEMOGRAPHIC CRISIS**

### **2.3.1. Transition to a New Model of Demographic Dynamics**

The demographic sphere is the most sensitive sphere of human activity in terms of state interference and society. The decision about how much and when to have children is taken by a family at its discretion. Rough methods of interference in the form of an external determination of the number of children in the family, forced sterilization and the like, as experience shows, give no results or bear negative fruit. But the state and society have the opportunity to influence the demographic processes using the material support to mothers and children, improving health care, benefits for large families, moral and religious norms and rules of conduct, the media, etc.

Negative trends in the demographic dynamics - both depopulation and overpopulation - are a danger to the fates of nations, peoples, civilizations, and future generations. Therefore, state and interstate associations, including the United Nations, are obliged not only to develop population projections but also to take measures to overcome the identified negative trends and threats - not less dangerous than the environmental threats, and associated with them.

Projections for the period until 2050 which are developed by the UN Population Division periodically (every two to three years) and updated, show the possible prospects of demographic dynamics in the world, for more developed and less developed countries, continents: Africa (5 regions, 54 countries), Asia (4 regions, 50 countries), Europe (4 regions, 40 countries), Latin America and the Caribbean (4 regions, 36 countries), North America (2 countries), Oceania (4 regions, 12 countries) - totally 194 countries. The summary figures of the projection variants are given in Table. 2.4.

Under the medium variant projection in the first half of the 21<sup>st</sup> century the world population will grow 1.5 times but the growth rate will decline from 1.37 to 0.36% - almost four times due to a significant

drop in fertility; the average age of earth inhabitants will increase from 26.7 to 33.4 years.

**Table 2.4. Variants of the UN population projections for 2050** (growth rates of the previous five years; projection variants: 1 - medium 2 - high, 3 - low)<sup>1</sup>

Indicators	Projection Variant	2000	2010	2020	2030	2040	2050
Population size, mln. people	1	6.24	6,907	7,667	8,318	8,824	9,191
	2		8,967	7,966	8,913	9,829	10,756
	3		8,844	8,914	7,364	7,727	7,792
people rates of population, %	1	1.37	1.17	1.00	0.75	0.54	0.38
	2		1.34	1.32	1.07	0.96	0.87
	3		0.99	0.65	0.42	0.11	-0.17
Fertility, %	1	2.80	2.55	2.37	2.21	2.10	2.02
	2		2.50	2.87	2.71	2.59	2.51
	3		2.30	1.87	1.71	1.61	1.54
Average age of population, years	1	26.7	29.2	31.5	34.0	36.3	38.1
	2		28.9	30.3	31.8	32.7	33.4
	3		29.5	32.7	36.3	39.9	43.3
Share of population in the age of 60 and over, %	1	9.9	11.1	13.5	16.6	19.1	21.8
	2		11.0	13.0	15.4	17.2	18.6
	3						

Experts do not exclude a worst-case scenario under which from the 2040s it will begin an absolute decline in the population size of the planet, it will increase for the half century by 27% and the average age will reach 43.3 years. If this tendency extends to the half-century more, then by 2100 the average age will be 70 years: it will be planet of the old who are little capable of radical innovations. This is the beginning of the demographic catastrophe, the beginning of the extinction of the human race.

The optimistic, high variant will be a rescue for the humanity. Although it will continue the decline in population growth rates, however, this process will be slower, especially in the second quarter of the century. A trend to the convergence of the rates of population

<sup>1</sup> World Population Prospects. The 2006 Revision. Vol. 1. N.Y.: UN, 2007. P. 42-43.

dynamics in different countries and civilizations will manifest itself.

We can expect that in the first quarter of the 21<sup>st</sup> century under the persistence of a cluster of current global crises, the actual dynamics of demographic processes will be close to the UN medium variant projection. But in the second quarter of the century, if a partnership strategy of civilizations aimed at the innovation-breakthrough scenario is taken and implemented, the actual dynamics will be closer to the optimistic, UN high projection variant. The global demographic crisis will be overcome gradually, depopulations will ease in some countries and civilizations and overpopulations - in others, and by the end of the century the world population will stabilize somewhere on the level of 7-8 billion people. The planet may well ensure a prosperous existence of such a mass of people in the implementation of the noospheric idea of harmonious co-evolution of society and nature.

### **2.3.2. A Socio-Demographic Partnership Strategy of Civilizations**

Overcoming the global socio-demographic crisis depends on how soon the global civil society, its active leading part will become aware of the dangers of negative demographic trends prevailed at the end of the 20<sup>th</sup> century, will be able to develop an effective long-term socio-demographic strategy based on partnership of civilizations.

The major points of this strategy are formulated in Part 4 of the Global Forecast "The Future of Civilizations" for 2050 - "Socio-demographic Dynamics of Civilizations" and are as follows:

1. In response to the new demographic challenges and threats it should be developed and consistently implemented on the basis of dialogue and partnership of civilizations an active global population strategy differentiated by three groups of countries and civilizations:

- At a moderate stable population growth - maintaining a stable population dynamics;
- At the development of depopulation - its overcoming or mitigation through the support of birthrates and mortality reduction;

- At high rates of population growth, the manifestations of overpopulation - encouraging a birth rate reduction under the persisting growth trends in the average life expectancy. The long-term population strategy is necessary to develop in each country. Its implementation should not allow violence and coercion, and must rely on explanation and persuasion, incentives under support of the state and civil society of favorable demographic trends.

2. The increase in the average life expectancy under the UN medium projection variant from 65.2 years in 1995-2000 to 75.4 years in 2045-2050 and a share of population aged 60 years and over (from 9.9 to 21.8%) requires the elaboration of a global gerontological strategy differentiated by civilizations and countries. It should be built on the principles and mechanisms to ensure a decent and active aging, moderate involvement in productive work, guaranteed pension benefits, and partnership of generations, combining efforts of families, business and government in solving these issues.

3. Due to the higher average life expectancy of women compared to men (the gap will increase from 2.9 years in 1950-1955 to 4.4 years in 1995-2000 and under the UN medium projection variant it will grow up to 4.7 years by 2045-2050), more involvement of women in the household and part-time farm, their smaller involvement in social production and lower wages, lagging in raising the level of education, especially in the civilizations of the East and Africa, the problems of gender inequality arise the solution of which needs the development of gender strategy differentiated by civilizations adjusted for their specifics as an integral part of the global sociodemographic strategy. The gender strategy should be closely linked to demographic and social strategy providing on the one hand, the overcoming of inequalities and lagging in education, a wider participation of women in production and socio-political life; on the other - giving them the opportunity to be engaged in housework and child-rearing, taking into account the labor spent for it as a part of GDP as a productive labor.

4. In the global economy international migration increases that becomes a modern form of movement of peoples.

The international migration in the first quarter of the 21<sup>st</sup> century will be increasing (although the crisis of 2008-2009 caused its temporary reduction). It causes serious contradictions between civilizations. Most migrants (especially from poor countries) are low-skilled, poorly adapt to living and working conditions alien to them, are subject to exploitation and discrimination. In the host countries the enclaves of other civilizations emerge, sometimes conflicts between civilizations occur. It is necessary the formulation and consistent implementation, based on a partnership of civilizations, of the global migration strategy based on the global balance of labor resources to be developed by the UN or the International Labor Organization. It's basic outlines:

- Weakening of the root causes of migration - to establish conditions for highly productive work and rising of income in countries with abundant labor resources, while reducing the labor shortage in the recipient countries;

- Pursuance of a more regulated and orderly international migration, taking into account the real needs and shifts in the employment patterns;

- Organization of training of migrants to improve their professional skills and adapt to new conditions of work and life, a new system of civilizational values;

- Overcoming discrimination and real protection of the rights and dignity of migrants according to their civilizational features;

- Development of a system of normative acts of international migration law corresponding to the features of the modern age;

- Vesting in one of the international organizations (probably the International Labor Organization) in conjunction with the United Nations Department of Economic and Social Affairs and other academic and social society organizations of monitoring and making projections for the dynamics of migrant flows, control over the implementation of international norms of migration law.

5. Demographic dynamics and quality of life are reflected in the

indicators of infant and maternal mortality, morbidity and level of health care costs. These figures are sharply differentiated across countries and civilizations. With an average level of maternal mortality of 400 per 100 thousand newborns in high-income countries in 2005, it is 8 (in the Eurozone - 5), in low-income countries - 654 cases per 100 thousand newborns (including Sub-Saharan Africa - 900, in Niger - 1800).

With an average incidence of AIDS 1% of the population in high income countries - 0.4% (in the Eurozone - 0.3%) in low-income countries - 1.7 in the African civilization - 5.8, in the South African Republic - 18.8, in Swaziland - 33.4%. Tuberculosis patients per 100 thousand people on average in the world (2006) 139, in high-income countries - 16 (in the Eurozone - 13) in lowincome countries - 221 in sub-Saharan Africa - 368 (in Swaziland - 1,156, in the South African Republic - 940). Per capita health expenditure in 2006 amounted in the world to \$ 727 US dollar in high-income countries - 4,032 (USA - 6,719), in low-income countries - 23, in sub-Saharan Africa - 53, in South Asia - 26, in Ethiopia - 7, in Myanmar - 3 US dollars.

It is evident that the low-income countries alone cannot solve this problem. It is needed the global strategy for improving health of population and overcoming dangerous epidemics and diseases enjoying support by developed countries and civilizations prepared by the World Health Organization. This is one of the Millennium Development Goals proclaimed by the United Nations. It is likely be needed to create a global health facility (similar to the Global Environment Facility) to support specific projects in this area.

6. Public health and ability to work are largely determined by the level and quantity of food, availability and affordability of food, surmounting hunger which affects tens of millions of people in low-income countries.

One of the reason for this trend is the reduction of the share of agriculture in the world GDP from 5% in 1990 to 3% in 2006, including in high-income countries from 3 to 2% (in the USA and the UK - from 2 to 1%), in low-income countries - from 29 to 20%, in sub-Saharan

Africa - from 18 to 15%. Concurrently, the share of food in world commodity exports fell from 10 to 6%. This is due to an underestimation of the agricultural sector and a faster growth of services (from 60 to 69% in the GDP structure) in the predominance of the neo-liberal model of globalization.

The world food crisis had a sobering effect on the political and business elite, and demanded radical measures to tackle the crisis. This issue was discussed at the summit, organized by FAO in Rome and at the summit of the Group of Eight in Japan, on the island of Hokkaido. However, the planned measures are mainly short term in nature and do not solve the underlying problems of the global agricultural crisis. The FAO long-term forecast has shown the need to increase food production in the world by 2050 by 70% that is fairly difficult. It will be required the development of the global food strategy designed for the long term and ensuring overcoming hunger in the world. The proposals for the establishment of the global food facility for financing projects in this area, especially in Africa and some Asian countries are validated. It is necessary to use the mechanisms and institutions of partnership of civilizations to deal with this emerging issue, to ensure a faster growth of food production over a population growth and more equitable distribution of food resources between countries and civilizations.

7. The evidence of the imperfection and decline of the industrial socio-economic system is an extremely increased gap between rich and poor civilizations, countries and social strata which has reached an extreme polarization of incomes. If in 1870 the gap in per capita GDP (in 1990 prices) between the U.S. and Africa amounted to 2.5 times, in 1913 – 8.3 times, then by 1950 it increased to 10.7 times, and in 2001 - up 21.7 times. In 2006, the gap between the U.S. and Sub-Saharan Africa amounted to 48.1 times at the current exchange rate. The process of globalization, the dominance of TNCs in the global economy is used as a powerful pump for the transfer of resources from poor to rich countries, increasing global inequities in income distribution.

The financial and economic crisis of 2008-2009 convincingly

demonstrated the ineffectiveness and a lack of prospects of the late-industrial socio-economic system, its impending doom and the need to replace it with another, more equitable integral system overcoming the gap between the wealth and poverty. This applies not only to stratification between countries and civilizations, excessive polarization in levels and quality of life but also to elimination of the excessive gap between the wealth and poverty within national economies. The factor of social justice must be fully taken into account when developing the lines for transforming the world economic and financial system and its institutions.

8. On the basis of a long-term socio-demographic forecast the UN and its bodies, with the participation of scientists, public officials and business representatives it is reasonable to develop a draft global socio-demographic strategy covering all the above problems, to discuss it at the World Summit on Sustainable Development "Rio-20" in 2012 or a specialized summit and to base the activities of the UN and other international organizations on it. This strategy will absorb, develop and expand the horizon of the UN Millennium Development Goals for which the period is limited to 2015 and are already partially inadequate to radically changing society, as well as the goals and interests of nation states and their associations. Only the concentration of efforts by international organizations and intergovernmental organizations, governments, business and political circles, global civil society will allow overcoming (or at least significantly mitigate) very dangerous trends of a socio-demographic crisis and transmit a healthier, more energetic and just society to future generations.

## **CHAPTER 3. NOOSPHERIC TRANSFORMATION OF ECONOMY**

### **3.1. THE ECOLOGICAL IMPERATIVE OF THE 21<sup>ST</sup> CENTURY**

#### **3.1.1. The Turning Point in Relations between Society and Nature**

The involvement in production of natural resources throughout the history of humanity was the prime factor for progress of society, transition from one historical stage to another. The Neolithic revolution allowed development of the fertile lands, taming animals. The transition to the Bronze and Iron Ages was based on the use of metals, and irrigated agriculture in the valleys of great rivers created conditions for the emergence of the first local civilizations. The development of steam power, electricity, and atomic nucleus, liquid and gaseous fuels were a source of progress of productive forces, increasing labor productivity. Although people by their actions often violated the balance in nature and caused environmental damage but it was rather a local phenomenon. The damage caused to the nature could be large (for example, as a result of salinization of irrigated lands or exhaustion of certain natural resources) but in general it could not negatively affect the dynamics of the relationship of human and nature. The natural factor was the engine of progress.

The situation changed in the 21<sup>st</sup> century. On the one hand, the development of natural resources - mineral, land, water, forest - has reached such a level where a further increase in the burden on them leads to the depletion of nonrenewable resources and reducing the opportunities to use them to meet the growing needs of the population on the Earth. On the other hand, environmental pollution has become the cause of adverse climate changes, endangered the balance of relations between human and nature, the possibility of further development of society.

The relations of nature and society have reached a turning point when the natural productive forces and the level of environmental pollution have turned into a development restrainer of productive forces of society. This was noted by Vladimir Vernadsky who validated the idea of the noosphere and highlighted that the human mind and his work become the forces that change the biosphere of the Earth, a kind of a geological force. In the recent millennia an intense growth in the influence of one species of living matter – civilized humanity on the changes of the biosphere, is observed. Under the influence of scientific thought and human labor biosphere changes into a new state - the noosphere. The humanity through a regular movement that lasted a million or two years, with an ever-increasing pace in its manifestation, is seizing the entire planet, setting off, moving away from other living organisms as a new unprecedented geological force. The evolution of the biosphere, its transition to the noosphere clearly shows the acceleration of the pace of geological processes during the (recent) few thousand years due to the growth of scientific thought and social activities of humanity.

In the industrial age the force of impact by a human, his mind and activities on the biosphere has increased many times and has reached a critical level as it was noted by V.I. Vernadsky: "In the 20<sup>th</sup> century, for the first time in the history of the Earth, a human has learned and embraced the whole biosphere, completed a geological map of the Earth, scattered over its entire surface ... Humanity taken as a whole is becoming a powerful geological force, and before it, in front of its thought and labor, a question of realigning of biosphere in the interests of free-thinking humanity as a single whole raises. This new state of the biosphere ... is the noosphere." Noosphere is the last of many states of evolution of the biosphere in the geological history, the state of our times<sup>1</sup>.

Vernadsky's ideas were developed by Nikita Moisseev who in a number of his works, further elaborated the essence of the

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<sup>1</sup> *Vernadsky V.I. A Scientific Thought as a Planetary Phenomenon. M.: Nauka, 1991. P. 20–21, 23.*

environmental threat and formulated an *ecological imperative*.

"Humanity is coming up ... to the edge that separates the current era of the predominantly technogenic civilization from a completely new period in its history. It will be characterized by a new paradigm of civilizations, when the main concern of people will become the overcoming of the coming ecological crisis. This post-industrial society ... will have to find the ways to preserve the species *Homo sapiens* on the Earth. A human will have so much to change his lifestyle that it will not be an exaggeration to call this stage of history a new turn in anthropogenesis ... It is vital that a strategy of civilization to appear, and it must necessarily be linked to Strategy of Nature ... We are faced with not only environmental, but also a civilizational crisis ... To continue its history a human must learn to negotiate not only local but also his own global (planet-wide) activity with the needs of Nature in establishing the rigid framework of own development, his activity, its coordination with the development of the rest of the biosphere. These requirements are so severe that they may be legitimately called the ecological imperative ... With the development of civilization at its certain stage a common goal – to ensure the conditions of the ecological imperative – appears for all humanity "<sup>1</sup>.

These points are developed in the writings of many scientists from different countries and have become the basis for powerful environmental movements, which become a global political force that demonstrated the events surrounding the environmental summit in Copenhagen in December 2009.

With all implacability a human faces a dilemma: either continuing the inertia-based path of natural resource depletion and increasing pollution of the environment, humanity will be approaching step by step to an environmental catastrophe, or it will take the path of the noospheric transformations of economy and technology, harmonious co-evolution of society and nature, which will provide the possibility for development of humanity at the new stage of relations between

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<sup>1</sup> *Moisseev N.N. Parting with Simplicity. M.: Agraf. 1998. P. 281, 282, 288.*

human and nature.

Therefore, the noospheric transformation of economy is now becoming an urgent task that must be addressed in the next few decades, at least until the middle of the 21<sup>st</sup> century as after that the further development by the inertia-based path, and the existence of humanity will be placed in jeopardy.

### **3.1.2. The Global Environmental Crisis and Prospects for Surmounting**

The global environmental crisis becomes a real restrainer of economic development and a growing threat to the existence of humanity in the 21<sup>st</sup> century. It involves almost all kinds of natural resources and all the technological systems based on their use. Threats of this crisis will continue to grow if the resource wasteful economy and society based on predatory use of natural resources and environmental pollution persist.

The face of the global environmental crisis is multifaceted. This is primarily an energy and ecological crisis related to the depletion of the best sources of fossil fuels, which is currently the main source of energy for humanity and the atmospheric pollutant resultant from the combustion of this fuel. This is a food crisis determined by the fact that fertile land is limited, more and more of it is used for residential and industrial construction, it is going a salinization of irrigated lands, the zone of deserts expands. Measures to improve the soil fertility on the basis of chemical fertilizers and cultivation of genetically modified plant varieties are limited and are often associated with negative effects on humans. Under the conditions where for the first half of the 21<sup>st</sup> century the population of the Earth will increase, according to the last variant of the UN demographic projection, 1.5 times and by the mid-century food production should be increased 1.7 times to overcome hunger in the world, a lack of agricultural land fit for this is becoming more evident.

A shortage of fresh water that engulfed a number of densely

populated regions in the world, leads to the fact that the consumption of poor quality water generates negative impacts on human health.

Rapid deforestation of equatorial forests in Africa and in the valley of the Amazon River - "green lungs of the planet" - leads to a deterioration of the carbon balance of the planet. A loss of biodiversity reduces the opportunities for the preservation of all the inherited wealth of flora and fauna of the planet.

All of these terms of the global ecological crisis complementing and deepening each other, become more noticeable trends that call into question the possibility of a continued existence and development of humanity on the Earth.

What are the main ways to overcome the global ecological crisis?

Some environmentalists suggest for the sake of rescue of the human environment to reduce the world population to one billion, that is, in fact, to carry out a collective suicide by the most of the population on the Earth. It is an absolutely unfit option that excludes the existence of humanity. Who will decide who of the currently existing 6.6 billion and by the mid-century - 9 billion people should be sentenced to disappear from the surface of the Earth, and who will enforce the sentence? And who then left on the Earth, if all forces of nations and civilizations are brought into effect to resist such a harsh sentence?

It must be taken into account that the growth of population load on the environment will gradually decline due to the falling rates of natural increase of world population and increasing spread of depopulation: after the humanity achieves the size of 9-10 billion, according to the UN projections, it will be observed a decline and aging of population. This seemingly positive trend for environmentalists at the same time will be accompanied by a loss of innovative creativity of the population, reducing the proportion of the innovation active population and its overall aging, weakening the ability to respond creatively to the challenges that the planet periodically puts before humanity.

It appears that there are the following main lines of response to the ecological challenge, which becomes more pronounced in the 21<sup>st</sup>

century.

**First**, this is rationalization of human needs, transition to a more economical way to consume natural resources. It should be said that in the developed countries, which consume the bulk of natural resources, a significant portion of these resources are used wastefully, predatory, going beyond reasonable limits. There should be exercised restrictions, streamlining the needs, to shift to more economical models of consumption. However, the possibilities for this are limited due to the fact that additional resources are needed to ensure an adequate standard of living and reproduction of population, overcoming hunger and poverty in the poorer and more backward countries. Admittedly, the ruling coteries in these countries evince aspiration in the pursuit of overconsumption and use the excessive amount of natural resources for this.

It is therefore necessary, and this is one of the objectives of reasonable humanity towards the noosphere mode of consumption, to reduce consumption to a reasonable level of not only different countries but also different social strata so that, in general, normal living conditions are ensured for all humanity but without the unnecessaries and predatory use of natural resources.

**Second**, the main source of the noosphere transformation of economy and society is the conversion to energy-efficient, environmentally friendly technologies in all spheres of production. This applies to energy, and metallurgy, and housing and utilities, and households. One of the main directions of scientific and technological progress is the replacement of fossil fuels and other natural resources with alternative fuels and materials based on the development of nanotechnologies, alternative energy and other resource-saving technologies. The possibilities for this are open on the basis of assimilation and dissemination of the sixth technological order. Therefore, in future production and the economy should be an increasingly less labor-consuming and at the same time ensure the necessary balance of resources for reproduction and beautification of the environment.

*Third*, the economic levers and incentives play the crucial role in the transition to the environmentally efficient type of reproduction. Obviously, the predatory use of natural resources is one of the hallmarks of a spontaneous market production and one of the factors of growth of superprofits of monopolies and multinational corporations. Therefore, the systems of economic levers and incentives should be realigned so that, on the one hand, they reflect the real costs, socially necessary for the reproduction of natural resources and the reimbursement of damage caused to the environment. On the other hand, the fees should be introduced which reflect the amount of damage caused to nature and make causing such damage disadvantageous, promote "green consumption". The matter in question is the new, noosphere economy, which should come to replace the current natural resource wasteful economy of the industrial society. With the help of these levers the problem of withdrawing in the public interests of ecological anti-rent – superprofits that entrepreneurs receive from predatory use of natural resources and a failure to perform socially necessary regulations to reduce pollution of the environment

The transition to a noosphere economy is one of the epochal innovations in the 21<sup>st</sup> century determining the nature of the ecological mode of production for centuries of the post-industrial society.

## **3.2. A DIFFICULT CHOICE OF THE ENERGY-ECOLOGICAL STRATEGY**

### **3.2.1. The Ambitions Goals of the Global-Energy Ecological Policy**

At the beginning of the 21<sup>st</sup> century the humanity, its representative bodies and first of all the UN, a tough intractable problem of choosing a long-term energy- ecological strategy has arisen.

It becomes increasingly evident that the movement under the inertia-based scenario is a dangerous path and the deadlock. With the growing rate of energy production and consumption, the main source

of which is fossil fuels, this path has no future through three grounds. First, fossil fuels are not renewable, richer and better located deposits are being exhausted, and after 2-3 decades a trend to a drop in the world oil production will take shape, and then in natural gas. Second, the consumption of fossil fuels is related to rising greenhouse gas emissions and other violations of the natural environment that is becoming one of the factors of adverse climatic changes on the planet. Thirdly, the transition to the worst and remote (including on the Arctic shelf) deposits of fuel, as well as combating greenhouse gas emissions and its reduction require a growing share of labor resources and investments, which becomes a more and more pronounced brake on the path of economic growth and growing of human welfare.

Our researches<sup>1</sup> have showed that the industrial energy-ecological mode of production and consumption based on the growing involvement of fossil fuels in the production and consumption and causing an increasing damage to the environment has largely exhausted its potential. The future is with a fundamentally new, noospheric energy-ecological mode of production and consumption oriented at energy conservation, a large-scale replacement of fuels with alternative (mainly renewable), environmentally friendly energy sources. This is the essence of the global energyecological revolution that will evolve in vanguard countries in the second quarter of the 21<sup>st</sup> century step by step covering the entire planet.

From this viewpoint, it appear justified and reasonable recommendations made at the summits of the Group of Eight in St. Petersburg (2006), Germany (2007), Japan (2008), Italy (2009), on measures to reduce greenhouse gas emissions on a global scale to 50% by the mid-century. The EU has put its strategic goal to reduce it by 20% by 2020. President Barack Obama went even further by advancing the goal of reducing emissions in the U.S. by 2050 by 80%.

However, to set the ambitious goal is easier than to reach it. It

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<sup>1</sup> The Energy-Ecological Future of Civilizations. P. 3 of the Global Forecast "Future of Civilizations" for 2050. M.: MISK, 2008; *Kuzyk B.N., Yakovets Yu.V.* The Global Energy-Ecological Revolution of the 21<sup>st</sup> Century. M.: INES, 2007.

should not be underestimated the complexity of the obstacles on this path to be overcome. The realignment of the whole structure of production, energy supply for both industrial as well as for public and private consumption will require not a ten trillion dollar investments on the Earth scale. But the main obstacle is in the energy-ecological divide between rich and poor countries and civilizations.

### **3.2.2. A New Global Divide**

The World Economic Summit in Copenhagen in December 2009 clearly showed signs of forming a new bipolar architecture of the global world order which is based on not confrontation between the two socio-economic systems and military-political blocs but the energy and ecological and economic divide between the groups of rich countries and civilizations major energy consumers and polluters of the environment and poor nations and civilizations with minimal power consumption and low emissions of greenhouse gases (Table 3.1 and Fig. 3.1). with minimum energy consumption.

At one pole – the pole of wealth and energy-ecological waste - there are 64 countries with a population of 1,056 million people (15.5% of the world population). It consumes 49% of all energy, it is concentrated 45% of CO<sub>2</sub> emissions, 75% of world GNI at the current exchange rate is produced and 59% - at the purchasing power parity of currencies. These are the countries of North American, Western European, Japanese, the main part of the oceanic (Australia, New Zealand) and part of the Muslim (oil exporting countries) civilizations.

At the opposite pole - the pole of poverty and energy poverty - there are 49 countries with a population of 1,296 million people (19.6% of the world population) which consume 5% of the world energy, CO<sub>2</sub> emission is 2.5% of the world, and gross national income (GNI) - is only 1.4% of the world. For each inhabitant of this pole it falls 11.4 times less energy consumption, 18.8 times less carbon dioxide emissions, 65.5 times lower GNI at the current exchange rate and 24.4 times less by PPP. These are mainly African countries, the poorest part of the Muslim, Buddhist and Latin American civilizations.

The group of countries with incomes above the average adjoins the pole of wealth and energy waste – these are 43 countries with a population of 824 million people (12.5% of the world population), consume 16.3% less energy and emitting into the air 15% of CO<sub>2</sub>. It is the Chinese, most of the Eurasian and Latin American civilizations. In this group of countries it is produced 11% of GNI at current exchange rates and 15% in PPP terms.

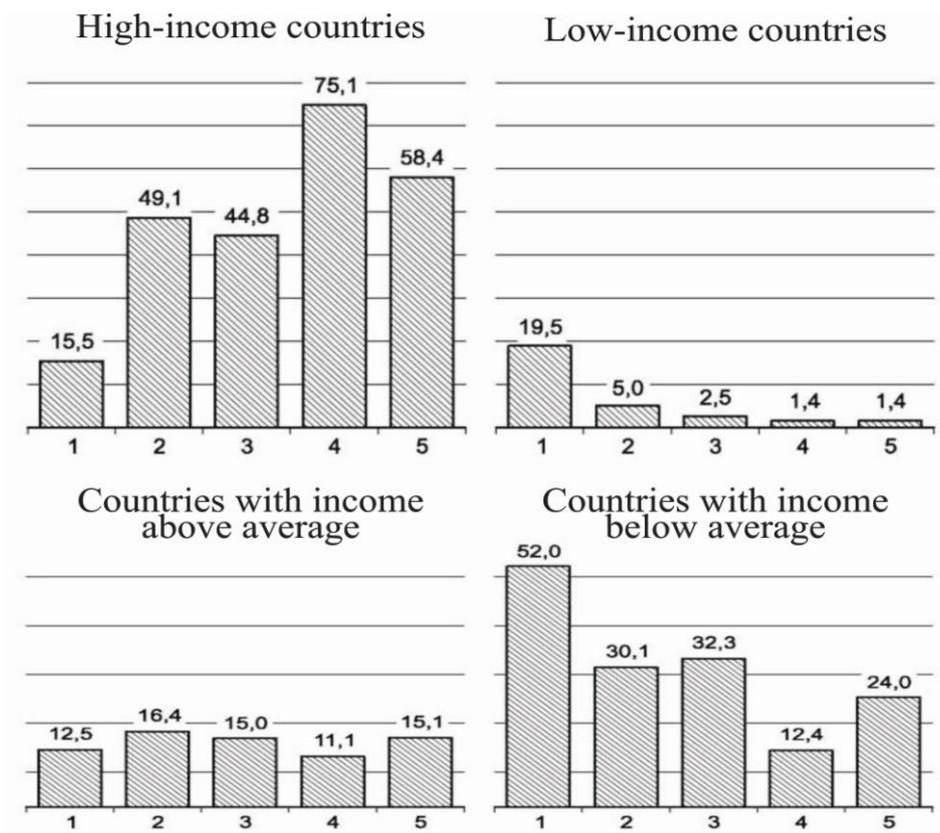
The group of countries with incomes below the average adjoins the opposite pole. These are 54 countries with a population of 3,435 million people (52,6% of world population) consume 30% less energy, emit 32% of pollution, produce 12,4% of GNI at current exchange rates and 24% in PPP terms. These include Chinese, Indian, part of Muslim, Buddhist and Latin American civilizations.

At the poverty pole the net energy exports is 28% of consumption, and the pole of wealth net imports of energy is 18% of consumption. The difference in labor productivity has reached 12.7 times which is largely due to disparities in electric energy consumption between the two poles of 31.3 times.

**Table 3.1. Differentiation of energy-ecological indicators by groups of countries<sup>1</sup>**

Indicators	Years	World	High-income countries	Countries with income above average	Countries with income below average	Low-income countries	Gap between high-income and low-income countries
Population size, mln. people / % of the world	2007	6,610 / 100	1,056 / 15.5	824 / 12.5	3,435 / 52.0	1,296 / 19.6	0.81
Energy production, mln. tonnes of oil equivalent / % of the world	2006	11,786 / 100	4,663 / 34.6	2,664 / 23.6	3,783 / 32.1	734 / 6.2	6.35
Energy consumption, mln. tonnes of oil equivalent / % of the world	2006	11,525 / 100	5,659 / 49.1	1,880 / 16.3	3,469 / 30.1	576 / 5.0	9.82
Per capita, kg / % of the world	2006	1,820 / 100	5,416	2,300	1,019	472	11.3
Net import, % of consumption	2006	-2	18	-42	-9	-28	
Energy-efficiency, GDP per kg / % of the world	2006	5.2 / 100	6.3	4.8	3.9	3.2	1.62
CO2 emissions, mln. tonnes / % of the world	2005	29,257 / 100	13,100 / 44.8	4,393 / 15.0	9,448 / 32.3	722 / 2.5	17.9
Per capita, t / % of the world	2003	4.5 / 100	12.6 / 280	5.5 / 122	2.8 / 62	0.6 / 13	21.0
Labor productivity, GDP per 1 employee, USD by PPP / % of the world	2006	7,629 / 100	24,524 / 321	7,245 / 95	5,348 / 70	1,937 / 25	12.7
GDP per capita, US dollars at the current exchange rate / % of the world	2007	7,995 / 100	37,570 / 470	7,107 / 99	1,965 / 25	579 / 7	65.5
GDP per capita, US dollars in PPP terms / % of the world	2007	9,947 / 100	38,386 / 385	12,072 / 121	4,585 / 46	1,489 / 15	24.4
Number of the states	2006	210	64	43	54	49	
Gross domestic income at the current exchange rate, bln. US dollars / % of the world	2007	52,850 / 100	39,786 / 75.1	5,854 / 11.1	6,543 / 12.4	744 / 1.4	
In PPP terms, bln. US dollars / % of the world		65,752 / 100	38,336 / 58.4	9,944 / 15.1	15,749 / 24.0	930 / 1.4	

<sup>1</sup> World Development Indicators. 2009. World Development Indicators. Washington: The World Bank. 2008



Indicators:

- 1 — a share of group of countries in the world population, 2007, %;
- 2 — a share in energy consumption, 2006, %;
- 3 — a share of CO2 emissions, 2005, %;
- 4 — a share in the world gross national income, 2007, %;
- 5 — a share of GNI in PPP terms, 2007, %.

**Fig. 3.1. Energy-ecological and economic polarization of groups of countries**

A new bipolar system is just being formed, its outlines and delimitations are in motion. While the pole of wealth is consolidated and has clearly identified leaders (U.S., European Union, Japan), the opposite pole is disunited, there is no universally recognized leaders at it.

### 3.2.3. The Insoluble Problem for the Poverty Pole

Countries with high incomes, advanced technological base can

completely manage the objective of reducing by half greenhouse gas emissions by the middle of the 21<sup>st</sup> century. This is evidenced by at least the German experience. For 16 years its energy consumption fell from 356 to 349 million tonnes of oil equivalent (2%) per capita - from 4,477 to 4,231 kg (5.5%); for 15 years emissions of CO<sub>2</sub> decreased from 981 to 784 million tonnes (20.6%) per capita - from 12.3 to 9.5 tonnes (22.8%), with the average annual GDP growth of around 1.5%.

However, for the countries of the opposite pole there is a radically different perspective. They cannot get out of poverty and misery, without overcoming the lagging in the power available per worker. To overcome poverty and to increase productivity they need to increase the power consumption many times. Since there are almost no resources for the implementation of this growth on the basis of alternative clean sources of energy in these countries, the increase in power consumption is usually accompanied by a significant increase in greenhouse gas emissions.

This is evidenced, in particular, by experience of China and India. The increase in energy consumption in China from 1990 to 2006 in 2.2 times was accompanied by increased CO<sub>2</sub> emissions for 1991-2005 2.3 times; for India, respectively, in 2.1 and 1.7 times. China became the largest polluter after the U.S. of atmosphere of the planet. China and India have relied on relatively cheap domestic fuel - coal which gives increased carbon dioxide emissions. A similar trend is observed in the countries of the Middle East and North Africa where the increase in energy consumption by 78% was accompanied by increased CO<sub>2</sub> emissions by 97%.

Energetically and economically poor countries face an insoluble dilemma. If they develop the economy and modernize it to overcome poverty, hunger and energy, they will have to increase many times the energy consumption and greenhouse gas emissions. If they make a commitment to reduce double greenhouse gas emissions by the middle of the 21st century, then they will have to forget about the development and modernization of economy, overcoming poverty. As the Latin proverb says: «tertium non datur» – no third possibility is

given. This explains why so rigid position is taken by the leadership of many lagging countries at the summit in Copenhagen.

In fact, there is a third possibility. The global energy-ecological situation is not a deadlock, hopeless. But this will require radical changes in the global energy sector. It will be required to overcome the neo-liberal approach, the uncontrolled domination of transnational corporations in the sector and bring them under control of a global civil society and its institutions.

It is necessary to take into account the fundamental features of the global energy sector to this effect. *First*, it has a global, supranational character. The nature ordered so that some countries and civilizations are in excess endowed with energy resources and are designed to use them subject to the needs of other countries and civilizations which cannot at the expense of their own resources to meet the needs of production and population in energy. The interchange should be profitable for one and the other, or general energy needs will not be fully satisfied.

*Second*, the process of exploration, exploitation, development and supply of energy resources is durable, can take decades. It affects the interests of the past, present and future generations. A horizon of the market is usually restricted to the medium or long-term benefit. Therefore, the energy sector to a greater extent than other sectors of economy needs the government and interstate regulations at the national and global levels. As the experience of Russia and other post-socialist countries has demonstrated the exaggeration of the role of markets and reducing the governmental regulation can bring great harm to the present and especially future generations.

*Third*, the different quality of natural resources and conditions of their exploitation in different countries is a source of global energy rent (in its various manifestations) and ecological anti-rent, the weight and the rate of which varies depending on the price fluctuations on the world energy market. It is necessary a stable and equitable system of distribution of such rent and withdrawal of anti-rent.

Given these three features it is necessary to develop a long-term

global strategy for energy- ecological partnership of civilizations, the formation of adequate institutions and mechanisms for its implementation. These issues should become a subject of discussion at the global energy-ecological forum, which could take place in Astana in autumn 2011 in preparation for the World Summit on Sustainable Development "Rio+20" in 2012 in Brazil.

#### **3.2.4. The Energy-Ecological Partnership of Civilizations**

In the 21<sup>st</sup> century a new global divide between countries and civilizations - by economic and energy-ecological attributes is being formed. For such a situation it is characteristic that poor countries with low energy consumption cannot get out of poverty independently, solve their energy and ecological problems alone. But the global energy-ecological situation is not a deadlock. Breaking the deadlock is in the development of a *global energy-ecological strategy* based on partnership of civilizations. What are the major milestones on the path to a solution of this acute, intractable global problem?

This strategy should be based on a long-term forecast of energy-ecological future of humanity. It is the forecast of global character for the middle of the 21<sup>st</sup> century because it is such a horizon is necessary and sufficient to identify the ways to address the global energy-ecological crisis covering the entire first quarter of the 21<sup>st</sup> century. In the second quarter of the 21<sup>st</sup> century it will be evolving the establishment of the noospheric energy-ecological mode of production and consumption. A long-term forecast relies on the predicted cyclical dynamics of interconnected spheres of the structure of society – ecological, demographic, technological, and economic. And the forecast is need to be developed not on the basis of expert survey (Foresight), but on the methodology of long-term integral macro-forecasting synthesizing the prediction of cycles, crises, waves of innovations, civilizational approach, the doctrine of the noosphere and the balance method of macro-forecasting. Strictly speaking, such a forecast has been prepared and discussed at the 2n Civilization Forum in Astana in

2008<sup>1</sup> and reported at the roundtable meeting at the UN headquarters on October 27, 2009. The monograph "Global Energy-Ecological Revolution of the 21<sup>st</sup> Century"<sup>2</sup> was published. However, this forecast will be necessary to update and revising by adding novations to it.

This includes primarily the forecast *energy-ecological balance* for the world, civilizations and the leading countries. It should reflect the dynamics of the needs of civilizations and countries in energy subject to the need, on the one hand, limiting the scale and level of consumption in developed countries, on the other – bringing up the level of energy supply of the lagging countries and civilizations. It will be necessary to investigate the parameters that determine the expansion of sources to satisfy the energy needs by increasing the share of alternative and especially renewable, clean energy sources. An important place should be given to a cooperation of energy-excessive and energy-hungry countries and civilizations. It is also necessary to forecast the impact of shifts in the structure of energy consumption on greenhouse gas emissions so that to ensure the reduction of such emissions on the planet in general subject to characteristics and level of development of various countries. Dynamics of economic indicators (primarily the costs and prices, investments) should be structured so as to ensure the progressive structural shifts in the energy sector and raising energy-ecological efficiency which reflects the ratio of GDP to total energy consumption and carbon dioxide emissions.

The development of such a balance is a pioneer task, the world does not have one yet (there are only fuel and energy balances). A well-thought-out methodology and reliable statistical base are necessary to develop it. In fact, such balance will perform the functions of the energy-ecological unit of geo-civilizational macro-model.

It is necessary to spur the development of a long-term *global strategy of energy-ecological partnership of civilizations*. This task is a

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<sup>1</sup> The Energy-Ecological Future of Civilizations. Part 3 of the Global Forecast "Future of Civilizations" for 2050. M.: MISK, 2008.

<sup>2</sup> *Kuzyk B.N., Yakovets Yu.V.* The Global Energy-Ecological Revolution of the 21<sup>st</sup> Century. M.: INES, 2007.

higher grade of complexity, as it directly affects the conflicting interests of states, civilizations and powerful transnational corporations (TNC) operating in the global energy sector. None of them wants to sacrifice their own interests and rent income for the common good, especially since we are talking about a large-scale sector of the global economy (in 2007 exports of metals, ores, fuel amounted to more than 1.9 trillion US dollars, including several hundred billion dollars of global mining rent).

A preliminary validation of the global energy-ecological strategy is included in the forecast "Energy-Ecological Future of Civilizations" mentioned above. Kazakhstan President Nursultan Nazarbayev, speaking at the opening of the 63<sup>rd</sup> session of the UN General Assembly on September 25, 2007 proposed to develop a global energy-ecological strategy and discuss it at the World Summit on Sustainable Development in 2012. In his monograph "The Strategy of Radical Renewal of the Global Community and Partnership of Civilizations"<sup>1</sup> Chapter 2 is devoted to the strategy for energy-ecological partnership of civilizations, its objectives and ways to implement it.

To develop a global strategy for energy-ecological partnership of civilizations is not enough to state a general scientific platform prepared by a team of scientists from different countries. It requires participation of governmental and political high executives, business leaders, international organizations and ecology movements.

The strategy can only spring to life if it is implemented in the system of long-term programs and projects both global and regional unions (EU, CIS, SCO and etc).

The target global programs are a new tool that can get the application in addressing major global challenges, such as the development of renewable and hydrogen energy, water supply and water treatment, fight against forest fires, etc. Each program relies on a network of innovative projects. To attract investors, it is expedient to hold exhibitions-contests and auctions of projects. A selection based on

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<sup>1</sup> *Nazarbaev N.A.* The Strategy of Radical Renewal of the Global Community and Partnership of Civilizations. Astana: ARKO, 2009.

such contests and auctions of energy-ecological innovation projects can be an important tool in the implementation of energy-ecological strategy. In accordance with the EU decision it is allocated 7.2 billion Euros to this effect. At the Copenhagen summit a number of country leaders promised to allocate large sums of money for environmental projects. These resources should not be sent in an impersonal way to these or those countries where they are embezzled to a large extent by officials and agents, and should arrive earmarked for specific energy-ecological projects under a strict international and community control. This will require expanded authority and resources of the Global Environment Facility, or to establish a specialized energy-ecological innovation and investment fund.

The environmental and humanitarian disaster in Haiti in January 2010 exposed the blatant injustice and intolerability of such world order under which a small island state with 10 mln population is situated next to the world's richest country - the United State with 302 million population and where gross national income per capita is 88 times less (in PPP terms - 44 times), health care costs are 160 times less than in the U.S., 65% of the population lives below the national poverty line, and the gap between the 10% of the population with the highest and lowest incomes is 53 times .

The international community should learn two lessons of the disaster in Haiti. *First*, it is necessary to create within the UN framework a powerful global emergency service with a sufficiently large insurance fund of several billion dollars to rescue people and to provide emergency assistance during natural and technogenic disasters that occur each year in different corners of the globe.

*Second*, it is time to develop and embark upon the implementation of a long-term global program of overcoming hunger and poverty on the planet as part of a strategy for sociodemographic partnership of civilizations, which should become the subject of discussion at the World Summit RIO-20 in 2012 in Brazil. The object of this program may be almost 50 poorest countries with a population of 1.3 billion people with gross national income per capita 65.5 times lower (in PPP

terms - 24.4 times) than in 64 high-income countries. The main source of funding for the program may be contributions from the "golden billion" countries. The socio-economic revival of Haiti, the country with the situation worsened many times after the disaster, may become a pilot project for a future global strategy of socio-demographic partnership of civilizations. Civilizational unions should actively be involved in its implementation providing a comprehensive support to their poorest fellows. An example of the European Union shows the feasibility and effectiveness of such support on a long term basis helping to overcome the historically excessive disparities in social, economic and technological development (although the position of Greece in the Eurozone has exposed the difficulties on such path). This will become an important step toward a postindustrial humanistically noospheric civilization.

It has already been said about the features of the global energy sector requiring the connection of the market and entrepreneurship with adequate and transparent global interstate regulation reflecting the general and long-term interests of present and future generations and stopping the abuses of monopolies and TNCs. The elements of such a regulation on a pilot basis are polished in the European Union. Its experience requires studying and use in developing regulatory mechanisms at the global level, individual elements of such regulation are provided for in the summit documents of Group 20 in Washington, London and Pittsburgh. But the proposed measures are short term and local in nature and do not provide for a radical renovation of existing and creation of new institutions and mechanisms in the interests of the majority of the world population. Meanwhile, speculative operations on the stock markets, formation of "bubble economy" which periodically burst, unpredictable and uncontrollable surges in world prices for oil and other commodity prices lead to large imbalances in the global economy, redistribution of rent income in the international trade, increasing the instability of economy and are fraught with losses of hundreds of millions of people in times of world crises.

Obviously, it is impossible and ineffective to constitute any global

committee for global prices and tariffs, which would set prices and tariffs for the millions of specific goods and services on the world market. But it is real and it would be useful to develop a scientific basis and guidelines for the formation and structure of prices, rent income, tax and customs duties, as is already largely done by the European Union, the World Trade Organization. It will also be required widely recognized rules, standards and norms of energy and ecological nature, such as developed by the EU in setting European standards on emissions of CO<sub>2</sub> into the atmosphere.

In fact, it is a gradual formation of the environmental or energy-ecological global law with the introduction of sanctions for violation of established norms and standards and bodies that make decisions about sanctions and their enforcement. The process of developing a global law will take more than one decade but it is almost underway.

Along with the formation of a global energy-ecological law other institutions will also be required for the implementation of the energy-ecological strategy. The Security Council or UN General Assembly should be given the authority to set mandatory rules of the energy-ecological law and not only record the international agreements reached. A need arises in the body responsible for implementing the long-term energy-ecological strategy. Now these functions are divided between different authorities. The United Nations Environment Programme – UNEP – deals with study and forecasting of trends in the ecological dynamics. But its functions are only advisory and analytical. The International Energy Agency develops projections in the energy field. However, it represents the interests of rich countries only. Individual projects are implemented by the UN Development Programme (UNDP). It will be required either to expand the competence and increase the responsibility for the implementation of the global energy-ecological strategy of the UNEP or UNDP, or - and this is likely to be more reasonable and effective - to constitute a UN specialized agency for the implementation of the energy-ecological strategy of partnership of civilizations which is of crucial importance for the future of humanity in the 21<sup>st</sup> century.

Thus, at the beginning of the 21<sup>st</sup> century a pressing need arises and the preconditions are created for developing a global program for energy-ecological partnership of civilization aimed at overcoming the crisis and the establishment of the noospheric energy-ecological mode of production and consumption. Russia could play a prominent role in the solution of this task - not only because it is one of the largest energy powers in the world but also because there are certain steps taken to create a forecast and the concept of humanity movement in this direction.

### **3.2.5. Analysis of the Global Energy-Ecological Balance**

To quantify the gap in energy consumption, CO<sub>2</sub> emission, energy, ecological, and energy- ecological efficiency and trends in the dynamics of these indicators for a half decade, let us make the global energy-ecological balance with the release of the four groups of countries: with low income, lower-middle-income, upper-middle-income and high income. For this we use the data published in the Yearbook of the World Bank in 2009 (Table 3.2.). In the yearbook the data on population and GNI are given for 2007, the consumption of energy - for 2006, by CO<sub>2</sub> emissions - for 2005. However, changes are minor for adjacent years not distorting the trend in the pre-crisis period.

A new index of the energy-ecological efficiency is introduced and calculated by relating GDP in PPP terms for 2006 to the amount of energy consumption (in tonnes of oil equivalent) for 2006 and CO<sub>2</sub> emissions (in tonnes) for 2005. The greenhouse gas emissions from year to year vary slightly. From the data obtained there are seen discrepancies between the indicator of energyecological efficiency by groups of countries since the structure of energy consumption and the emission volume of CO<sub>2</sub> are not the same, the gap between them by ecological efficiency is less than by the indicator of energy efficiency.

What conclusions may be made from the analysis of the global energy-ecological balance?

1. Two poles of the global economic space - the pole of wealth

and the pole of poverty – differ only slightly by the number of states, land area and population size. However, they are highly polarized in wealth: the ratio of the poles in terms of GNI in 2007 was 53.3 times, GNI in PPP terms – 19.9 times; GNI per capita - 65.5 and 24.4 times respectively. Such a gap in a single globalized economy is not only extremely unfair but also extremely dangerous as it becomes a source of instability throughout the global system. This is one of the signs of imbalance and instability of the industrial economic system. The gap in levels of economic development of countries and civilizations has been never before so striking.

2. One of major factors in this polarization is the gap between the poles by the level of energy production (6.3 times in 2006) and energy consumption (9.8 times), and the pole of poverty is the energy donor (energy exports 28% of consumption) for the pole of wealth (import is 18% of energy consumption). It would seem that it should bring huge amounts of world energy rent to exporters. But it is concentrated in the hands of a small number of exporters and TNCs, and it does not ease the situation of the poverty pole in general. The industrial economic system can not cope with this task.

**Tab. 3.2. Global energy-ecological balance<sup>1</sup>**

Indicators	Measu-res	Year s	World	Group of countries				Polari- zation <sup>2</sup> , times
				Low incom e	Lower - middl einco me	Above - middl einco me	High	
<b>1. Overall figures</b>								
Number of countries		2007	210	49	54	43	1.31	64
	%		100	23	26	20.1		32
Population size	mln. People	2007	6,610	1,196	3,435	824	0.86	1,056
	%		100	19.6	52.0	12.5		15.5
Territory	mln. km	2007	133,946	21,846	35,510	41,497	1.6	35,094
	%		100	16.3	26	31.0		36.2
Gross national income	bln. US doll.	2007	52,850	744	65 13	5,854	53.3	39,686
	%		100	2.9	12.4	11.1		75.1

<sup>1</sup> 2009 World Development Indicators. Washington: The World Rank, 2009. P. 16, 160, 164.

<sup>2</sup> Polarization means a relation of indicators of the group of countries with high and low income.

The same in PPP terms	Bln. US doll.	2007	65,750	1,930	15,749	9,944	19.9	38,336
	%		100	1.4	24.0	15.1		58.3
GNI per capita	US doll.	2007	7,995	574	1,905	7,107	65.5	37,570
	%		100	7	24	89		470
The same in PPP terms	US doll.	2007	9,947	1,489	4,585	12,072	36,340	24.4
	%		100	15	46	121	365	
<b>2. Energy balance</b>								
Energy production	mln. tonnes of oil equivalent	1990	8,822	451	2,272	2351	3,780	8.38
		2006	11,786	734	3,783	2664	1,663	6.35
	%	1990	100	5.1	32.1	26.6	42.8	
		2006	100	6.2	25.8	22.6	39.6	
Energy consumption	mln. tonnes of oil equivalent	1990	8,637	400	1,973	1,824	4,479	11.2
		2006	11,525	576	3,469	1,880	5,659	9.8
	%	1990	100	1.6	22.9	21.1	51.9	
		2006	100	5.0	30.1	16.3	49.1	
Net export (-), import (+) of energy	mln. tonnes of oil equivalent	1990		-52	-29.6	-529	+7.7	
		2006		-161	-312	-790	+ 1,019	
	% of consumption	1990	+2	-13	-15	-29	+ 16	
		2006	+2	-28	-9	-42	+ 18	
Share in consumption: a) fossil fuel	%	1990	81.2	445	74.4	88.4	84.1	1.89
		2006	80.9	13.1	81.0	84.8	82.9	1.92
b) renewable sources	%	1990	10.0	52.9	22.7	5.9	2.8	0.05
		2006	9.8	53.8	15.2	7.0	3.4	0.06
c) alternative sources	%	1990	8.7	2.8	3.0	5.3	13.0	4.6
		2006	9.2	3.2	3.9	7.6	13.5	4.2
Energy consumption per capita	Tones of oil equivalent	1990	1,686	482	7,716	2,584	4,807	10.1
		2006	1,820	478	1,019	2,300	5,416	11.3
	%	1990	100	2.8	3.0	5.3	13.0	
		2006	100	3.2	3.9	7.6	13.5	
<b>3. Ecological balance</b>								
CO2 emission	mln. tonnes	1990	22,585	519	4,882	4,793	11,003	21.2
		2006	29,257	722	9,448	4,393	13,100	18.1
	%	1990	100	2.3	21.6	21.2	48.7	
		2006	100	2.5	32.6	15.0	44.8	
CO2 emission per capita	tonnes	1990	4.3	0.7	1.8	6.9	11.8	16.9
		2006	4.5	0.6	2.8	5.5	12.6	21.0
	%	1990	100	16	42	160	274	
		2006	100	13	62	122	280	
<b>4. Energy-ecological efficiency</b>								
Energy	Doll. GDP in	1990	4.4	2.6	3.6	3.8	5.2	2.0

efficiency <sup>1</sup>	PPP, tones of oil equivalent	2006	5.2	3.2	3.9	4.8	6.3	2.0
	% of the world	1990	100	59	82	86	118	
		2006	100	62	75	92	121	
Ecological load <sup>2</sup>	Tones CO2 US doll. GDP in PPP terms	1990	0.6	0.3	1.0	0.8	0.5	0.8
		2005	0.5	0.4	0.8	0.5	0.4	4.0
	% of the world	1990	100	50	167	133	-	
		2005	100	80	160	106	80	

3. The pole of wealth is a major source of greenhouse gas emissions into the atmosphere - 18 times more than the pole of poverty; 45% of global CO2 emissions vs. 2.5% at the opposite pole. Therefore, rich countries must take the brunt of the costs for reducing greenhouse gas emissions - along with the countries of the second group, the share of which in total emissions rose from 22% in 1990 to 32% in 2005. Increasing available power and energy consumption in the group of low income countries could increase their share of greenhouse gas emissions.

4. In the poor countries the share of fossil fuels in energy consumption is significantly below world average (43% vs. 81%), while the share of renewable sources is much higher (54% vs 9.2%). Traditional renewable energy sources can be a significant source of greenhouse gas emissions. Therefore, the focus should be on increasing the share of clean energy sources.

5. The indicators of energy, ecological and energy and ecological efficiency are also differentiated by country groups, but significantly less than the energy consumption and greenhouse gas emissions, where the energy efficiency gap reaches 2 times, there is no for ecological efficiency, and it is 1.33 times for energy-ecological efficiency. This can be explained by the high level of correlation between energy consumption (power availability per worker) and GDP production (labor productivity).

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<sup>1</sup> Energy efficiency means GDP in PPP terms per unit of energy use.

<sup>2</sup> Ecological load means CO2 emission per 1 US dollar of GDP in PPP terms.

For a decade and a half the gap for all three indicators have fallen somewhat but to mitigate the economic polarization it will be required a higher rate of growth of power available in the group of poor countries while reducing energy consumption in the group of rich countries.

6. The energy-ecological efficiency has a general tendency to increase. For a decade and a half for the world it has grown up by a quarter, with the gap between the poles have somewhat fallen (from 40 to 30%). A More significant gap by the energy component (2.08 times in 1990, 1.97 times in 2006) is minimized by the ecological component (1.7 times in 1990, the same level in 2005).

With the economic crisis of 2008-2009, recession and decline in the GDP output the figures of the energy, ecological, and energy-ecological efficiency are somewhat worse but in different degrees by different groups of countries.

It is appropriate to monitor the indicators of the energy-ecological balance by civilizations and leading countries in the annual mode according to the proposed technique. This will allow linking the indicators of economic, energy and ecological dynamics with each other, and to carry on activities more focused to implement the global energy-ecological strategy and overcoming the excessive polarization of rich and poor nations and civilizations.

### **3.3. FORMATION OF ECOLOGICAL ECONOMY**

#### **3.3.1. A New Branch of Economy and Economic Science**

In the late 20<sup>th</sup> - early 21<sup>st</sup> century it is observed the formation of a new activity, new branch of the national and global economy - **ecological economics**. It unites three basic types of activities people were engaged in since the depths of unrecorded time, but which now buds in the independent sector of economy expressing the relationship in the dynamics of society and nature:

- reproduction (in economic terms) and the rational use of the extensive range of natural resources necessary for the functioning of

production and life of people;

- activity on a relative and absolute reduction of harmful emissions into the environment, entailing adverse changes in the natural conditions of life and increasing the risk of local and global environmental disasters;

- forecasting of natural calamities and disasters, mitigation of their adverse effects on human, society and the environment. These three types of economic activities require appropriate institutions and mechanisms, professional staff, increasing weight and share of investment and GDP costs.

These activities have existed for at least ten millennia since the Neolithic revolution but have been inextricably linked with the relevant sectors of the economy based on division of labor: agriculture, animal husbandry, maintenance of irrigation systems, extractive industry, city economy, etc.

It is only since the late 20<sup>th</sup> century when it became apparent the growing threat of the exhaustion of essential natural resources (especially after the Club of Rome report "Limits to Growth", energy crisis of the 70s and in the context of the global energy-ecological crisis of the early 21<sup>st</sup> century) it has arisen the task of forming a special sectoral economy uniting three types of activities outlined above and which is at the intersection of a number of sectors of economy associated with the operation of certain types of natural resources, ecology and emergency situations. This is sort of a hybrid economy (or noospheric economy), including the nature-reproducing and nature-consuming industries, the area of monitoring and protecting the environment. The formation of such specialized sector of economy is one of the key areas of the noospheric transformation of the global and national economies in the first half of the 21<sup>st</sup> century. In the future, the share of this sector in the costs of resources and GDP will grow steadily.

These actively developing processes make specific demands to economic science. We cannot say that it was indifferent to the

economic side of the relationship of society and nature. The economy of geological exploration, mining, forestry and water management, irrigation and land reclamation, environmental protection and emergency situations, environmental sections in the sectoral economies have got development. The theory of rent in a variety of its manifestations develops. A considerable number of monographs on the problems of mining, forest, water rent, economic evaluation of environmental pollution, economics of geological exploration, forestry and water management, etc. is published.

However, in this stream of researches and publications unifying elements have been weakly seen. To some extent it was made up by the formation and development of the theory of the noosphere – in the writings of V.I. Vernadsky, and especially in a series of papers of N.N. Moisseev "Parting with Simplicity", "The Fate of Civilizations is the Path of Reason", "Humanity... To Be or Not to Be..."<sup>1</sup> etc. Several books on the theory of the noosphere ("noospherization") were published by A.I. Subetto.

I deal with the economic problems of interaction between nature and society over half a century - from the time of defending the thesis for Candidate degree on the theory of nationalization of land and publication of the first monograph "Theory and Practice of Socialist Collectivization of Land" (M.: Sotsizdat, 1960). In the monograph "Pricing Methodology in the Mining Industry" (1965) there were researched into the problems of mining rent, economy of geological exploration and rational nature management. In the first half of the 70s I validated the necessity of introducing fees for geological exploration and penalty payments for excessive losses in the extraction of mineral resources. Such fees were carried into effect and existed until the late 90s.

In 1995, there was arranged a cross-disciplinary discussion in St. Petersburg "Ecofuture: the Path to the Noosphere or Ecocatastrophe",

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<sup>1</sup> *Vernadsky V.I.* Philosophical Thoughts of Naturalist. M.: Nauka, 1988; *Moisseev N.N.* The Fate of Civilizations is the Path of Reason. M., 1998; *Moisseev N.N.* Parting with Simplicity. M.: Agraf; *Moisseev N.N.* Humanity ... To Be or Not to Be? M.; 1999.

published a book under the same name.

In 2002, I returned to the topic, prepared a paper "Rent, Anti-Rent, Quasi-Rent as Sources of Global Sustainable Development" and organized a roundtable on this issue at the World Summit on Sustainable Development in Johannesburg. On this basis, it was published a monograph (in Russian and English) "Rent, Anti-Rent, Quasi-Rent in a Global Civilizational Dimension"<sup>1</sup>.

In 2007, together with the B.N. Kuzyk it was published in Russian and English the monograph "Global Energy-Ecological Revolution"<sup>2</sup> and monograph "Russia: a Strategy of Conversion to Hydrogen Energy"<sup>3</sup>.

In connection with the preparation of the Global Forecast "The Future of Civilizations" for 2050 Part 3 of the Global Forecast – "Energy-Ecological Future of Civilizations"<sup>4</sup> was published. The key findings and recommendations on this issue are included in the consolidated summary, part 9 of the forecast of "The Future of Civilizations and Partnership Strategy of Civilizations"<sup>5</sup> which was discussed and endorsed at the roundtable meeting within the 64<sup>th</sup> session of the UN General Assembly (New York, 27 October 2009).

Such a long list of completed and published papers on this subject I quote so that to make it clear that the following conclusions and recommendations are the result of half a century of researches, the fruit of mature reflection and comprehensive analysis rather than building "castles in the air" in a speculative way.

### **3.3.2. The Subject of Ecological Economics**

Like any other branch of science, ecological economics must have its subject and use appropriate methods of research to this subject.

In a broad sense, the subject of this branch of science is the

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<sup>1</sup> *Yakovets Yu.V.* Rent, Anti-Rent, Quasi-Rent in a Global Civilizational Dimension. M.: Akademkniga. 2003.

<sup>2</sup> *Kuzyk B.N., Yakovets Yu.V.* The Global Energy-Ecological Revolution. M.: INES, 2007.

<sup>3</sup> *Kuzyk B.N., Yakovets Yu.V.* Russia: a Strategy of Conversion to Hydrogen Energy. M.: INES. 2007.

<sup>4</sup> The Energy-Ecological Future of Civilization for 2050. M.: MISK. 2009.

<sup>5</sup> The Future of Civilizations and Partnership Strategy of Civilizations. Part 9. Global Forecast "Future of Civilizations" for 2050. M.: MISK.2009.

economic aspects of the interaction and co-evolution of society and nature in all the diversity, complexity and inconsistencies of this relationship.

Accordingly, there are three major interrelated subjects of ecological economics:

1) ***reproduction and rational use of natural resources*** - land, mineral, forest, water, flora and fauna. It can be both reproducible, exhaustible resources (minerals) and reproducible (land, forest, water, fish, flora and fauna). This is the subject of some of the private economics – geological exploration, melioration, forestry, water management and fisheries, etc.;

2) ***monitoring and reduction of environmental pollution*** in all forms of pollution: emissions of greenhouse gases, solid waste, untreated sewage and other types of contaminants, including radioactive contamination; measures to reduce pollutant emissions and beautification of the environment, prevention of adverse changes in climate; monitoring and prediction of economic dynamics and its consequences;

3) ***forecasting of natural and technogenic accidents and catastrophes*** (earthquakes, floods, volcanic eruptions, tsunamis, forest fires, typhoons, etc.) and liquidation of their consequences. In such case we use the functions of weather service, seismology, Earth remote sensing, emergency services, etc.

*The main tasks* of ecological economics (or eco-economics) are:

- finding regularities and trends of interaction between society and nature in their variety and in conjunction with economy, identification and assessment of crisis situations in these relations, the establishment of the noosphere and mechanisms to effectively use these regularities for further harmonious co-evolution of nature and society, satisfaction of the growing needs of human and society;

- Development of long- and medium-term forecasts and strategies for development and efficient use of natural resources, reducing harmful emissions into the environment and response to natural and technogenic disasters;

- Creation of effective mechanisms for managing the development of this sector of economy in collaboration with other sectors at regional, national and global levels, the optimal combination of market institutions with national and international regulation of this sphere, coordination of activities of various countries, civilizations and international organizations in this field;

- Participation in shaping public opinion, national and global civil society institutions supporting activities to optimize the interaction between society and nature;

updating the structure and legal rules of regulation, operation and development of this sector of economy - national and global environmental law, national and global organizational structures of management of this sphere (national ministries, UNEP), environmental courts and environmental facilities, ecological education, etc.

### **3.3.3. Ecological Cycles and Crises**

The fundamental direction of the new branch of science – ecoeconomics is to identify the *regularities and mechanisms of cyclic-genetic dynamics* of this sphere.

Here we are dealing with regularities of development of the cosmos even poorly known, geosphere, biosphere in their interaction with the regularities of cyclical dynamics of society and all parts of the genotype of civilization - demographic, environmental, technological, economic, geopolitical and socio-cultural. Moreover, economic and demographic cycles and crises are most closely intertwined with the cycles of nature, which, however, are remarkable for a significantly greater duration. Nature's cycles have the horizon from daily and seasonal fluctuations to the millions and tens of millions of years. Cycles in the life of society - from seasonal, full-year (in agriculture) to the ten-year (medium-term), half a century (long-term Kondratieff) and century (civilizational), millennium (historical super-cycles in the dynamics of the global civilization). The intertwining of nature's cycle and cycles in the dynamics of society forms *ecological cycles* of

different amplitude and duration. It should also be noted such a variety of ecological cycles as a cyclicism of working mineral deposits in the mining industry and the relationship between environmental cycles and technological cycles. Global ecological cycles and crises are studied in the forecast "Energy-Ecological Future of Civilizations" of the Global Forecast of "The Future of Civilizations", Part 3 for 2050 (New York: SKII, 2008).

### **3.4. THE RISE OF THE WORLD NATURAL RENT**

Nationwide, the natural rent, particularly land, has long been known and studied thoroughly - dozens of concepts, hundreds of books, thousands of articles in publications from many countries are devoted to it. Another thing is with the *world* natural rent. Although it exists for more than one hundred years since the international exchange of agricultural products, and then the forest and mineral raw materials assumed a regular character, and an opportunity for generating super-profits has become a stimulus for the development of exports of natural resources, this category has not yet been subject to a comprehensive research. It was first considered in detail in my monograph "Rent, Anti-Rent and Quasi-Rent in a Global Civilizational Dimension" published in 2003 in Russian and English<sup>1</sup>.

#### **3.4.1. The Global Uniform of the Natural Rent**

Going beyond the national boundaries, a natural rent is largely changed its appearance, the factors of formation and dynamics, the mechanism of appropriation and distribution. The profit received from the international trade in natural raw materials and fuel (minerals and forest products, products of agriculture and fisheries) becomes its object. The subjects of appropriation are the participants in international trade: companies, transnational corporations, and states. The world export prices become the most important factor determining the level, structure and dynamics of the natural rent.

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<sup>1</sup> *Yakovets Yu.V.* Rent, Anti-Rent and Quasi-Rent in a Global Civilizational Dimension. M.: Akademkniga. 2003.

The world rent is influenced by many conflicting factors, both economic and geopolitical. It changes by the phases of economic cycles: it falls in periods of crises and depression, in the compression of the world market (although there are exceptions - for example, in connection with an abrupt increase in world prices for oil and other mineral products in the period of crisis of the mid-70s which brought enormous super-profits for oil exporting countries) increases in the phases of recovery and the rise when demand increases. Geopolitical crises, military conflicts are reflected in the size of the world natural rent. Its dynamics is under the direct influence of technological cycles. The assimilation of new generations of technology and technological orders, the involvement of new natural resources in the production, expansion of international trade increases the scale of the world natural rent.

The *forms* of the world natural resource rents are traditional, though somewhat modified in comparison with the rent in the domestic market. It is beyond dispute the existence of *differential rent* of three kinds. The differential rent of the first kind expresses the super-profit (extra income) received by agents of the world market with better deposits of natural resources or more favorably located with respect to the global market in. In this case, the tendency of gravity of prices to costs of exporters with relatively worse natural conditions - they would not deliver their products to world markets without it. The differential rent of the second kind arises with the suppliers of natural resources to world markets which have implemented more efficient technologies that ensured super-profits in comparison with the use of prevailing technologies. The differential rent of the third kind is formed based on the inter-industry competition and in industries where production is on average lower costs compared to the costs of industries that determine the price level for this group of substitute goods (e.g., natural gas compared to fuel oil and power generating coal). The assessment of the world differential rent is made only for that product which comes to the external market. Products circulating in the domestic market fall into the calculation

only if they are interchangeable with the exported products, replace it.

However, even from the worst sites (deposits), the product will not come into the world market, if the owners of these resources do not receive a certain income -*absolute rent* which, respectively, will be included in the price of products from all sites involved in international exchange as an economic realization of ownership to natural resources.

Individual exporters and countries that have unique natural resources from the standpoint of the global market have the ability to fix and maintain high monopoly prices for their products which generate world *monopoly* natural rent. However, the number of such exporters is not high, and the level of monopoly prices has its limits determined both by the inter-industry competition, and limits of demand on the world market. Fluctuations in world prices may increase or decrease the size of the world natural rent.

*Types* of world natural rent are determined by the types of nature-intensive products traded in the world market (Table 3.3). Some important conclusions about the structure and dynamics of natural rents follow from these figures.

**First**, the volume of exports of food, raw commodities and fuel products - material carriers of natural rent - is constantly increasing, an increase (in current prices) in 17.6 times for 29 years (Fig. 3.2). However, the calculation in the current prices does not take into account the "price revolution" of the 70s when there was a change of scale of prices, a fall in several times of the actual dollar value under the influence of the jump in oil prices and other fuel-raw commodities and a fall in their value content of their share in subsequent years. The share of fuel and raw commodities and foodstuffs in the total world exports has a general tendency to decrease: from 43.7% in 1960 to 18% in 1999 - more than twice; a break in the trend was observed only in the second half of the 70s as a result of higher-than-anticipated rise in prices for fuel and other commodities. Hence, although the overall volume of world natural rent expressed in current prices has increased significantly, in physical terms, this process looks much more modest,

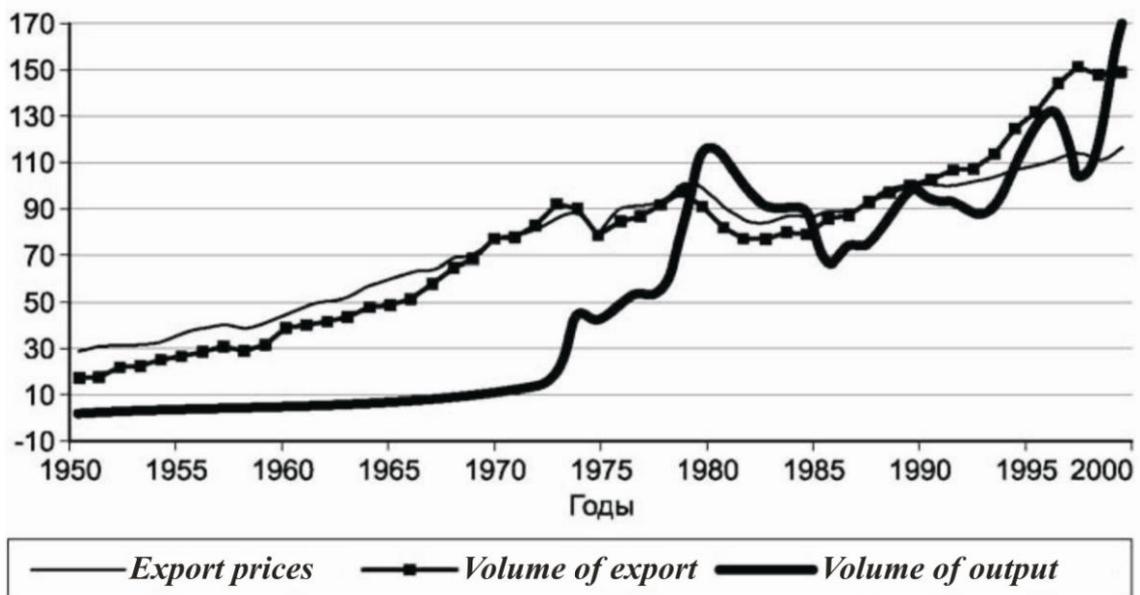
and the share of natural rent in the overall cost structure of world exports declined markedly.

**Second**, in the structure of exports of foodstuff, fuel and industrial commodities it is observed remarkable shifts that is reflected in the structure of the world natural rent. Export of fuel develops at the higher-than-anticipated rates and consequently the volume of fuel (firs of all oil and gas) rent grows: the share of fuel increased from 22.6% in 1960 to 58.7% in 1980 (with a multifold increase in the oil and gas rent), then decreased to 39.8% which was 1.7 times higher than the share in 1960. In 1998, the level of world oil prices fell again, but in subsequent years it grew up (until mid-2008) that restored the trend of structural shifts in favor of fuel. The share of foodstuff in 1999 remained at approximately 1960 level, although in 1980 it occurred its sharp fall; the size of the world land rent varied respectively. The share of exports of industrial commodities (where through mining and forest rents are realized) decreased 1.8 times, the share of such types of world rent fell respectively. The 2008/2009 world economic crisis led to a new fall in prices for commodities and weight of natural rent.

**Table 3.3. Dynamics and structure of world export of foodstuff and commodities<sup>1</sup>**

	1960	1970	1980	1990	1999
<i>World export, bln. USD</i>	128.3	314.1	2,002	3,425	5,522
in % of 1960	100	245	1,560	2,670	4,335
<i>Export of commodities and foodstuff, fuel, bln. USD in % of world export</i>	56.3	103.2	815	840	992
in % of 1960	100	183	1,448	1,492	1,764
<b>Developed countries, bln. USD</b>	26.5	51.4	300.7	419	503
in % of food-raw commodities export	47	50	37	50	51
<b>Developing countries, bln. USD</b>	24.6	42.8	450.7	338	426
in % of food-raw commodities export	44	41	55	40	4.3
<b>Countries with economies in transition, bln. USD</b>	5.2	9.0	63.1	83	60
in % of food-raw commodities export	9	9	8	10	6
<i>Export of foodstuff, bln. USD</i>	22.3	413	201	297	292
in % of world food-raw commodities export	39.6	40.0	24.7	35.4	39.6
in % of 1960	100	185	901	1,332	1,762
<b>Developed countries, bln. USD</b>	8.6	24.3	129.9	203.1	2,613
in % of world foodstuff export	53	59	65	68	67
<b>Developing countries, bln. USD</b>	8.6	13.9	61.7	84.9	121.9
in % of world foodstuff export	39	34	31	28	31
<b>Countries with economies in transition, bln. USD</b>	13	3.1	9.6	93	9.1
in % of world foodstuff export	8	7	5	3	2
<i>Export of fuel, bln. USD</i>	12.7	28.9	477	364	365
in % of food-raw commodities export	22.6	28.0	58.5	43.3	39.8
in % of 1960	100	22.8	3756	2866	3122
<b>Developed countries, bln. USD</b>	3.4	7.6	87	103.8	121.6
in % of world foodstuff export	27	26	18	29	31
<b>Developing countries, bln. USD</b>	7.7	18.4	318.1	200.9	234.6
in % of world fuel export	61	64	73	55	59
<b>Countries with economies in transition, bln. USD</b>	1.6	2.9	42.3	59.5	38.8
in % of world fuel export	13	10	9	16	10
<i>Export of industrial commodities, bln. USD</i>	21.3	33.0	137	178	205
in % of food-raw commodities export	37.8	32.0	16.8	21.2	206
in % of 1960	100	155	643	836	960
<b>Developed countries, bln. USD</b>	11.3	19.5	83.8	112.1	120.1
in % of world foodstuff export	53	59	61	63	59
<b>Developing countries, bln. USD</b>	8.3	10.5	41.9	52.1	72.8
in % of world raw commodities export	39	32	31	29	36
<b>Countries with economies in transition, bln. USD</b>	1.8	3.0	11.2	14.2	11.9
in % of world industrial commodities export	8	9	9	8	6

<sup>1</sup> Ustinov I.N. World Trade. Statistical and Encyclopedic Reference Book. M.: Ekonomika, 2002. P. 54, 139, 293, 693.



**Fig. 3.2. Indices of world production and export of industrial commodities (1990 = 100)**

*Third*, changes occurred in the distribution of natural rent and its major types by group of countries. Approximately a half of fuel-raw commodities and foodstuff exports falls to the developed countries; about 43% - to developing; the share of Countries with economies in transition (including Russia) is small – 6% only. The exception was 1980 when the share of the developing countries rose to 55%, and the share of developed fall to 37%. However, the "rebellion" of developing countries was soon suppressed; powerful TNCs that operate in the global market restored the old structure.

The share of country groups (civilizations) in different categories of goods varies. In the export of fuel (and, accordingly, in the fuel rent) developing countries are in the lead, although their share declined slightly - from 73% in 1980 to 59% in 1999, the share of developed countries fell from 27% in 1960 to 18 % in 1980, then rose to 31% in 1999, countries with economies in transition, with significant reserves of mineral fuels, and especially Russia, could not realize its advantages: their share in exports of fuel has dropped from 13% in 1960 to 9% in 1989, rose to 16% in 1990, but then again decreased to 10%. Those countries' share in the global oil and gas rent is much lower because their costs for oil and gas production are several times higher than that

of the major oil exporters - countries of the Middle East.

With regard to food (and, consequently, land rent) and industrial commodities (mining and forest rent), the leadership is clearly with the developed countries which share in exports of foodstuff rose from 53% in 1960 to 67% in 1999 (the differential rent of the second kind especially increased due to the technological revolution in agriculture), and in the export of industrial commodities - from 53 to 59% for the same years. The developing countries' share in foodstuff exports declined from 39 to 31%. The share of countries with economies in transition in the export of foodstuffs fell four times (from 8 to 2%), while in industrial commodities export remained stable in the range of 8-9% (mainly due to exports of metals and mining and chemical commodities) but it dropped 6 % by 1999.

How will the processes of *globalization* and modern scientific and technological turn underlying the establishment of the post-industrial technological mode of production influence the dynamics and structure of the world natural rent? Here we should note several processes.

**First**, the trend of growth in the share of finished products, manufactured goods and high-tech products in the structure of exports will continue that will greatly reduce the demand for food, mineral, and forestry raw commodities and their share in the structure of export which differs substantially by country groups and civilizations.

The share of nature-intensive goods in world trade will fall and the space for the world natural rent will reduce respectively.

**Second**, deepening the technological gap between rich and poor countries will become a fall factor of the developing countries' share in the world natural rent. Mastering the sixth technological order is connected with large investments in research and development, innovations, in modernization of production. The low-income countries do not have the funds for that, so one should not rely on large-scale investments in basic innovations there.

**Third**, globalization carried out by neo-liberal model in the interests of TNCs leads to intensification of redistribution processes of

income in general, and rent incomes in particular. A significant portion of the rent generated by the natural resource base of low- and middle-income countries is actually appropriated by TNC through transfer pricing, bypass of taxes, bribing officials, etc. This further reduces the opportunities to appropriate that share of world natural rent which would be due to them in a more equitable distribution and use of world natural rent, by developing countries and countries with economies in transition.

If these trends persist and further implementation of the neoliberal model of economic globalization, the world economy will be at an impasse. On the one hand, rich countries holding key positions in the world production, foreign trade, investments despite all the successes in reducing energy and material intensity of their products, cannot do without increasing imports of nonproduced raw materials and fuel, as well as timber and certain agricultural products from countries with low- and middle-level of development. On the other hand, many poor countries - exporters of agricultural products, natural raw materials and fuel - do not have sufficient resources to modernize their economy and provide a decent standard of living for population; billions of people struggle to survive in the clutches of poverty, unable to use the rent income appropriated by TNCs. The increasing polarization reaches the limits under which the global socio-economic system cannot function as the common integrity, moving to a global social explosion, which can lead to selfdestruction of humanity in the world saturated with deadly weapons.

There are two possible ways to prevent this explosion. One path - towards global totalitarianism, the establishment of the world dictatorship of the most powerful civilization and superpower with the formation of a unipolar world, the subordination of the rest of the world, and forcible suppression of opposition. This is the concept of Zbigniew Brzezinski<sup>1</sup>; of Russian scientists it is more clearly expressed by V. Inozemtsev<sup>2</sup>. In this case, TNCs relying on the power of the super-

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<sup>1</sup> See Brzezinski Zb. *The Grand Chessboard*. M.: 1998.

<sup>2</sup> See *Inozemtsev V.L. The Divided Civilization*. M., 1999.

power determining the world order, will carry out the unimpeded flow of world rent, antirent and quasi-rent into their accounts securing the continuing growth of economy of rich countries and civilizations.

However, this path is illusory and highly dangerous, as it encounters increasing resistance of majority population of the Earth driven to despair. This manifested itself noticeably at the World Summit on Sustainable Development in Johannesburg (2002). Despair, lack of prospects, inability to provide the conditions for survival of children and grandchildren against the background of growing wealth and complacency at the opposite pole are the breeding ground for international terrorism, clashes between civilizations and ethnicities. These growing grapes of wrath can not be suppressed by military force; it is necessary to overcome deep roots of polarization increased to a critical limit. The boiler will explode sooner or later, and no rescue from the explosion will be at any continent. Such a prospect causes a mass movement of people who does not agree with it not only in poor but also in rich countries, and the power of this movement will increase each year.

Another way remains: to choose and implement a *humanistic-noospheric model of globalization* that focuses on the interests of the majority population of the Earth, the world civil society, present and future generations.

This model we believe should be based on the concept of *global sustainable development*, dialogue and partnership among countries and civilizations, in addressing global ecological, demographic, technological, economic, geopolitical and socio-cultural issues that determine the fate of humanity as an integral system. With regard to the issue of world natural rent assumptions of this concept are the following. Natural wealth is not a creation of human. They are distributed around the globe very uneven, disregard the partitions and borders created by people and are designed to provide vital activity and reproduction of the entire human race, more specifically Homo sapiens species. Rational exploitation of natural resources and provision of all earthlings with them can not be a privilege and source

of enrichment for any one group of people, whether it is a private company, TNC, or a separate country. Revenues from exploitation of natural resources, including super-profit as economic content of the natural rent should be reasonably distributed among the different levels of economic activity of people: enterprises that carry out this exploitation, keep the house using efficient technologies to this effect, municipal, regional and state associations, in the territory of which this wealth is located and which shape socio-economic environment for their use and are entitled to a share in the resulting super-profits; finally the local and global civilizations because they form the demand for nature-intensive products (failing which no super-profit would arise), concentrate intellectual capital and investments for effective exploitation and use of natural resources based on new technologies, should appropriate a part of the world natural rent received for rationalization of environmental management on a global scale and support for countries and civilizations deprived of natural resources. This will not only be a new model of globalization but also a new world order where the global civil society and institutions established by it will be able to put under control the vested interests of TNCs and individual states in the interest of all humanity, having carried out a modus vivendi for not only the "golden billion" but also the other billions of earthlings. This path is long and arduous, it will encounter a fierce resistance of powerful TNCs and the wealthy powers, the opposition of the advocates of market fundamentalism who seek to privatize and harness natural wealth to serve them. There is no certainty that this path will be walked through the end in the coming decades; but it is the essential element, the core of the global idea which will have to unite active and far-reaching social and political forces of humanity for its preservation and development.

We now consider in more detail the problems of the main types of world natural rent - land and mining.

### **3.4.2. The Land Rent in a Globalizing World**

The world land rent is the first in its origin. It emerged in the

ancient world, when the exchange of products between countries and civilizations assumed a regular nature though often violated by wars.

In the Middle Ages international trade developed, especially in agricultural products, spices, tea on the Silk Road, the Great Volga and Neva-Dnieper Roads, as well as maritime routes rapidly developing. In conditions of frequent wars, it was a risky occupation. One had to cover the increased risks by a high level of trading profit which included a rent element as well. The international trade associations were established featuring the Hanseatic League, the East India Company. The great geographical discoveries, the development of the New World increased many times the volume of international trade, contributed to the development of new crops in Europe.

With the formation of colonial empires, much of the previous international exchange of agricultural products was carried out within the empires, between the metropolis and the colonies. The Industrial Revolution, the application of its achievements in agriculture intensified international food trade and led to an increase in the scale and share of the world differential rent.

The world land rent emerged not only in trade in food and spices but also in the manufacture and sale of agricultural raw materials. In North and South America, it became one of the reasons for the development of plantation agriculture and resuscitation of the slave order, resulting in the deaths of tens of millions of Africans.

In the industrial society a system of international division of labor developed, many countries specialized in manufacturing and supplying the world market with food and agricultural raw materials while hoping for a world land rent. On this basis effective export production developed in a number of countries such as Canada, Australia, and New Zealand. In the 20<sup>th</sup> century, especially in the second half, production and export of agricultural products began rapidly to increase in developed countries based on the technological revolution. As a result, under the overall increase in food exports from 1960 to 1999 in current prices from 22.3 to 392 billion USD (17.6 times) the share of developed countries in this market grew from 53 to 67% (a growth in

22 times in exports at current prices) whereas the share of developing countries declined from 39 to 33%, and countries with economies in transition - from 8 am to 2%. The share of developed countries in the appropriation of land rent grew to an even greater extent as they have higher labor productivity. For example, in 1998-2000 the added value per agricultural worker (in 1995 prices) amounted to 54.1 thousand US dollars in Denmark, the Netherlands and France – 53.8 thousand, Singapore – 49.9 thousand, Finland – 36.6 thousand, the UK – 34.9 thousand, Canada – 34.9 thousand, whereas in Russia – 2.2 thousand, Poland – 1.9 thousand, Uzbekistan – 1.0 thousand, Tajikistan – 0.3 thousand, Angola – 0.12 thousand, Mozambique – 0.13 thousand, Ethiopia – 0.14 thousand USD. In the future we can expect a further drop of the world land rent in total income of foreign trade.

In the second half of the 20<sup>th</sup> century production and export of agricultural products had a steady trend to increase, and the dynamics of export prices was remarkable for significant fluctuations.

The structure of land (agricultural) rent can be viewed in three aspects.

The *forms* of land rent: differential, absolute, and monopoly. *Differential rent* is most widespread and movable.

The *differential rent of the first kind* has two varieties: by fertility of the lands used (natural and artificial, the latter is the result of accumulated agricultural culture, fertilizer application, irrigation, etc.) and by location (natural-climatic conditions, remoteness from marketing outlets and procurement of materials, development of transport networks); a location-based rent is intertwined with transportation rent.

The *differential rent of the second kind* expresses a super-profit arising from the use of science and technology achievements to improve soil fertility, crop yields, livestock productivity, and transportation costs reduction. This variety of differential rent overlaps with the technological quasi-rent, is its specific manifestation in agriculture associated with a better use of the natural factor. The differential rent of the second kind increases during the technological

transformation when new generations of equipment and technology spread; it reduces when these innovations become prevailing, defining socially normal costs and prices of agricultural products; practically disappears in the phases of crisis and depression of technological, economic and agricultural cycles. A drop differential rent of the second kind (as well as other types of differential rent) is especially noticeable during prolonged agrarian crises. N.D. Kondratieff notes as one of the regularities of cyclical dynamics that the down waves of big cycles of conjuncture are accompanied by long depression of agriculture, the absolute and relative decline in prices for agricultural products<sup>1</sup> that reduces the possibility of formation of not only differential but also the absolute and monopoly land rent.

*The differential rent of the third kind* is of an inter-product nature, it expresses the relation of costs and prices of substitutable products of agriculture - such as wheat, rye and barley, pork, beef and mutton, coffee, cocoa and tea. The prices for interchangeable products (although no complete substitutability exists) are formed under the influence of the costs of a more expensive product otherwise it would not enter the market. As a result, manufacturers of cheaper products will receive a super-profit. Weather conditions of each year, the relation of supply and demand, price policy of monopolies and other factors, including non-economic affect the dynamics of prices of substitutable goods and the value of the differential rent of the third kind.

*The absolute rent* is the result of the monopoly of private ownership to land (whereas the differential rent are the monopolies of the private business practice on the land). It is more stable than the differential rent, and in principle it is appropriated by the owners of all plots of land causing higher prices for agricultural products compared with the average price of production for the national economy. However, another consideration is that a significant portion of farmland is owned by the state, major agricultural and commercial

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<sup>1</sup> Kondratieff N.D. Big Cycles of Conjuncture and a Theory of Foresight. M.: Ekonomika, 2002. P. 276-277.

farms and also small private owners farmers who can run the economy with income below the average. Although there are no precise calculations of volumes of absolute rent, we can assume that its share in total income of agriculture, including the rent income is not high. It should be added that, according to Marx K., Lenin V.I. and other advocates of the theory of nationalization of land, its conversion to public ownership leads to the elimination of absolute rent - a tribute, which society pays to the landowners - and the relative reduction in price of agricultural products. In the international exchange of agricultural products the state acts as a separate owner in such cases and claims an appropriation of the absolute land rent.

The field for the emergence of *monopoly* land (agricultural) rent is rather narrow. It refers, for example, to areas with exceptional natural conditions permitting to get wines of rare taste or spices with the demand exceeding stably the supply, thus making it possible to establish and maintain high monopoly prices for these products - a source of super-profit. However, there could be fluctuations, rise or fall of monopoly rents in relation to fluctuations in yield or a change in the phases of economic and agricultural cycles.

Two main *types* of agricultural rents are distinguished between - farming and animal breeding; the roots of the differences lie as far back as in the first social division of labor during the Neolithic Revolution. The *farming rent* in turn can be divided into three varieties: *food* (production of various crops, vegetables and potatoes, sugar beet and sugar cane, fruit and berries, and oilseeds); *agricultural raw materials* (production of cotton, flax, silk cocoons, hemp, and tobacco); *tropical* (cultivation of tea, coffee, cocoa, spices, and rubber trees). The *animal breeding rent* can be divided into meat, butter and milk, poultry, wool, and leather. Often, different types of rent are combined in a single diversified farms protecting it in changes of weather conditions favorable for some and unfavorable for other crops or livestock products.

In the *territorial* aspect it can be considered a *land* (agricultural) rent at four levels: *local* - in sales of agricultural products on local

markets (for example, for suburban households); *regional* (within one market or group of neighboring regions, such as the North Caucasus, Central Chernozem zone, Western Siberia), *national* - in sales of major agricultural products across the country, their procurement by the state; *world* - within the civilizational union (for example, the European Union) or globally (on all major world food exchanges).

Special mention should be of such a prosperous type of world land rent, as *drugs rent*. It has as its main source the growing of agricultural crops that serve as a feedstock for the production of drugs, then distributed through an extensive network of traffickers and dealers around the world. Although no official data is available on drug trafficking and super-profits received, it could be tens and hundreds of billions of dollars. Cultivation of drugs is carried out mainly in Central and South-East Asia (Afghanistan, Myanmar, etc.) and Latin America (Colombia and other countries) where much of the world drugs rent is settled; however, the overwhelming share of it is appropriated by international drug cartels - a kind of illegal but a powerful form of transnational corporations in the field of criminal business. While all states are fighting against the production, export and import of drugs, destroying a large part of them, these costs are included in the retail price for the tens of millions of drug addicts.

The size of the national and world land rent is directly affected by the change of phases of long-term and medium-term cycles. N.D. Kondratieff noted that the period of the up wave of a big cycle of conjuncture is accompanied by increases in commodity prices and an increase in rent: "The high rates for agricultural products on the world market and low cost of production in the countries of intensive farming with cheaper transportation costs provided a high differential rent to these countries and pushed them to the path of a rapid growth of agricultural production and exports<sup>1</sup>. The down waves of big cycles, by contrast, are accompanied by falling prices and land rent<sup>2</sup>.

Who *appropriates* the world land (agricultural) rent?

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<sup>1</sup> Kondratieff N.D. Big Cycles of Conjuncture and Theory of Foresight. M.: Ekonomika, 2002. P. 717

<sup>2</sup> Ibid. P. 377-379.

The system of assigning the world agricultural rent can be divided into two basic levels - national (within the national economy) and supra-national, international (within the world economy or its major part).

Each of these levels, in turn, is divided into several sub-levels.

We consider the *national* level, only in the part that relates to export or import of agricultural products.

The primary source for the emergence of the land rent are *agricultural producers* - both farms and peasant farms which supply products for export as well as large agricultural producers (including plantations specializing in supplying of agricultural products to the world market - coffee, cocoa, tea, latex to produce rubber, spices, as well as specialized broiler, meat and dairy, and other companies); it can be attributed here associations of agricultural producers - cooperatives, cartels, etc. A part of the agricultural producers using a new highly efficient technology that appropriates the differential rent of the second kind, in using the most fertile and favorably situated lands - a part of the differential rent of the first kind (by fertility and location), inter-sectoral differential rent of the third kind, and even the absolute rent if they are the owners of the farmland. Of course, only those countries may participate in the appropriation of the world differential rent where the agricultural productivity is much higher than world average.

The next sub-level is represented by agricultural products processing enterprises, procurement sales organizations, financial and credit and insurance companies, as well as land owners and mortgage banks. The last group claims to an absolute rent and a part of the differential rent of the first and third kind.

Municipal and regional bodies get their share through federal and local taxes and fees as well as dotations and subventions from the center. The role of central government bodies is a key one. They not only appropriate a part of the world land rent through taxes, levies and customs duties (both export and import) but also take some of the risks caused by sharp fluctuations in export and import prices, and use

a significant share of the resources to subsidize farmers, implementation of the programs to maintain soil fertility, making the land cadastre, to combat drug trafficking, etc. WTO limits the amount of customs duties protecting domestic agricultural producers, and the sizes of government support to them, yet this and other tools are widely used in the customs policy of many countries.

### **3.4.3. The Leading Role of the World Mining Rent**

Mining rent plays the leading role in the world natural rents now.

The mining rent, as well as land, has a long history. The beginning can be attributed to the 3<sup>rd</sup> millennium B.C., when it started the international exchange of gold, silver, bronze and their products. The appropriation of these coveted resources is often served the cause of wars and raids but there were also channels of international exchange of these commodities, especially in the classical antiquity. The purpose of these exchanges was not only expanding the range of jewelry, tools, and weapons but also receiving super-profits.

In the periods of medieval and early industrial world civilizations the range and volume of international trade in mineral products extended greatly. Development of the New World and a powerful flow of gold and silver from the overseas colonies which greatly increased the influx of the mining rent played a big role in this. Spanish and Portuguese empires, which were then pressed by the British, absorbed the flow of precious metals from India and other colonies raised on this stream.

In the industrial era, beginning with the industrial revolution of the late 18<sup>th</sup> - early 19<sup>th</sup> century a rapid growth in demand for mineral products to create rapidly expanding fleets of machinery, railways, locomotives, steamboats, various firearms once again led to a multifold increase in the scale of the world mining rent.

The technological revolution of the late 19<sup>th</sup> - early 20<sup>th</sup> century gave new impetus to the development of the mining industry and international trade in minerals. The development of oil production and

refining, obtaining a wide range of liquid petroleum products from it used in internal combustion engines, in the power industry became the largest event. International trade in ores and concentrates of ferrous and nonferrous metals and metals themselves, mining and chemical raw materials and mineral fertilizers further developed. Mineral raw materials and fuels and their derivatives occupy leading positions in the world of rent income pushing agricultural products and land rent into the background.

These trends continued and intensified in the second half of the 20<sup>th</sup> century when natural gas was included in the structure of fuel balance, and the development of electronics required to increase production of rare and precious metals. International trade in mineral products grew at priority rates and the volume of world mining rent increased respectively.

However, in the last decades of the 20<sup>th</sup> century the reverse of these trends began. High-tech goods and services moved to the first place in production and international trade; mineral raw materials and products of its processing play a less and less role. Under the current rate of production the limit of exhaustion of the best and most accessible reserves is approaching for many kinds of mineral raw materials and fuel, and the transition to the worst deposits is associated with a significant rise in prices for their production and processing. Therefore it can be expected that by the middle of the 21<sup>st</sup> century the extraction of many minerals will be reducing and the costs of production, processing and transportation will increase relatively and absolutely, differentiation of production costs will increase by countries. This means that the size of world mining rent, albeit reduced compared with respect to technological quasi-rent, it will increase absolutely. Humanity will never come to a state of "no mineral" reproduction.

The world mining rent is subject to quantitative and qualitative fluctuations in the change of civilizational cycles, at different phases of formation, development and decline of world civilizations marking the

milestones in the history of humanity. However, cyclical fluctuations in production, international trade and world rent are also observed within long-term (Kondratieff) and medium-term (decade-long) economic cycles.

Dissemination of a new technological order (within the Kondratieff cycle) and, to a lesser extent, next-generation technology (within the medium-term cycle) is accompanied by massive renewal or modernization of fixed capital, a significant increase in production and foreign trade, and consequently by a substantial increase in demand for mineral raw materials and fuel, domestic and world prices for it. This gives impetus to the growth of production at the developed fields of minerals, exploration and involvement of new fields in production with the worst mining conditions. Thus expands the volume of both absolute (and sometimes even monopoly) and differential rent of the first and third kind. At the same time the opportunity is offered to use scientific and technological achievements, new generations of equipment and technology in exploration, production, refining and transportation of minerals that leads to reduction of costs and increase of the scope of the differential rent of the second kind.

In the phase of maturity of the technological and economic cycle the amount of mining rent received (domestic and world) reaches maximum but the rate of rent begins to fall. In the phases of crisis and depression, total volume of production and investment reduces, demand for mining products also decreases; businesses that develop the worst fields suffer bankruptcy, weight and rate of absolute, monopoly and differential rent reduces until the recovery phase when the curve of price and rent dynamics begins to go up again.

**Table 3.4. Structure of the world natural rent<sup>1</sup> (Natural resources rents, % of GDP, 2010)**

<b>Civilizations</b>	<b>Total natural resources rents</b>	<b>Oil rents</b>	<b>Natural gas rents</b>	<b>Coal rents</b>	<b>Mineral rents</b>	<b>Forest rents</b>
<b>World</b>	4.0	1.8	0.4	0.8	0.8	0.2
<b>West European</b>						
Euro area	0.3	0.0	0.1	0.0	0.0	0.1
United Kingdom	1.5	1.2	0.3	0.0	0.0	0.0
Norway	13.1	10.1	2.9	0.0	0.0	0.0
<b>East European</b>						
Poland <sup>2</sup>	1.0	0.1	0.1	1.3	0.6	0.2
Romania	2.2	1.2	0.7	0.3	0.0	0.0
<b>Eurasian</b>						
Russia	19.9	14.2	3.6	1.4	1.7	0.3
Kazakhstan	27.6	22.4	2.7	6.5	2.5	0.0
Azerbaijan	46.5	42.6	3.9	...	0.0	0.0
Uzbekistan	29.4	3.3	18.1	0.2	0.7	0.7
Turkmenistan	43.9	19.7	24.2	...	0.0	0.0
<b>North America</b>						
USA	1.0	0.7	1.0	0.4	0.1	0.1
Canada	3.8	2.3	0.3	0.1	0.8	0.5
<b>Latin America</b>	8.0	4.7	0.4	2.1	0.6	0.2
<b>Oceanic</b>						
Australia	8.3	0.9	0.7	1.8	6.6	0.1
<b>Chinese</b>						
China	4.5	1.5	0.1	0.0	2.2	0.2
<b>Indian</b>						
India	4.0	1.0	0.4	2.6	2.1	0.6
<b>Japanese</b>						
Japan	0.0	0.0	0.0	0.0	0.0	0.0
<b>Buddhist</b>						
Vietnam	10.4	8.0	1.3	3.1	0.3	0.7
<b>Moslem</b>						
Middle East and North Africa	17.7	14.9	3.2	0.0	0.6	0.1
Indonesia	6.0	2.4	0.9	0.0	1.0	0.0
<b>African</b>						
Sub-Saharan Africa	16.7	12.0	0.5	0.0	1.3	1.3

In 2010, according to the World Bank estimates (Table 3.4 ) the world natural rent was 4 % of GDP, including oil rent - 1.8 %, gas rent - 0.4 %, coal and mining - by 0.8 % and forestry - 0.2 %. The main rent receivers were Muslim, Eurasian, Latin American, African and Oceanic

<sup>1</sup> 2012 World Development Indicators. Washington: The World Bank, 2012. p. 204-206.

civilizations. The western European, eastern European, Japanese civilizations were paid rent when buying mineral fuel and raw materials. But actually the main part of the world rent was appropriated by multinational corporations who shared it with the owner states of subsoil.

However, the sharp fall in world commodity prices as a result of the global economic and financial crisis of 2008-2009 led to a multiple drop in the volume of world mining rent and its share in export value. One might expect that with the beginning of economic recovery mining rent will partially restore its positions but it will unlikely reach the level of 2007 in the future, as factors limiting the growth of world prices for mineral fuels and raw materials will persist.

Various forms of mining rent are investigated in the monograph "The Pricing Methodology in the Mining Industry"<sup>1</sup>. They are different in many ways from forms of land (agricultural) rent. Differential rent of the first kind reflects the geological and production settings for mineral deposits: the volume of recoverable reserves, thickness of layer (orebody), depth of occurrence (availability for open or underground mining), the angle of incidence, water content, gas content of coal seams, etc. Another parameter of the differential rent of the first kind is the natural quality of mineral resources occurring in-situ: the content of useful components, useful and harmful impurities in the ore, the heat of combustion and coke capacity; the content of light fractions, sulphur, and paraffin content in oil, etc. The third parameter is the geographical location of the deposit, natural and climatic conditions of its exploration and development, proximity to transportation routes, sale markets, etc. These parameters can be in different combinations, vary at different stages of development of the field and at its various sites (ore fields, oil-bearing horizons, etc.). In relation to the world differential rent these parameters are averaged over the country, determining the effectiveness of export of this or that mineral.

Differential rent of the second kind arises in the use of more

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<sup>1</sup> *Yakovets Yu.V.* The Pricing Methodology in the Mining Industry. M.: Ekonomika, 1965.

efficient technologies of exploration, production, transportation and processing of minerals, allowing for achieving lower costs or improved performance and appropriating super-profit (in fact, technological quasi-rent) for a while until a new technology becomes widespread determining the publically normal level of costs and profits. The scale of differential rent of the second kind increases during the spread of new generations of exploration and mining equipment (technologies) but then stabilized, in phases of crisis and depression differential rent of the third kind practically disappears.

Differential rent of the third kind expresses super-profit received by the extractive industries for those substitutable minerals, which have lower costs compared to the relatively worse, determining the level of market prices. This applies, for example, to fuel oil, natural gas and associated gas, energy coal and uranium fuel, substitutable building materials, etc. However, it should be noted that no complete substitutability of minerals exists, they usually vary by individual consumer characteristics and the price level, furthermore, the degree of substitutability may change with the development of fundamentally new technologies.

Absolute mining rent, unlike land (agricultural) rent is of a temporary nature. It terminates its existence together with the end of working the deposit.

Monopoly mining rent occurs in the instances when exclusive properties of this or that deposit of mineral resource, scarcities in its reserves allow establishing and supporting domestic or world prices, for the time being, on the level ensuring deriving of additional profit above differential and absolute rent. However, such exclusive cases are quite hard to identify in practice. In connection with world rent such opportunities arise in setting up of international cartels.

It is possible to identify a rich palette of varieties of mining rent depending on the types of mineral resources.

Fuel rent includes super-profit derived in production, transportation, oil and associated gas refinery, natural gas and condensate, coal as well as during oil refinery. Now fuel rent occupies

the leading position in the structure of natural rent both on world market (see [Table 3.4](#)), and in the economy of major oil exporters, such as the Saudi Arabia and other Arabic countries, Russia, Venezuela, Nigeria, Norway, etc.

Mining ore rent is implemented through sales inside the country and export of ores of ferrous and non-ferrous metals and products of the first process stage, noble metals, diamonds and precious stones, mining chemical raw material, potash fertilizers and phosphate fertilizers. These groups of goods occupy a considerable share, though going down, on the world market as well as in Russia's export.

Prospecting rent on the stages preceding mining the deposit of natural resources is immediately allied with mining rent. It externalizes in super-profit derived by prospecting companies in opening of rich deposits. Prospecting jobs are often performed in other country that is the basis for formation of world prospecting rent then developing into mining rent.

The mechanism underlying appropriation of mining rent, its distribution by countries and civilizations depends, first and foremost, on the form of ownership to subsurface, mineral resources available there. In many countries state ownership to subsurface prevails. This vests the state with the right to claim the appropriation of the major part of mining rent (especially world), except differential rent of the second kind and in part - of the third kind.

Many economists agree that private property to subsoil assets does not meet the requirements to their rational use, restore of exploited reserves. But how apart from the state is it possible to ensure the implementation of 'civil property' to subsurface? Who will issue them to lease by businessmen, evaluate and take rent, distribute it between all nationals in the country? And what should be done about world mining rent, which to a great extent depends on relation demand and supply on the world market and fluctuations in export prices? The state is set up by civil society exactly to exercise under its commission a number of significant functions for the benefit of that society, including take care of rational consumption, replenishment

and protection of natural resources, including subsurface assets, use income derived therefrom (including rent) in behalf of the majority population in the country and future generations. The state acts as the subject appropriating world mining rent. The other thing is that under market economy it should share with businessmen (mining industrialists) who ensure use of subsurface and create differential rent of the second kind and share mining rent in export of mineral resources and fuel with transnational corporations.

At the national level prospecting companies engaged in prospection, exploration and economic evaluation of deposits and mining are the originators of super-profit (mining rent) in all its forms as well as mining industrialists tapping such deposits, mining them and often doing beneficiation and primary processing (for instance, at metallurgical integrated works). They may mainly claim the differential rent of the third kind (under state property to subsurface), and if they are owners of proved deposits of mineral resources, then to other forms of rent. Withdrawal of the major part of differential rent of the first and third kinds, absolute and monopoly (if it is created) mining rent puts mining industrialists and geologists in equal conditions of competition as they do not create subsoil assets, which they have discovered or operate.

However, enterprises and organizations processing products of the mining complex or servicing it may participate in appropriation of differential rent (especially differential rent of the third kind) such as secondary processing enterprises (consumption) of mineral resources (for instance, heat stations, metallurgical, petrochemical plants, cement plants) as well as companies engaged in development and supply of more efficient equipment and technology to mining industrialists and geologists, including carriage, sales, export, and financial companies. In the period of the 90s reforms in Russian and other CIS countries a lot of intermediary companies emerged in the mining complex that sought to appropriate a considerable portion of mining rent, overstating the level of prices for mineral raw materials.

Authorities, especially under state ownership to subsurface, are

actively involved in appropriation of mining rent, building an appreciable part of budgetary revenues thereon. Along with customary taxes on profits, value added tax, and property tax specific forms to withdraw rent are applied. A minimum share of mining rent is appropriated by municipal bodies, mainly in exploitation of deposits of local importance, from mining lease as well as in getting dotations and subventions from regional and central bodies. A share of mining rent appropriated by regional bodies is significantly higher (for instance, in major oil and gas producing regions). But major part of mining rent goes to the federal budget, where rent mechanisms are used – differentiated rates of royalties to the state as the owner of subsurface in percentage of gross output or profits or fixed rates per physical unit of products as well as payment from each unit of land allocated under license to do prospecting. The state may also get a part of rent as full or partial owner of mining companies in the form of dividends on its shareholdings.

Appropriation of world mining rent occurs at two levels: commercial and interstate. Transnational corporations and international monopolies playing the leading role in mining, export supplies, carriages and sales of minerals and products of their processing get a significant share of this rent. Usually these are companies with vertical organization covering all chain from prospecting to gas fuel station, ferrous and non-ferrous metal scrap stations, etc.

The behavior of world mining rent is essentially influenced by regular fluctuations in world export prices.

It is possible to identify several tasks faced by global civil society in the field of evaluation, appropriation, distribution and use of world mining rent for the benefit of all humanity and future generations.

First, there are necessary scientifically sound, internationally recognized and practically acceptable techniques of determining the value of world mining rents derived by TNCs operating in this area and individual countries, reliable methods for the statistical monitoring and control of its dynamics, to minimize concealment of its true size

with the help transfer prices and in other ways.

Second, agreed rates of deductions from world mining rent to interstate (within civilizational and other associations as the European or African Unions, CIS, etc.) fixed under international law will be required as well as global ecological funds for ensuring guaranteed reproduction and providing with mineral raw material basis of all civilizations and states regardless of their available deposits of these or those mineral resources.

Third, in view that the subsurface deposits are not renewable and many deposits will be depleted in the 21<sup>st</sup> century, then it is time to start outlining and implementing interstate and global programs and large-scale projects on increase in reserves and their efficient use and replacing of fossil fuel and raw material with alternative sources of energy and materials. For financing of such programs and projects it should be used both specialized funds, and consolidation of investments of countries and civilizations concerned and using the mining rent among other things.

### **3.5. THE ECOLOGICAL RENT AND ANTI-RENT**

#### **3.5.1. The Emergence of a New Economic Category**

The point at issue above was natural rent - an economic category existing within thousands years, being studied by scientists within several centuries. The ecological rent and anti-rent addressed below are a phenomena of business life which have formed literally in front of our eyes within recent decades of the 20<sup>th</sup> century, and only now it is being introduced into scientific use, becoming the object to study in order to be further included in the noosphere system of economic transformations and regulation both on national state and global levels. A lack of success of the global environmental summit in December 2009 clearly demonstrated the vital importance of this new category, which becomes a divide line between rich and poor countries and civilizations.

How are new categories born in science? There are two ways. The

first is the result of the development of scientific cognition, discovering by an inquisitive researcher of objective process or phenomenon existed long ago but yet unknown or failed to find explanation. The other way is in the emergence of the process (phenomenon), which has not existed and which is only now in the process of its becoming, in its pristine freshness attracts close attention of researchers. Ecological rent and anti-rent belong exactly to the latter case.

N.D. Kondratieff notes that unlike physical, chemical laws and other natural sciences, laws of socio-economic sciences change together with the development of society, arising and disappearing together with its transition from one stage to the other. This presents a specific difficulty and specific charm for inquisitive researchers – to discover changes in the system of socioeconomic laws in transition to another world civilization (and exactly such critical period is observed at the turn of the millennia).

This applies in full extent to the system of economic categories. Subject to the regularities of socio-genetics, the system of categories studied by science described various sides of industrial capitalist (as well as industrial socialist) economy, is subdivided into four layers. Some of such categories express the hereditary nucleus, genotype of economic life and invariably succeeded by the following phase of the development of society. Others, describing the variability in the dynamics of systems are modified with respect to changed conditions for functioning of society. The third was specific to completing stage and leaving the arena together with it, becoming the subject-matter to be studied in the history of economy. And finally, the fourth layer of economic categories arises describing the specifics of the system of the next economic mode of production with a set and correlation of economic orders inherent to it as well as the level of socialization of reproduction featuring from local to global.

Ecological rent and anti-rent belong exactly to the latter layer describing specific features of humanistic noospheric postindustrial society aborning with contradictory processes of globalization inherent to it. These categories have been introduced in scientific use

only recently<sup>1</sup>.

So, why did ecological rent and anti-rent emerge only at the end of the 20<sup>th</sup> century, whereas their immediate relative – land rent has already existed within several millennia, being modified in transition to the next economic mode of production?

The industrial society has brought to its limit the involvement of natural resources in the process of reproduction and negative impact of production and people's activity on the environment. Globalization has speeded up this process many times and aggravated contradictions inherent to it. This has entailed a principally new phenomenon in business life – a new major social division of labor, formation of ecological activity as a specific sector of national economy with the system of economic categories inherent to it. What kind of activities may be attributed to such sector of national economy along with industry, agriculture, construction, transport, etc.?

This, **first**, ecological science fundamental and applied researches and research and development targeted at the study of trends, contradictions and perspectives (ecological forecasts) of relations between society and nature, ensuring reproduction (in terms of economy) of natural resources (land, mineral, forest, water, etc.), conservation and improvement of the environment. Such specialization, separation of ecological researches and development is already a fact in the world and Russian science (though it is still not acknowledged in the classification of sciences for natural, technical, social and human sciences and ecological).

**Second**, the group of nature management industries ensuring reproduction and replenishment of natural resources, which are necessary to carry on simple and expanded reproduction featuring geologic exploration, forest, water and fishery, maintaining fertility, melioration and reclamation of lands, etc. Such industries separated

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<sup>1</sup> *Utkin A.I., Fedotova V.G.* The Future through the Eyes of the US National Intelligence Council: Global Trends 2025. M.: INES-MAIB, 2009. P. 72; The US Economy in Future. Problems and Predictions. M.: Progress, 1982. P. 40; *Yakovets Yu.V.* Russian Cyclicalism: A New Vision of the Past and Future. Lewiston-Queenston-Lampeter. The Edwin Mellen Press, 1999. P. 7-9.

long ago in the system of differentiation of labor, but they, as a rule, are dissolved in bigger industries consuming these or those natural resources, subordinated to the interests and requirements of the latter and therefore they are often unable to discharge their own functions with quality, and moreover, to ensure a uniform approach to reproduction and efficient use of interrelated types of resources.

**Third**, the environment-oriented industries ensuring monitoring the state, dynamics and pollution of the environment and forecasting its changes, designing and construction of purification plants and environment-oriented facilities, making new ecological facilities and ecological machinery, etc. (that is interlaced with other industries of national economy – science, industry, construction, and transport). The growing number of people and organizations worldwide are engaged in such types of business. Entities engaged in liquidation of the effects of natural calamities may also be included here.

**Fourth**, numerous consumers of natural resources - nearly all industries of the economy, including household – are included here. Some industries are nature-intensive (for instance, power engineering, metallurgy, and transport), others consume natural resources in the slightest degree (for instance, services, high-tech industries) but all business entities pollute the environment to this or that extent. From such viewpoint, all economy may be included in the ecological sector, but, however, understanding that only one side of this many-sided phenomenon is addressed.

**Fifth**, the industry in question includes ecological infrastructure, which ensures the delivery of natural resources to consumers, performs information and finance and banking service of activities with respect to all links of the ecological complex.

**Sixth**, it should be included here the ecological management on all levels – from specialized divisions in the management of enterprises, banks, research institutes, holdings, TNC to national and international organizations (UNEP, Global Environment Fund) carrying on the development of norms of nature management and environment protection activities, environmental standards, exercising control over

their performance, ecological examination of investment projects, collection of environment taxes and penalties, etc.

*Seventh*, it is also included here ecological education, which is elaboration of educational programs, issuance of textbooks and teaching aids on the environment-related subjects, teaching such subjects, arrangement of ecological education and upbringing in secondary and higher school, in the system of complementary education and distance learning, in teaching post-graduates and doctoral students, in the performance of specialized academic councils accepting for upholding theses, in issuance of educational multi-media disks on the environment, Internet sites, TV broadcasting, etc.

The specifics of the ecological sector of economy is first in its intersectoral nature (and accordingly, in a cross-disciplinary nature of researches performed in this field), in the necessity to unite efforts of various industries in the national economy (science and services to science, industry, construction, agriculture, management, etc.) for solution of major environmental issues. Second, the specifics is in a long horizon of environment activities, necessity to make allowances for long-term effects with respect to going processes sometimes continuing for decades. It requires a long retrospective view of researches, long-range economic forecasts and strategies. Third, the specifics of the ecological sector is in the multilevel nature of environment relations and interactions: some of them are of local nature tied to such locality; other - regional; third - national, statewide; fourth - transgovernmental nature covering the group of adjacent countries, the whole continent, and even all global ecological space. Fourth, in the beginning of its becoming this sector is characterized by its disproportionality and instability; one types of environment activities are more developed, the other - lagging behind, third - just begin to form. The latter includes the system of relation associated with making, appropriation and distribution of ecological rent and anti-rent.

Of course, the ecological sector of economy has its own set of economic categories meeting the specifics of its functioning and

development. Some of such categories may be named featuring environment demands of society; supply of production with key types of natural resources; cost of reproduction per unit of resources; economic damage from environment pollution; rates to compensate for costs to reproduce certain types of natural resources; payment rates for environment pollution; ecological rent; ecological anti-rent.

What is the content and specifics of two kindred, but opposite in their direction, mechanism of appropriation and distribution of the latest economic categories – ecological rent and anti-rent?

Ecological rent is super-profit arising in nature management and nature exploitation spheres as a result of application more advanced equipment and technology (against prevailing), ways of industrial engineering, etc. In its essence it is similar to differential natural rent of the second kind arising under efficient use of natural resource but appreciably wider as it may manifest itself in any type of business associated with use of natural resources and impact on the environment. It could be the employment of efficient (bringing super-profit) innovation technologies both in prospecting, forestry and water management, agriculture and so on, and in the sphere of processing and use of nature-intensive and material-intensive products, construction of purification plants and transport vehicles with minimal emissions, employment of non-waste technologies for raw material processing, etc. In such wide sense ecological rent may manifest itself in any sector of national economy, unlike natural rent, the field of which is limited by agriculture, mining industry and transport.

Along with that ecological rent is similar to technological quasi-rent as it is a result of the employment of more efficient technologies and is short-life in time as soon as ecological novelty becomes prevailing, expressing publicly necessary costs and normal effect of ecological activity, super-profit disappears in this field until next major environment-related novelty.

Consequently, ecological rent is progressive, it induces the technology developers and businessmen to seek all the time, find and employ more efficient ecological technologies leading to noospheric

economy. Therefore it is naturally that first of all, businessmen may claim the appropriation of ecological rent as well as developers of such technologies and the state taxing super-profits. This is a kind of a gingerbread inducing the agents of the market economy to seek all the time and implement ecological innovations as the period of super-profit brought by them (ecological rent) is short-life. But the world community may claim its share in distribution of such super-profit as its original source – a scientific-technological thought is of global nature and furthermore pollutions of global nature are overcome.

The content of ecological anti-rent is principally different as 'bastard' super-profit derived by businessmen (both national, and TNC) as a result of a predatory use of natural resources and discharges to the environment exceeding established standards. In actual fact, this is a result of theft of natural resources and living environment from future generations that in prospect will require additional costs for reproduction of natural resources and elimination of environment damages. Consequently, the issue in question here is not administrative and economic sanctions for illegal actions, but real economic consideration turned to future, somewhat looking like a kind of interest rate or discounting rate in estimation of deferred income. The main function of this category is not to be a carrot, but a stick punishing for anti-environment action and making it unprofitable a wasteful use of natural resources and pollution of the environment exceeding standards. Apparently, a businessman should be the payer of such environment penalties, and for transboundary pollution and damages – countries causing such damages in favor of a suffered country or world society represented by international organizations (first of all, environmental).

Withdrawal of ecological anti-rent has a positive, stimulating function, which make it closer to ecological rent and induces to efficient innovations in this sphere as it provides publicly accepted border for estimation of efficiency with respect to ecological innovations and investments. Consequently, working in pair, in close association, these two interrelated economic categories complete each

other, being the corner stones of noospheric economic mechanism operating on national and global levels and optimally combining state (and interstate) ecological regulation in the interests of present and future generations and market beginnings forming a real ecological and economic interest with commodity producers.

Moreover, a skilful application of these two categories in their unity meets the market laws to the greatest extent as it levels economic conditions of competitions between businessmen using the ecological factor not to the same extent, encouraging active innovators with additional profit (ecological rent) and punishing through ecological anti-rent of those operators tending to unfair competition, deriving super-profit through predatory use of natural resources and pollution of the environment exceeding standards. Thus the said categories serve the interests not only of ecological, but economic, technological and social progress.

It should be stressed once again that such categories have arisen not by chance, invented by zealous environmentalists followed by economists. Two generally accepted facts predetermined objectively underlie these categories, and more precisely – vividly expressed trends of the end of the 20<sup>th</sup> beginning of the 21<sup>st</sup> centuries. First, depletion of a number of types of natural resources and pollution of the environment reached the critical level and threatening to cause a change in the climate of the Earth and a chain of ecocatastrophes, especially in heavily populated areas of the planet; second, a rapidly increasing globalization being implemented in its recent model in the interests of TNC that deepens the gap between rich and poor countries. It is possible to mitigate these key contradictions of the 21<sup>st</sup> century, to prevent a global ecocatastrophe, ensure the implementation of the principles for sustainable development in the planetary scale through shifting from declarations and pathetic calls of alarmists, separate actions of the ‘green’ to practical actions to develop and implement such economic mechanism, which would make it unprofitable for each agent on the market a wasteful attitude to natural assets and pollution

of the environment, encouraging to ecological innovations, consideration for interests of future generations.

The matter in question is dynamic, formed stage by stage and developing mechanism. It would be the easiest for the sake of the rescue of nature to prohibit exploitation of natural resources and emissions to the environment. But this would become the beginning of a rapid decay of the society, 'cleaning' nature from man, who is unable to survive without consumption of natural resources and pollution determined by technologies employed. The content of ecological imperative, which was worded by N.N. Moiseyev, is in another: to establish conditions for optimal co-evolution of nature and society meeting the fundamentals of humanistic noospheric postindustrial society. This mechanism is remarkable for the fact that based on the continuous implementation and diffusion of economically justified ecological innovations there will be established conditions for step by step stiffening of environmental standards, multiple use of natural resources. This will also become the basis for gradual change in the vector of today's model of globalization, its humanization and 'noospherization'.

The extent of reality of the proposed ecological-economic mechanism should not be overstated, or the resistance to it be underestimated, assuming that statesmen and representatives of business world after familiarization with such concept will rush to implement it right away. Introduction of deductions from ecological anti-rent, moreover in the global scales would meet violent resistance of powerful TNC and states, which do not want to share super-profit with anybody else, but even showing its real amount at all, making it the object of state and interstate regulation. A clear scientific concept will be necessary supported by powerful social movement, pressure of the global civil society which is aware of its ecological interests and institutes in order that the ecological economic category in question would become a reality, setting it up in life.

### 3.5.2. The Forms of Ecological Rent and Anti-rent and Factors of their Dynamics

Let us consider two new categories in their certain hypostases together. As they act as twins and antipodes completing and setting off each other.

Traditional forms of rent are known: differential, absolute, and monopoly. To what extent are they applicable to the mentioned ecological and economic categories?

The existence of *differential* ecological rent and anti-rent is hard to dispute. The use of basic ecological innovations (mastering of new sources of natural resources, new generations of ecological equipment and technology) gives a considerable and relatively long-term super-profit, it needs no saying after all initial (start-up) high costs of pioneer mastering and a new market niche will be opened (although it happens not all always). In the maturity phase super-profit gradually comes to nought, and in the closing phase it is transformed into its antipode opening the way for mastering of the next generation. In the distribution phase of the new generation of equipment (technology), ecological rent is implemented through many improving innovations producing (but not always) minor and short-life super-profit. However, due to their large number the volume of ecological rent may be considerable, but gradually reducing.

It is also obvious differential nature of ecological anti-rent. It depends on the scale of violations made and resources tapped, strictness of state control over the compliance with environmental standards and losses exceeding standards in production of mineral resources, quality of the standards themselves and norms and other factors.

As concerns the *absolute* rent than it is almost not seen with respect to ecological rent. The other thing is with ecological anti-rent. Appropriating it, the state acts as the supreme owner of natural resources, responsible to present and future generations for the state of the environment. Therefore, here the traits of absolute rent

determining the minimum amount of fee for environment pollution and losses exceeding standards are more obvious.

*Monopoly* ecological rent and anti-rent may arise in the instances when TNC succeed in using its monopoly position for holding cheapening of ecological equipment or achieve exclusive (preferential) ecological standards and loss standards or achieve non-application of sanctions established under laws through corruption (bribing of the officials).

Variants of ecological rent and anti-rent may be arranged with respect to those types of natural resources and elements of the environment where they operate (Tab. 3.5.).

Ecological rent finds its expression as super-profit derived as a result of use of highly efficient technologies allowing significantly reduce losses in mining, processing and transportation of natural raw material, increase land fertility, reduce hazardous emissions to air and aquatic environment as well as pollution of soil and atmosphere; accordingly, it is possible to speak about atmosphere, hydrosphere and lithosphere variants of such rent. However, it can't become a reality, if damage caused by emissions to atmosphere, discharge of sewage, use of land areas for dumpings, incineration in flame of casing-head gas, losses exceeding standards of mineral and forest resources when they are produced, etc. is ignored and not paid for. In its turn institutions controlling the compliance with established environmental standards and deviations therefrom (to worse or better) and authorized by the government are necessary to this end. In other words, ecological 'stick and carrot' should act together under the single mechanism of state and international ecological regulation. In such case the most difficult is to determine and adjust from time to time pollution standards, penalties rates (ecological anti-rent) and super-profit taxation rates, which is the basis of ecological rent and anti-rent, and as it comes from Tab. 3.5. are of a mirror nature.

**Tab. 3.5. Variants of ecological rent and anti-rent**

<b>ECOLOGICAL RENT</b>			
Resource saving		Environment Protection	
Reduction of losses in extraction of natural raw materials	Non-waste processing of natural raw materials	Reduction of hazardous emissions	Recycling of wastes
Reduction of losses in transportation of natural raw material	Manufacturing of resource saving equipment	Use of eco-friendly transport	Manufacturing of ecofriendly equipment
<b>ECOLOGICAL ANTI-RENT</b>			
Resources wasteful		Environment Pollutive	
Losses exceeding standards in extraction raw materials	Non-integrated processing of natural raw materials	Hazardous emissions exceeding standards	Growth of industrial and household waste
Losses exceeding standards in transportation of raw materials	Manufacturing of resources wasteful equipment	Use of environmentally-destructive transport	Manufacturing of environmentally-destructive equipment

This problem becomes by an order of magnitude more difficult when the matter in question is transboundary exchange of hazardous emissions between countries and civilizations. The inspections are conducted, which allow identifying the ‘exports’ and ‘imports’ volume of such emissions between various countries.

**Tab. 3.6. Carbon dioxide emissions<sup>1</sup>**

	Total, mln. t		2005 % of world	Per capita, t		2005 in % of world	2005 in % of 1980
	1980	2005		1980	2005		
<b>World</b>	22,589	29 257	100	4.3	4.5	100	105
<b>High-income countries</b>	11,003	13,199	44.8	11.0	12.6	285	107
Including:							
USA	4,800	5,776	10.7	19.7	19.5	433	102
Japan	1,001	1,230	3.6	8.7	9.6	213	110
UK	569	591	1.9	9.9	9.1	202	92
Germany	981	784	2.7	12.3	9.5	211	73
France	363	376	1.2	6.4	6.2	138	93
Australia	213	269	1.2	17.2	18.1	402	105
Low-income countries	519	772	2.5	0.7	0.6	13	86
Sub-Saharan Africa	463	649	2.2	0.9	0.8	18	89
Middle East and North Africa	565	1113	3.8	2.5	3.7	82	148
<b>Eastern Asia and the Pacific Region</b>	3,030	6,769	23.1	1.9	3.6	80	189
Including China	2,399	5,548	19.3	2.7	4.1	96	152
Europe and Central Asia	4,366	3,067	10.6	10.4	7.5	16	71
Including Russia	2,262	1,503	5.1	15.3	10.5	233	69
<b>Latin America</b>	1,037	1,361	4.7	2.3	2.5	56	109
<b>Southern Asia</b>	770	1,593	5.4	0.7	1.1	24	157
Including India	680	1,402	4.7	0.8	1.3	29	163
Pakistan	68	134	0.5	0.6	0.5	18	90

By the coverage area ecological rent and anti-rent may be divided into local, regional, national (on a national scale), interstate (for instance, within the EU) or global, which may be determined by the UN bodies or based on an international treaty.

On distribution of hazardous emissions (and ecological anti-rent accordingly) between the major states and civilizations it is possible to judge by information of the World Bank Group on CO<sup>2</sup> emission ([Table 3.2.](#)).

Nearly a half of carbon dioxide emissions falls to the countries

<sup>1</sup> 2009 World Development Indicators. Washington. The World Bank, 2009. P. 162-164.

with high income, where about 15.5% of the population of humans on the planet Earth live (including the USA – 19.4%); only 2.5% of emissions fall to the countries with low income (19.6% of population on the Earth) that is 21 times lower per capita. It is naturally to assume that the burden of world ecological anti-rent, if it is introduced, will fall to the North American, West European and Japanese civilizations in favor of African and Indian.

While in high-income countries emissions have nearly stabilized (and even reduced in Germany by 27%), in China, India, Middle East and North Africa they are growing rapidly that predetermined the increase in the level of emissions in general on the planet by 5%.

What are the factors of dynamics with respect to ecological rent and anti-rent both in national and global scales?

If force-majeure circumstances are left aside (natural calamities, technogenic catastrophes, armed conflicts, etc., bringing gross ecological damage) than the system of major factors determining the level and wave-like behavior of ecological rent and anti-rent is possible to correlate with the change of technological, economic and ecological cycles and their phases, various by their spheres of action and duration.

Technological cycles of various duration affect the most the behavior of ecological rent and anti-rent featuring medium-term (generations of equipment and technologies), long-term (technological orders), super long-term (technological modes of production).

Diffusion of new generations of equipment, and more so – technological orders based on the cluster of basic innovations is accompanied by the involvement of new natural productive forces in production, abrupt growth in labor productivity, production cost reduction. The volume and rate of ecological rent grow fast in this phase of technological cycle (both national and world) in the vanguard countries, which are the epicenter of technological revolution and enjoying its fruit in the form of technological quasi-rent and ecological rent as well as differential natural rent of the 2<sup>nd</sup> kind. Ecological anti-rent is minimized within this period.

In the maturity phase of technological and economic cycles the rate of ecological rent drops, but its volume is maximum through a wide-spread of a large number of basic and improving innovations and expansion of the areal where generations of equipment are applied (the next technological order) due to involvement of more and more new countries in it. Along with that the accomplishments of the pioneers in technological breakthrough become common determining the publicly required level of quality and price developed new market niches of products that narrow the field where super-profit may arise in its any form. There is an increase of ecological anti-rent which is super-profit derived from violation of environmental standards, which are not established themselves yet and predatory consumption of natural resources, especially in lagging countries.

These negative trends intensify under the crisis phase of technological and economic cycles, in the period of rapidly evolving ecological crisis. There is no ecological rent (as well as technological quasi-rent) at all, production is phased down, demand for nature-intensive and hightech products drops, costs increase, bankruptcies occur avalanche-like. The remaining companies try to survive through intensive exploitation of the best natural resources and reduction of ecological expenses, transfer of nature-intensive production into other countries. Ecological anti-rent scale increases very fast, though it drowns in the total volume of dropping rate and volume of profit.

In transition to another cycle, at the end of depression and beginning of revival under mastering of a new cluster of basic innovations ecological rent (as well as technological rent) is nearly not available because of high costs for development efforts for principally new products (technologies) and winning market niches by them. But the volume of ecological rent and technological anti-rent begin to increase under decrease of ecological anti-rent.

Consequently, the dynamics of ecological cycles (inseparably connected with technological and economic cycles of various duration) finds its expression in the movement of volume and rate of ecological rent and anti-rent, which are as if in anti-phase to each other: in the up

phase ecological rent is maximum, ecological anti-rent is nearly not available, in phases of crisis and depression the reverse picture may be observed. The fluctuation amplitude is the highest in change of technological modes of production and technological orders, and less significant – under change of generations of equipment (technologies) as the basis of medium-term cycles.

The end of the 20th – beginning of the 21st century is characterized by transition from industrial to postindustrial technological mode of production. The fifth technological order dominating in this period reached the maturity phase at the turn of the centuries, its down wave began that manifested itself in the crises of 2001-2002 and 2008-2009 hit the most developed countries in terms of technology such as the USA, Japan, and the states of Western Europe. This becomes the impulse for focusing researches on the development of the sixth order technologies which will become dominating on the world market in the 2020s.

Consequently, it may be anticipated that at the beginning of the 21st century the rate and volume of ecological rent will drop (under fluctuations within medium-term cycles), while ecological anti-rent will go up. Presumably, in the 2020s in the phase when the sixth technological order is diffused, the reverse trends will prevail. The nearest future will show to what extent such expectations will be met, and, consequently, to what extent the proposed concept covering cyclical dynamics of ecological rent and anti-rent is close to the truth.

### **3.5.3. The Prospects for the World Ecological Rent and Anti-Rent**

How do globalization processes influence the level and dynamics of ecological rent and anti-rent, its further destiny?

Globalization leads to consolidation of planetary ecological space. This finds its manifestation in two reverse trends. On the one hand, global scale of reproduction, keeping of comparatively high growth rates of demand for primary resources, which will be on the edge of depletion in the foreseeable future, increase in emissions to the

environment of industrial and household waste, fast devastation of tropical woods – ‘green lungs’ of the planet, pollution of oceans and seas, thereby advancing the humanity to local and global ecological catastrophes, setting limits to the development of society, expressly worded in the reports to the Club of Rome. Although some of such projections turned to be overly pessimistic, however, they caused thinking humans to face the impending threat and concentrate their efforts on its prevention.

This negative trend in today’s globalization is aggravated by the fact that it is mainly implemented by the neoliberal model in the interests and under control of powerful TNC concentrated in the developed civilizations (North American, Western European, and Japanese), entailing exacerbation of the gap reached the critical level between the reach minority and poorest majority of the population on the Earth planet.

This trend leads to reduction in the space for ecological rent (as the major stocks of natural resources are located in the countries and civilizations with low and medium income per capita) and growing scales of ecological anti-rent appropriated by TNC bossing in such countries with no control.

But the other, opposite trend of globalization and its effect is taking shape as well. It opens space for the next technological revolution and its diffusion in the planetary scale. The promising high-tech products are associated with natural raw material to the minor extent (though it consumes a nice bit of energy). New ecologically clean energy sources are involved in production as well as modes of transport, and man-made materials. Relatively, and in a number of instances the demand for natural resources is absolutely reduced, power-efficient, low-waste and non-waste technologies gain ground. Also, the demand of population for natural sources of raw material and energy comparatively decreases. Although the end demand still absolutely increases, especially for the account of developing countries, level of environment pollution with wastes grows, but in the longrange perspective new opportunities are opened here too.

However, the positive alternative of ecofuture may become the reality provided that the noospheric model of globalization is implemented, being implemented in the interests of the majority of the planet residents, if TNC are placed under control of global civil society and its institutes.

The struggle between two alternatives, two models of globalization – non-liberal and noosphere – is the main contradiction of the first decades of the 21<sup>st</sup> century. It clearly manifested itself at the Summit on Sustainable Development in Johannesburg (2002) and at the Copenhagen Environmental Summit (December 2009). The first model prevails so far but as its negative effect becomes more and more obvious, the prerequisites are growing, scientific and public (and in prospect – political) forces standing up for the noospheric model and implementing it are ripening. It may be anticipated that after deep world technological, economic and ecological crisis of the 2010s a strong impulse for the implementation of such model will be given. In such instance the space for ecological rent based on diffusion of the sixth technological order will be significantly increased, and the volumes of anti-rent (under more rigid national and international control) will sharply reduce.

Globalization is accompanied by integration of national economies and concurrent deepening of differentiation of local civilizations, formation of its fifth generation. How does it tell on relations of society and nature, ecological development, distribution of ecological rent and anti-rent between civilizations and leading countries?

What are the prospects for resources and ecological dynamics of civilizations in the first half of the 21<sup>st</sup> century adjusted to trends of globalization and evolvement of the technological turn? It may be anticipated the overall reduction in the rates of consumption growth with respect to primary resources and environment pollution through operation of a number of long-term factors:

-Increase in the number of population on the Earth planet, and, accordingly, the density in population and demand for nature-

intensive and pollutive products. In these circumstances, some civilizations high rates of population growth (African, Indian, Moslem, Buddhistic, Latin American, Oceanic – in part of Micronesia, Melanesia and Polynesia) will persist; in other the population growth will be moderate (Chinese, North American); in the third the trend to depopulation (Western European, Japanese, Eurasian – in part of Russia, Ukraine and Belarus);

-changes in the structure of economy, increase in the specific volume of services and high-tech productions consuming natural resources and polluting the environment with emissions to the least extent, under a continuing drop in the share of agriculture and mining industry. This trend will be observed in all civilizations, reducing the dependence of developed countries from imports of raw material and energy commodities but it is quite far from full independence;

-Diffusion of energy-conservative, non-waste and ecologically friendly technologies inherent to the fifth and especially sixth technological orders.

Differentiation of civilizations for pure exporters (donors) and pure importers (consumers) of natural resources and fuel will manifest itself more accurately. Such trend is observed also in respect of carbon dioxide emissions and other pollutants. To a greater extent such trend is the effect of the implementation of a neo-liberal model of globalization, aggravating the degree of polarization brought to the dangerous line between countries and civilizations by the level of economic development and ecological state. In order to reverse such dangerous trend it is necessary to change to the noospheric model of globalization.

The foregoing trends will render a contradictory impact on the dynamics of ecological rent and anti-rent. On the one hand, adaptation of highly efficient, resource saving generations of equipment of the sixth technological order at first will entail a significant jump in super-profits for companies, TNC and countries, which will be pioneers in the assimilation of such order in nature management and nature-intensive industries until such technologies become widely spread, determining

the competitiveness of goods and services. Along with that the volume of ecological anti-rent will decrease, especially under conditions where the control over the compliance with the established environmental standards is enhanced (a regular stiffening of such standards will lead to a temporary increase in the amounts of ecological rent and anti-rent). On the other hand, reduction in the volume of pollution and a share of agriculture and mining industry in the structure of reproduction will entail reduction in the weight of ecological rent and anti-rent, a significant drop of their share in the total volume of super-profit derived by TNC and civilizations.

#### **3.5.4. The Appropriation and Use of Ecological Rent and Anti-Rent**

The economic substance of property is in appropriation of income, profit and especially super-profit (rent) from exploitation of the object of such property. With respect to natural resources the rule is known from the times of Henry George: only that person is the real owner, who appropriates the rent, whoever has a formal ownership title. Henry George's theory of land nationalization was based on it. Levying of taxes on landowners, which is equal to rent, will allow, according to Henry George, to increase wages of workers and profit from capitals, eliminate the poverty.

How can be such general rules of appropriation and use of profit and super- income (superprofit) be applied to such mirror-like interconnected economic categories born beneath our eyes, such as ecological rent and anti-rent? In doing so, first of all, it should be clarified and found the answers to the questions who is the object and the subject of property (appropriation) in national and world economies.

The object of ecological rent may be deemed super-profit derived in employment of more efficient technology (against with publicly normal, average for national or world market under given level of expenses and prices) under effective environmental standards and restrictions. Such super-profit is the result of ecological innovations,

exists a limited period (until this innovation becomes generally spread) and may arise in any field of environment activity, for instance, in use of ecologically friendly, mobile (transport) or stationary sources of atmosphere pollution, in discharge of sewage better purified, in reducing the losses in production of mineral and forest resources, improvement of soil fertility, etc. The main thing is that the measurement scale of additional ecological (expressed through economic) effect from the employment of such equipment and technologies, real source of ecological super-profit (among the same at the expense of reduction in payments of ecological anti-rent) and the opportunity to measure it are in place. In the opposite case ecological super-profit will remain ephemeral, immeasurable and economically negligible category, 'cloud in pants', and ecological innovations lose their sense for businessmen and may be implemented only for account of budgetary provisions or voluntary donations.

The issue is more complicated in determination and measurement of world ecological antirent. Here the mandatory element should be the availability of environmental standards, which are internationally accepted, provided for by international treaty entered into legal force, rules for their application and determination of sanctions for violation of such standards. (such as, for instance, Convention on Long-Range Transboundary Air Pollution, the Kyoto Protocol). It is necessary the international body with clearly defined control authorities over the implementation of established rules of international ecological law as well as efficient mechanisms to enforce sanctions and use of the funds received. All these international environmental norms and bodies are at the nascence stage or establishment at best, therefore world ecological rent is more desirable than real. However, it exists and measurable under export of ecological equipment and technology of new generations, bringing super-profit, which may also be attributed to technological quasi-rent.

The issue pertaining to determination of the subject of appropriation of ecological rent is not less difficult. As such rent is the result and fruit of innovation activity with starting costs and risks

inherent to it then the right to appropriate super-profit received by businessman-innovator, who implemented ecological innovation on his own account and at his own risk, is indisputable. But is it just it? As he has realized the idea of the researcher and inventor vested with the right to intellectual property and, consequently, participation in appropriation of a part of super-profit derived based on the implementation of such idea.

Does the state participate in appropriation of ecological rent? It does, it participates on the customary basis levying taxes on profit (income) derived by businessman, and in the event where export customs duties are imposed, appropriating a part of world ecological rent therethrough. Furthermore, if the state is the owner of enterprises exporting ecological equipment (technologies), it is entitled to claim the immediate participation in appropriation of super-profit derived thereat.

Also, TNC, which may act as exporters of the results of efficient ecological innovations are the subjects of appropriation of ecological rent. As TNC control considerable (and sometimes major) markets of ecological equipment (technologies), they may use their power for overstating the prices for them and appropriation of monopoly ecological rent.

Other picture is formed with the object of appropriation of ecological anti-rent.

In this instance, the object is super-profit which is the result of a failure to perform established environmental standards and restrictions, whether national or international, savings on cost, which would require to comply with such standards and restrictions, based on the fact that the damage from such failure, will not be discovered at all or will be discovered in a long period of time. In its essence, this is unlawful enrichment from illegal action or omission of action. Therefore, the aim of ecological anti-rent is not only to withdraw unlawful (derived as a result of a failure to meet the rules of fair competition) super-profit but to assess the arisen environmental damage and compensate it (adjusted to the factor of time). A penal

element is often added to said, being a kind of economic punishment for offence.

If in national economies (especially in developed countries) economic sanctions for committed environmental violations are more and more implied, then in the world practice only first timid steps are undertaken in this direction. Although damage to global ecological community is obvious to everybody, which arising out in connection with excessive pollution by certain countries and civilizations as well as under speedy devastation of tropical forests, no economic sanctions are established for such cases. Failing said it is impossible to restrict mercenary actions of TNC, which are ready to violate environmental rules for the sake to derive super-profits. Therefore, the necessary condition for the implementation of declarations on sustainable development and ecological balance in the world, adopted at the summits in Rio-de-Janeiro (1992) and Johannesburg (2002) is to introduce international ecological rules and restrictions and economic sanctions for their violation – world ecological anti-rent.

Who is the subject of appropriation of ecological anti-rent? Certainly, a businessman or TNC violating the requirements of environmental standards and restrictions can not be it, as withdrawal of unlawful super-profit levels the competition conditions on national or world market, weakening the temptations to increase profit at the expense of predatory use of natural resources and pollution of the environment, and establishing a favorable economic background, inducements for rational nature management, assimilation of ecological innovations and deriving ecological rent on such basis. 'Stick' and 'carrot' are two-in-one in such tandem.

Public appropriation of ecological rent, in our opinion, should be multi-level, the same way as the civil society is hierarchic itself. Five levels may be distinguished: primary (municipal); regional; national-state; interstate-civilization (the European Union, CIS, NAFTA, African Union type, etc.), and global. Each of such levels has its own range of interests and liability for efficient nature management and state of the environment and should have stable sources of income to exercise

such function, including and first of all, on the account of appropriation of a certain part of ecological anti-rent. This is a sophisticated system; it requires a clear-cut legal demarcation of the competence between all the five levels, but none of them may be excluded from the general system describing the hierarchic character of nature management and hierarchic structure of civil society.

How should ecological anti-rent be used coming to each of five levels of civil society? Two mechanisms of such use are possible. One, which is widely-applied now, is dissolution of arriving payments in the revenue part of appropriate budgets; then the funds for ecological monitoring, financing of activities on efficient nature management and environment protection, environment special-purpose programs and projects, maintenance of environment services, establishment of ecological facilities, etc. are provided for in the spending part of the budget. Such mechanism is very convenient for the officials of various levels from municipal to international, opening space for decision-making at their own discretion. But it deprives the forming ecological sector of economy of independent, stable sources of self-financing with respect to reproduction, whether simple or extended, place it to infirm ground of the arbitrariness from the authorities approving and implementing the budgets of the relevant level. And this is typical for psychology of the officials to neglect long-range, strategic interests in favor of current, momentary needs.

Therefore, it seems more promising and reliable the mechanism of self-financing of the ecological sector from stable sources. Such sources may include:

- Specific depreciation deductions for long-term exploitation of prospected deposits, forestlands, water systems, agricultural and other purpose lands in the form of costs recorded to the costing, compensating expenses for prospecting, forestry, water management and fishery, melioration of lands, etc. This is not at all the tax as certain financial wisemen tried to describe it and the legislators supported them, but a necessary element of reproduction costs in nature exploiting industries; these funds should be concentrated in the

relevant funds serving as the source of funds for reproduction and conservation of natural resources;

- Revenues from deductions of ecological anti-rent to ecological funds of the relevant level; such funds should be of an interindustry nature and be used for financing of ecological monitoring and researches, environment programs, projects and activities on each of the five levels of civil society and its institutions;

- Current proceeds from the implementation of environment programs and projects (including deductions from ecological rent, received under support of the funds), performance of ecological examination of investment and innovation projects, development of the natural resources cadastres and other fee services of environment bodies and organizations. The establishment of concerted, clearly operating economic mechanism of efficient nature management and environment protection meeting the conditions of regulated market economy and resting on the formation and efficient use of own stable sources of selffinancing, including deductions from ecological rent and anti-rent, is the only reliable path to the noospheric post-industrial society ensuring the optimal co-evolution of society and nature.

### **3.5.5. The Ups and Downs of the World Rent**

The general trend of the 19th and first half of the 20th century was the fall of the share and the role of natural rent in the national and world economy as a result of industrialization and outrunning growth of manufacturing industry and then service sector. This trend continued in the 3<sup>rd</sup> quarter of the 20<sup>th</sup> century against the up wave of the fourth Kondratieff cycle and rapid industrialization of developing countries. But in the last quarter of the 20<sup>th</sup> century and the beginning of the 21<sup>st</sup> century trends have changed. While the outrunning growth of manufacturing industries and services continued in national economies and in the export structure, the jumps in world prices led to increased instability of the global economy, rapid fluctuations of weight and rate of world natural rents (especially mining rent) and a

redistribution of value among national economies.

The figures of Table 3.6 show that the general trend of a falling share of certain commodities in the structure of world exports (fuel, food, and raw materials) persisted - the share of food fell from 44.1% in 1960 to 18% in 1999, however, in certain periods the reverse trend was observed: the increasing share of food exports from 33.1% in 1970 to 41% in 1980, with 18% in 1999 to 27% in 2006.

**Tab. 3.7 Dynamics of the structure of world merchandise export (in current prices, %)<sup>1</sup>**

	1960	1970	1980	1990	1999	2006
Food	44.1	33.1	41.0	24.5	18.0	27
Raw materials	17.5	13.2	10.0	8.7	7.1	8
Fuel	10.7	10.6	6.9	5.2	3.7	4
Finished goods	9.9	9.3	24.0	10.6	7.2	11
Semi-finished goods	54.7	64.8	56.7	73.1	78.5	73

The main reason for such fluctuations is the fluctuations in export prices, not the physical volume of exports of selected commodity groups (Table 3.8).

In general, for the world economy the physical volume of production grew 7.1 times for half a century, the physical volume of GDP – 6.7 times. This indicates that there is some increase in the share of intermediate product and the decline in the share of value added in the gross output of the world economy. However, in the third quarter of the 20<sup>th</sup> century the world production increased

3.6 times GDP – 3.2 times, in the next quarter-century - 1.95 and 2.05 times, respectively, indicating a decline in the economic growth at the decline of the industrial economic system and increasing share of services in GDP notable for low consumption of materials and environmental capacity.

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<sup>1</sup> *Ustinov I.N.* World Trade. Statistical and Encyclopedic Reference Book. M.: Ekonomika, 2002. P. 54; 2008 World Development Indicators. Washington, The World Bank, 2008. P.

At the same time, exports grew at higher-than-accepted rates - increased 21.8 times for half a century, including in the third quarter of the century 5.8 times and in the fourth - 3.8 times. The index of the outrunning growth of export compared to GDP growth amounted to 3.1 times over half a century. During the same period the world export prices increased 90.5 times, including in the third quarter of the century - 13 times (due to a jump in the early 70s), in the fourth - 7 times. This indicates a high rate of inflation and depreciation of dollar acting as world currency.

The unevenness in the dynamics of prices of commodity groups increased. In general, for half a century, the price index for finished goods increased 194 times, by agricultural products - 19.3 times, raw materials - 84.5 times. If in the third quarter of the 20<sup>th</sup> century such growth was 21 times, 5.1 times and 21 times respectively, in the fourth - 9.2, 3.4 and 4.0 times.

These data indirectly indicate that the world technological quasi-rent outran natural rent by the growth rates and made the major part of the super-profits of TNCs and exporters.

A characteristic tendency of the fourth quarter of the 20<sup>th</sup> century is an intensification of unevenness in the dynamics of export prices. If in 1950-1970s changes in export prices were relatively low, including the main groups of commodities, from 1973 to 1980 the overall index grew 4.9 times, including raw materials - 10.2 (mainly due to the swing in oil prices), for agricultural products 3.6, finished products - 4.1 times. This led to an abrupt increase in the world mining rent with a substantial reduction of weight and rate of land rent and technological quasi-rent.

**Table 3.8. Indices of physical volume of production (a), export (b), export prices (c)<sup>1</sup>**

		1950	1955	1960	1965	1970	1975	1980	1985	1990	1995	2000
Total	a	18	24	30	41	54	65	78	86	100	107	127
	b	9	13	18	26	41	52	68	75	100	136	196
	c	2	3	4	6	9	26	59	56	100	145	181
Agricultural products	a	37	42	49	55	63	72	78	90	100	108	122
	b	26	30	41	50	61	65	86	90	100	126	154
	c	7	8	10	12	15	36	71	63	100	139	135
Raw materials	a	29	37	45	60	76	82	99	85	100	106	116
	b	18	27	39	40	77	79	91	79	100	125	149
	c	2	3	4	6	10	42	115	88	100	108	109
Finished products	a	13	19	24	35	49	60	75	84	100	107	130
	b	5	7	11	17	29	42	58	72	100	137	210
	c	1	2	3	4	8	21	45	49	100	152	194
GDP output		19	25	30	39	50	61	73	84	100	107	125

However, in 1987 the trend changed to opposite: the index of export prices for raw materials decreased by 42% and for agricultural products (by 1985) by 11% with the index rise for finished products by 31%, and by 2000 – 4.3 times by 1980 against 1.9 times for agricultural products and

1.5 times for raw materials. TNCs in the manufacturing industries had revenge in the distribution of the world of rent income for a partial retreat in the 70s. The share of technological quasi-rent in such income again became dominant.

In the early 21<sup>st</sup> century a counterattack suppliers of fuel and raw materials to the world markets repeated that was the resulted of expansion of the global energy and ecological crisis against falling production efficiency of the fifth technological order on the down wave of the fifth Kondratieff cycle. However, due to the financial and economic crisis of 2008-2009 and falling world prices for oil and minerals the volumes of world natural rent have increased sharply. Similar fluctuations will also persist in future.

<sup>1</sup> *Ustinov I.N.* World Trade. Statistical and Encyclopedic Reference Book. M.: Ekonomika, 2002. P. 61-62.

# **CHAPTER 4. THE GLOBAL TECHNOLOGICAL REVOLUTION OF THE 21ST CENTURY AND TRANSFORMATION OF ECONOMY**

## **4.1. THE BACKGROUND AND CONTENTS OF TECHNOLOGICAL REVOLUTIONS**

### **4.1.1. Technological Revolutions in the System of Global Transformations**

Waves of epochal and basic innovations are periodically rolled around the world and find their expression in the technological revolutions underlying the global economic transformations and serving as their material and technical base.

The structure of technological transformations is multifaceted. By depth and frequency, they can be divided into four levels:

- modifications of equipment and technologies of production based on improving innovations enhancing the competitiveness of goods and services already available on the market; such modifications are carried out at the micro level on a continuing basis in the process of competitive struggle;
- a change in the prevailing generations of equipment and technologies based on the basic innovations giving a significant economic effect in the diffusion phase bringing innovation super-profit to successful innovators (technological quasi-rent); renewal of generations of technology in the leading industries and countries takes place approximately once a decade and serves as the material basis of periodic economic crises at the stage when the leaving generation of technology has no effect, and the new generation is at the stage of innovation assimilation and not yet profitable;
- occurring approximately once in half a century a change in the prevailing technological orders that determine the competitiveness of economy and underlying several successive generations of technology, formation of new productions and industries. This serves as a material base for the change of the Kondratieff cycles and finds its expression in

long and deep economic crises, evolvement of technological revolutions in the vanguard countries;

Finally, the most profound and long-term technological transformation is reflected in the global technological revolution implementing a cluster of epochal and basic innovations and transforming the material and technical base of society, technological mode of production and economic system based on it included in the genotype of the world civilizations coming one after another.

Consequently, ***the global technological revolution is the highest, most profound and long-term technological transformation, the content of which is a change, on the basis of a wave of epochal innovations, of the prevailing technological mode of production - first in vanguard countries and then worldwide.***

Technological transformations are the starting point for the formation and evolvement of technological cycles of various duration and inextricably linked to economic cycles, form a single system of social progress, its movement from stage to stage (Tab. 4.1).

Technological revolutions, changing technological methods of production every few hundred years serve as the beginning (civilizational) of establishing a new super-long technological cycle, technological mode of production and next economic system. It was the character of the industrial revolution of the last third of the 18<sup>th</sup> - early 19<sup>th</sup> century that evolved in England and then engulfed the economy worldwide. Such is the nature of the utmost deep technological transformation of the first half of the 21<sup>st</sup> century which will become the basis for the establishment of the post-industrial technological mode of production and integral economic system.

Each super-long technological cycle goes through several stages - long-term technological cycles, change of technological orders. The first and last of these orders are of a transitional, mixed character, embodying the features of both the leaving and coming technological mode of production. The second and third orders bring the most complete embodiment and maximum effect.

**Tab. 4.1. System of technological cycles**

<b>Cycles</b>	<b><i>Technological modes of production</i></b>				
Super-long term	TMP1	TMP2	TMP3	TMP4	TMP5
	<b><i>Technological orders</i></b>				
Long-term	TO1	TO2	TO3	TO4	TO5
	<b><i>Generations of equipment (technologies)</i></b>				
Mediumterm	GT1	GT2	GT3	GT4	GT5
	<b><i>Models of equipment and modifications of technologies</i></b>				
Short-term	ME1	ME2	ME3	ME4	ME5

Each technological order, in turn, is realized in 4-5 generations of technology changing each other and running in parallel in different sectors generations of technology. Here again, the first and the last generation are of a transitional nature and are characterized by a relatively low growth effect, which is the basis of crisis phases of medium-term economic cycles repeating approximately every decade.

Finally, each generation of technology finds its expression in 4 -5 models of equipment, modifications of technology, marking the change of short-term technological and economic cycle (Kitchin cycles as Joseph Schumpeter termed them).

It should be noted that technological transformations of one level or another do not occur simultaneously in all sectors and countries. At each stage there are leading industries and countries the epicenters of technological transformations that first take the risk and costs for the initial assimilation of a new technological cycle; but then they are rewarded by a maximum mass and the rate of innovation super-profit (technological quasi-rent) in the phase of the spread (diffusion) of the new technological cycle. Following the vanguard countries a wave of innovations is taken up by catching up industries and countries where innovations are already of a more imitating nature, associated with a lower risk but generate less effect (although there are exceptions: for example, Japan in 1950 -1960s ensured record rates of economic growth exactly on such imitation innovations; China follows the same trajectory in the last three decades). Finally, it should be highlighted a group of lagging sectors, countries and civilizations that do not have the resources to master a new technological cycle and where

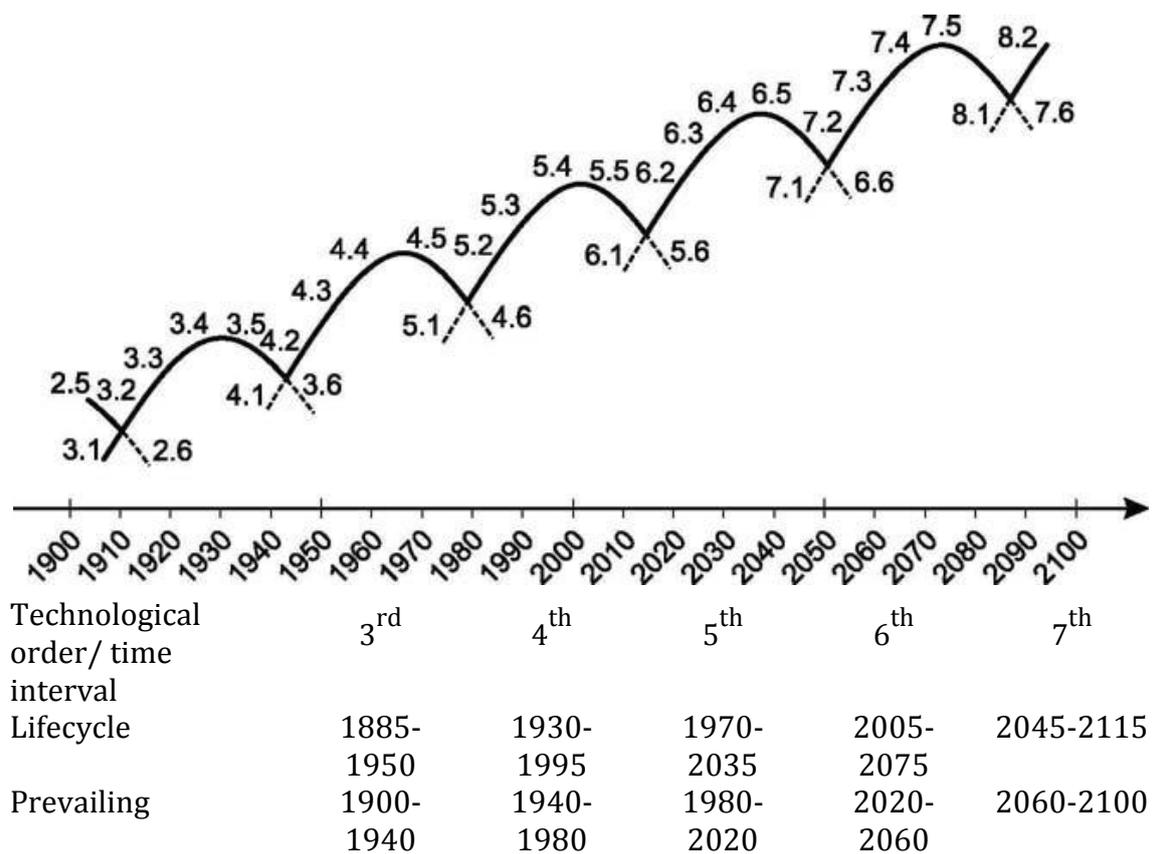
technological orders and generations of equipment of the long past cycles prevail.

Consequently, national and world economies are always mixed; technological cycles of different periods coexist there but the ratio of these orders is not the same for vanguard, catching up and lagging behind countries and civilizations.

#### **4.1.2. Technological Turns of the 20<sup>th</sup> Century**

In the 20<sup>th</sup> century three major technological turns associated with the development of the vanguard countries of the third (in the beginning of the century), fourth (in the 40-50s) and fifth (from the 80s) technological orders occurred. Each technological order, in turn, comprised several successive (from about a decade intervals) generations of technology (Figure 4.1).

For the technological turns of the 20<sup>th</sup> century it is typical a close intertwining of the two main driving forces for an innovative update of material and technical base of civilizations - the scientific intellect and its materialization in the new generations of technology. This gives ground to speak about a scientific and technological progress and its embodiment in the periodic waves of innovative reforms. Any significant development of technology is now almost impossible without new scientific ideas and inventions and their technological elaboration. But scientific progress is also unreal without the cutting-edge instruments, means of processing the information received. The trend of mutual penetration, merging of science and industry overrides. At the same time, it is all the more pronounced regularities of cyclical dynamics of science and technology, change of generations of machinery, technological orders. In the composition of a single scientific technological cycle - medium- and long-term - the phase of nascence and technological elaboration of a new scientific idea (scientific discovery, major invention) underlying the basic novation or next generation of technology has organically entered.



**Fig. 4.1. Rhythm of change of technological orders and generations of technology in the 20-21<sup>st</sup> century**

The tendency of turning science into a direct productive force, the organic merging it with the technological innovations generated a new form of technological turns - *scientific-technological revolution* (STR) –in the 20<sup>th</sup> century.

The first STR evolved in the developed countries of the world in the 40-60s of the 20<sup>th</sup> century, although its initial scientific base had been created somewhat earlier as a result of a number of major scientific discoveries and inventions. It determined the contents of the fourth technological order the prevalence of which fell to the 50-70s of the 20<sup>th</sup> century in the leading countries. Its source was the major achievements in physics (discovery of the structure and fission of atomic nucleus, quantum theory), chemistry, biology and engineering sciences. The first STR was based on three scientific and technical areas: development of atomic energy; electronics, creating laser

technology, electronic power converters; cybernetics and computer technology, and creation of computer.

However, all of this is just the tip of the iceberg of the scientific and technological turn. Its implementation required fundamental changes in all life of society. There were created computers, numerically controlled machine tools and machining centers, automated lines and automated industrial management system and automated enterprise control system, and nuclear energy. Artificial materials: synthetic resins, plastics, and chemical fibers gained rapid development. The development of jet engines caused a revolution in aviation. The technologies for continuous casting of steel were invented. Outer space exploration as a result of the synthesis of a number of scientific and technical fields: mathematics and astronautics, management theory and computers, metallurgy and instrumentation technology, rocket engineering became the highest scientific and technical achievement of the 20<sup>th</sup> century. The information revolution evolved. The technological progress became to penetrate widely into everyday life, changing life conditions of tens of millions of families.

The creation of atomic and thermonuclear weapons, their means of delivery anywhere in the world, secretly conducted experiments with chemical and bacteriological weapons, production of new generations of aircrafts, helicopters, tanks, artillery, automatic small arms, warships, atomic submarines - all these achievements of military technological revolution in the middle of the 20<sup>th</sup> century put humanity on the brink of self-destruction.

Dissemination on the basis of the first STC of the fourth technological order led to a record economic growth in the history of civilizations. In the world, the average annual GDP growth rate amounted to 4.9% in 1950-1973, in Western Europe - 4.79, USA - 3.93, Japan - 9.29, Eastern Europe - 4.86, the Soviet Union - 4.84, China - 5.02, India - 3.5, Latin America - 5.38, Africa - 4.43%. The STR served as the locomotive of an unprecedented economic growth. Many had the

feeling that global civilization expects prosperity in the very near future. However, air castles were destroyed by the inexorable rhythm of the changing technological and economic orders, and periodic crises.

Giddy successes of the first STR had also dark sides. Natural (mainly mineral) resources had never before been so actively involved in production. Now, the best fields were fast exhausted, and the degree of pollution increased rapidly, so that many mining and metallurgical regions were threatened with ecological disaster.

All this brought about a series of crises that struck the world in the 70s: technological, energy, ecological, and economic. The second technological turn which started in the last quarter of the 20<sup>th</sup> century and marked the formation of the fifth technological order became a material basis for their surmounting. However, the level of novelty of basic innovations was not that high as in the previous technological turn; and the effectiveness did not grow at the same high rates. Therefore it is valid to consider this turn not as a new scientific and technological revolution but as the second phase of the evolution of the first scientific and technological revolution, less deep and effective than the first because it fell to the phase of the decline of the industrial technological mode of production.

Its nucleus was the triad of basic scientific and technological fields: microelectronics, biotechnology, and informatics. They reflect the fundamental achievements of quantum physics, molecular biology, and cybernetics. The creation of large and super-large integrated circuits opened the way for the development of microprocessors, personal computers, multimedia, mobile communications, miniaturization and increasing the self-containment of technical systems in all sectors of national economy. The ability to decipher and change the structure of hereditary substance by genetic engineering methods allow to design bacterial strains with beneficial properties for humans, to work on heredity, to create a fundamentally new technological processes and materials. Latest information technology, collection, processing, transmission, use of information tools open new horizons for understanding the complex processes in nature and

society and their control, for informatization of production, management and day-to-day life of people.

The basic directions of the fifth order of life provide the basis of qualitative transformations in all spheres of production equipment. Development of programmable productions, robotics technology, flexible manufacturing systems, computer-aided design enables comprehensive automation.

Depletion of conventional energy resources and their high ecological danger forces to seek and develop non-conventional, practically inexhaustible sources of energy (solar, hydrogen, wind, tidal, etc.), use energy-efficient microprocessor technology. But the real energy revolution is still ahead.

The Iron Age that has prevailed as the main material of construction for almost three millennia is ending. The priority is given to materials having the specified properties - composites, nanomaterials, ceramics, plastics and synthetic resins.

Completely new technologies in production – geobiotechnology in extraction of raw materials, low-waste and waste-free technologies at its processing, membrane, plasma, laser, electro-impulse technologies are being assimilated. This allows getting the final product leaving a number of intermediate operations and processes and reducing harmful emissions into the environment at lower costs and in a shorter time.

Fundamental shifts are taking place in communications technology and transport. Fiber-optic communication lines, space, fax, cellular communication make a real revolution in this field. A number of fundamental novelties are underway in transport (hovercraft, surface-effect ship, maglev trains, electric cars, etc.). However, these novelties are being introduced slowly; the transport revolution is lagging that leads (together with rising fuel prices) to rising prices for transport services. Saturation of large cities with cars has already exceeded reasonable limits.

In agriculture, production (based on the methods of biotechnology) of green products, reduction of the use of herbicides

and pesticides, mineral fertilizers, application of microprocessor based agricultural machinery and intensive technologies ensuring programmable yields are coming to the fore.

While it was typical of the fourth order a scientific and military exploration of outer space, then for the fifth - production. Commercial launches of satellites, which are essential to modern communications, have become a common thing.

The use of personal computers and digital information technologies has allowed automation of fine and complex processes of production management and economy, enhance the validity of decisions taken, and exercise control over product quality. The level of automation of administrative work, its capital-labor ratio have very closely approximated to those in the sphere of material production, and even exceeded them.

Fundamentally new means of medical equipment, medicines obtained by biotechnological methods, tools of diagnostic and treatments are being created. Computerization and informatization of education are helping to intensify the learning process, to boost attention of students.

However, it should be noted that the efficiency of the fifth technological order has turned to be lower than at the previous stage of scientific and technological progress. Average annual GDP growth rates in the world declined from 4.90% in 1950-1973 years up to 3.05% in 1973-2001., including in Western Europe - from 4.79 to 2.21%, USA - from 3.93 to 2.94%, Japan - from 9.29 to 2.71%, Latin America - from 5.38 to 2.89%, Africa - from 4.43 to 2.89%, Eastern Europe - from 4.86 to 1.81%. In the former Soviet Union at the end of the century there was an absolute, almost double, decline in GDP.

## **4.2. THE GLOBAL TECHNOLOGICAL TRANSFORMATIONS OF THE FIRST HALF OF THE 21ST CENTURY**

### **4.2.1. The Global Technological Crisis of the First Quarter of the 21st Century**

In the late 20th – early 21st century new trends are observed in innovation and technology dynamics: aggravation of technological gap between the vanguard and lagging civilizations and countries, intensification of competitive struggle on world markets, new challenges in the energy and ecological development, contradictions of globalization in the innovation-technological sphere. It is possible to speak about a global technological crisis preceding a change of technological modes of production and orders.

1. After the world technological crisis of 2001-2002 the core of which was the first global information crisis that hit the vanguard countries and civilizations (the United States, Western Europe, Japan), the fifth technological order has entered the down phase. A change in the generations of technology, models of products and modifications of technologies continues but it brings an increasingly fewer economic effect and technological quasi-rent (innovative superprofits).

The establishment of the post-industrial technological mode of production, the sixth technological order requires a radical innovation renewal of world production facilities (fixed assets), investments of trillions of dollars in the epochal and basic innovations under the decline in the growth rates of efficiency of reproduction on a planetary scale. And the larger and more largescale is the amount of capital, the greater inertia it possesses. Outdated technologies tend to reproduce themselves in a modified form. A flow of pseudo-innovations increases – improved technologies served its time. This hampers the implementation of an overdue technological turn - and by volume of investments in the application of the new technology, and by term and extent of their development and distribution.

*Hence, the first critical situation of the global technological*

*development: the growing gap between the urgent need for radical innovation renewal of the world economy through the development of a cluster of epochal and basic technological innovations that make the contents of the global technological revolution of the first half of the 21<sup>st</sup> century - and the inertia-based dynamics and the falling rates of efficiency growth of aging technological base of the world economy that finds expression in the slowing down of productivity growth.*

It is possible to resolve this critical situation based on the growth of total investment in innovative modernization of economy and its share in GDP, reallocation of investments in favor of basic innovations of the sixth technological order.

2. Many-time increased global production facilities, innovation and investment sector of the world economy are orientated at the system of priorities of the industrial age, including the priorities of military-technological sector, development and exploitation of natural resources. In the postwar period the setting of the Cold War prompted the rapid growth of direct and indirect military spending in the GDP structure, encumbering arms race. After a short break in the 90s when the share of total military spending in the world declined from 3.2% of GDP in 1992 to 2.3% in 1999 (including in countries with high income from 3.1 to 2.3%, in the U.S. - from 4.8 to 3%, in Russia - from 8.0 to 5.6%), it is again prevailed a tendency to the outrunning growth of military spending – up to 2.5% of GDP in the world, 2.6% for high-income countries, 4.1% in the U.S. in 2008. Despite the overall increase in investments for environmental and humanitarian aims, their extent is completely inadequate to address the massive problems of the establishment of the humanistically noospheric post-industrial society, especially in low-income countries.

The second critical situation of the global technological development can be summarized as follows: *the structure of the innovation and technological potential of the global civilization focused on the priorities of the industrial society (militarism, greater exploitation of nature) and does not meet the needs of the establishment of the humanistically noospheric post-industrial civilization.*

The resolution of this critical situation can be found on the ways of the realignment of the structure of the innovation and investment sector of the world economy, increasing its share in GDP and a focus on the innovative development of human capital and resource-efficient technologies.

*3. A growing technological gap between the vanguard countries and lagging countries and civilizations is the third critical situation in the global technological dynamics.* It predetermines the low competitiveness of products of the lagging civilizations, the growing gulf between wealth and poverty in the global community.

This critical situation is confirmed by the World Bank figures on the structure of high-tech exports, expenditures for research and information and communication technologies ([Table 4.2](#)).

The main scientific-technological and innovative capacity of the planet is concentrated in the vanguard civilizations - the North American, Western European, Japanese, Chinese. They occupy key positions in the export of high technology. China overtook the U.S. in terms of exports of high-tech goods but lags significantly behind by the share of expense for R&D in the GDP, especially in terms of ICT expense.

**Table 4.2. Technological level comparison of leading countries<sup>1</sup>**

Civilizations and Leading Countries	High-Tech Export, 2010		Expense for R&D 2005–2009, % of GDP	Expense for ICT, 2005	
	Bln. USD	% of world		% of GDP	Per capita, USD
<b>Civilizations of Europe</b>					
<i>Western European</i>					
Eurozone	439.2	27.9	2.09	5.4	1813
UK	59.4	3.1	1.87	6.9	2721
<i>Eastern European</i> Bulgaria					
	0.8	0.0	0.53	...	...
Poland	8.4	0.5	0.68	4.2	362
Romania	1.4	0.1	0.48	3.2	180
<i>Eurasian</i>					
Russia	5.2	0.3	1.25	3.2	222
Ukraine	1.6	0.1	0.86	7.8	177
Kazakhstan	2.1	0.1	0.23	...	...
<b>Civilizations of America and Oceania</b>					
<i>North America</i>					
USA	145.5	9.2	2.79	8.7	3846
<i>Latin America</i>					
Brazil	51.6	3.3	0.85	5.3	304
	8.1	0.5	1.08	6.4	363
<i>Oceania</i>					
Australia	3.8	0.2	2.35	6.4	2413
<b>Civilizations of Asia and Africa</b>					
<i>Japanese</i>					
Japan	122.0	7.8	3.45	7.9	2688
<i>Chinese</i>					
China	406.1	26.5	1.47	5.4	108
<i>Indian</i>					
India	10.1	1.6	0.76	6.1	50
<i>Buddhist</i>					
Republic of Korea	92.9	5.9	3.36	6.6	1214
Thailand	34.2	2.2	0.21	4.0	129
Vietnam	2.1	0.1	...	15.1	110
<i>Moslem</i>					
Middle East and North Africa	1.6	0.1	...	2.9	72
Pakistan	0.3	0.0	0.46	6.9	55
Indonesia	6.7	0.4	0.08	6.1	50
<i>African</i>					
Sub-Saharan Africa	2.6	0.2	0.58	6.0	47
<b>World</b>	1572.1	100	2.15	6.7	564
Low-income countries	...	...	...	6.1	47
Medium-income countries	490.4	31.2	1.07	5.1	166
High-income countries	1081.5	68.8	2.41	7.2	2555

For the crisis period Russia lost the position of one of the leaders in technological development. The share of expenditure for science is

<sup>1</sup> 2008 World Development Indicators. Washington. The World Bank. 2008. P. 208– 210. 2012 World Development Indicators. Washington. The World Bank. 2012. P. 332–334.

half of the world average, expenditure per capita for ICT – 2.8 times lower and the share in the world high-tech exports did not exceed 0.3% in 2010. The indicators of Ukraine and Kazakhstan are even lower. The Eurasian civilization downgraded to the technologically backward. The situation is not better with the Eastern European civilization as well as most of the Buddhist (except the Republic of Korea).

The Muslim civilization (except for the group of rich oil-exporting countries) and Africa (excluding South Africa) closes the "table of ranks" by level of technological development.

The technological turn of the 21<sup>st</sup> century will increase the gap between vanguard and lagging countries as the latter do not have the minimum required scientific, human resources and investment potential for the assimilation of the sixth technological order. The way-out is in partnership of the vanguard and lagging civilizations to make the fruit of the evolving global technological revolution available to all countries and civilizations on the planet and to bridge the gap between their level of economic and social development.

4. The fourth critical situation in the technological dynamics of civilizations is an acute shortage of human resources able to effectively develop, assimilate, produce and exploit the fundamentally new technologies. The matter in question is all links of the technological chain -

scientists, designers, engineers, technicians, skilled workers, managers, and public servants.

There is not the question of their quantity but quality, tuning to radical innovations associated with a significant risk but also with great success (significant amount of quasi-rent) in case of successful development of new innovative market niches.

The paradigm prevailing in science and in the system of education, in engineering areas and business focuses on partial improvements of industrial technologies which time is coming to an end. Excessive commercialization of science and education narrows the scope of bold scientific and innovative search. Deteriorating conditions of

reproduction, new challenges of the 21<sup>st</sup> century require large-scale, with a high level of initial capital investments in the development of a cluster of epochal and basic innovations of the post-industrial technological mode of production, its initial stage - the sixth technological order. And such an innovative breakthrough is impossible without the active innovators human resources focused on it, without innovative partnership between the state, business, science and education. Formation of such a partnership in all civilizations is the trunk problem of the coming decades, a necessary condition for a global technological revolution, more evenly spread across the planet than the industrial revolution. This is one of the key fields of partnership of civilizations in the coming decades.

5. The fifth of the critical situation is the growth of disparities and imbalances in the global dynamics of the innovation-investment capital that is becoming a brake on radical innovation renewal of production facilities in relation to the requirements of humanistically-noospheric postindustrial society. This situation is due to the predominance of the paradigm of the late-industrial economic system and manifests itself in the global energy-ecological and food crises, information crisis developing in the early 21<sup>st</sup> century, accelerated growth of capitalization of the TNCs and large companies (an increase of its relation to GDP from 48% in 1990 to 121.3% in 2007 shows that a growing share of investment is directed to the development and innovation update of the sphere of material production to meet the needs of the world's population but to the development of the sphere of services, manipulations on the stock exchange).

It is observed a redistribution of investments and scientific-innovative potential in favor of the large-scale assimilation of the new military-technical revolution, development of production and procurement of new generations of weapons that limits the possibility of innovative transformation of the civil sector of economy.

A neo-liberal nature of globalization in the interests of TNCs and developed countries intensifies disparities in the distribution of the

innovative capacity by civilizations and countries. The scientific, technological and innovative capabilities are concentrated in rich countries of the "golden billion" while low-income countries, which are home to nearly 1.3 billion people do not have the necessary scientific and technical base, investments and human resources for innovative transformation of economy that increases the instability of the global economy and intensifies a threat of the clash of civilizations. Furthermore, TNCs draining skilled personnel and a growing share of GDP from the lagging countries slowing down the innovation transformations in them.

As a result of neoliberal market reforms, according to the recipes of the International Monetary Fund, countries of the Eurasian civilization (including Russia, Ukraine, Kazakhstan) are involved in these trends and turn under the control of TNCs.

The resolution of this critical situation is possible only through the formation of an integral humanistically noospheric economic system<sup>1</sup>, overcoming the increasing parasitism and disparities in the structure and use of the global scientific-technological and innovation-investment potential, concentration of resources on the innovative transformation of material production, and especially the development of alternative environmentally clean energy sources, increasing food production, high technology of the sixth order, humanization of the Internet and telecommunications.

#### **4.2.2. Tendencies in Dynamics of Labor Productivity**

The dynamics of social labor productivity – GDP output per worker employed in economy may serve as the generalized measurement of the technological level of civilizations, its dynamics and effectiveness. However, the structure factor affects this index. Data calculated by the RAS Institute of World Economy and International Relations are given in Table. 4.3.

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<sup>1</sup> *Kuzyk B.N., Yakovets Yu.V.* The Establishment of the Integral Economic System as a Global Transformation of the 21<sup>st</sup> Century. M.: INES, 2008.

If in the first half of the 20<sup>th</sup> century the labor productivity grew slowly in the world, the growth rates of labor productivity increased in the 60-70s as a result of basic innovations for the assimilation and dissemination of the fourth technological order. The Japanese, Western European, Eurasian civilization took the lead. However, in subsequent decades, labor productivity growth rates slowed down noticeably - up to 1.83% in the 70s, 1.6% - in the 80s, 1.1% - in the 90s in the world. The dissemination of the fifth technological order did not give such a jump, as the spread of the foregoing fourth order - the core of the post-war scientific-technological revolution. Chinese (7.0% in the 90s) and Indian (5.9%) civilizations gained the lead in the growth rates of labor productivity. The Eurasian civilization (including Russia) turned thrown back for nearly half a century as a result of the crisis and technological degradation of economy (14.6 thousand U.S. GDP per person employed in economy in 2000 with 18.7 thousand in 1960 ). In 1970, Russia lagged behind the developed countries only a quarter while the gap increased 4 times by 2000.

**Table 4.3. Dynamics of labor productivity by civilizations and leading countries (a — thous. US dollars, in prices by PPP 2000, b — average annual growth rates for the previous years, %)<sup>1</sup>**

Civilizations and Leading Countries		1900	1913	1929	1938	1950	1960	1970	1980	1990	2000	2000, % of World
<b>World</b>	a	3.9	4.7	4.7	5.9	6.9	9.3	12.1	14.4	16.8	18.7	100
	b		1.4	1.2	0.4	1.3	3.0	2.7	1.8	1.6	1.1	
<b>Civilizations of Europe</b>												
Western European	a	9.9	11.1	13.2	15.2	14.5	20.9	31.1	38.6	46.7	53.9	288
	b		0.9	1.1	1.6	-0.4	3.7	4.0	2.0	1.9	1.3	
Eastern European	a	5.3	5.5	6.1	6.4	12.2	20.8	27.0	31.4	30.6	33.6	180
	b		0.3	0.6	0.5	5.8	2.9	2.9	0.6	-0.2	0.9	
<b>Eurasian</b>												
USSR	a	4.1	5.2	5.4	6.5	9.9	18.7	24.2	28.9	26.6	14.6	78
	b		1.8	0.2	2.1	3.6	6.6	2.6	1.8	-1.0	-5.8	
Russia	a	5.2	5.9	7.1	8.0	10.7	20.8	26.8	20.5	27.5	15.4	
	b		1.0	1.2	1.3	2.5	6.9	2.6	1.0	-0.5	-5.8	
<b>Civilizations of America and Oceania</b>												
<b>Northern American</b>												
USA	a	17.0	21.9	30.4	29.0	25.3	38.2	49.6	59.6	69.5	73.1	391
	b		2.0	2.1	-0.6	1.6	0.8	2.5	0.9	1.5	0.5	
Latin American	a	3.8	4.5	5.4	6.5	8.4	10.9	12.3	17.5	17.1	17.6	94
	b		1.4	1.1	2.1	2.2	2.5	1.9	3.6	-0.3	0.4	
<b>Oceanic</b>												
Australia	a	14.2	17.0	16.5	18.2	23.1	27.0	35.4	43.7	51.4	58.8	314
	b		1.5	-0.2	1.0	2.0	1.6	2.7	2.1	1.5	0.5	
<b>Civilizations of Asia and Africa</b>												
Japan	a	3.1	3.9	6.2	7.8	6.2	12.0	26.7	37.8	53.7	54.9	294
	b		1.8	2.9	2.6	-1.9	6.8	7.9	3.2	3.6	0.2	
China	a	1.0	1.0	1.1	1.0	1.1	0.9	1.2	1.1	-	7.0	37
	b		0.0	0.6	0.0	-1.7	2.9	-0.9	1.7	9.1	8.5	
India	a	1.7	1.8	1.8	1.7	1.6	1.8	2.0	2.5	3.4	5.9	32
	b		0.4	0.0	-0.7	-0.5	1.2	1.0	2.3	3.2	5.7	
<b>Buddhist</b>												
Thailand	a	2.0	1.9	2.0	2.0	2.5	3.5	5.6	19.2	17.9	19.4	91
	b		-0.4	0.3	0.0	1.9	3.7	4.8	5.1	6.3	1.3	
Republic of Korea	a	2.3	2.5	3.0	3.1	2.6	3.3	6.8	13.3	27.8	41.1	220
<b>Moslem</b>												
Middle East and North Africa	a	1.7	2.0	2.3	3.3	5.0	8.4	13.4	19.5	19.0	20.9	112
	b		1.3	0.9	4.1	3.5	5.3	4.8	3.8	-0.3	1.0	
Pakistan	a	2.5	2.0	2.8	2.8	2.9	2.7	3.3	4.4	5.7	6.1	33
Indonesia	a	2.3	2.3	3.1	3.4	2.7	2.9	3.5	6.5	9.8	10.0	53
<b>African</b>												
Sub-Saharan Africa	a	2.0	2.2	2.3	2.4	3.0	3.5	3.7	4.0	4.3	4.6	25
	b		0.7	0.3	0.5	1.9	1.6	0.5	0.8	0.7	0.6	
Gap between the upper and lower levels, times		17.0	21.9	26.3	32.1	39.2	31.8	45.1	45.8	22.4	17.9	

Although the gap in labor productivity between civilizations (the

<sup>1</sup> World Economy. Global Trends for 100 Years /Under the editorship of I.C. Koroleva. M.: Yurist, 2003. P. 539-540.

Northern American and African) reduced from 32.1 times in 1950 to 15.9 times in 2000, it remains extremely high. In the vanguard countries and civilizations the fifth technological order prevails and activities under way for the innovative assimilation of the first generations of equipment and technology of the sixth order; it will reinforce the dominance of these countries and civilizations on the world market. In civilizations with the medium level of technological development dominates the fourth order and the fifth is expanding. In the lagging countries it persists the prevalence of the third and partially fourth order; there is a significant proportion of relic orders.

The figures on dynamics of labor productivity, GDP output per worker employed in economy in U.S. dollars at purchasing power parity are published in the World Bank publication "2008 World Development Indicators". [Table 4.4](#) gives the figures on the levels, comparisons and dynamics of labor productivity. What findings may be made upon reviewing these figures?

1. For the period 1990-2006 it falls the completion phase of the up stage of the fifth technological order and the transition to the down stage that was marked by the world technological and economic crises of 2001-2002 from which the information section of economy that had been developing at a rapid pace suffered to the greatest extent. In this period the growth rates of labor productivity were 2.5% (with a tendency to decrease at the end of the period), with higher growth rates observed in the medium-income countries (3.8%, mainly because of China) and low income (mainly because of India). In countries with high income the growth rate are more stable - 1.9%. As a result, the gap in technological development between countries with high and low incomes reduced for the decade and a half from 15.4 to 12.7 times but it still remains quite significant. It can be expected that as a result of the global technological and economic crises the growth rates of labor productivity will be slowing further until 2020 but then they will increase as a result of the assimilation and dissemination of highly efficient technologies of the sixth order. Under the innovation-breakthrough scenario and the implementation of the strategy of the

technological partnership of civilizations, the gap in technological development and labor productivity between the vanguard and lagging countries and civilizations will significantly reduce but it will not be overcome by the middle of the 21<sup>st</sup> century. Under the inertia-based scenario, given that the lagging countries do not have sufficient investment and human resources for the assimilation of basic innovations of the sixth order, the gap may persist and even increase.

**Table 4.4 Levels, relations and dynamics of labor productivity by civilizations and leading countries<sup>1</sup>**

Civilizations and Leading Countries	GDP by PPP per 1 employee, US dollar						
	1990	2006	Growth, %	Growth Rates, %	Relation of the World Average Level, %		
					1990	2006	2006, % of 1990
<b>Civilizations of Europe</b>							
<i>Western European</i>							
Eurozone	15,772	24,354	156	2.8	292	322	110
U.K.	16,430	22,957	140	2.1	303	301	99
<i>Eastern European</i>							
Poland	5,113	8,999	176	3.6	95	118	125
Romania	3,511	4,305	122	1.3	64	56	88
<i>Eurasian</i>							
Russia	7,779	7,297	94	-0.4	144	96	66
Ukraine	6,027	4,154	69	-2.2	111	54	44
Kazakhstan	7,458	8,954	120	1.1	138	117	85
Uzbekistan	6,474	8,313	128	1.6	120	109	91
<b>Civilizations of America and Oceania</b>							
<i>Northern American</i>							
USA	23,201	31,245	115	0.9	431	410	95
Canada	18,872	24,633	127	1.5	349	323	94
<i>Latin American</i>							
Latin America	5,186	6,704	129	1.7	96	88	72
Brazil	4,923	5,812	118	1.1	91	76	84
Mexico	6,085	7,816	128	1.5	113	102	91
<i>Oceanic</i>							
Australia	17,108	22,582	112	0.7	316	246	79
Philippines	2,224	2,734	122	1.3	41	36	87
<b>Civilizations of Asia and Africa</b>							
<i>Japanese</i>							
Japan	16,313	19,653	117	1.1	302	252	85
<i>Chinese</i>							
China	6,402	12,207	191	4.1	118	160	136
<i>Indian</i>							
India	1,309	2,611	199	4.4	24	34	143
<i>Buddhist</i>							
Republic of Korea	8,704	18,086	210	4.3	161	244	152
Thailand	4,633	7,888	170	5.7	86	103	124
Vietnam	1,025	2,458	240	5.4	19	32	230
<i>Moslem</i>							
Middle East and North Africa	5,186	6,452	124	1.4	96	85	88
Pakistan	1,589	2,278	143	2.3	24	30	124
Indonesia	2,526	4,126	163	3.1	47	54	115
<i>African</i>							
Sub-Saharan Africa	1,061	1,192	112	0.7	20	16	78
SAR	8,993	8,691	97	-0.2	166	114	69
Nigeria	540	514	95	-0.3	10	7	67
Ethiopia	578	702	121	1.2	11	9	84
<b>World</b>	5,408	7,629	141	2.5	100	100	100
High-income countries	18,145	24,534	135	1.9	336	322	96
Medium-income countries	3,208	5,775	181	3.8	59	76	129
Low-income countries	1,175	1,937	165	3.2	22	25	110

2. In the technological dynamics of the *European civilizations* the opposite trends were observed. The western European civilization using the benefits of integration successfully assimilated the fifth technological order and ensured the growth rates of labor productivity

<sup>1</sup> 2008 World Development Indicators. Washington: The World Bank, 2008. P. 52-54.

above the world average (2.8% in the Eurozone against 2.5% of the world average). The eastern European civilization passed through the crisis of the early 90s, accelerated growth rates of the labor productivity, especially in Poland. However, in Romania and other Balkan countries, the growth rates slowed and the level of labor productivity is below the world average.

The Eurasian civilization is in the process of technological degradation. In 1990, the level of the labor productivity in Russia was 44% higher than the world average, in Ukraine - 11, in Kazakhstan - 38, in Uzbekistan - 20%, while by 2006, despite the accelerated economic growth in recent years, the lagging from the world average level in Russia was 6%, Ukraine - 46, and the difference with Kazakhstan reduced to 17 and Uzbekistan - to 9% (the high level of labor productivity indicators in Kazakhstan and Uzbekistan are primarily explained due to increasing world prices for fuel and raw materials exported).

In the implementation of the innovative-breakthrough scenario based on the assimilation, in the 10s and the spread in the 20s of the 21<sup>st</sup> century, of the sixth technological order the growth rates of labor productivity after the fall during the global crisis of 2008-2009 will rise again in all civilizations of Europe. The highest growth exceeding the world average is anticipated in the western European civilization which is one of the leaders of the technological revolution. With the inclusion of the European Union the eastern European civilization will come closer to it. If the strategy of the innovative breakthrough is implemented, the level of labor productivity in general for the Eurasian civilization will exceed the world average, first of all in Russia, Kazakhstan and Belarus. In the 30s of the 21<sup>st</sup> century the growth rates of labor productivity in all three civilizations will stabilize, and in the 40s they will decline related to exhaustion of resources of the sixth technological order.

Under the inertia-based scenario the western European civilization will keep the lead and continue the process of convergence

by this indicator with the eastern European civilization. However, the situation of the Eurasian civilization remains critical as the GDP growth opportunities for account of the growing production and export of mineral resources in connection with the implementation of the energy-ecological revolution and the reduction of natural resources will significantly reduce, and the obsolete scientific and technical capacity will prevent the large-scale renewal of economy; the growth rates of labor productivity will remain low (in the crisis period of 2009-2010 - negative), the lagging from the world average level will increase. The countries of the Eurasian civilization will be thrown to the periphery of the world technological progress, scientific and technical potential will be derailed, and the high-tech market will remain under the control of TNCs.

3. In the last decade and a half *civilizations of America and Oceania* significantly lag from the growth rates of labor from the average world level: USA – 0.9%, Canada – 1.5, Latin America 1.7, Australia - 0.7 and the Philippines - 1.3 % against 2.5% of the world average. However, the picture is sharply differentiated by the level of labor productivity: the USA is the world leader, the level of labor productivity 4.1 times higher than the world average in 2006; Canada is coming closer (3.2 times) and Australia (2.5 times). At the same time, the Latin American civilization is lagging by 12% from the world level on average (including Brazil by 24%, while Mexico is largely integrated with the U.S., has 102% to the world average level), the Philippines - 36%.

In the future under both scenarios the United States will remain the world leader in terms of technological development and labor productivity. However, due to the high costs for innovative modernization of production facilities and long-term effects of the economic crisis of 2008-2009 the current excess of the average world level will be unlikely kept, especially under the inertia-based scenario.

In Latin America it is anticipated the acceleration in the growth rates of labor productivity (especially under an innovative-breakthrough scenario), the achievement, and eventually the

exceeding the average world level. With regard to the Philippines and the island part of the oceanic civilization, the lagging from the world average level will be increasing.

4. By *civilizations of Asia and Africa* it is being formed a rather mixed picture. The Japanese civilization was one of the world technological leaders in the second half of the 20<sup>th</sup> century. However, the potential of the innovative breakthrough by the end of the century reduced, exceeding of the world level of labor productivity declined from 3 to 2.5 times, the growth rates of labor productivity dropped by 1.1% against 2.5% of the world average.

The opposite trend is observed in China and India: the growth rates of labor productivity are 4.1 and 4.4% under 2.5% of the annual average; exceeding the world level of labor productivity grew from 18 to 60% in China, the lagging of India from the world level decreased from 76 to 66%. However, despite successes in some areas, India is still among the countries with the low technological level of economy.

For the Buddhist civilization high growth rates of labor productivity were observed, outrunning the world average: in the Republic of Korea - 4.3%, Thailand - 5.7, Vietnam - 5.4%. However, in the Republic of Korea, the level of labor productivity is higher than the world average (in 2006 - 2.4 times), then in Thailand it is on the world average level (102%), while in Vietnam three times lower (32%). Myanmar, Cambodia, Laos are among outsiders of the technological advances.

For the Moslem civilization the picture is also mixed. In general, it is observed the lagging from the world average level of labor productivity in the civilization (the Middle East - 12%, Indonesia - 46, Pakistan - 70%) and by the growth rates (except for Indonesia). At the same time, some oil-exporting Arab countries have reached high levels.

The African civilization (Sub-Saharan Africa) is in the state of technological degradation: the growth rates of labor productivity are only 0.7% of the annual average, and the lagging from the world level has increased from 5 to 6.2 times (in Nigeria - from 10 to 14 times, Ethiopia - from 9 to 11 times). Only in South Africa it remains the

exceeding of the world level but it dramatically reduced - from 66% in 1990 to 14% in 2006. In South Africa and Nigeria, labor productivity falls.

The extreme technological backwardness is the main cause of poverty and hunger of a rapidly growing population of the African civilization and its catastrophic situation.

In the long term we can expect that Japan, China, Republic of Korea will be among the leaders in the assimilation of the sixth technological order in labor productivity. The situation with India is more tangled where the lagging remains from the world average. The African and a number of the countries of the Moslem civilization poses the most serious problem as they are lagging to the greatest extent from the world average level of the economic and technological development and do not have their own resources for innovative transformation of economy. The persistence of the prevailing current trends is fraught with great geo-civilizational upheavals and explosive state for the entire global civilization. It will be required a large-scale program of support from the vanguard civilizations and countries for the implementation of the innovative breakthrough in the extremely backward countries to reduce their dangerous gap from the world average level. In this case, under the implementation of the innovative-breakthrough scenario civilizations of Asia and Africa will be the leaders by the growth rates in labor productivity, and the lagging of a part of them from the general world level will be reduced by the mid-century, although it will not be overcome.

#### **4.2.3. The Content and Features of the Global Technological Revolution of the Second Quarter of the 21<sup>st</sup> Century**

From about the 20s of the 21<sup>st</sup> century the vanguard countries and civilizations the global technological revolution of the 21<sup>st</sup> century will evolved as a response to the global technological crisis of the first quarter of the century and it will take the space of the second quarter of the century, and it will involve the lagging countries and civilizations

only in the second half of the century. This revolution will lay the foundation of the post-industrial technological mode of production as a material and technical basis of the integral economic system of the 21<sup>st</sup>-22<sup>nd</sup> centuries.

The contents of this revolution will be a large-scale assimilation of the sixth technological order - the first stage of the post-industrial technological mode of production; it will become an epochal innovation, the most profound technological transformation of the 21<sup>st</sup> century. A transition to the subsequent technological orders - the seventh, eighth, ninth, and possibly the tenth in the late 22<sup>nd</sup> century - it is unlikely to be so radical at different stages of the life cycle of the post-industrial technological mode of production.

The structure of the sixth technological order: its basic directions - nanotechnologies, biotechnologies based on genetic transformation of plants and animals, information networks, renewable and alternative energy; transformations in technological base in the sphere of production (tools, sources of energy, materials, and technologies) and the sphere of personal services and personal consumption (medical, personal, educational and cultural services, household).

What are the *features of the global* technological revolution in the 21<sup>st</sup> compared to its precedent technological transformations of the 20<sup>th</sup> century?

**First**, it marks not change of the orders within the dominant technological mode of production but transition to a new, post-industrial, humanistically noospheric technological mode of production, an innovative type of development of the global economy. This implies the deep depth and complexity of the transformation, the scale and character of the epochal and the basic innovations that underlie this revolution. It follows also much larger investments in radical innovative update of the technical base of all society and all spheres of reproduction.

**Second**, under globalization conditions the latest technological

revolution, since the very beginning, acquires a global character, transforming the material base of the all world economy. But this is connected with a certain risk: an increasing gap between the vanguard, catching up and lagging countries, global technological polarization. However, this means the need for the technological priority in the process of globalization, in its new model going to replace the neoliberal.

**Third**, by operation of compression law of historical time the pace of technological transformations significantly accelerates, the duration of technological cycles reduces. While it has taken nearly a century to spread the achievements of the industrial revolution on the planet, now the rate is measured in decades. As examples it may be given the velocity of propagation of personal computers, and mobile communications. The speed of transformation will continue to grow, especially in the transition period.

**Fourth**, the depth and speed of transformations make high demands to the efficient management of these processes from business, states and international organizations, actors of the great transformational drama. It is already dangerous here to rely on the creative power of market competition. It is needed a long-term prediction of these processes at all levels - from corporate to global. The incompetence of the leaders becomes an increasingly more dangerous, errors made in technical and economic policy because of it becomes more and more expensive. Therefore the latest technological revolution will be more manageable than its precedent technological revolutions of the industrial era, more oriented to the principle of an innovative partnership than to the principle of tough market competition. To the principle of partnership in three aspects: between science, education, business and state; between related industries, manufacturers and consumers; partnership of countries, and civilizations in the development and dissemination of epochal and basic innovations and overcoming the technological polarization that has reached a critical level on a global scale.

Accounting for these features by the global community will allow

implementing the innovative-breakthrough scenario of the global technological development, in the shortest time and, at the global level, assimilating the latest achievements of the technological revolution in the interests of all countries and civilizations. The movement by the inertia-based scenario is fraught with losses in rates of technological transformations, the deepening divide between the vanguard and lagging countries, the loss of the ability of humanity to give an adequate innovation response to the challenges of the 21<sup>st</sup> century with all the ensuing very dangerous consequences.

### **4.3. THE STRATEGY OF TECHNOLOGICAL PARTNERSHIP OF CIVILIZATIONS**

#### **4.3.1 The Need for and Goals of Technological Partnership**

The partnership of states and civilizations in the field of technological development and global innovation breakthrough is a key factor in overcoming the modern cluster of the global crises (technological, energy and ecological, food, and economic) and well-aimed formation of the postindustrial technological mode of production as the basis for the transition to the integral postindustrial civilization. This is determined by several factors.

*First*, Only on the basis of saltatory development of technologies, implementation of strategies of the innovative breakthrough on a global scale a slowdown in the economic growth can be surmounted as well as to improve the labor productivity at the stage of the late industrial development stage at the end of the 20<sup>th</sup> - beginning of the 21<sup>st</sup> century, to ensure the material and technological base for a significant acceleration of growth rates in labor productivity and gross domestic product under conditions of a slowing down rates of population growth, reduction in the share of able-bodied population in the overall population size and a falling share of population in the innovation age. Only on this basis it is possible to modernize the technological base of society, its adaptation to radically changing

conditions of global and local civilizations.

**Second**, the technological partnership is a prerequisite for overcoming the divide between a handful of the vanguard countries in the economies of which the fifth technological order is dominated and the foundations of the sixth order are being laid, and the majority of the population on the Earth, concentrated in technologically lagging countries and civilizations, where it is dominated the third, and even the relic technological orders, pre-industrial technological modes of production that determines an extremely low level of labor productivity and causes poverty and pauperism of the majority population in these countries. This kind of technological gap is the basis for the economic gap between rich and poor countries, for aggravation of geopolitical and hinders the progress toward the next turn of the spiral of dynamics of civilizations. It is obvious that without the partnership of civilizations, without organized assistance from the vanguard countries to the lagging countries it is impossible to escape from the technological backwardness and poverty.

**Third**, the establishment of the sixth technological order and post-industrial technological mode of production requires a huge investment in upgrading the technological base of society, as well as in the creating of a scientific base and human resources basis for the implementation of the strategy of such transition. Moreover, this concentration of efforts should be undertaken not only at the level of states and civilization interstate associations, but also globally. This requires the refining of institutions and mechanisms for technological partnerships among civilizations, which will allow concentrating the resources and solving the problems of the establishment of a new technological mode of production in a relatively short historical period and planetwide under a significant reduction of the gap between the vanguard and lagging countries and civilizations based on their technological partnership.

The area of technological partnership is the most backward in the modern mechanisms of interaction between states and civilizations in the system of bodies and activities of the UN and its organizations.

Although there is some experience in organizing such a partnership, primarily in information technologies and developing a global information society, including a number of international conferences organized by the UN but it is only one area of innovation breakthrough, and in this area the focus was made on technology-related problems, and not on the content fleshing of information networks to address pressing problems of transition to a post-industrial society. In fact, the domain of international technological cooperation is farmed out to multinational corporations which seized the fast-developing global high-tech market and dictate their own conditions on it ensuring the inflows of huge volumes of world technological quasi-rent to these corporations and developed countries where such corporations have their registered headquarters. This kind of unrestricted dictate of TNCs on the global technological market is a major factor in deepening the technological gap between developed and developing countries.

An example of interstate cooperation in the field of technology and innovations can serve a technology policy of the European Union. There operate two scientific and technological programs aimed at providing an innovative breakthrough. This is a framework program for science and technology of the European Union taken every four-five years and providing for the allocation of large shared resources for priority areas of technological breakthrough. Furthermore, within the EU there are long-term innovation-technological programs, the so-called Platforms, which determine long-range goals of innovative breakthrough in a particular area (e.g. hydrogen energy), form specific mechanisms and provide the funding to achieve these goals.

Another program is called "Eureka", it provides for the selection of the most promising innovative technology projects and uniting of efforts of the countries concerned, not only among members of the European Union, for the implementation of such projects and obtaining concrete results. This allows the European community to formulate and solve major challenges in implementing an innovative breakthrough in technology or other priorities.

However, nothing of the kind exists so far within the UN on a

global scale. If the science has some experience in co-operation and international regulation within the UNESCO framework, although its efforts in this area are clearly insufficient; if the intellectual property has a special structure - the World Intellectual Property Organization, implementing measures for harmonizing patent policy and accelerating the implementation of the most promising inventions as discussed at the recent Singapore International Conference on Intellectual Property; if there are international institutions in economy that are aimed at facilitating dialogue and partnership of civilizations in this area, in the area of innovations there is little organization within the UN, which would be responsible for the development and implementation of the strategy of technological partnership of civilizations. Probably, this direction of partnership of civilizations is closest to the UN Development Programme but the problems of innovation and technology partnership do not occupy a central place in the activities of this organization

It should be clearly understood that overcoming the current deep crises, largely caused by adverse effects of the modern structure and mechanisms of global technological progress is impossible without setting goals and developing a mechanism to achieve them through partnership of civilizations on a global scale.

The technological turn plays a key role in the innovation breakthrough, in overcoming the crisis. Academician N.N. Moisseev noted: "The dialectic of our life is so that because of the development of technological innovations, we found ourselves on the brink of a precipice but without them we could not go ahead and move away from the edge of the precipice - this is inconsistency of anthropogenesis ... Technological development is absolutely necessary but it is not enough: civilization should become another as well as the spiritual world of human, his needs, his mentality"<sup>1</sup>.

The most important task for the near future is the formation of technological partnership of civilizations as one of the main, key parts

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<sup>1</sup> Moisseev N.N. The Fate of Civilization. The Path of Reason. M.: MNEPU, 1998. P. 70.

of the overall partnership system of civilizations on a global scale. The technological partnership of civilizations should be aimed at achieving the following major goals:

- pooling the efforts of countries and civilizations to implement the strategy of innovation breakthrough on a global scale, providing a large-scale assimilation and distribution of the sixth technological order that implements the achievements of scientific and technological revolution of the first quarter of the 21st century.;

- overcoming the prevailing technological polarization in the development of countries and civilizations on the basis of joint efforts and development of a mechanism for transfer of high technologies from the vanguard countries and civilizations to the lagging and providing such bridging the gap based on the mobilization of financial and human resources;

- developing a mechanism for global regulation of technological development, the implementation of the strategy of innovative breakthroughs, limiting the effects of domination of transnational corporations in this area, establishing conditions for more uniform and equitable distribution of the achievements of modern scientific and technological revolution and the fruits of globalization in the technological field between different civilizations, countries and social strata which is the basis for overcoming the economic polarization;

- formation of the system of technology partnerships civilizations will require a clear, science-based super-long forecast of the innovation and technological development on a global scale, the choice of the system of priorities of innovation and technological breakthrough, joint programs to implement these projects and the formation of mechanism for the support with resources of their implementation.

#### **4.3.2. The Main Outlines of the System of Technological Partnership**

It is necessary to identify the main lines and successive steps to form a global system of technological partnership of civilizations, major

activities, as well as institutions and mechanisms. The basic directions of formation of such a system are as follows.

1. Theoretical foundations of the strategy of technological partnership of civilizations

Development of the global technological relations, scientific foundations and methods for their interstate regulation through partnership of civilizations is a relatively new area of international relations, which requires scientific understanding and elaborating an effective concept for the formation and development of such partnership. This requires, above all, a clearer idea about the content and rhythm of change on a global scale of technological modes of production once every hundred centuries as a basis for changing the world civilizations; about the formation, development and change of technological orders in the half of a century rhythm as a basis for the next Kondratieff cycles; a change, with a periodicity of about once every decade, of the prevailing generations of technology determining the competitiveness of goods and services on world markets and defining the dynamics of economic cycles and periodic technological and economic crises.

The basis of this new branch of economic science is the researches of Nikolai Kondratieff and Joseph Schumpeter, as well as modern Russian school of Russian cyclicism into the regularities of the progress of science and technology with a periodic change of waves of basic and epochal innovations.

The researches of N.D. Kondratieff have shown that technological breakthroughs are carried out simultaneously in the most developed countries; in fact, they are global, spreading from the epicenters to other countries and civilizations. These ideas are elaborated in the works of contemporary Russian civilizational and innovative schools which have showed the rhythm and inner logic of the periodic carrying out of technological and scientific-technological revolutions, the mechanisms for their distribution on the planet, their implementation in the change of the prevailing technological orders and generations of equipment.

We can therefore say that the theoretical base for the global technological partnership of civilizations in its main features have already been created, but it is still accepted by only a small proportion of scientists, top-managers and public officials, forming a long-range technological policy. The challenge is therefore that through the Internet and through the education system to make this area of the modern post-industrial scientific paradigm accessible to a wide range of people who take strategic decisions and preparing these solutions, in order to form the basis for a long-term global strategy.

2. The choice of priorities and developing a global strategy of technological partnership of civilizations should be based on long-term forecast of technological development of civilizations which is the subject-matter of Part 5 of the Global Forecast “Future of Civilization” for 2050.

Based on this forecast collective actions are required for elaborating a system of priorities of technological development both globally and in civilizational and national systems of socio- economic development.

As our predictive researches show the priorities of technological partnership of civilizations in the next decade are:

- orientation of the partnership strategy at the implementation, on a global scale, of innovation and technological breakthrough ensuring the assimilation and distribution, of the long-range sixth technological order within a relatively short historical time, its first generation of equipment and technologies for overcoming the technological crisis and acceleration of labor productivity growth rates and GDP rates on a planetary scale;

- Assimilation and dissemination of basic directions of the sixth technological order – nanotechnologies, biotechnologies, advanced information and communication technologies and alternative energy, as well as a large-scale use of these basic trends in various industries, and primarily in the energy-ecological areas for the formation of the noospheric energy and ecological mode of production and consumption in the field of food to supply the entire population of the

planet with ecologically clean food and overcoming hunger in some civilizations, the establishment of high-tech industries to provide a technological breakthrough, the development of the advanced transport and communications systems, and international and intercontinental transport corridors, greatly reducing transportation costs and facilitating access of all countries and civilizations to modern markets of goods and services;

- convergence of levels of technological development of countries and civilizations through the arrangement of technology transfer and drawing the level of technological development of backward countries and civilizations for their change to the modern fifth and sixth promising technological order and bringing closer to the level of the vanguard countries and civilizations.

#### **4.3.3. The Institutions and Mechanisms of Technological Partnership of Civilizations**

The necessary conditions for the establishment of the technological partnership of civilizations are the formation of institutions and mechanisms for the implementation of the technological breakthrough on a planetary scale, the establishment of the relevant organizations responsible for achieving these goals of partnerships within the UN, the development of global innovation and technology programs and projects ensuring the implementation of priorities of a global partnership of civilizations, establishment of the Global Technology Facility, and mechanisms for support with resources of the implementation of joint innovation and technology programs and projects.

As the UN system has no so far the organization responsible for coordinating the efforts of the world community in the field of innovation and technological development, it is advisable either to create such a specialized body, or to assign these functions to the United Nations Development Programme, the basic content of which should be promoting partnership of civilizations and nations in the field of technological development. This central body should play a

major role in preparing (with the assistance of expert groups and periodic updating and refinement) of global technological development; act as the initiator of development and discussions of the global long-term strategy for innovative partnership of civilizations and institutions and mechanisms for such partnership at the world summits; to develop and coordinate the implementation of global innovation and technology programs and projects that ensure the implementation of priorities of the innovative partnership of civilizations; and coordinate activities of the Global Technology Facility for financial support of such programs and projects, ensure monitoring of the implementation of programs and projects, and their periodic update and adjustment in the context of changes in the development conditions. Such a body should act in coordination with UNESCO that provides a global regulation of scientific activity and use of its results with the World Intellectual Property Organization, the Economic and Social Council of UN, UNEP, other international organizations involved in implementing the strategy of technological partnership.

Another important issue is the support with resources of programs and projects of technological partnership of civilizations based on the establishment of the Global Technology Facility in the UN system. The proposal to establish such a fund was put forward by Russian scientists at the World Summit on Sustainable Development in Johannesburg in 2002 and published in the monograph of Yu.V. Yakovets "Rent, Anti-Rent and Quasi-Rent in a Global Civilizational Dimension" (2003). It was expected that the basis for filling this fund with financial resources may be a kind of taxation of international trade in arms and high-tech goods. This would provide a stable financial base for the implementation of programs and projects of technology partnerships. It is clear that this proposal will face fierce resistance of transnational corporations and states benefiting the most from the trade in arms and high-tech goods and do not wish to share technological quasirent with international organizations and other countries. However, without the establishment of a stable, reliable and sufficiently extensive financial basis, programs and projects of global

technology partnerships will be up in the air, and will have no real basis for its implementation. You can search for different methods of filling of such fund, but it appears that the need for such a fund as a permanent source of the implementation of a long-term strategy of technological partnership will be gradually recognized, and it will be created in the future.

The third important issue of ensuring the implementation of the strategy of innovative partnerships is an acute shortage of human resources for the assimilation and dissemination of basic innovations, particularly in the lagging countries, not having sufficient own scientific and technological base. And therefore it will be needed to form a global system of training innovative personnel for projects and programs of technological partnership, a focus of education systems in all countries and civilizations on achieving these goals. To some extent these problems were set in the document adopted at the summit of the Group of Eight in St. Petersburg in July 2006 - "Education for Innovative Societies in the 21<sup>st</sup> Centuries." However, a concrete mechanism to implement these tasks have not yet been formed.

One of the directions of realization of the task to support with human resources of the global innovation breakthrough on the basis of partnership of civilizations may be the establishment of the International Innovative online university. Currently, the International strategic and innovative technological alliance is preparing the project of creation of the International Innovative internet university with branches in the leading universities of civilizations, creation of the network of study-consulting and education centers. However, this would require arranging the financial base for such education because not all countries have the conditions for the implementation of such a project on a fee-basis. UNESCO can play an important role in solving this problem as one of its tasks is global cooperation in education. The implementation of our proposal to establish the global socio-cultural facility under the auspices of UNESCO would also contribute to the desired goals, and one of the main tasks of such facility would be support of the educational systems, especially in lagging countries, to

implement the most relevant programs and projects of technological cooperation of civilizations.

The strategy of technological partnership of civilizations could be developed on the basis of a long-term forecast of the technological dynamics of civilizations prepared by an authoritative group of scientists, political figures, business representatives, and then published, discussed and adopted at the World Summit in 2011 as a concretization of the general strategy of partnership of civilizations in the 21<sup>st</sup> century. The implementation of this program can be designed for several decades and involve the elaboration of the system of global programs and projects to implement the shared priorities, the formation of institutions and mechanisms to implement these programs and projects and the necessary adjustments under the changing development conditions. It might be assumed that the deep crisis of 2008-2009 will give an additional impulse that would motivate countries and international organizations to the need to develop, adopt and implement such strategy and mechanisms for its implementation.

## **CHAPTER 5. THE STRUCTURE OF ECONOMIC TRANSFORMATIONS**

### **5.1. THE DECLINE OF INDUSTRIAL AND ESTABLISHMENT OF INTEGRAL ECONOMIC SYSTEMS**

#### **5.1.1. The Time of the Crucial Turn in the Trajectory of Economic Dynamics**

Economy of the global civilization (world economy), as the economy of its components - civilizations and countries develops in cycles, natural uneven, wave-like. The periods of high economic growth rates on the up waves of civilizational, Kondratieff and medium-term economic cycles, are followed by periods of falling growth rates on the down waves, and even reduction in production during the economic crises, especially in periods when the crisis phases of medium, long-term and super-long cycles coincide in time and resonate.

It is this period occurred in the first quarter of the 21<sup>st</sup> century. The economy of the industrial world civilization which reached the peak of its development in the third quarter of the 20<sup>th</sup> century when the annual growth rates of GDP according to A. Maddison's estimations reached 4.9%, and per capita - 2.92% in the last quarter of the 20<sup>th</sup> century it is entered into the down wave (GDP growth rates fell to 3.05%, per capita - to 1.41%), and in the first quarter of the 21<sup>st</sup> century - a series of global crises accompanied by reducing to a minimum the growth rates, and even by an absolute reduction in world GDP and world trade. Similar trends were observed in most civilizations and leading countries, albeit to varying degrees (Table 5.1). The rest of civilization could be in the opposite phase, as it happened with the Eurasian civilization in the late 20<sup>th</sup> - early 21<sup>st</sup> century.

**Table 5.1. Average GDP growth rates** (a — average GDP growth rates in prices of 1990; b — the same per capita, %) <sup>1</sup>

		1000- 1500	1500- 1820	1820- 1870	1870- 1913	1913- 1950	1950- 1973	1973- 2001
<b>World</b>	a	0.15	0.32	0.93	2.11	1.82	4.90	3.05
	b	0.05	0.05	0.54	1.30	0.86	2.92	1.41
Western Europe	a	0.29	0.40	1.68	2.11	1.14	4.79	2.21
	b	0.13	0.14	0.98	1.33	0.76	4.05	1.88
Eastern Europe	a	0.19	0.41	1.41	2.33	0.86	4.86	1.01
	b	0.04	0.10	1.63	1.39	0.60	3.81	0.68
Former USSR	a	0.22	0.47	1.61	2.40	2.15	4.84	-0.42
	b	0.04	0.10	0.63	1.06	1.76	3.35	-0.96
USA	a	-	0.86	4.20	3.94	2.84	3.93	2.94
	b	-	0.36	1.34	1.82	1.61	2.45	1.86
Latin America	a	0.09	0.23	1.22	3.48	3.42	5.38	2.89
	b	0.01	0.16	-0.03	1.82	1.43	2.58	0.91
China	a	0.17	0.41	-0.37	0.56	-0.02	5.02	6.72
	b	0.06	0.00	-0.25	0.10	-0.62	2.86	5.32
India	a	0.12	0.19	0.38	0.97	0.23	3.54	5.12
	b	0.04	-0.01	0.00	0.54	-0.22	1.40	3.01
Japan	a	0.18	0.31	0.41	2.44	2.21	9.29	2.71
	b	0.03	0.09	0.19	1.48	0.88	8.06	0.91
Africa	a	0.07	0.15	0.75	1.38	2.57	4.43	2.14
	b	-0.01	0.00	0.35	0.57	0.82	2.00	0.19

In the third quarter of the 20<sup>th</sup> century the Japanese civilization was steadily in the lead by the economic growth rates, eastern European, Latin American, Chinese and Eurasian civilizations were after it. The economic growth rates of the northern American, Western European and African civilizations were lower.

In the last quarter of the 20<sup>th</sup> century the leadership in the economic growth passed to the Chinese and Indian civilizations. The Eurasian civilization found itself in a deep crisis, thrown back for ago. In the 90s the crisis, although to a lesser extent, embraced the Eastern European civilization, the economic growth rates of other civilizations decreased in the final phase of the industrial super-long cycle.

At the beginning of the 21<sup>st</sup> century the crisis of 2001-2002 and

<sup>1</sup> Maddison A. The World Economy: Historical Statistics. Paris, 2003.

especially of 2008-2009 strongly hit the economic poles – highly developed northern American, western European and Japanese civilizations and the African least developed. The Chinese and Indian civilizations continued to develop at a rapid pace and to strengthen its leadership. The Latin American and Buddhist civilizations established their positions. The situation with the Moslem civilization is contradictory. The Eurasian and eastern European civilizations which had the high growth rates, were plunged into the economic crisis of 2008-2009 in the first seven years of the century and lost their positions.

What rates of economic dynamics of global and local civilizations are anticipated until the middle of the 21<sup>st</sup> century?

The world crisis of 2008-2009 will probably end with the depression, after which it begins the phase of recovery but it will be followed by another crisis of the second half of the 10s. The matter is that technologies of the sixth order have not yet received international distribution, will require major investments in technological modernization of economy. The up wave of the sixth Kondratieff cycle will begin only in the second quarter of the 21<sup>st</sup> century; it can be expected a significant increase in GDP growth rates and labor productivity.

The crisis phases of medium-term economic cycles will be observed on this wave but already less deep and prolonged. However, we can hardly expect a return to record high economic growth indicators of the third quarter of the 20<sup>th</sup> century. Two main factors will prevent it: reducing the rate of growth of able-bodied population and its proportion in the overall population size, especially in western European, Japanese, Eurasian, and then the Chinese civilizations; the natural ecological factor - the exhaustion of the best natural resources, a shortage of fuel and water, the need to direct a growing share of resources for environmental protection, reduction of greenhouse gas emissions. The peak of the sixth Kondratieff cycle will likely be reached in the 30s, and then the slowing of the economic growth rates will

begin and creation of prerequisites for the seventh Kondratieff cycle, and the technological order adequate to it.

With regard to the economic dynamics of local civilizations, it should be expected a further relocation of the global center of economic activity from the north and west (from the northern American and western European civilizations) to the east and south - to the Chinese, Indian, Buddhist and Latin American civilizations. The situation of the Eurasian civilization will be difficult because the raw type of economic dynamics has no prospects, and it will not be sufficient human and financial resources for technological modernization. A larger part of the Muslim and especially African civilizations will find themselves in such a situation where the crisis drags on for a long time and can not be overcome without a substantial support of the vanguard civilizations.

Under the inertia-based scenario the crisis phases will be more lasting and deep, the process of transition to the sixth Kondratieff cycle may be delayed until the late 30s. Subject to the implementation of the innovation-breakthrough scenario with the energy efforts of the vanguard civilizations for the implementation of the strategy of innovative breakthroughs and help to the lagging civilizations the transformation and the innovative renewal of the world economy can be greatly accelerated and accompanied by smaller losses and sacrifices.

Radical changes will occur in the ratio of levels of economic development of local civilizations and leading countries. The basic contradiction of the industrial era is a multiple increase of economic stratification, the gap between rich and poor civilizations and countries. This can be judged from [Table 5.2](#).

While in the pre-industrial era the gap between Western Europe and Africa was small and began to increase with the evolution of the industrial revolution, the beginning of the 21<sup>st</sup> century it increased again. In 2007, according to the World Bank figures, the gap between the countries of the "golden billion" and the poorest countries amounted to 65.5 times by GDP per capita at current exchange rates,

and by PPP – 24.4 times.

The ensuing economic stratification is the heavy legacy of the industrial economic system, deep foundation of the geopolitical contradictions.

In the period of global crises of the first quarter of the 21<sup>st</sup> century it should be expected a further deepening of global economic stratification as the lagging poor civilizations and countries have no necessary intellectual, labor, material and financial resources to modernize the economy.

**Table 5.2. Differentiation trends in the levels of economic development by civilizations** (a - GDP by PPP per capita, US dollars 1990; b - relation of the world average level, %)<sup>1</sup>

		1000	1500	1920	1870	1913	1950	1973	2001
<b>World</b>	a	436	566	667	875	1,525	2,111	4,091	6,049
	b	100%	100%	100%	100%	100%	100%	100%	100%
Western Europe	a	400	771	1,204	1,960	3,458	4,579	11,416	19,256
	b	92%	136%	181%	224%	225%	211%	279%	318%
Eastern Europe	a	400	548	683	937	1,695	2,111	4,988	6,027
	b	92%	97%	102%	107%	111%	100%	122%	100%
Former USSR	a	400	499	688	943	1,488	2,841	6,059	4,626
	b	92%	88%	103%	108%	98%	135%	148%	76%
USA	a	-	400	1,257	2,445	5,301	9,561	16,689	27,948
	b	-	71%	188%	279%	348%	453%	408%	462%
Latin America	a	400	416	692	681	1,481	2,506	4,504	5,811
	b	92%	73%	104%	78%	97%	119%	110%	96%
Japan	a	425	500	669	237	1,921	1,921	11,434	20,683
	b	97%	88%	100%	84%	91%	91%	279%	372%
China	a	450	600	600	530	552	439	839	3,583
	b	103%	100%	90%	61%	36%	21%	21%	59%
India	a	450	550	533	533	623	619	853	1,957
	b	103%	97%	100%	61%	44%	29%	21%	32%
Africa	a	425	414	420	500	637	894	1,410	1,489
	b	97%	73%	63%	57%	42%	42%	34%	25%

To reverse the prevailing trend, reducing the depth of stratification and the gap between rich and poor countries and civilizations it will be necessary to develop and implement a strategy of economic partnership, implementing innovation-breakthrough

<sup>1</sup> Maddison A. The World Economy: Historical Statistics. Paris, 2003. P. 262.

scenario of dynamics and interaction of civilizations. It will be required significant efforts of the global community, especially the vanguard countries to assist the lagging poor countries and civilizations in addressing the technological and socio-economic backwardness on the basis of modernization of economy, influx of foreign direct investments, development of basic innovations of the sixth technological order, training of professional personnel.

In this case, the gap in the levels of economic development between rich and poor civilizations can be reduced by the middle of the 21<sup>st</sup> century 2-3 times, hunger and poverty mostly be overcome on the planet, a sustainable (not without amplified fluctuations) growth of the world global economy and economy of local civilizations and countries be ensured.

### **5.1.2. A Choice of the Model of the Post-Industrial Economy**

In the second half of the 20<sup>th</sup> century it became apparent that the industrial economy is in a phase of decline and that a new, post-industrial economy will come to replace it. However, the idea of the nature, model of such economy were very different, sometimes opposite.

The Marxists were convinced that this will be the economy of developed socialism, gradually developing into the communist economic system where it will be dominated by national property and planned economy and on the banner of which it will be written an old dream of the oppressed and exploited people: "From each according to his ability, to each according to his need." This model was presented more vividly in the CPSU program adopted in 1960, which provided for the building of the foundations of communism in the Soviet Union by 1980 with a further spread around the world. However, life soon rejected these intentions, and in the 70s and 80s socialism was already clearly losing in economic competition with capitalism, and in the 90s the socialist system in the USSR and other socialist countries failed, and was replaced by spontaneous market capitalism of the era of

original accumulation of capital. But in China and Vietnam market socialism has survived and flourishes showing sustainable high economic growth rates unprecedented for capitalism. It is a kind of integral connection of socialism and capitalism, plan and market in accordance with the NEP model of the mid-20s of the 20<sup>th</sup> century.

**Pitirim Sorokin** in the book "The Basic Trends of Our Time" published in 1964 noted that "the dominant type of emerging society and cultures would not be likely either capitalist or communist but a type sui generis, which we denote as an integral type. This type is intermediate between the capitalist and communist orders and countries. It should absorb most of the positive values and be free from serious defects of each type. Moreover, the emerging integral system in its full development will probably not be just an eclectic mix of specific features of both types but the combined system of integral cultural values, social institutes and integral type of personality, significantly different from the capitalist and communist samples. That is my brief forecast of alternative future of humanity."

American futurist Alvin Toffler in his book "The Third Wave" published in the United States in 1980 comes from the fact that the economy of the "second wave" which began with the industrial revolution, has largely exhausted itself, and is being transformed into the economy of the "third wave".

Toffler viewed the crisis of the 70s of the twentieth century not only as an economic and energy crisis but also as a crisis of major sources of the existence of society as a crisis of the industrial civilization as a whole to be followed by an entirely new civilization - society of the "third wave". This is a crisis of corporatism as a basis for the industrial economy, the crisis of the mass market. Corporations of the institutions generating profits turn into multi-purpose organizations, become multi-purpose institutions that take into account environmental, social, informational, political and ethical demands of a transforming society.

Furthermore, the process of marketization of economy is under completion, formation of the market as "a planetary global system

which involves millions, or rather billions of people"<sup>1</sup>. The role of "prosumption" that leads to demarketization of at least some activities, thus changing the market role in the life of society, and thus, according to A. Toffler, "The Third Wave" creates a trans-market civilization.

We must admit that A. Toffler rightly pointed out, and correctly assessed the many trends and features of the future post-industrial, integrated economy. Decades after the crisis of the 70s showed that it was only the first call that the late industrial society managed to recover after it, to give itself a shake and to continue the implementation of its main features and the prevailing trends that would inevitably lead to a subsequent deeper and more protracted civilizational crisis. Probably there will be needed the "third ring" as the next global crisis of the second half of the 10s (in 40 years after the crisis of the 70s - the duration of the fifth Kondratieff cycle) before it starts a really radical transformation of the global economic system, many directions of which has been so cleverly divined and described by Alvin Toffler.

Another variant of the forecast of the post-industrial economy is presented by the American sociologist **Daniel Bell** in the book "The Coming Post-Industrial Society" published in 1973. In an extensive preface to the Russian edition of this book in 1999 there are represented the views of D. Bell on the future of society in a more mature and concentrated form. As Toffler, Daniel Bell comes from the fact that the industrial society has exhausted itself, and will have to transit to a postindustrial society. Its essential features, according to D. Bell, are: modification of the theoretical knowledge and the increasing role of science in transforming the world; knowledge becomes a source of value; change in the professional structure of workforce; the transformation of services in a direct source of productivity; a new social structure, dependence of the status of a person on his educational level.

At the root of the establishment of the postindustrial society lies

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<sup>1</sup> *Toffler A. The Third Wave. M.: ACT, 1999. P. 376.*

the third technological revolution, the distinctive features of which are:

- replacement of mechanical, electrical and electro-technical systems with electronic;
- miniaturization of products;
- transformation of information into digital form;
- software.

This is primarily a society based not on material production but on services. It changes essence of the traditional sector of economy, the education system will be reorganized, nature of the character of labor changes. Society enters the information age that brings to life new principles of social and technological organization of society, which is based on intellectual technology and “makes theoretical knowledge the corner stone as a source of renewal and changes the nature of technological progress, it makes equally significant the idea of globalization”. This approach is worth noticing.

D. Bell believed that the post-industrial society will end the era of shortage of benefits, primarily material that will allow the implementation of the ideas of K. Marx and J. Keynes about the affluent society. He assumed that by 2000, 12 countries (first of all the U.S. and countries of Western Europe) can be considered "clearly post-industrial" and nine more - "post-industrial in the initial phase."

D. Bell's ideas on the post-industrial information society formed the basis of the majority of prognostic studies in the last quarter of the century. However, the lessons of the global crisis and our researches provide a basis to introduce significant changes to such ideas, although much in them is original and essential.

**First**, the ideas of a future society as a society of services, as an information civilization do not stand up to criticism. Already the crisis of 2001-2002 when the information “soap bubbles” burst shattered those views. The crisis of 2008-2009 as well as contemporary energy-ecological and food crises further dispelled the myth of a society of services, low dependent on material benefits. Undoubtedly, the role of services grows, but their overgrowth, especially market services, is one of the signs of parasitism of late-industrial economy. Production of

material benefits serving to meet necessary life needs of people and production, has always been and will be the foundation of economy.

**Second**, the myth of the "affluent society where wealth will flow as full flow" and can be carried out distribution according to needs, is dispelled. Production resources are limited, many of them will be eventually exhausted, the share of able-bodied population in its overall size falls and the law of rising necessities will concurrently operate. To satisfy them, the scanty of resources should be taken into account and use them more effectively, develop material productions.

**Third**, under the growing importance of knowledge labor not knowledge itself is the source of value. Another thing is that the role of highbrow work of scientists, designers and engineers in the creation and adding of the value increases; but it is still labor that defines the content and scope of the newly created value. An excessive gap between the market prices of the value and their swings only emphasize the need to return to this only objective and reliable guidepost.

Finally, **fourth**, Bell rushed to declare the United States, Western Europe and other countries post-industrial. Experience of the last quarter of the century and contemporary global crisis has shown that we will still have to pass a severe, painful and not short way of the establishing a postindustrial integral economy, at the best case it will only be achieved by the second quarter of the 21<sup>st</sup> century and maybe later.

Let us dwell on one, fourth concept of the post-industrial economy developing in many ways and, at times reducing to an absurdity the views of D. Bell. This is a monograph of **V.L. Inozemtsev** "The Divided Civilization" published in 1999<sup>1</sup>. It must be admitted that the book is not without entertaining and consistency in the presentation of the author's concept, abundantly supported by quotes and statistics but that is what facilitates its criticism.

V.L. Inozemtsev treats the post-industrial society as the *post-*

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<sup>1</sup> *Inozemtsev V.L. The Divided Civilization. M., 1999. P.6.*

*economic civilization* which is the result of the post-economic revolution evolving in the U.S. and Western Europe: "The transition from the economic era to the post-economic treated as the post-economic revolution can be compared by its significance only with the process of the establishment of the economic era itself taken several centuries"<sup>1</sup>. This process will "determine the content of the development of civilization over the next century." As a result of this process it will be finally overcome the dependence of economy on natural resources, labor will be replaced by the creation, the world will be able to "overcome the three major systemic phenomena of economic society – commodity exchange, private property, and exploitation"<sup>2</sup>. But it is achievable only for the chosen civilizations. The greater part of them (including Russia, Japan), having exhausted the possibility of "catching up development" will remain forever at the stage of the industrial society. "Constantly increasing investments in development of both material production and human capital lead to the deepening and widening the gap between post-industrial countries and the rest of the world"<sup>3</sup>. Finally, the third group of countries that are not able to solve independently the problems of development will find itself in the system of renewed colonialism. Over the next 10 years, according to V.L. Inozemtsev, they should be deprived of their sovereignty through the interference of international forces on the basis of the UN mandate or another such regulatory act, and their management to be delegated to the group of international observers and experts relying on the UN troops. Over the next 10-15 years after the establishment of such a regime on the funds allocated from the budgets of the leading countries and international financial organizations, activities should be carried out to ensure the subsistence level for the nationals of these countries, building their productive capacities based on balanced agricultural technologies and prevention of further degradation of their natural ecosystems.

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<sup>1</sup> *Inozemtsev V.L. The Divided Civilization. M., 1999. P.8.*

<sup>2</sup> *Ibid. P. 54.*

<sup>3</sup> *Ibid. P. 105.*

However, this concept of economy of the post-industrial society does not stand up to criticism and correspond to actual trends.

**First**, a civilization can never become post-economic. The nature of the economic system, form of ownership, exchange, and distribution may change but the very system of economic relations in some of their modifications has always been, is and will remain an indispensable component of the genotype of civilization. In the change of world civilizations the prevailing economic mode of production changes but the economy remains. The "post-economic revolution" is meaningless.

**Second**, the labor cannot be replaced by creation. Another thing is that in the future the labor will acquire more creative nature but there will always be a need in household, sphere of services, material production, to a certain percentage of the labor uncreative, monotonous but necessary.

**Third**, it is impossible to ensure the independence of even the most high-tech economies from the use of natural resources, natural productive forces. The energy crisis of the 70s of the 20<sup>th</sup> century and energy-ecological crisis of the early 21<sup>st</sup> century have once again convincingly confirmed this.

**Fourth**, to represent the post-industrial society as a "multi-layer" civilization where the leadership belongs to technological northern American and Western European civilizations in the unipolar world followed by the industrial civilizations, and at the bottom of this pyramid there are hopelessly backward countries, to which the regime of the "renewed colonialism" is not only utopian but also dangerous. This is the approach used by the U.S. with respect to Iraq and Afghanistan; its consequences are known. The process of the establishment of the post-industrial civilization transforms the entire planet. The recently lagging (recent examples - South Korea, Singapore, Malaysia, China, Taiwan) may join the vanguard countries and civilizations. It is necessary to apply not the mode of "renewed colonialism" to the utmost lagging countries (e.g., African civilizations) but a partnership of civilizations in order to overcome their

backwardness.

A different concept of the post-industrial economy has put forward and is being developed by the modern Russian school of civilizations. It is expressed in the monographs of Yu.V. Yakovets "At the Dawn of a New Civilization" (1993), "History of Civilizations" (1995, 1997), «The Past and the Future of Civilizations» (2001), "Globalization and the Interaction of Civilizations" (2001, 2003), in the monograph of B.N. Kuzyk and Yu.V. Yakovets "Civilizations: Theory, History, Dialogue and the Future" (2006). The essence of this concept can be summarized as the following key provisions.

1. The industrial economic mode of production prevailed in Western Europe in the late 18<sup>th</sup> -early 19<sup>th</sup> century as a result of the industrial revolution has mostly exhausted its potential in the first quarter of the 21<sup>st</sup> century, completes its life cycle under the conditions of a cluster of global crises of all elements of the genotype of civilizations. Such a crisis is inevitable, predictable and necessary.

2. The crisis is the forerunner and the impetus for the evolvement of an economic revolution of the second quarter of the 21<sup>st</sup> century the outcome of which will be the establishment in the vanguard countries and civilizations, and then spread across the planet, of the post-industrial economic system.

3. The new economic order will not be either capitalist, or socialist but integral in nature, humanistically noospheric providing humanization and a social focus of economy, the noospheric harmonization of co-evolution of society and nature, the transition to an innovative type of development.

4. The change of the model of globalization will be implemented. The neo-liberal model which has become one of the main causes of the global financial crisis will pass. There will be a rollback of globalization, the independence of national economies will strengthen, the speculative capital flows will decrease, and migration will reduce. Globalization will develop on a new and sound basis in a multi-polar world order based on partnership of civilizations promoting the

convergence of the economic development levels of countries and civilizations.

5. Individual elements of the integral economic system are already present in life. It is primarily the experience of China, Vietnam, the Scandinavian countries, and the European Union. These elements will be enriched and developed in relation to the realities of the 21<sup>st</sup> century.

6. It is clear that the new economic system can not appear directly in finished and distributed form. It will take at least a quarter-century, if not longer, before its main outlines are clearly taken shape and gain global distribution. However, in future it will not mean homogeneity, uniformity of the economic system on the planet. In different countries and civilizations, it will retain its own features and modifications with regard to the prevailing civilizational values. It will be one in western civilizations, the other - in China or India, the third - in the Islamic world, the fourth - in Russia and other countries of the Eurasian civilization, the fifth - in the African civilization, etc. The economy remains as diverse as the world of civilizations is diverse. However, some fundamentals of the integral economic system will be common to all civilizations.

## **5.2. THE INSTITUTIONAL AND STRUCTURAL TRANSFORMATIONS OF Economic System**

### **5.2.1. Changes in the Relation of Economic Orders**

A change of super-long (civilizational) and long-term (Kondratieff) cycles is characterized by the transformation of the economic system, a set of economic orders, changes in their relation, and sometimes the formation of new orders.

For the industrial world civilization of the 19<sup>th</sup>-20<sup>th</sup> centuries it is typical the predominance first in the vanguard, and then in the countries and civilizations following after them, of the industrial, market-capitalist system based on the dominance of private capitalist order, market competition, with a more or less state regulation of

economic relations, the formation of national markets and expansion of the scale of their interaction to the global market. Along with the private capitalist order small commodity, state capitalist, relic natural-patriarchal (family and private households) existed.

In the 20<sup>th</sup> century cooperative and state-socialist orders were added to these orders in a number of countries, and state capitalist transformed into state-monopoly.

In the last quarter of the 20<sup>th</sup> century as a result of globalization and development of powerful transnational corporations one more order came into being - transnational and the processes of integration in the European Union have outlined the contours of the interstate (indeed, civilizational) economic order. At the same time it began to revive the small commodity order before actively ousted in the form of a large number of small businesses. As a result of neo-liberal reforms in post-socialist countries the state-socialist order transformed into state monopoly. In China and Vietnam, it remained state-socialist but essentially adapted to market economy ("market socialism").

Thus, economy has always been, is and will continue to be *multi-order*. However, the nature of the orders and their relation change over time in response to radical changes in the technological base of society, demographic and economic constraints, and geopolitical shifts.

In the late 20<sup>th</sup> - early 21<sup>st</sup> century the institutional structure of economy, like economy and society in general, are undergoing a deep transformational crisis, the way out of which will be found in the second quarter of the 21<sup>st</sup> century on the path of becoming of the post-industrial mode of production (integral economic system), the new balance of economic orders. The main outlines of this system were formulated in the report at the 15<sup>th</sup> World Congress of the International Economic Association in Strasbourg (June 2008).

Let us address the coming institutional transformations in the longer term in the composition and nature of economic orders (Fig. 5.1).

*The transnational order* has suffered substantial losses as a result of the financial crisis of 2008-2009, yet it will retain its positions and will be expanding in the context of increasing globalization. The crisis may even strengthen the internationalization of capital as evidenced by changes in the world automotive industry, financial and banking sector. However, the time of the uncontrolled dominance of TNCs passes in the world economy. The transnational order will be increasingly operate under control of the international community and its institutions. This is evidenced by the declaration of "Twenty." Proposed restrictive and deterrent measures should be supplemented with a long-term strategy, which in the long term would give humanistically noospheric character to the transnational order, make it one of the institutions of the integral economic system that operates on the principles of partnership of civilizations promoting the convergence of the levels of economic and technological development of the vanguard and lagging countries and civilizations. There will come into being new global institutions, supervising the ramified transnational order and regulating the activities of TNCs on the basis of the global antitrust laws.

<b>Late-industrial economy</b>	<b>Post-industrial economy</b>
Transnational order (TNCs)	Transnational order (TNCs, international organizations)
State-monopoly order, state-socialist order	State integral order
Private capitalism (comprador, national)	Large and medium corporations National corporations
Small commodity order (farmers, small business)	Small commodity order (farmers, small business)
Social order (municipal economy, co-operatives)	Social order (municipal economy, cooperatives)
Natural-patriarchal order	Family-patriarchal order (family and private households)

**Fig. 5.1. The institutional structure of late-industrial and post-industrial economy**

*The state monopoly and state socialist orders* will be coming

closer to each other and transforming into the institutions of the integral economic system representing strategic nationwide interests. As a result of the 2008-2010 crisis positions of the state order are strengthening and expanding because the states have fully or partially nationalize the bankrupt large enterprises and banks, insurance companies, etc. It is unlikely that the crisis will be followed by a new wave of privatization according to the neo-liberal recipes. However, it must be clearly and unambiguously identify those areas of activity in the mixed multi-order economy where the last word should belong to the state, and to outline the effective functioning of state order, overcoming corruption and incompetent interference of officials. In any case, this order should play a key role in the functioning and development of social and economic sphere, military-industrial complex, a number of strategically important facilities, the implementation of strategic and innovative function of the state.

*The large-scale capitalist order* includes monopolies, large and some medium-sized enterprises and is divided into two parts. One is a comprador capital serving the interests of TNCs and the transnational order and adjacent thereto, the other – national capital focused on the national system and competing with TNCs. It must be said that the national large original capital has lost some of its positions under the competitive pressure from two sides: from TNCs and state monopoly order and on the part from small commodity capital, small business experiencing the state of Renaissance.

Further the large-scale capitalist order will unlikely recover to its former dominant positions, although in some developing civilizations (e.g. Indian) its role remains very significant.

*The small-commodity order* is represented by small industrial, handicraft and commercial enterprises, farmers, craftsmen working for the market, people of liberal professions, etc. Recently, the small commodity order is experiencing a kind of the Renaissance that is largely due to miniaturization of technical facilities, deconcentration and diversification of production, information revolution reviving work at home at electronic offices and cottages. This order gives work,

income, opportunity of entrepreneurship and innovations to millions of small owners, so it requires the support of the state. In some countries, small business occupies the dominant positions, becomes a significant economic and political force, it is supported by the government. It is remarkable for a highly innovative spirit, although, of course, it can not implement an innovative breakthrough and transformation of the entire economy by itself.

*The family natural order* is directly adjacent to small commodity, and also has the prospects for a faster growth. These are family economies working largely not for the market but the needs of all the family, the households, performing services for families. This order, in most civilizations, is the basis of subsistence, food, health, every day arrangements of families.

*The social order* plays an important role in social and environmental orientation of economy and acts in different forms. This is first of all fast-growing municipal economies diverse in composition for subsistence of families, promoting education, culture and ecology. In large cities these economies receive a substantial support from national and regional authorities are, in essence, para-statal but at the same time the principles of self-regulation operate here.

Another form is different kinds of cooperatives, voluntary associations of family households to perform common functions. Cooperatives complement the family order, organically built into it and have growth prospects.

Thus, a mixed economy being formed is diverse and represents a new type of economic mode of production, its institutional structure. But the matter is not only in the mixed economy but a new type of interaction between orders - not on the principles of tough competition but on the principles of partnership, complementarity and cooperation in addressing the entire range of steadily growing needs of population and society in the most efficient way. Each order should occupy its inherent niche and fulfill its mission in the general system of mixed integral post-industrial economy at all levels - municipal, regional, national, civilizational, and global. The institutional

transformation of economy will be implementing in this direction under the implementation of the innovationbreakthrough scenario. With regard to the inertia-based scenario, it will prolong the agony of the historic term of the obsolete institutions of the late-industrial system and make the transformation process longer and more painful.

### **5.2.2. A Relation of Material Production and Production of Services**

In the previous historical periods the backbone of economy was material production - production of an increasingly diverse set of consumer goods and means of production, a growing share of which took the form of commodities. In the medieval and its preceding eras in the structure of material production agriculture and processing of its products (agrarian economy) prevailed, and after the industrial revolution - the industry in an increasing number of sectors. Services both sociocultural and market, mainly commercial played an important but supporting role in economy and subsistence, mainly for the ruling establishment and the haves. On the trade routes large cities sprang up, civilizations were formed.

The structure of economy began to change rapidly in the late-industrial period, from the last quarter of the 20<sup>th</sup> century. Production of services grew at the priority rates - both social, information, and purely market (trade, financial and legal services, real estate transactions, etc.).

The services in economy of developed, and then developing countries have become predominant - from three-fourths to four-fifths of GDP. It concerns first of all western civilizations. Thus, in the United States from 1990 to 2007 the share of services in GDP rose from 63 to 77% in the Eurozone - from 62 to 71%, in Australia - from 63 to 69% in Japan - from 37 to 68% under a reducing share of agriculture (in the world) from 7 to 3% and industry - from 36 to 28%. The Latin American and Indian civilizations were reaching after them.

The Eurasian and Chinese civilization as well as Muslim countries

restrained these trends for a long time – more through ideological and religious reasons. However, as a result of market reforms and a tough stance of the IMF, these barriers were removed; the share of market services increased dramatically.

Many scientists began to interpret this trend as the regularity of the establishing the postindustrial society as economy, first of all of information services, and the essence of this system was understood as an information civilization in which the bulk of labor is directed to production, storage, distribution and use of information, production of material values acquires a secondary character, the share of agriculture and industry will continue to fall and reduce to a minimum. A *myth* that the U.S. and Western Europe first entered into the post-industrial society from the last third of the 20<sup>th</sup> century reducing the share of material production, thus weakening the dependence on imported fuel and raw materials from other countries become self-sufficient (such a position was expounded in the monograph "Divided Civilization" published in 1999, by V.L. Inozemtsev), is not proven true.

However, the crises of the early 21<sup>st</sup> century have greatly shaken, if not dispelled these myths. The 2001-2002 world crisis was basically the first global information crisis. Many information "soap bubbles" burst or suffered major losses. The myth of the coming information society was extremely beneficial to TNCs represented in this area. Information services with all their importance and significance can never become a major distinctive feature of the world civilization.

A cluster of global crises – energy-ecological, food, financial-economic – hit a heavy blow on such myths. It showed, *first*, that the backbone of economy and subsistence continues to be material production - production of food and other consumer goods, energy, materials, machinery and equipment, construction and other facilities. Although the share of services grew but they can never replace the material basis of human activity. *Second*, it becomes increasingly clear that the rapid growth of the share of services in GDP is largely a manifestation of parasitism of the late-industrial economy and leads it

to a crisis. The fact is that, along with a reasonable growth of social services (medical, educational, cultural), as well as tourism and related information services a significant portion of the increase of services is of a purely parasitic nature, caused by rising costs for trade and advertising with a large number of intermediaries that serve swollen streams of virtual capital on the financial markets.

What trends should be expected in the future, until the middle of the 21<sup>st</sup> century?

It seems that a rapid growth of services in general for the world economy and the majority of countries and civilizations will cease or be reduced to a minimum. Under the conditions of a growing labor shortage a part of manpower employed in commerce and advertising will be released for social services and material production.

The structure of services will also change. It will significantly increase the share of educational and medical services in connection with the need to support the innovative breakthrough with qualified personnel, reduce mortality and increase the average life expectancy, especially in poor countries and civilizations. It may be anticipated not only relative but absolute reduction in the number and proportion of people employed in trade, advertising, finance and some other kinds of commercial services.

These processes will run differently in different civilizations and countries. In the lagging, less developed countries the share of services will increase due to the accelerated development of educational, information and medical services. At the same time in the developed countries and civilizations, where the share of services in GDP has increased significantly due to the policy of "dumping" of material production to the lagging countries and excessive swelling of market services, it might be observed the opposite trend as the result of development of own material production and electronic commerce. The cleaning of economy from the parasitic elements and the formation of optimal proportions between material production and production of services which meet the real structure of the humanistically noospheric integrated post-industrial civilization will

thus be occurring.

### **5.2.3. Shifts in the Reproductive Structure of Economy**

We understand the reproductive structure of economy as a relation of groups of industries and productions (both goods and services) that perform different functions in reproduction, in addressing the needs of population and production. According to our concept underlying the formation of reproductive-cyclical macro-model of national and world economy, four reproductive sectors of various functional purposes are distinguished:

- *The consumer sector* serving the satisfaction of needs of population in goods and services (free and fee-based) - agriculture, light industry and food industry, housing and utilities, consumer services, services of transport, communications and information (in part of consumption of population), social (health, education, culture, and social security). The mission of this sector is the reproduction of human potential (human capital);

- *The innovation-investment sector* - science, mechanical engineering (including production of weapons), chemistry and petrochemicals, and construction. The mission of this sector is to implement an innovative renewal of economy relying on production of increasingly sophisticated generations of equipment and materials based on the investment flows, as well as to provide national defense;

- *The energy-raw materials sector* is the ensuring needs of society in energy and raw materials. This includes the fuel industry, electrical energy industry, ferrous and nonferrous metallurgy, production of timber and construction materials, as well as nature reproduction and environmental industries (exploration, forestry, water industry, melioration and land reclamation, eco-monitoring, etc.). The mission of this sector is to ensure the needs of society in primary resources, efficient co-evolution of society and nature, to implement the noospheric principles;

- *The infrastructure sector* produces services that promote goods from producers to consumers and their sales (freight transport of all

kinds), the functioning of financial credit and foreign exchange mechanisms (banks, stock exchanges, insurance companies), management of reproduction and society at the local, regional, national and global levels. The mission of this sector is to ensure the functioning of market and non-market sectors of economy and optimization of their proportions, while minimizing transactional and administrative costs and to create conditions of security (the army, security forces and lawenforcement bodies, etc.)

In today's statistics it is not always possible to find data on the distribution of industries and type of activities between these sectors, so we have to use in constructing, comparing, and forecasting more rough data that, however, does not interfere with identification of key differences and trends in the changes of the reproductive structure of economy.

The reproductive structure of economy is mobile in time and varies in space by local civilizations and countries.

In the framework of economic cycles the proportions change according to the phases of the cycle. Crisis leads to a sharper drop in the innovation-investment and infrastructure sectors, while consumer and energy-raw material sectors are more stable, less prone to sharp fluctuations. In the phases of recovery and rise the innovation-investment and infrastructure sectors develop at a vigorous pace, when an innovative renewal of economy and growth of business activity occurs.

In the late-industrial period in developed countries and civilizations the infrastructure sector has acquired a priority hypertrophic development as well as the innovation-investment sector due to mechanical engineering and military-industrial complexes. The energy-raw material sector was largely curtailed as a result of ousting the extractive industries to developing countries. In developing countries, quite the reverse, consumer (especially agri-food) and energy-raw material sectors took priority while the innovation-investment sector had a relatively small weight. In Russia and in other transition economies as a result of neo-liberal market reforms

supported by IMF the consumer and innovation-investment sectors were curtailed, the products of which were ousted by imports, the share of the energy-raw material sector export-oriented increased and the share of the infrastructure sector increase many times due to the rapid development of trade (including intermediate trade), especially in imported goods, advertising, financial and other commercial services, swelling the managerial staff, an outstripping growth of transport rates. The elements of parasitism and the shadow economy have increased many times.

What trends in the reproduction sectors of civilization can be expected in the future?

**Consumer sector.** After the global economic crisis of 2008-2009 it may be expected some strengthening of positions of the consumer sector of the economy. This is due, *first*, the social focus of the post-industrial integral economy, the need to ensure the conditions of reproduction, raising the level and quality of life in general on the planet, drawing lagging countries and civilizations by these parameters, where the majority population of the Earth live. *Second*, it is due to the need for accelerated development of health and education to improve health and reduce mortality and to support with the professional staff of the innovative breakthrough in all countries and civilizations. *Third*, the necessity to overcome the food crisis, hunger on the planet, providing with food of all population groups in all corners of the planet that is associated with the development of the global agribusiness.

At the same time it will be observed the trend to rationalization of the structure of consumption, particularly in developed, rich countries and civilizations, transition to more moderate and economical standards of consumption, eliminating the unnecessaries both in food, and in the provision of housing, personal transport. The extension of the American model of overconsumption to the planet would be disastrous, exceeding all possible resources, and as shown by the crisis it is beyond the power of the US itself to maintain such model. It is necessary development and active promotion of the rational

(differentiated by civilizations and countries) consumption model and creating conditions necessary for its implementation.

**Innovation-investment sector.** In the future dynamics of this sector it will be observed the opposite trends. On the one hand, the needs of radical innovative renewal of economy, the establishment of a post-industrial scientific paradigm and assimilation of the sixth technological order require a breakthrough in science, its accelerated development. Therefore, the share of science, especially in the coming quarter century, will increase substantially. The assimilation and distribution of the sixth technological order, a wave of basic and improving innovations will rely on the development of investment mechanical engineering, new generations of equipment and materials, and a rapid growth of investments. On the other hand, it becomes an imperative the termination of a new whorl of the arms race, a well-thought-out strategy for demilitarization of economy and the associated reductions in military R&D, investments in innovations for production and export of new generations of weapons that could lead to a slowdown of growth rates of the innovation-investment sector in a number of countries and civilizations. But at the same time it may be expected an increase in the share of this sector in the reproductive structure of economy, especially in the first quarter of the 21<sup>st</sup> century.

**Energy-raw material sector.** In the dynamics of this sector it will also be observed the contradictory trends. On the one hand, the resumption of economic growth will lead to a greater consumption of fuel and raw materials, and their inevitable rise in prices due to the exhaustion of the best mineral deposits, forest resources - to increase of their share as defined in current prices. On the other hand, the energy-ecological revolution of the second quarter of the 21<sup>st</sup> century, replacement of non-renewable energy sources rising in prices and materials with inexhaustible, clean and cheapening renewable sources will lead to a significant reduction, in the middle of the 21<sup>st</sup> century, in the need for natural sources of raw materials and fuel. The solution of tasks to reduce greenhouse gas emissions into the atmosphere in

general on the planet by 50% by 2050, European Union – by 20% by 2020, and by the US by 80% by 2050 will contribute to it. In the long run it is reasonable to expect a certain reduction of the energy-raw material sector share in GDP.

**Infrastructure sector.** In the future it is taking shape a significant possibility of essential decline in the share of this sector in GDP, because of the need to overcome the excessively grown parasitic elements in the structure of the sector. This is primarily reducing the number of people employed in advertising and trade and reducing transaction costs as a result of the elimination of the intermediary links and e-commerce development. This is reduction in financial and credit machinery and speculative trading on stock exchanges, as well as real estate transactions. This is reduction in transport and communication rates and decrease in transportation of fuel and raw materials. This is a decrease in extremely swollen officialdom on the basis of electronic control systems. This kind of trends can be observed in all countries and civilizations, though with varying intensity and in different forms.

In the long term, by the middle of the 21<sup>st</sup> century it may be expected an increase in the share of the consumer sector in the world economy (mostly due to social, housing and utilities and tourist services and agri-food complex) and the innovation-investment sector (by increasing production of new generations of equipment and materials while reducing the military-industrial complex), while reducing the share of the energy-raw material sector (due to alternative sources of energy and materials), and especially the infrastructure sector (commerce, advertising, finance-credit and administrative services).

The structural shifts will occur mainly in the second quarter of the 21<sup>st</sup> century and will be uneven and at times opposite direction in various civilizations. In the northern American, western European and Japanese civilizations, they will be relatively smaller, the reduction will affect mostly the infrastructure sector. In the Chinese, Indian, Latin

American, Eurasian and Buddhist civilizations the direction and intensity of the shifts will be approximately the same as the world average. The largest shifts will be observed in the structure of the African and a larger part of the Muslim civilizations.

#### **5.2.4. The Revival of Solidarity Economy**

One of the paradoxical directions of economic transformations in the 21<sup>st</sup> century is the rise of solidarity economy – noospheric by its nature economy of family labor households, expansion of private households where it is consumed from one-half to two-thirds of GDP and reproduction of labor resources occurs.

In the industrial society, especially in the second half of the 20<sup>th</sup> century the market reached the peak of its triumph and transcended its optimal functioning, capturing new areas of human relations. It subdued much of the spiritual reproduction sphere to its principles - science, education, ethics, mass media and sports. The excessive commercialization of these areas has caused a considerable damage to the spiritual foundations of society. In pursuit of super-profit it was unleashed arms race, wars brought about, a robbery of the nations lagging behind in their development was done. Under the guise of missionary work, and in fact for the sake of gold and silver there were destroyed ancient civilizations of America, tens of millions of Africans killed or enslaved.

The last quarter of the 20<sup>th</sup> century brought new forms of negative manifestations of the market. Among them: separation of the virtual capital from real and the formation of the "soap bubble economy"; barbarian robbery by oligarchs and TNCs of the states and peoples of Russia and other former Soviet countries under the banner of a return to a free market; the emergence of illegal trade in slaves, and quite legal the world market of athletes where they buy and sell athletes for some period of time; the emergence of a specialized type of market activities – contract murders; building of fraudulent pyramid schemes, and not only in the post-Soviet countries but also in the citadel of free-

market capitalism - the U.S., and more.

It is becoming increasingly evident that these trends are very dangerous for society that the market of one of the tools of economic activity of people is seeking to become a full master dictating its laws to economy and society. It is necessary to improve the market economy and return it to the natural framework.

Once again there are calls to abandon services of the market and private property.

Clearly, however that it is impossible to replace the market mechanism orientating tens of millions of producers of various goods and services to meet the needs of hundreds of millions of families and millions of businesses with any other mechanism, especially in the global economy uniting with the help of the world market of more than two hundred national economies. The question is not to refuse from commodity production and market in the long-run, and their rehabilitation, a release of parasitic accretions of the post-industrial society.

The advocates of neo-liberal concepts adhere to illusory views, the authors of the neo-liberal market reforms of the 80-90s in many countries that have adopted a course under the prescriptions of the "Washington Consensus" of the International Monetary Fund on the deployment of market forces, the absolute power of the market and removal of the state from economy that has found practical reflection in "Reaganomics", "Thatcherism", "Kudronomics". It has become one of the main factors of global economic and financial crisis of 2008-2009 on the down wave of the fifth Kondratieff cycle.

The main content of market reforms of the 90s in Russia, according to E.T. Gaidar and his adherents, was the transition from an inefficient non-market to efficient market economy, for that the country and people had to pay exorbitantly high price. However, this is more like a convenient myth to cover up horrendous redistribution of property in the third period in Russian history of primary accumulation of capital - this time not productive but increasingly parasitic. The Soviet economy in its main part was a market, albeit

overly regulated. Such market categories as price, wages, profits, finances, credit worked, the laws of commodity economy operated. The Kossygin reform and price reform in 1967 confirmed this. Also formed as a result of neo-liberal reforms the market is far from being civilized, socially and innovative oriented marked of the western European or Chinese type but a predatory market of the period of primary accumulation of capital. It was accompanied not by reduction but a growing share of the non-market sector of economy, naturalpatriarchal order in the countryside and the city, increasing the share of labor and products created on the private plots and households. The share of individual farms in the gross agricultural output increased from 23% in 1990 to 59% in 1998. Just one type low efficient type of market economy was replaced by another, yet less effective, and this change was accompanied by a double decrease of GDP, monstrous hyperinflation, gigantic robbery of population and the state, ousting of domestic producers from domestic and foreign markets.

American futurist Alvin Toffler has a more rational approach to the future market. He believes that by the end of the 20<sup>th</sup> century the historical process of building the market is completed: "Humanity at least ten thousand years was engaged in building a worldwide network of exchange - market. Over the past 300 years, from the very beginning of the "second wave", this process was going at a breakneck speed. Today - at just the moment of the new emergence of "prosumption" - this process is coming to an end"<sup>1</sup>.

A. Toffler concluded that the "third wave" will create the first in the history "trans-market" civilization." Under the word "trans-market" I do not mean a civilization in which there is no exchange network - a world thrown back ... Under the word "trans-market" I understand a civilization able to put on the agenda new problems, as the market has already been built"<sup>2</sup>. It will get development "prosumption" that "leads to the democratization of at least some activities, thus changing the market role in society ... The emergence of

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<sup>1</sup> *Toffler A. The Third Wave. M.: ACT, 1999. P. 458*

<sup>2</sup> *Ibid. P. 463.*

"prosumption" indicates the irreversibility of economy which will not resemble the economy of the first or second waves but will fuse together the characteristics of both in a new historical synthesis"<sup>1</sup>. In other words, we are talking about an integral post-industrial economy.

In the post-industrial integral civilization it will be raised the role of ***solidarity economy***. Under it I understand the "prosumption" free from both market categories and mechanisms, competitive struggle, and from the dictate of the state and bureaucratic arbitrariness of the officials.

***The essence of solidarity economy*** adds up to a collective self-regulatory of processes of reproduction by a group of interdependent persons to meet their own needs and interests and to ensure the most efficient use of resources on such basis.

***The scope*** of this economy is very extensive and diverse. It may be selected more than one of its typical forms:

- Family households whose primary function is reproduction of population and labor resources on the principles of family solidarity, partnership of generations;
- Personal family labor economy - agricultural, horticultural, construction, handicrafts - mostly for their own consumption (though some products may be sold on the market); it is usually described as a natural-patriarchal order;
- collective households of peasants or craftsmen, often of mixed type where a large part of products may be sent to the market but within the team it is observed the principle of solidarity rather than competition;
- social or religious (monastic) households focused not on the production of goods and paid services but on social security of children, disabled persons, addressing common environmental problems.

Microeconomics as a totality of small, medium and large producers of goods and paid services on market competitive basis is

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<sup>1</sup> Ibid. P. 446.

opposing solidarity economy.

With that understanding of solidarity economy, we can conclude that it always was, is and will remain in the economy of any kind and, furthermore, that it is the foundation of life and existence of society because its main purpose is to meet the needs in the most effective form of reproduction of people, labor resources. It expresses the principle of partnership of the adjacent generations in this continuous process.

Solidarity economy came about long before the market and commodity production, it was the main and only form of economy of the primitive society of the Paleolithic, Mesolithic and Neolithic. Without solidarity economy the primitive groups of people could not survive in the harsh struggle for existence and under severe climate changes. And only in the late Neolithic with the development of the social division of labor it began to form the elements of commodity production and market competitive economy. But the basic means of production – grazing lands, public lands, irrigation systems, etc. - remained in the community property, were used under the principles of solidarity and self-regulation.

In the ancient and medieval civilizations from the beginning of the 1<sup>st</sup> millennium B.C. until the 15<sup>th</sup> century A.D. the scope of the market economy was expanding rapidly along with the development of national and international markets, increasing differentiation of households and national economies. However, solidarity economy, patriarchal at its core, spread to both medium and large households, remained the basis for the reproduction of life of the overwhelming mass of peasants.

In the early industrial era, and especially the industrial world civilization the scope of solidarity economy reduced many times under pressure from the market. This was due to a sharp reduction in the share of agricultural economy and rural population size, a decrease in the family sizes, and ousting of the patriarchal and small commodity orders.

However, since the end of the 20<sup>th</sup> century the opposite trends started to be observed. Family and summer home households developed, their role increased in the conditions of crises to meet the needs of the family. This was also contributed to the increase in the share of pensioners in the population size. There are also observed the signs of increasing "prosumption", measures are taken to limit the omnipotence of the market.

We can expect that in the long run of the following decades these trends will continue to grow, the share and significance of solidarity economy will increase, which however, does not replace the market but will complement it by providing important spheres of human activity and the family economy.

The elements of solidarity economy are strengthened in times of crises, natural disasters. In the post-industrial integral economy the scale of solidarity economy will rise in the context of the growth of leisure time and increasing the number of pensioners.

It is curious to note that the Nobel laureate in economics in 2009 Elinor Ostrom received the award for the development of mechanisms and application rules governing the exploitation of resources of common use, such as grazing lands, hunting and fishing grounds of common use. On the basis of long-term observations in different regions, scientists have concluded that selfgovernment and self-regulation based on the age-old traditions of solidarity economy is much more efficient than privatization by public officials.

These same conclusions were reached almost a century ago by Russian scientist Alexander Tchayanov who proved the effectiveness of family labor households and their co-operation on the principles of self-government. The Tchayanov ideas have found wide application in agriculture in a number of countries.

Based on these ideas the concept of rehabilitation and development program for Agriculture in the republics of North Caucasus, where between 70 and 90% of the agricultural products is produced in households of population, was developed by me in 2009. It is necessary to support cooperation of these households to increase

productivity and sales of products, to help them in acquiring modern tools, materials, giving orders for food and agricultural raw materials to replace imports. It would be good to develop for the members of such cooperatives, the social insurance system, considering them a part of the total employees performing important functions in meeting the needs of their families and society in a quality food.

I believe that solidarity economy has future - as one of the important orders of the integral economic system.

### **5.3. TRANSFORMATION OF MACROECONOMIC DYNAMICS FACTORS**

#### **5.3.1. The Key Role of Economic Growth Factors**

In the postwar decades, the problem of economic growth took a key place in the researches of economists and state regulation of economy. There was a strong objective basis for this.

*First*, the economy exhausted by long, the most destructive war in the history, of most countries of the Eurasian continent was in need of radical modernization and accelerated growth to meet the immediate needs of the population impoverished by the years of war.

*Second*, the peoples of Asia, Africa, and Latin America liberated from colonial or semicolonial dependence and eagerly tasted the fruits of independence demanded the same.

*Third*, the world population size grew at record rates for all the history of humanity: it increased 2.4 times for half a century. And there were needed the highest, same record rates of economic growth to meet the needs of this rapidly growing mass of people on the Earth. At the same time the size of working-age population and its educational level grew fast.

*Fourth*, the third quarter of the 20<sup>th</sup> century is a period of scientific and technological revolution, assimilation and dissemination of the fourth technological order which became the basis for accelerated economic growth and rising of living standards. The scientific-technological revolution created the prerequisites and

became the basis of the record economic growth. Militarization of economy and the arms race prompted the same. Much of the intellectual, labor, technological, financial resources was burned in the unquenchable furnace of the arms race.

**Fifth**, it was a period of involvement of new rich natural resources - oil and gas fields, deposits of ferrous and nonferrous metals, new land areas and woodlands - in the production. The natural factor was the lever of economic growth, and a very tangible factor.

**Sixth**, the integration processes took effect, and then grew into globalization. The scales of world division and co-operation of labor expanded, world markets, the integration unions in Western and Eastern Europe were forming, foreign trade grew at outstripping rates, all of which gave an additional synergistic effect, accelerated the pace of global economic growth.

Finally, the **seventh**, on the up wave of the fourth Kondratieff cycle the crisis phases of the medium-term cycles were not deep that nurtured illusions about the possibility of overcoming crises, continuous and rapid economic growth.

### **5.3.2. Tendencies in Economic Dynamics**

The record performance of this "Golden Age" (more precisely, a quarter of the century) in world economic history can be seen from the data given by A. Maddison ([Table 2.1](#)).

If during the early industrial world civilization the average GDP growth rates in the world were 0.32% for 320 years, and per capita - 0.05% only that is equivalent to economic stagnation in the long historical retrospect, then in the industrial era, relying on achievements of the industrial revolution, the average annual economic growth rate rose to 2.11% (per capita - 1.30%) and after a slight drop in 1913-1950 associated with the two world wars and the world economic crisis of 1929-1933 rose to a record level of 4.90% (per capita - 2.92%). It was the absolute world record in the history of humanity. Despite some slowdown in the last quarter of the 20<sup>th</sup>

century (3.05 and 1.41 respectively), they still remained high.

For individual local civilizations economic dynamics was remarkable for its significant diversity. In the 19<sup>th</sup> and the first half of the 20<sup>th</sup> century the leaders, in terms of growth, were northern American (USA) and western European civilization where the figures were significantly higher than world average. Latin American, Eurasian and Japanese civilizations were in the rear echelon. African, Muslim, Buddhist, Indian and Chinese civilizations brought up the rear. In China, which in former times was the world leader, the period of 1820-1870 can be characterized as economic degradation: the average annual drop in GDP was 0.37%, per capita 0.25%.

In the second half of the 20<sup>th</sup> century the picture changed dramatically. The Japanese civilization became the leader which established an absolute record for the GDP growth rates (9.29%, per capita 8.06%) in the third quarter of the century, and then leadership was tackled by China (6.72% in the last quarter of the century), India (5.12%), new industrial countries tailed after it.

In the third quarter of the 20<sup>th</sup> century high economic growth rates were also observed in western European (4.79 and 4.05% per capita), eastern European (4.88 and 3.81%), Eurasian (4.84 and 3.35%), Latin American (5.30 and 3.55%), the rest of Asia (4.44 and 2.00%) and African (4.49 and 2.00%) civilizations. All the world economy was booming, and the energy of growth (and to some extent euphoria) embraced all civilizations.

However, the last quarter of the 20<sup>th</sup> century (especially the 90s) and the beginning of the 21<sup>st</sup> century had a sobering effect. The economic growth rates both in the world and in most civilizations and countries have slowed down noticeably, only the Chinese and Indian civilizations have been able not only to maintain but also to increase the rate of growth. The northern American, western European civilizations have slowed down the growth rates, the Japanese civilization has found itself in the state of stagnation, the eastern

European, and especially the Eurasian civilization have experienced a deep transformation crisis, and the African civilization (sub-Saharan Africa) is in a state of economic degradation. One can judge about these trends from [Table. 5.3](#).

**Tab. 5.3. Average annual GDP growth rates by civilizations and leading countries** (a — average annual GDP growth by PPP in prices of 2000; b – the same per capita, %) <sup>1</sup>

Civilizations and Leading Countries	1951-1960	1961-1970	1971-1980	1981-1990	1991-2000	2001-2010
<b>World</b>	5.0	4.6	3.5	2.9	2.6	2.7
<i>Western European</i>	4.5	4.9	2.7	2.4	1.9	1.4
<i>Eastern European</i>	6.9	3.6	2.3	0.5	1.1	4.0
<i>Eurasian</i>	6.9	3.6	2.3	0.5	-6.0	5.3
Russia	7.0	3.6	2.3	0.5	-6.5	5.4
<i>Northern American</i>						
USA	3.3	3.8	2.9	2.6	2.8	1.8
<i>Latin American</i>	5.4	4.7	6.6	1.2	1.6	3.8
<i>Oceanic</i>						3.2
Australia	3.7	5.5	3.3	3.2	2.9	
<i>Japanese</i>						0.5
Japan	8.1	10.7	4.6	4.0	0.7	
<i>Chinese</i>						10.8
PRC	6.0	5.3	0.6	4.1	9.8	
<i>Indian</i>						8.0
India	3.5	3.5	3.8	5.3	7.9	
<i>Buddhist</i>						
South Korea	4.3	8.9	8.5	9.1	6.0	4.1
Thailand	6.1	7.2	6.9	7.9	2.7	4.5
<i>Moslem</i>						
Middle East and North Africa	9.1	7.6	6.0	2.0	3.2	4.7
Pakistan	2.7	5.2	5.4	6.0	2.3	5.1
Indonesia	3.1	4.0	8.2	5.5	1.2	5.3
<i>African</i>						
Sub-Saharan Africa	4.4	2.8	2.3	1.7	1.3	5.0

The reversal of economic dynamics trends at the turn of the 3<sup>rd</sup> millennium is due to the transformation of economic growth factors which is long and requires scientific understanding.

**First**, the natural factor from the engine of economic growth is turning into its limiter. This is related to three trends: the exhaustion

<sup>1</sup> World Economy. Global Trends for 100 Years. M.: Ekonomist, 2003; 2012 World Development Indicators. Washington. The World Bank, 2012. p. 214-216.

of some of the best oil and gas and mining fields and the inability to replace them with the equally rich and well-located deposits; an absolute and relative rise in price of natural raw materials and fuel, a need to direct an increasing share of investment and labor to maintain and increase its production by diverting from other spheres that can give the GDP growth; an increase in the weight and proportion of investments and labor allocated to environmental protection, and to prevent adverse climate change.

Obviously, the deficit and the appreciation of non-renewable fuels and raw materials in the future will increase that will require major investments in improving energy-ecological performance and will adversely affect the economic growth rates.

**Second**, the growth rates of the efficiency of human resources, labor productivity has a tendency to decrease. This is due to the increasing number of countries affected by depopulation, low efficiency of the growing migration flows, as well as the fact that professional incompetence will increase in connection with the belated reaction of education to changes in the working and living conditions of the new generations. Simultaneously, the share of GDP allocated to social spending and unproductive consumption increases due to inefficient, largely parasitic consumption in many rich countries.

**Third**, the factor of technological progress on the basis of highly efficient basic innovations has lost its force in many ways. The energy of the innovative breakthrough which prevailed in the world in the 50-60s of the 20<sup>th</sup> century is largely burned out. A huge mass of basic capital is largely outdated morally and physically, is slowly being updated. The transition to new generations of technology at the dawn of the industrial technological mode of production requires a growing mass of investments and not gives the former effect. The predominant trend is to decrease in the growth rate of labor productivity. It also restricts economic growth rates.

**Fourth**, the growth rate of return on the use of intellectual resources (science and inventions) also tends to decrease. The industrial scientific paradigm that prevailed for several centuries has

largely exhausted its creative potential. It is observed the trends to excessive differentiation, aging of researchers, reducing the number of major scientific discoveries and inventions. Prestige of science is falling, the growth rate of its share in GDP is reducing, and in some countries this share is decreasing. This inhibits economic growth, recovery from crisis based on the innovative breakthrough.

**Fifth**, globalization developing by the neo-liberal model has failed to meet expectations placed in it. It has led to an increase in technological and economic polarization of countries and civilizations, to the predatory use of the planet resources, to the rise of the elements of parasitism, "soap bubbles" in the world financial and economic system. This was clearly demonstrated during the world crisis of 2001-2002 and especially of 2008-2009. This becomes all the more noticeable brake on economic progress.

**Sixth**, the industrial economic system becoming obsolete, growing volumes of services and virtual economy, excessive polarization of income levels act as inhibitory factors on economic dynamics. The negative impact of these factors may only be overcome on the path to the establishing the integral economic system.

**Seventh**, it should be taken into account the growing influence of the wave of global and national crises that have hit all aspects of life of global and local civilizations. It is observed a resonance interaction of the crisis phases of medium-and long-term (Kondratieff) and super-long (civilization) cycles as well as crises in the neighboring areas of economy - technological, energyecological, socio-demographic, geopolitical, and socio-cultural. The whole atmosphere is permeated and poisoned by degradation products of the industrial civilization, and it has a negative psychological effect, limits the desire for bold innovations, and reduces the energy of the breakthrough.

Existing mechanisms of corporate governance, state and international regulation of economy have turned out conservative, weakly adapted to radically altered conditions of reproduction, thereby increasing chaos and strategic errors.

### **5.3.3. Prospects for Global Economic Dynamics**

Thus, the entire set of interrelated factors of economic dynamics undergoes deep and long upheavals. The inevitable question arises: how long these negative trends will endure? What awaits the world economy in the future?

The answer to this question is far from being univocal. A negative impact of some factors - primarily natural (especially energy-ecological), and demographic - at least until the middle of the 21<sup>st</sup> century (and possibly until the end of the century) will be increasing. It is inevitable the exhaustion of the best deposits of non-renewable mineral resources. It will unlikely be managed to reduce the shortage of fresh water, the best forest resources, fertile lands. And the number of countries hit by depopulation, according to the UN population projections, as well as the aging of population and falling of the share of population in the able-bodied and innovation active age will be growing in the future. Therefore, there is a need to accept the negative impacts of the primary factors (natural and labor) as an inevitable fact and respond adequately to it, assimilating effective alternative and renewable sources of energy and materials, to search for and implement innovations on a large scale, fundamentally new technologies that allow raising the labor productivity many times.

Another group of factors - an intellectual resource and its embodiment in the basic capital, and also globalization - should strengthen its impact on the economic growth to largely neutralize the negative impact of the primary factors (natural and labor). Assimilation and dissemination of high-performance basic innovations of the sixth technological order as the first stage of the postindustrial technological mode of production, the transition from neo-liberal to the humanistically noospheric model of globalization under control of the global civil society will contribute to it.

It is equally important to achieve a reverse in the third group of factors - the effectiveness of the economic system and management system to adequately respond to the inevitable cyclical fluctuations

and crises shocks, to ensure transformations of the global economy.

A couple of more fundamental observations about the prospects of economic dynamics based on the transformation of its factors should be made.

**First**, a return to extremely high rates of economic growth (4.9% in 1950-1973) is impossible and unnecessary in the long run. The world record will never be beaten. On the one hand, it will be prevented by the above-noted limitations of the primary factors, the inevitable trend of falling population growth rates and, consequently, the overall needs that must be satisfied on the basis of economic growth. Besides the basic human needs have natural and moral constraints and the patterns of consumption in rich countries, it is hoped, will become more rational and economical, excesses of overconsumption of "consumer society" will be overcome

**Second**, the speed and effectiveness of adaptation of society to new conditions of reproduction will to a great extent depend on the awareness of all segments of society, all countries and civilizations of the danger of the new challenges of the 21<sup>st</sup> century, on the validity of the chosen strategy and consistency of its implementation based on the principles of partnership of social strata, generations of people, states and civilizations. Nothing so unites and induce to joint and efficient actions as awareness of a common mortal danger. Indeed, dangerous threats in moving by the inertia-based scenario really threaten with a catastrophe. Development and implementation of a long-term strategy for partnership of civilizations and states is an inescapable imperative of the 21<sup>st</sup> century and the generation of the 20s of the century already in will have to put it into effect to which from the 10s the gravity and responsibility of the adoption and implementation of fundamental strategic decisions, effective transformation of economy and society to implement the innovation-breakthrough scenario of the future of humanity will pass for three decades.

## **5.4. ON THE LONG-TERM STRATEGY OF ECONOMIC PARTNERSHIP OF CIVILIZATIONS AND TRANSFORMATION OF GLOBALIZATION**

### **5.4.1. The Need for a Long-Term Strategy**

The global financial-economic crisis of 2008 – 2009 shook the world economy and has shown a need for its radical transformation and a change of the prevailing neo-liberal model of globalization. However, it is unclear yet in what direction such transformation should be performed, to what extent and using what institutes. The G-20 documents are targeted at partial reforms of the established system, short-term and medium-term measures. Recommendations headed by Nobelist in Economics Joseph Stiglitz issued by the UN Commission on Reforms of the International Monetary and Financial System discussed at the international conference on the global economic and financial crisis and its impact on development held in June 2009 were of a more radical nature, incorporated some basic innovations within the medium-term strategy.

However, a profound scientific analysis of regularities, tendencies and prospects of cyclical-genetic dynamics of local, world and global civilizations shows a need for the elaboration and consistent implementation of a long-term strategy for a radical update of the economic system and globalization based on the cluster of epochal and basic innovations and institutes of partnership of civilizations.

Primary directions of such radical innovative update of the world economic system and outlines of the upcoming integral economic system are stated in the report of B.N. Kuzyk and Yu.

V. Yakovets at the 15<sup>th</sup> World Congress of the International Economic Association (Istanbul, June 2008) “The Establishment of the Integral Economic System as a Global Transformation of the 21<sup>st</sup> Century”<sup>1</sup> expounded in the report of the same authors at the

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<sup>1</sup> *Kuzyk B.N., Yakovets Yu.V.* The Establishment at the Integral Economic System as a Global Transformation of the 21st Century. M.: INES, 2008

International Scientific Conference on 25 March 2009 “Responses to Challenges of the 21<sup>st</sup> Century is the Establishment of the Integral Civilization”<sup>1</sup> and in Part 6 of the Global Forecast “Future of Civilizations” for 2050.

A need for such long-term strategy is dictated by several circumstances.

**First**, as the first half of the 21<sup>st</sup> century is a period of the *civilizational revolution* preceded by a global civilizational crisis (more specifically a cluster of global crises) of the end of the 20<sup>th</sup> beginning of the 21<sup>st</sup> centuries and which drastically transforms all sides of society life, all elements of the genotype of civilization – socio-demographic and energy-ecological, technological and economic, geo-political and socio-cultural. This revolution comprises three basic elements:

- a change of the industrial world civilization prevailing for two centuries with the postindustrial world civilization integral by its content;

- a replacement of the fourth generation of local civilizations under which the dominance of the West has been observed for five centuries, with the more differentiated fifth generation with a shift of creative activity center to the East;

- a transition from the second historical super-cycle in dynamics of the global civilization with its millennium and a half cycle (period of the Middle Ages, early industrial and industrial world civilization) to the third historical super-cycle to cover the triad of the post-industrial world civilizations with an about millennium and a half time period (in the context of the historic time compression law). These signs are of a long nature and require a long-term horizon of foresight and strategy.

**Second**, the industrial economic system oriented at the system of market-capitalist relations, every possible exploitation of labor and natural resources and militarization for the sake of deriving super-profits, prevailed in the vanguard civilizations and world economy

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<sup>1</sup> *Kuzyk B.N., Yakovets Yu.V. Responses to the Challenges of the 21<sup>st</sup> Century is the Establishment of the Integral Civilization. M.: INES, 2009*

during two centuries has mainly exhausted its growth potential, accumulated a considerable share of parasitic elements of a “soap bubble” economy, brought to the dangerous edge the gap between the rich and poor, vanguard and lagging countries and civilizations, is becoming, as the present global crisis demonstrates, increasingly dangerous for the present and future generations and requires a replacement with the integral economic system - a more harmonized noospheric co-evolution of society and nature built on the principles of partnership, humanization and social justice. A longrange horizon of the foresight and strategy determines the main direction and ways to transform the economic system and globalization.

**Third**, urgent short-term and medium-term measures undertaken not in the context of a longrange outlook might give unexpected and undesirable results, lead to conservation and extension of the agony of the industrial economic system lived its historical period and institutes adequate to it and thus to extend and make a crisis process of transformation more painful. Such scenario is preferred by developed countries, TNC and international financial centers and international economic organizations representing their interests but it is much harder for the most countries and civilizations and humanity in general.

**Fourth**, a neo-liberal model of spontaneous market self-regulation of economy and globalization prevailed in the last quarter of the century has shown its inadequacy. It is necessary to shift to the model of a harmonious combination of market enterprise and self-regulation with governmental and inter-governmental regulation of functioning and development of economy in the context of interests of the present, past and future generations, principles of social partnership and noospheric approach, partnership of civilizations in the multi-polar world, in the context of a need for the governmental support to the non-market sector where reproduction of labor, intellectual and natural resources takes place, ensuring the partnership of economic orders and social strata, states and civilizations. The global transformation becomes ever more targeted and manageable, and this

implies the elaboration and consistent implementation of long-term national and global strategies, forming the institutes of partnership on a national and global scale. Its delay will make this process of transformation much longer and more difficult.

#### **5.4.2. Global Economic Transformation Scenarios**

Two scenarios to surmount the global crisis and upcoming economic transformation in the near decades are taking shape: inertia-based and innovation-breakthrough.

*The inertia-based scenario* prevails in the Group 20 documents already mentioned.

**The declaration of the Group 20 summit on financial markets and the world economy**, (including also the action plan) adopted on 2 April 2009 in London is targeted at short-term and medium-term measures so that to prevent the repeating of a global crisis in future based on the market principles, open investment regime, and also efficient regulation of financial markets contributes to dynamism, innovations and enterprise failing which it is impossible to ensure an economic growth, employment and decreasing the level of poverty.

Putting another way the matter in question is to preserve the current system of market functioning under a certain strengthening of a governmental and inter-governmental anti-crisis regulation.

The proposed measures are targeted at the achievement of such aims:

- a need for an active strategy to respond under a closer cooperation between states to renew the economic growth (specifically an unprecedented injection of the budget funds to economy to save banks and corporation serves it);
- the implementation of the assistance plans to the most problematic developing countries, first of all, for increasing the resources of the International Monetary Fund (IMF);
- the improvement of transparency and strengthening of regulation at the financial markets;

- the improvement of efficiency of regulation;
- the increase of participation and role of developing countries in the IMF and Financial Stability Forum decision-making (FFS);

A positive side of this declaration is the recognition of a need for governmental and international regulation of economic processes, i.e. return to the Keynesian approaches to anti-crisis regulation. However, the implementation of the proposed system of the anti-crisis regulation system of measures is vested in the current international institutions and first of all the IMF, recommendations of which (known as the Washington Consensus) have become one of the causes of the current global crisis.

Measures are outlined for a partial adjustment of the now prevailing neo-liberal mode of functioning of economy and globalization.

Some measures are provided for support the developing countries most adversely impacted by crisis with no own resources to modernize their economies.

However, the Group 20 document is mainly focused on the financial-monetary sphere, “virtual economy” and nearly does not address the innovations in the real economy.

The implementation of the system of measures proposed by Group 20 speeds up the recovery from the global crisis and will facilitate further crises but does not provide for radical changes to the late industrial economic system and neo-liberal globalization. It is interesting to note that the UN and its organizations are not mentioned at all in this document; in actual fact the matter in question is a mechanism of international regulation acting beyond the UN and democratic principles of its functioning. The International Monetary Fund becomes a basic engine for reforms.

The recommendations of the UN Commission were of a more radical nature than the platform of Group 20 and included a number of basic innovations not only medium-term but long-term nature: the establishment of the coordination council for the global economy with the standing group of scientific experts; additional credit systems and

currency reserve system. The interests of the developing countries making the most of humanity and most adversely impacted by crisis are more completely reflected in the concept worked out by the UN Commission. Therefore such recommendations are closer to the innovation-breakthrough scenario. However, they reflect the issues of necessary radical changes in the reproductive, technological and institutional structure of the world economy to a small extent, and do not reflect the concept of the establishment of the integral economic system.

**Innovation-breakthrough scenario.** In a more complete form while less explored in details, the directions of the innovation-breakthrough scenario are addressed in the report of B.N. Kuzyk and Yu.V. Yakovets at the World Congress of the International Economic Association (Istanbul June 2008). The concept of the establishment of the integral economic system is first set forth here, its distinctive features and specifics are determined, foundations of the strategy of the partnership of civilization in this sphere.

The innovation-breakthrough scenario of radical transformation of the world economy and globalization could be implemented only based on the elaboration and consistent implementation of a long-term strategy for the establishment of the integral economic system, a strategy targeted at the partnership of civilizations and uniting the efforts of science, education, business, states and nongovernmental organizations, all global civil society. It implies the existence of a long-term program of targeted transformation and the determination of society, its business scientific, political elite to take painful but necessary radical transformations.

What is necessary to undertake for development and implementation of such long-term strategy?

**First**, the impulse for transformation given by the global crisis. It showed the dead-end and danger of the inertia-based path, multiplies the energy of search, overcoming the dead-end and climbing this thorny and untravelled path. A fear before the unbeknown future full of unexpected surprises will have to be surmounted on this path on the

one hand, future shock according to Alvin Toffler, on the other hand, an enormous power of energy, resistance of social strata guarding their positions, change the orders and principles established. A force of crisis and awareness of the gap moving the inertia-based path help to overcome such obstacles. The crisis is like a powerful earth shock undermines and destroy the prevailing but going rack and ruin orders and institutes prevailed within two centuries of the industrial economic system and lost their ability to stand under a powerful earth shock, under the neo-liberal model of globalization. The crisis induces to find vigorously the paths and methods to build more life sustainable institutes of the post-industrial economic system. The depth and destructive force of the current global economic crisis is exactly such. If it fails to awake a deedful energy of transformations, then it would do the next more destructive crisis of the second half of the 10s.

**Second**, the final goal of economic transformation, basic outlines of the future global economic system should be clearly determined. Putting it another way a profoundly substantiated **theory** of the future post-industrial economic system and paths to move towards it are required.

Certainly, one cannot say that the picture of future economy, what it will be like by the middle of the 21<sup>st</sup> century is already represented in full and in a completed form. It is only generally outlined; they require not only detailing but checking, adjustment. Two-three decades more will be required so that it would become one of the generally accepted cores of the post-industrial paradigm of social sciences. But the step has been made and appearingly in the right direction.

**Third**, as the general outlines of the future economy are already mainly determined, the primary task for the scientific community becomes to make the **long-term forecasts** for the establishment of the post-industrial economy – both by scope and depth by elements of business life and countries and civilizations.

The global crisis of 2008 – 2009 has given a new impetus for the researches into scenarios and transformation paths of national and

world economies in all its complicated structures and interactions that finds its reflection in present part 6 of the Global Forecast “The Future of Civilizations”<sup>1</sup>. In such case the methodology of integral macro forecasting worked out by the Russian scientists and system-based developing the ideas of Nikolai Kondratieff and Joseph Schumpeter, Pitirim Sorokin, Arnold Toynbee and Fernand Braudel, Wassily Leontieff and other Russian and foreign scientists has become the starting basis for a long-term foresight. Such global forecast made is anticipated to represent at the UN roundtable meeting in autumn 2009. Undoubtedly, it will provoke not a few disputes but will lay the foundation stone into a long-term global forecasting of the establishment of the post-industrial integral economy.

*Fourth*, the validation of a theory of the integral economic system, directions of the establishment are only the first but far from being the last steps on this long and difficult path. The next essential step is the **elaboration of a global strategy** of coordinated movement by this path overcoming all hollows, ups and downs and obstacles, resistance of the adherents to preserve prior orders, who fears to lose their positions, influence, and super-profits. Who and how will take a burden and responsibility for the elaboration of such strategy?

It is clear that scientists cannot do it themselves although they lay foundations of such strategy. Representatives of the business world, business cannot take such burden; such task is far beyond their horizon of vision and opportunities. It is also beyond the power of a representative of one or more (whether Group 8 or Group 20) of the leading countries. Only the global institutes represented by all community of states and civilizations of the world may be authorized to do so. The United Nations Organization and the World Summit on sustainable development called by it is a certain all-Earth parliament representing adverse interests and expressing the will of all population of the planet Earth.

After discussion and approval by the World Summit only, the

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<sup>1</sup> The Forecast of Economic Transformation of Globalization. Part 6 of the Global Forecast “The Future of Civilization” for 2050. M.: SKII, 2009.

Strategy becomes a document determining the directions of the activity both of the UN and other international organizations, all states of the planet Earth.

### **5.4.3. Radical Shifts in the Structure of Economy**

In order to ensure the implementation of the innovation-breakthrough scenario of the establishment of the integral economic system, a long-term economic strategy should be targeted at support of progressive shifts in the real economy of states, civilizational unions and in the global economy. Real economy - production of a wide range of goods and services for satisfying continuously growing demands of population, production and public sector of economy was always, is and will be the basis of business life, market and non-market sectors of economy, the supreme goal and mission of its functioning and development. What are principal directions of these strategic shifts in the long-term outlook until the mid of the 21<sup>st</sup> century?

#### *Shifts in the Reproductive Structure of Economy*

The reproductive structure of economy expresses the relation of its basic parts in terms of functional purpose of basic products. Four reproductive sectors are distinguished to this end: *consumer* – goods and services serving the satisfaction of demands of population (agriculture, food and light industry, housing and utilities services, services of social complex – public health, education, culture, social security); *innovation—investment* aimed at the use of investments for innovative renewal of economy (science, machine industry, chemical and petrochemical industry, construction); *energy-raw materials* using natural resources for satisfaction of the demands for energy, commodities and materials (electric power industry, fuel industry, forest, woodworking and paper-and-pulp industry, building materials; geologic exploration, forest and water industry, melioration and recultivation of lands may be included here); *infrastructure sector* ensuring the circulation of goods produced, functioning of market economy and management (transport and telecommunications, trade,

financial services, public administration).

In the last quarter of the 20<sup>th</sup> and beginning of the 21<sup>st</sup> centuries negative structural shifts supported by states and international economic organizations have occurred in the reproductive structure and found its expression in the rapid decrease of a specific weight of the consumer sector (especially of the agro-food complex), extreme swelling of the sector of infrastructure (especially trade, finance and management) and defense-industrial complex in the innovative-investment sector as a result of renewal of arm racing after a short break.

From our view point the principal direction of long-range shifts in the reproductive structure of economy supported by national governments, interstate unions and international economic organizations should become, *first*, modernization and advance development of the consumer sector (that meets the social orientation of the integral economic system) and specially the agro-food complex (to surmount the food crisis, hunger on the planet and ensuring a stable balanced food of the population on the planet), housing and utilities (to satisfy day-to-day needs of families in comfortable homes and quality public utilities services) and social complex, especially of public health (to strengthen the health, reducing mortality level, surmounting epidemics) and education (to get a necessary level of knowledge and skills and innovative trend in staff training for all population).

Such structural shifts will help to ensure a social orientation of the post-industrial economy and surmount the gap in the level and quality of life between the rich countries of the “golden billion” and poor countries and civilizations.

*Second*, high development rates of the innovation-investment sector to ensure the demands in the innovative updating of economy, assimilation and spread of the sixth technological order. One should be looking at termination of the arms race and gradual demilitarization of economy, conversion of the defense-industrial complex at that by channeling intellectual and economic resources released to the

development of the invest machine building, civil high-tech products.

**Third**, the realignment of the structure of the energy-commodities sector by replacing of fossil fuel and commodities with alternative (first of all renewable) sources of energy and materials (nanomaterials and composites) and gradual transition to a noospheric mode of production and consumption under a considerable reduction of hazardous emissions into the environment. The efforts of governments, interstate unions should be targeted at assimilation and spread of the achievements of the energy-ecological revolution of the first half of the 21<sup>st</sup> century.

**Fourth**, a significant reduction of extremely swelling market infrastructure which is used by TNC and monopolies for redistribution of wealth in their favor will be needed. In many countries a specific weight of trade has grown in GDP under an enormous number of intermediaries increasing transaction costs beyond measure. World financial centers and finance-credit organizations are taken away by the pursuit of super profit by blowing market capitalization (virtual economy) that has become a push for the evolvement of the global crisis. The number of the managerial staff (and corrupted in many countries at that) is increased beyond measure. It is necessary to support tendencies toward the reduction of the number of the employed in trade through an extensive spread of e-commerce, reduce the number of stock exchanges and banks and put them under control of society, reduce the number of officials while increasing their responsibility for the management efficiency.

#### *Shifts in the Technological Structure of Economy*

The technological structure of economy is determined by the relation of technological orders (TO) in the gross output of national, civilizational and global economy. The principal directions of the structural shifts in this direction:

- a gradual replacement of the now prevailing fifth TO – material and technical base of the fifth Kondratieff cycle which entered the down wave from the crisis of 2001-2002, with the longrange sixth TO which is at the innovative assimilation phase now and be prevailing,

determining the competitive capacity of goods and services in the 20-40s of the 21<sup>st</sup> century;

- the ousting of the fourth TO prevailed in the third quarter of the 20<sup>th</sup> century which still takes a significant part in economy of many countries and civilizations of the second echelon, the third order prevailed in the first half of the 20<sup>th</sup> century and still persisted in the countries and civilizations of the third echelon, and also the relic early industrial (first and second) and preindustrial TO prevailed in the 19<sup>th</sup> century and previous centuries and which lost the competitive capacity long ago but still persist in the backward countries and civilizations of the fourth echelon in the natural-patriarchal family households.

The relation of the orders changes, especially in the periods of technological revolutions marking a change of technological orders (approximately once in a half of a century) and technological modes of production (once in several centuries) in the vanguard countries and civilizations.

The 10s-20s years of the 21<sup>st</sup> century are characterized by the evolvment of the global technological revolution targeted at the assimilation of a cluster of the sixth TO innovations as the first stage of the post-industrial technological mode of production ensuring an increase in the growth rate of labor productivity and efficiency of reproduction. A long-term economic strategy of this period should be targeted at:

- support of basic technological innovations ensuring assimilation and spread of the first generations of the sixth TO;
- promotion to the dissemination of technologies of the sixth order both vertically (by sectors, national economy complexes, reproductive sectors) and horizontally (by countries and civilizations) so that to bring up the technological level of the lagging sectors and countries;
- setting the investment (both internal and direct foreign) the

innovative nature targeted at the assimilation and spread of technologies of the sixth order;

- training professional staff orientated at basic innovations and having necessary knowledge and skills for that;
- creation of financial and legal framework to support basic innovations of a long-term nature, high capital intensity and increased level of risk through direct governmental support in the launching period, tax preferences, insurance of innovation risks.

The leaders of the upcoming technological revolution will be the northern American, western European, Japanese, Chinese civilizations, and also partially oceanic (Australia) and Buddhist (the Republic of Korea) civilization. In the second echelon – eastern European, Eurasian, Indian, Latin American civilizations. Among outsiders – African and a significant part of the Moslem civilization who will require a large-scale support in modernization of economy from the vanguard civilizations and global community.

#### *Shifts in the Institutional Structure of Economy*

The institutional structure of economy is determined by relation of economic orders based on various forms of ownership and forms of distribution and exchange adequate to it.

In the first quarter of the 20<sup>th</sup> century a *transnational order* expressing the TNC impact and compradors related to it developed at the advance rate based on globalization. National *private business capitalism* retained its positions. It revived in the post-Socialist countries as a result of neo-liberal market reforms. The privatization policy led to the diminishing influence of the *governmental monopoly order*. In the post-Socialist countries the governmental-socialist order partially transformed into the governmental monopoly (in the Eurasian and Eastern European civilizations). The tendency towards strengthening the role of *small commodity* order (small business) and *natural-patriarchal* order (family households in Russian and other post-Soviet countries) has taken shape.

However, in the process of institutional transformations the

optimization of the structures was not ensured and improvement of the efficiency of all orders – each in its niche.

In the near decades the economic strategy should be targeted at the restriction of the transnational order, creation of global anti-monopoly laws, ensuring better transparency of TNC and strengthening control over their performance. A concurrent policy of active support of small commodity order, ensuring conditions for enterprise and income of millions of small businesses, and also development of cooperation of family households for raising their productivity and marketability, using the principles of cooperation of Alexander Tchayanov and Nikolai Kondratieff should be pursued.

National private business capitalism will mainly preserve its positions but will be to a larger extent under control of the government and society. The governmental order (governmental capitalist and governmental-socialist) will retain its positions and in some countries it will increase as a result of measures undertaken.

In any case a long-term economic strategy should be aimed at the preservation and optimization of the mixed structure so that each order filled its niche and the balanced partnership of orders at various stages of the economic cycle is reached.

#### *Shifts in the Space Structure of Economy*

The late industrial economy was characterized by strengthening of the unevenness in the space structure and the level of economic development of regions, countries, civilizations. As a result disbalances have grown excessively, an increasing gap between the rich and poor countries and civilizations that reduced the sustainability and efficiency of global economy in general. Therefore a long-range economic strategy should be targeted at the surmounting the gap and bringing up the level of the lagging, poor countries and civilizations (especially African, a larger part of Moslem, a part of Buddhist, Indian and Latin American).

This space strategy may be pursued on three levels.

On the *national* level – for accelerated development of the lagging and regions with the assistance of national governments and support

of modernization of economy of the lagging regions, national minorities, etc.

On the *civilizational* level – for assistance of accelerated development of the lagging countries of such civilization (as it was done in the EU; with respect to the Eurasian civilization – support of economy of Tadzhikistan and Kirgizia).

On the *global* level – formation of mechanisms to support modernization of the lagging civilizations and groups of countries based on the principle of partnership of civilizations (for instance, the global support and modernization program for degrading economy of the African civilization, a number of the countries of the Moslem, Buddhist and other civilizations).

While certain steps are pursued in this direction under the UN and its agencies, however the scale of assistance is incommensurable with the scale of the problem. The establishment of new institutes and mechanisms to achieve such goal will be required to be addressed below.

#### **5.4.4. The Strategy of Transformation of Global Monetary, Financial-Credit and Price Relations**

Along with the shifts in the real economy transformations in the system of instruments of virtual economy which in the last decades split off from real economy and formed a kind of “economy of soap bubbles” burst in the crisis periods of 2001-2002 and especially the global crisis of 2008-2009. The matter in question is transformation of world monetary, financial-credit, price and rent relations. Such problems have been addressed in detail by Group 20 and the UN Commission report in terms of short-term and medium-term strategy. It is necessary to consider them in the context of a long-term strategy of the establishment of the integral economic system

##### *World Monetary Relations*

Within centuries the functions of the world money was performed by gold which has real value equivalent to the labor cost of all other goods and services circulating on the world markets.

A refusal from the golden standard and assigning the function of the world money to one of the national currencies – US dollars changed drastically the situation. Goods and services coming to the world market are exchanged into US dollars, almost lost its connection with gold and not backed by it. In addition the accumulation of the US foreign and internal debt and crisis upheavals of the American economy has become one of significant factors of the global crisis.

Several freely convertible currencies circulate on the world market. This is dollar, Euro, pound sterling, Japanese Yen, and Swiss franc. The proportions of such currency exchange constantly vary; this is one of the factors of instability of the world economy and unreliability of economic calculations.

The establishment of the multi-polar world makes the tendency towards formation of several reserve currencies is more real, the establishment of bicurrency settlement systems, etc. But these are half-measures as in any case national currencies show the specifics of economy they serve.

It seems long-range more and more often proposals stated (in particular by President of the Republic of Kazakhstan Nursultan Nazarbaev) to create the global currency reflecting the functioning of global economy and free of influence of national specifics and tendencies. In such case one should take into account experience of conversion from the nominal unit of account ECU to real monetary supranational unit of currency – Euro accumulated by the EU. The principles of real value backup of such currency should be observed at that.

Certainly, such path is difficult and long-term, will take not one decade. But it is important to determine the final goal of movement and move along this path step by step.

### ***World Financial-Credit Relations***

The world market can not function normally failing the developed system of financial-credit and settlement relations and institutes, world financial centers, banks, stock exchanges, insurance companies, etc. They make settlements and transfers of investments and

securities, determine market capitalization of companies, stock indices serve a kind of the barometer describing the state of the investment climate and health of economy at various cycle stages. But one should not forget that the principal part of capital circulating in this sphere is virtual, fictitious capital which has no independent value. Splitting off from the tendencies of the real economy movement, it becomes a false mirror and one of the strong factors of periodical economic crises.

This is the tendency of a split off of virtual capitalism from real, formation of “soap bubbles” of financial capital gave rise and act as a system fact of the global economic crisis of 2008-2009 which started as the mortgage crisis in the US economy already in 2007.

In the Group 20 documents and UN Expert Commission a lot of validated proposals to reform the world financial system, strengthening its transparency and responsibility, supervision over efficiency of the performance, improvement of the accounting statements is made. Not repeating such recommendations the following recommendations could be proposed.

It appears advisable of completing now existing stock exchanges where the securities are listed of the companies admitted, with one more instrument – *stock exchange of innovative projects* where innovation-investment projects passed an innovative-technological evaluation would be listed so that to attract strategic investors for them. The implementation of the pilot project to establish the Moscow International Stock Exchange of Innovative Projects is one of the primary goals of the International Strategic Innovation and Technology Alliance set up in Moscow at the end of 2008. The goal of such project is to provide conditions for raising investments to implement an innovation-breakthrough strategy.

#### *Regulation Strategy of World Prices and Rent Relations*

A basic instrument of the sales of goods and services and estimation of their efficiency on the world market are world prices – or stock exchange (for fuel and basic commodities) or posted or contract. A lack of the estimation of the international value of goods and services and world market fluctuations lead to periodical sharp changes in

world prices and rent income related to it, redistribution of the value between national economies.

Furthermore economy of countries and innovations is assessed as if in two dimensions by actual currency exchange rate and parity of purchasing power of currencies reflecting a real relation of local prices where the second indicator is only for the developing countries exceeds the first 3-4 times (China, India, etc.), and by Japan – lower. Accordingly the estimation of national wealth and level of economic development changes, efficiency of export and import, etc.

Sharp fluctuations of the world prices and their relation by fuel, commodities, finished goods undermine stability of economy and reliability of economic estimations for the states and companies involved in the international trade. Although direct fixing of world prices for millions of goods and services circulating on the world markets is almost impossible, nevertheless there is experience of price regulation in the market economy which could be used. Not mentioning experience of the work of the price commission headed by John Galbraith in the Franklin Roosevelt administration, experience of the 70s years worked out under Nixon could be used. Under conditions of high inflation neither company could increase prices failing the submission of the evidence of objective conditionality of such price increase to the federal price commission (which by its number exceeded the State Price Committee under the USSR Council of Minister). The inflational price growth was soon suspended, the Price Commission was terminated.

It appears that it would be reasonable to establish a dedicated international body which would be engaged in analysis and forecasting of the tendency in price dynamics and estimation of the implications of such changes and would issue certain recommendations for possible price changes. Such body could operate in linkage with a dedicated international anti-monopoly body. As experience of the European Union demonstrates, such moves are possible and efficient in this direction.

In this connection the question becomes now how to regulate

world rent income. The matter in question is both natural rent (mining, forest, water, land) and ecological anti-rent (super profits arising as a result of predatory exploitation of natural resources and extreme pollution of the environment) and technological and financial quasi-rent. At the round table meeting of the Global Civil Forum of the World Summit on Sustainable Development in Johannesburg (2002) we put forward a proposal on imposing a kind of taxes on world rent income and establishing of three global funds for such account: ecological (with the deduction of the ecological anti-rent to already existing such fund instead of selling quotas to hazardous emissions), technological (taxation of profits in trading weapons and high tech goods) and socio-cultural (taxation of financial quasi-rent generated on the stock exchange markets). This proposal was endorsed by the round table participants published<sup>1</sup> and submitted to the UN but received no attention. Perhaps time will come to return to such issue.

Only some most pressing issues pertaining to transformation of the world system of monetary, financial-credit, price and rent relations have been addressed above, some basic innovations have been proposed in this sphere. Obviously a circle of such innovations in the elaboration of the strategy for economic partnership of civilizations has to be expanded considerably.

#### **5.4.5. The Institutions and Mechanisms for the Implementation of a Long-term Strategy of Economic Partnership of Civilizations**

The recommendations given above for a long-term strategy of economic partnership of civilizations will hang in the air and will turn out a corpus of good wishes provided that their implementation does not rely on necessary and adequate network of competent institutes and real mechanisms.

Two possible scenarios are taking shape in the establishment of such institutes.

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<sup>1</sup> *Yakovets Yu.V.* Rent, Anti-rent, Quasi-rent in Global Civilizational Economy. M: Akademkniga, 2003

The **inertia-based** scenario is fairly good seen in the G-20 documents. The matter in question is the reforming the world financial-credit system based on already existing institutes – International Monetary Fund, World Bank, Financial Stability Forum, etc. by expanding their competencies, adjusting the membership and replenishing the funds, beyond and regardless of the UN. On the one hand basic factors in the reform those international organizations remain which have contributed to the spread of the global financial-economic crisis. On the other hand, new rules of the game are dictated by a relatively small group of mainly developed countries in which interests the now neo-liberal model of globalization functions and which has come to a dead-end and more representative and democratic UN stands on the sidelines from such reforming. Naturally, one could hardly expect a radical update of the world financial-economic mechanism based on basic innovations under such scenario.

The UN Commission recommendations are closer to the **innovative-breakthrough** scenario. The principal distinction is that the center of gravity in the reforms is transferred to the UN – Group 192 (according to the UN members). It will require more complete regard of the interests of the developing countries suffered to a greater extent from crisis. These recommendations include some basic innovations and first of all the establishment of the Global Economic Coordination Council (at the level of the General Assembly and Security Council), standing group of experts from the authoritative scientists from all over the world (a kind of the “Council of the Wise) or UN Scientific Council), new global reserve system, new lending fund. In actual fact, the matter in question is the reform of the UN system as the central link in the reforming the system of global economic regulation in response to the global crisis and other challenges of the new century.

With all its failures and weakening of the strategic function the UN and the system of its organizations is the only legally competent body to elaborate and implement the global strategy to respond to the challenges of the new century.

At the same time the need to reform radically the UN, its innovative update become increasingly obvious so that it could perform its responsible function efficiently. It seems to us that such final goal is transformation of the UN approximately by the middle of the 21<sup>st</sup> century into the **World Confederation of States and Civilizations**. We put forward such proposal of transformation at the 2<sup>nd</sup> World Congress on global civilization (New York, 2005) and in the report “The Establishment of the Integral Economic System as a Global Transformation of the 21<sup>st</sup> Century” (at the 15<sup>th</sup> World Congress of the International Economic Association, Istanbul, June 2008). The formation of a similar confederation in Europe earlier riven by discords and wars – first western European, and then eastern European civilization may be taken as an example and pilot project in this direction. Under such approach the line of transformations of the institutes of the global economic system seems more validated. The Global Economic Coordination Council proposed by the UN expert commission is a step towards the formation of such confederation, a basis of the global executive power responsible for the elaboration and promotion of the global strategy of economic and social development.

But for normal functioning of a new global institute another institute is necessary – **global law**, in this case – global civil, financial, labor, social, etc. There are already the rudiments of such law, proposals formulated by both Group-20 and UN Expert Commission. But it lies ahead to vest the UN General Assembly with the functions of legislative, standard-setting global body, and also to establish the supervising bodies over the compliance with the rules of the global law (a kind of a global prosecutor’s office) and judicial bodies to settle disputes as a matter of course (arbitration, private arbitration, etc.), it is also anticipated to train specialists in global law using experience of international private law, patent law, etc.

As the result this complicated diligent job to reform the global economy meets the demands of the global civil society at a new whorl of its development and will be going under control of such society.

It will be more efficient mechanism for the implementation of a global long-term strategy for economic partnership of civilizations and states meeting the terms of the establishment of the integral economic order.

#### **5.4.6. Towards the New Model of Globalization**

One of the prime lines of the establishment of the integral economic system is a deep transformation of globalization permeated the world economy from the end of the 20<sup>th</sup> c. It has objective reasons and efficiency potential growth as a result of internationalization of production forces and market economic institutes. However, it develops according to the neo-liberal model, under control and interests of TNC, world financial centers and civilizations of the “golden billion” and leads to the aggravation of contradictions and exacerbation of the element of parasitism of the late industrial economic system.

The world economic crisis of 2008-2009 has led to the rollback of globalization, decrease in the international trade.

It becomes increasingly obvious the need to change the model of globalization. The basic lines for transformation of globalization, giving it a humanistically noospheric nature, optimization of relation of global and non-global economies, strengthening of regulation from the UN and institutes of global civil society. Let us address these directions in more detail.

**1. Humanization of globalization.** Under the prevailing neo-liberal model globalization is subordinated to self-serving interests of TNC which control more than a half of the world GDP and the utmost rich countries where the headquarters of the most TNC are based. This leads to redistribution of the world income in favor of such countries, strengthening of technological and economic gap between the rich and poor, vanguard and lagging countries and civilizations, intensification of economic stratification, to the poverty and hunger of a significant part of the population on the planet, especially on the African

continent.

A gap in the level of average national income per capita between the countries with high income and countries with low income grew from 14 times to 24.4 times in 2007 by PPP. Hundreds of millions of people live in poverty; millions die from hunger while tens of millions are overweight and reside in luxury on the opposite pole. The world community of nations and civilizations should change the vector of globalization using its advantages in the interests of all humanity, surmounting technological and economic polarization of countries and civilizations.

The introduction of global progressive taxes on super-profits and TNC rent income should promote it among other things and establishment of the global fund for such expense – sociocultural, technological, food, ecological which may be used for performing large scale projects for modernization of economy, improvement of the level and quality of life of countries and civilizations with low level of income.

**2. Noospherization of globalization.** Under the neo-liberal model of globalization it increases a predatory use of natural resources increases and threatens with the unfavorable changes in climate, pollution of the environment. Non-renewable reserves of the best mineral deposits are being depleted, they cut down tropical forests – “green lungs” of the planet, a shortage of plough lands and fresh water increases. For a decade and a half the energy consumption grew from 8.6 to

11.2 bln. t of oil equivalent in the world, i.e. by 30%, CO<sub>2</sub> emissions - from 22.7 to 23 bln. t - by 28 %, where the half of energy consumption and emissions fall to the countries of “golden billion”. The areas of forests and plough lands reduce. In pursuit of super-profits TNCs are bringing closer the global ecological catastrophe.

The world community is called to make barriers to the predatory use of natural resources and pollution of the environment taking the path of the establishment of the noospheric energyecological mode of production and consumption on the scale of the planet, efficient co-

evolution of society and nature. It will be required to use economic methods for that: a complete economic estimation of the cost of reproduction and use of natural resources and their large scale replacement with alternative sources of energy and materials; global diffusion of resource saving technologies, economic model of productive and personal consumption; estimation of damage caused to the environment, removal of world ecological anti-rent and its use for financing the global ecological projects.

**3. Optimization of globalization,** relation between global and national economies. At the end of the 20<sup>th</sup> – beginning of the 21<sup>st</sup> century globalization finds its expression in the priority growth of foreign, increasing dependency of national economies on the world market and TNC running the show on it. From 1990 to 2006 the export quota (relation of export and GDP in current prices) grew from 19.7 to 24.9%, including in the Eurozone from 22.7 to 48%, Russia from 7 to 30.9%, China from 13.5 to 36.6 %, in sub-Saharan Africa - from 11.1 to 32.6%. The WTO activity first of all representing the interests of TNC has contributed to the reduction of customs barrier and establishment of TNC monopoly on the markets of many countries. Migration of labor resources and capitals has intensified.

World economic and food crises broken out from 2008 have demonstrated that such tendency has its own limits. It may be anticipated a slowing down of globalization rates in the near decades and involvement of national economies in the world market, and for some areas (for instance, food) – deglobalization, enhancement of self-sufficiency of national economies.

**4. Devirtualization of global economy.** Globalization in its neo-liberal performance has first of all pervaded the world financial market, the network of world stock centers where the virtual (fictitious) capital is concentrated of a relatively small number of companies. The virtualization of global economy has occurred. The relation of market capitalization and GDP in the world grew by 28% in 1990 to 113.9% in 2007, including in the USA - from 53.2 to 147.6%, Australia - from 35.2 to 140.4%, Japan - from 95.6 to 106.2%. Less

developed civilizations are fast involved in the sphere of fictitious capital: relation of capitalization to GDP grew in Africa to the south of Sahara from 51.9% to 159.9%, India from 12.2 to 89.8%, Thailand from 20 to 68.4%, Middle East and North Africa - from 27.8 to 48.9%. The post-socialist countries are also involved in such sphere where there were almost no stock markets: in Russia capitalization reached 107.1% of GDP. China develops fast using this way - relation of capitalization increased from 0.5 to 91.7%,

Fictitious capital gets certain independence in its movement. Speculative operations prevail on the stock markets, the prices are forced up. A kind of "economy of soap bubbles" is being formed and which are burst in multitude in the periods of crisis showing the dependence of fictitious capital from real. This is one more manifestation of the aggravating parasitism of the late industrial economic system. In the integral economy the balance between securities and real income will have to be improved, make their relation more transparent and steady.

**5. Regulation of globalization.** The neo-liberal globalization develops spontaneously; it has outrun the building of institutes of global civil society which could perform the regulation of such processes, set a limit to the TNC self-serving interests. Existing international financial-trade organizations - the International Monetary Fund, World Bank, World Trade Organization - reflect interests of TNC and rich countries as a matter of fact and promote their enrichment. There are almost no international anti-monopoly laws (its separate elements begin to be framed in the European Union).

It will be required the formation of efficient institutes and mechanisms for regulation of globalization in the interests of all nations and civilizations.

The United Nations and its various organizations transformed to the new environment must become the central link in this regulation. The main direction of this transformation is the transformation of the UN to the leading institute for development and implementation of the new strategy for sustainable global development based on partnership

of states and civilizations. The path of this transformation is long, but there is simply no other direction of movement to reverse the trajectory of descent into global catastrophes and implementation of the innovation-breakthrough scenario of the future of humanity.

Thus, in the near two-three decades the face of globalization is expected to be changed supporting its progressive elements and mechanisms in the interests of all civilizations and countries and surmounting the elements of monopolism and parasitism.

The establishment of the integral economic system implies increasing regulation of the globalization processes from the global civil society, establishment of special institutes of global civil law for that and framing the anti-monopoly laws, international judicial instances for referring such issues, enforcement bodies of judgments taken.

## **CHAPTER 6. TRANSFORMATIONS OF THE SPIRITUAL REPRODUCTION SPHERE**

### **6.1. TRANSFORMATION OF THE MODEL OF SOCIAL REPRODUCTION**

#### **6.1.1. A New Scheme of Social Reproduction**

It is widely known the reproduction scheme of Karl Marx that revealed the processes of interaction between two divisions of social reproduction (production of means of production and production of consumer goods) in the processes of simple and expanded reproduction.

This scheme has been studied in detail by Rosa Luxemburg and other economists. V.I. Lenin modified it and made it more complex by including the factor of technological progress in it. It was written a good few of monographs about the model of reproduction in the USSR and in other countries, it was validated the law of preferential growth of manufacture of the means of production which underlay the policy of industrialization pursued by the USSR and other socialist countries for decades.

Karl Marx's reproduction scheme comprising two divisions of social reproduction was sufficient for the aggregative analysis of these processes in the context of the 19<sup>th</sup> – 20<sup>th</sup> centuries. However, in the second half of the 20<sup>th</sup> century it became increasingly obvious a need to make this model more complex as applied to a more differentiated structure of reproduction, the features of which became increasingly apparent. The Polish political economist from Krakow added the third to the two divisions - reproduction of services and built a new, more complex scheme of reproduction, taking into account the exchange between the sphere of services and two divisions of material reproduction which were included in Karl Marx's model.

In one of the articles of the 70s I addressed this issue and showed the need for the introduction of one more division, and namely the

production of means of destruction, military equipment the products of which are not supplied to other divisions of reproduction, and are being accumulated and used in armed conflicts, deforming the structure of reproduction.

In the monograph "The Prospects for Socio-Cultural Dynamics and Partnership of Civilizations"<sup>1</sup> it is researched into one more sphere of reproduction - the sphere of spiritual reproduction, shows its constituent elements, special features and relations with other divisions of social reproduction.

In a number of works I have examined the features of reproduction of natural resources and environmental protection, industry groups which are engaged in reproduction and use of natural resources, and validated the need for accentuation of the sphere of reproduction of natural resources in the input-output balance and reproduction-cyclical macromodel. It should be noted that in the model of the world economy developed by Wassily Leontief, and used in the development of a long-term forecast there were identified six major areas of environmental pollution. Thus, the basics for the formation of the new, expanded scheme of social reproduction made more complex in the context of the 21<sup>st</sup> century have been created so far that reflects the basic proportions in the process of functioning and development of macroeconomics fuller and more adequately.

Let us try to formulate the basic provisions of the new scheme of social reproduction that meets the conditions of the 21<sup>st</sup> century by its structure and system of interactions taking into account cyclical fluctuations in economy.

It seems necessary to distinguish six divisions in the structure of social reproduction.

**Division I** - production of means of production (machinery, equipment, buildings, structures, materials) necessary for the functioning of all social reproduction, all its divisions; it is mainly

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<sup>1</sup> Ossipov G.V., Kuzyk B.N., Yakovets Yu. V. The Prospects for Socio-Cultural Dynamics and Partnership of Civilizations. M.: INES, 2007.

manufacturing industry, mechanical engineering, metallurgy, production of building materials, construction of industrial buildings.

**Division II** - production of consumer goods used for reproduction of labor power of human and meeting his material needs (housing, clothing, footwear, food, etc.), in whatever division he works as well as to maintain the lives of those who yet or no longer can work, but needs a means of subsistence and development.

**Division III** - reproduction of services both of an industrial character associated with the turnover of material values and social nature needed to meet the basic needs of people. This division is connected with the previous two divisions by the results of their activity, it includes transportation, communications, housing and utilities, personal and commercial services, etc.

**Division IV** - manufacture of instruments of defense and security necessary to ensure the defense capability of the country, participation in armed conflicts and population security. This division receives the products from other divisions but only minimal supplies its products to them. It is included in the sphere of final consumption, as well as the second division. The sphere of public administration can also be attributed here.

**Division V** - the process of reproduction of natural resources and environmental protection, ensuring the needs of production and people in natural resources and environmental conditions necessary for the functioning, as well as creating conditions to overcome natural disasters occurring from time to time (earthquakes, floods, volcanic eruptions, typhoons, tsunamis, etc.).

**Division VI** - renewal and development of the sphere of spiritual reproduction: obtaining scientific knowledge (science), transfer of knowledge and skills to future generations (education), maintenance of culture, moral foundations of society and religious values. This division could be included in division III - the sphere of services but its result is the reproduction of cultural values that are the foundation of the development of society, so we include it into an independent sphere of reproduction.

Each of the six divisions is interconnected with others and receives necessary funds for the operation and development from them, and transmits the results of their operations to them. The effective functioning of all social reproduction, the rates and efficiency of economic development in the country and the world depends on the necessary proportionality between these divisions, providing them with natural, labor, material, intellectual resources in proportions sufficient for their effective functioning and development.

Another novation is to consider the scheme of social reproduction within the cycling dynamics distinguishing the periods of expanded, narrowed and deformed reproduction. *Expanded* reproduction is carried out in phases of recovery and rise of economic and other cycles responding to rapidly growing needs and demand for goods and services, products of all divisions. *Simple* reproduction is observed in a short-life depression phase - in the period after crisis and before the revival of economy when production is at the lower level. *Narrowed* reproduction happens in times of crises, major natural disasters, etc. when the reproduction process is curtailed, and disproportions intensify in its structure. *Deformed* reproduction can be observed during periods of heavy militarization of economy when proportions of reproduction are violated, it is hypertrophied the fourth division to the detriment of all other divisions.

It should be taken into account, especially in long-term forecasting, the interaction of overlapping phases of medium-term (about a decade), long-term Kondratieff (about half a century) and super-long (civilizational) cycles. On the rising phases of the higher level it is observed higher rates of expanded reproduction and a moderate slowdown in the crisis phases of medium-term cycles. In the down periods of long-term cycles, on the contrary, the growth rates are slowing and the crisis phases are accompanied by a significant drop in production.

A distinctive feature of the new scheme of reproduction lies in the fact that in the process of analysis not only the sphere of commodity production is included but also a non-market sector of economy. This

is first of all the major part of the sphere of spiritual reproduction, private household, family household, activities related to defense, public administration, health, social security, etc. This opens up another aspect of the analysis of the complex interrelations between different sectors of economy - between market and non-market sectors - in the process of social reproduction.

The new scheme of social reproduction is linked to reproduction-cyclical macromodel developed by us for four reproductive sectors (consumer, innovation-investment, energy-raw materials, infrastructure) and with the new model of cyclical-economic dynamics which was dealt with in the previous chapter.

The foregoing mentions only the basic outlines of the new scheme of social reproduction, adequate to conditions of the 21<sup>st</sup> century. The composition and the specific relations between the six divisions of social reproduction in their cyclical dynamics remain to be studied. Let us leave it to those young economists and mathematicians who are interested in this problem. We discuss below only one division which we are most interested in - the sphere of spiritual reproduction.

### **6.1.2. The Structure and Interconnections of the Spiritual Reproduction Sphere**

In a series of my works I include five interconnected types of activities in the sphere of spiritual reproduction:

- *Expanded reproduction of scientific knowledge*, its replenishment and update, identification of regularities in development of nature and society and methods of using these regularities for the benefit of humanity. This includes fundamental and applied science, development works, inventive activity, its execution (intellectual property), a network of research institutions, universities, and enthusiasts - scientists and inventors outside of these organizations. The result or product of these activities are scientific hypotheses, conferences, theories, discoveries and inventions of different levels, expressed in publications, patents, etc.;

- *Education* as a process of generalization and transmission to future generations the accumulated amount of knowledge and skills, ranging from primary forms (primary education) to higher and post-graduate education, postgraduate studentship, doctoral studies, as well as additional vocational education and self-education, continuous replenishment and update of knowledge and skills received in the context of changing scientific paradigms that underlie the practice;

- *Cultural activities* covering all its forms (art, literature, architecture, cinema, television, libraries, theaters, etc.) using which it is performed receiving and transmission to future generations of accumulated cultural heritage for thousands of years subject to cultural diversity, replenishment and expansion, the aesthetic appreciation of nature and society by human;

- preservation, transmission from generation to generation and modification in the context of new conditions the system of *moral values* that underlie human behavior and collective body, serving as criteria for evaluation of human actions that determine the moral foundations of family and society;

- *religious activities* and other forms of ideology forming the ideals of human and ensuring their transmission from generation to generation, supporting the moral foundations of society and family.

All of these activities, or sub-systems of the spiritual reproduction sphere as it would seem, has something intangible as a result of their operation, a set of ideas, truths, values, ideals and ethical standards. However, this entire sphere is closely linked with other divisions of social reproduction, and requires the availability of a variety of resources, and the share of this sphere varies in the structure of social reproduction and has a general trend to rise.

To implement these five subsystems of spiritual reproduction referred to above it is necessary human resources - scientists, engineers, teachers, people of art and workers of culture, the church. We are talking about tens or hundreds of millions of people across the global economy, in major national economies. For these resources to function it is required the production of the first, second and third

divisions of social reproduction. The results of scientific activities are the starting point for the development of the fourth division, especially during the periods of military-technical revolutions, and a part of scientific achievements received is transmitted to other divisions.

For functioning and expanded reproduction of the sixth division it is necessary the means of production supplied by the first division of social reproduction - buildings, structures, instruments, equipment, materials, etc. However, scientific ideas, engineering design efforts and trained staff are needed for function of the first and the other divisions of social reproduction.

Even the functioning results of such delicate spheres of spiritual reproduction, as morality and religion, are consumed in other parts of social reproduction and are the spiritual foundation for the existence and development of all social reproduction that becomes particularly evident in crisis situations.

The role of the spiritual reproduction sphere, its share of all social reproduction is varied in different historical epochs. Familiarity with the historical monuments of ancient Egypt, Athens or Rome, Crete, convincingly shows what a significant share of social labor and wealth in ancient civilizations were directed to spiritual reproduction sphere: construction of magnificent temples, palaces, pyramids and other structures associated with the reproduction of spiritual life. Perhaps, this proportion was significantly higher than in the pragmatic modern societies.

During the period of the dominance of the sensate socio-cultural system in the West within the recent five centuries, the share of resources allocated for construction of temples and palaces has declined while the share of investment in the development of science and education has increased related to the acute need in scientific discoveries and educated workforce. However, each local civilization has its own features in the nature and structure of spiritual reproduction, ensuring the needs of society in its final products.

Let us consider in more detail those transformations that are occurring and will occur in the sphere of spiritual reproduction in the

first half of the 21<sup>st</sup> century.

## **6.2. REVOLUTIONS IN SCIENCE AND EDUCATION OF THE 21<sup>ST</sup> CENTURY**

### **6.2.1. Global Crises of Science and Education**

From the late 20th century there are observed growing signs of the global crisis of science and education. These processes are interrelated. Transformations in science are usually made by young scientists brought up in the creative spirit, seeking for the truth during their self-actualization, seeking to form their own scientific views, on discoveries and inventions. On the other hand, the most important function of education is to transmit to a new generation the system of scientific views and skills, which for decades will be the basis for the adoption of practical decisions for them. Therefore, research and educational cycles are usually closely linked both in their up and down waves, with the leads on the side of scientific cycles.

From the late 20<sup>th</sup> century there are observed trends to extinction of the explosion of scientific creativity which was typical of the industrial civilization for two centuries. The great scientific revolution of the 15<sup>th</sup>-17<sup>th</sup> centuries was the forerunner of the formation of the industrial civilization. Its development was accompanied by scientific revolutions of the middle of the 19<sup>th</sup> century, end of the 19<sup>th</sup> century, beginning of the 21<sup>st</sup> century and scientific-technical revolution of the 50-60s of the 20<sup>th</sup> century. The sphere of scientific reproduction gained the priority development rates, the number of academies, institutes, and design bureaus grew rapidly as well as the employment in science and services to it. The flow of scientific discoveries, large and medium inventions increased. The process of education developed and differentiated simultaneously, the universal primary, and then secondary education gained currency, new higher education establishments formed rapidly, a process of differentiation and

multiplication of the number of specialties that meet the needs of science and industry was going. Scientific researches developed both within the leading universities and major institutes split off from them. Communities of scientists were created in the form of academies of sciences which worked closely with the higher school. This became the basis of radical transformations in the sphere of technology, record growth rates of labor productivity and economic growth, especially in the third quarter of the 20<sup>th</sup> century. The world leaders in science and education - United States, Western Europe, USSR, Japan were the leaders in the sphere of technological transformations.

Breakthroughs in the development of atomic energy, space, information revolutions based on the creation of electronic data processing machine, and then personal computers, information systems generated the illusion that the triumph of science is endless that it is able to solve all the problems the humanity faces.

However, the signs of crisis of science and education manifested. Their development was first of all stimulated by the military-technical revolution, the arms race and the needs of the military-industrial complex of the warring countries and camps in the results of scientific activities and human resources trained for their assimilation. The makeup of science and education at the expense of state and military-industrial companies was a crucial factor in the accelerated development of science and education in leading countries.

After the end of the Cold War there was observed a general tendency to reduce the share of defense spending in GDP, reducing the flow of orders from the military-industrial complex for science and education. It became one of the factors for dropping the growth rates in the number of employed in science and allocations for its development.

However, the matter is not only in the needs of the militarized sector of economy (the fourth division of social reproduction) but also in the fact that the industrial civilization and the industrial scientific paradigm dominated in it and the education system have largely exhausted its potential. In the long term transition to a postindustrial

society the conditions of functioning and development of society change, many scientific facts and trends appear that do not fit into the Procrustean bed of the prevailing industrial scientific paradigm. It is increasingly losing its creative and prognostic power as it is not able to reflect the new conditions of reproduction and life of society. There comes a time for the emergence of the new, post-industrial scientific paradigm, especially in social sciences with respect to the conditions of functioning and development of society in the 21<sup>st</sup> century. A new picture of the world is taking shape.

It should be noted that these changes did not occur suddenly, they have accumulated over the 20<sup>th</sup> century. The fundamentals, the cornerstones of the new post-industrial scientific paradigm were laid by Russian scientists in the 20-30s of the last century - in the writings of such scientists of international level as Nikolai Kondratiff, Pitirim Sorokin, Vladimir Vernadsky, Nikolai Vavilov, Alexander Tchizhevsky, Alexander Bogdanov, Ivan Pavlov, Dmitry Mendeleev, etc. - and have received recognition, support and development in the works of many foreign scientists. However, these streams of scientific thought have been little used in education and science for a long time where the predominant schools were those professing and developing the industrial scientific paradigm. Only from the end of the 20<sup>th</sup> century the conditions for completion of the formation of the new paradigm and its dissemination in the scientific community and in education were established. This is promoted by the increasingly clear signs of crisis in modern science. Publications appeared that all great discoveries have been made, the end of the century of science and it remains for scientists to finish and develop in details the scientific discoveries that have been made by their great predecessors. But in fact the crisis of science is a sign not of the end of science in general but only the industrial scientific paradigm. It precedes and contributes to a new wave of major scientific discoveries and inventions that will be built on the basis of the post-industrial and scientific paradigm and is a necessary element in the formation and spread of the post-industrial

humanistically noospheric civilization in the first half of the 21<sup>st</sup> century. This meets the regularities of cyclical dynamics of scientific knowledge disclosed by Vladimir Vernadsky in 1926: “ A certain speed of movement is inherent in the flow of scientific thought... It naturally varies over time, and there is a change of periods of its freezes and periods of gains ... Explosions of scientific creativity, repeated through centuries, indicate... that through the centuries periods are repeated when it is accumulated in one or a few generations, in one or many countries richly endowed individuals, those whose minds create a force that changes the biosphere”<sup>1</sup>.

The crisis of science is expressed primarily in the fact that based on the industrial paradigm the scientific schools have found themselves able to predict a cluster of global crises that have penetrated all aspects of existence and development of humanity at the beginning of the 21<sup>st</sup> century and to offer a reliable way to overcome these crises, to create a coherent concept, scientific base for the establishment of the post-industrial civilization.

The crisis of science was complimented and deepened by the crisis of the education system, the main symptom of which is that it is directed to a greater extent to the past but not to the future, arming a new generation with the system of knowledge and skills reflecting the realities of the past 20<sup>th</sup> century and do not meet the new conditions of society, resulting in a new generation is poorly equipped to understand and resolve a cluster of acute contradictions and crises of the early 21<sup>st</sup> century. Extreme commercialization, pragmatization and standardization of education have led to that the ranks of talented young scientists who know a cross-disciplinary approach and have a creative potential for new major discoveries and inventions are scarce, for radical transformations in the sphere of scientific knowledge and the system of education. One has to pay high for this crisis by a large number of errors admitted in the transformation of society, first of all

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<sup>1</sup> *Vernadsky V.I. Works on the Universal History of Science. M.: Nauka, 1988. P. 215*

in the implementation of neo-liberal market reforms in post-Soviet countries and dissemination of the neo-liberal model of globalization.

As the process of changing the system of scientific views of generations of scientists and teachers is rather inert, takes rather a long time, we can expect that the current crisis of science and education will take another couple of decades before in the second quarter of the 21<sup>st</sup> century it will be fully implemented radical transformations of science and education ensuring the assimilation and dissemination of the recent scientific and education revolution.

### **6.2.2. Synthesis of Three Revolutions**

The basis of transformation in the field of spiritual reproduction in the second quarter of the 21<sup>st</sup> century from our viewpoint will be the synthesis of three revolutions: scientific, educational and information. Why are these revolutions inseparably interlinked and connected into a powerful stream, which forms the spiritual foundation for the establishment of the integral post-industrial civilization?

**The scientific revolution** that lays the foundation of the post-industrial scientific paradigm, already deployed on the basis of the cornerstones of that laid by its predecessors as far back as the 20<sup>th</sup> century but so far is at the initial phase of formation. The crisis of science at the end of the 20<sup>th</sup> - beginning of the 21<sup>st</sup> century pushed the scientific thought to search for fundamentally new approaches to the knowledge of nature and especially society, encouraged the formation of the foundations of the post-industrial scientific paradigm, a new picture of the world. The scientific revolution is based on major scientific discoveries of the previous century, and paves the way for a new paradigm that is adequate to the realities of the post-industrial civilization. In fact, it begins the process of the great scientific revolution of the 21<sup>st</sup> century which is equal to the scientific turn of the 16<sup>th</sup> -17<sup>th</sup> centuries. The objective basis for this is that the 21<sup>st</sup> century is characterized by the process of changing the world civilizations,

completion of the second historical super-cycle in the dynamics of the global civilization and the establishment of fundamentally new, third historical super-cycle that will entail a radical change in living conditions and development of society and in the system of knowledge, formation of a new picture of a radically changed world, fundamentally different from scientific paradigms of the previous centuries.

If the leadership in the industrial scientific paradigm was with the natural and technical sciences that answered the nature of the industrial civilization, then in the coming scientific revolution sciences about life, society and ecology will be leading, this is where lies the key to the threats not yet fully being aware of and new challenges for humanity in the new millennium. This requires an understanding of the profound transformation of society and developing a new system of scientific views, which will absorb the earlier achieved and at the same time will be the biggest step forward in knowledge not only of the world but also human and society. The priorities and the leaders of scientific knowledge also include ecological sciences which will form the basis for the formation of the noospheric approach, for generating scientific basis for harmonious co-evolution of society and nature in accordance with the principles formulated by Nikita Moissejev<sup>1</sup>.

The process of forming a post-industrial scientific paradigm is actively developing. The leader of this process in the social sciences proves to be the Russian science which is based on the achievements of great predecessors who laid the cornerstones of a new scientific paradigm. This is evidenced in particular by the formation of new active scientific schools - the modern school of Russian cyclicism, civilizational school, the school of integral macro-forecasting, schools in the area of synergy, philosophy of household and others. However, in the natural and technical sciences, requiring a powerful technological base, and major investments, Russia lags behind the vanguard countries as a result of the deep crisis of science of the past two decades, and reducing its state support.

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<sup>1</sup> *Moissejev N.P.* The Fate of Civilization. The Path of Reason. M.: MPEPU, 1998.

It may be anticipated that the foundations of the post-industrial paradigm will be consolidated during the next decade and a half, and from the 20s it will begin the phase of its active dissemination in the scientific community and the education system - first in the vanguard countries, and then across the globe. This process in its main features can be completed by the middle of the 21<sup>st</sup> century when the new scientific paradigm will be generally recognized, and the process of the great scientific revolution of the 21<sup>st</sup> century will be mainly completed<sup>1</sup>.

**Revolution in education.** In parallel with the scientific revolution in the first quarter of the 21<sup>st</sup> century the foundations for a revolution in education are being laid. Its core, basic content is the assimilation of the foundations of the post-industrial scientific paradigm by a new generation. However, this process is not easy and long because it requires this paradigm capturing the minds of scientists and educators and be expressed in textbooks which will also require decades. However, the accelerating pace of transformations is pushing this process, making all the more compelling the need to abandon the outdated scientific views and to assimilate new ideas, discoveries and inventions that make up the base of the post-industrial scientific paradigm. This process is all the more so demanded as the new generation, generation of the 20s to whom the burden and responsibility of the adoption and implementation of strategic decisions passes from the 10s of the 21<sup>st</sup> century within three decades, feels it more and more a need for new approaches to understand and resolve the crises and contradictions of the new century, its challenges and finding efficient responses to these challenges. The new generation will be drawn into the sphere of teaching, organization of educational process, eagerly absorbing new ideas and trying to put them into life. Thus a demand for new ideas, a new paradigm is being formed.

However, the revolution in education is not limited to changes in

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<sup>1</sup> See. *Yakovets Yu.V.* The Epochal Innovations of the 21<sup>st</sup> Century. M.: SKII, 2004

the content, the amount of scientific knowledge delivered in schools and universities. The structure of the educational process should change. In prospect, it will be a shift of the center of gravity to the assimilation of the new paradigm by those who have already graduated, working, but whose knowledge is largely obsolete. Therefore, the main focus should be laid on the development of supplementary education, which will give the system of new knowledge in a concentrated form, reflecting the content of the post-industrial paradigm. Among other things, the establishment of the International Strategic Innovation and Technology Alliance of the Global Online University is targeted at that which in partnership with leading universities in different countries will enable scientists and specialists who have a university education, on the basis of additional vocational training, to master new areas of the postindustrial scientific paradigm and its practical application in various fields, especially in the field of innovative activity.

The revolution in education means changes in the pedagogic foundations of the process of getting knowledge. The excessive pragmatism of the education system, the emphasis on tests, memorizing rapidly aging knowledge comes into conflict with the pace of innovative changes, in the midst of which are specialists who have received higher education. The emphasis should be placed on creative pedagogy, on the ability to identify new trends and contradictions, to find nonstandard ways of solving them. Creativity, creative approach peculiar to the Russian educational system and ensured its advantages in training human resources in the previous scientific and technological revolution must be restored and developed in relation to the conditions of a functioning society in the 21<sup>st</sup> century based on knowledge. The tendency to creativity, out-of-the-box thinking should be inculcated from the very beginning of the educational process, otherwise we get an army of persons in charge who are unable to timely and effectively react to a changing world, to implement innovations which are deployed as a growing wave in the world.

**Information Revolution.** The features of modern revolutions in

science and education are in the fact that they are closely related to the information revolution, the creation and active use of information systems and especially the Internet. The way that the new generation perceives the inherited system of knowledge, changes. If for centuries its focus was the books centered at the various libraries, and stacks of textbooks which were supposed to learn each schoolboy and student, now the methods of transmission and perception of information by the new generation change qualitatively.

If it is viewed from the standpoint of the theory and physiology of cognition, at the stage of forming a human the basis of cognition was the first signaling system, i.e. receptors that allow perceiving signals of the external world, processing and using them in their struggle for existence and in the process of development. Then the second signal system was formed when the words that replace these or other images of the outside world appeared and allowed transmitting information, first using verbal media, and then using written symbols. It was the biggest revolution that established the foundations for the power of the human race, development of its intellectual capabilities, survival and triumph in the difficult conditions of the outer world. Now, in fact, it is being formed a new model of perception, a kind of the third signal system, which connects the empirical and logical knowledge into a single system, including the virtual world. This allows us to significantly accelerate the process of assimilation of accumulated knowledge and new ideas and their dissemination throughout the world through global information networks. The computer becomes the main instrument in perception and accumulation of knowledge, their assimilation and transmission to next generations. This greatly increases the volume and assimilation rate of information, provided that the information is logically well-constructed and does not contain a lot of unnecessary informational noise. Therefore, the modern information revolution becomes a prerequisite and factor in the dissemination of scientific and education revolutions. The computer itself can not replace the process of creative cognition of changes that occur in the outside world or become a source of scientific discoveries

but it creates a base so that information required for such discoveries and their verification and dissemination flows strong and contributes to a significant acceleration of this process.

However, the intertwining of three revolutions imposes certain requirements on both the information revolution and the information flows, their orientation to a greater extent at scientific knowledge and its dissemination in the educational process, their systematization, generalization and enrichment of inherited knowledge and their transmission to next generations.

A synthesis of scientific, education and information revolution is inextricably linked with global economic transformations of the 21<sup>st</sup> century. This relationship can be traced in the following areas.

**First**, the revolution in science, assimilation of a new paradigm through the education system by the new generation on the basis of modern information and communication technologies are a prerequisite for effective economic transformations, innovative renewal of economy and society. At the root of the wave of epochal and basic innovations are major scientific discoveries and inventions resulting from the evolving scientific revolution of the 21<sup>st</sup> century. The scale, complexity and speed of innovative transformations are increasing, and it determines greater requirements for mastering by human resources through continuing education a new scientific paradigm, scientific discoveries and inventions that are the basis for accelerating economic growth rates and solving complex energy-ecological and other problems. The implementation of innovations needs creative human resources who are able to understand and implement with the greatest effect the innovative transformations. The speed of innovative transformations increases; and society has no time to wait for when through the traditional system of education human resources will be prepared for the implementation of basic innovations. This task can be solved only based on the wide use of educational information systems, filling the Internet and channels with educational programs that reflect the content of the new scientific

paradigm and methods of its informational use in different spheres of activity. Therefore, the synthesis of scientific, education and information revolutions becomes the foundation of effective and innovative transformations in economy and society within a short historical period to adequately respond to the challenges of the new century.

**Second**, the solution of this trunk problem above requires economic support for the synthesis of three revolutions, a significant increase in weight and share of expense for science in the whole chain - from fundamental researches to development efforts, education and innovative application of scientific discoveries and inventions for fleshing of information networks with the latest scientific and educational data. Therefore, the share of expense for science, education and information and communication technologies should be increased significantly in the world and across all countries and civilizations. This is a prerequisite for the effective implementation of the cluster of basic economic transformations.

**Third**, the implementation of three revolutions and their synthesis requires structural shifts in economy itself by increasing the share of science-intensive industries, science-intensive goods and services in the sphere of circulation, increasing the share of the innovative-investment sector, the growing share of total expense for science, education and information and communication technologies in the GDP structure, the redistribution of labor and financial resources in favor this sphere. This is the starting point to form the economic foundation for the implementation of the strategy of the innovative breakthrough and should be consistent with a significant increase in weight and share of expense for assimilation and dissemination of epochal and basic innovations, new generations of technology of the sixth technological order.

**Fourth**, an essential prerequisite for the synthesis of three revolutions, and their use as a basis for effective economic transformations is to overcome the excessive polarization of the scientific, educational and informational capacity by countries and

civilizations. Low-income countries have almost no scientific, educational, human and financial capacity to implement modernization and innovation breakthrough.

Obviously, such a polarization can not be overcome by forces and resources of each country. It will be necessary to unite the efforts of the vanguard countries to support large-scale and long-term assistance in the development of scientific and educational potential of lagging countries and civilizations. In this the important role should belong to the UN, UNESCO. At the round table of the World Summit on Sustainable Development in Johannesburg I proposed that the Global Socio-Cultural Facility should be established under the aegis of UNESCO to this end; this proposal is validated in the book "Rent, Anti-Rent, Quasi-Rent in a Global Civilizational Dimension"<sup>1</sup>, as well as in the monograph "The Prospects for Socio-Cultural Dynamics and Partnership of Civilizations"<sup>2</sup> which was reported at the UNESCO headquarters in 2007.

It will be necessary to intensify the UNESCO actions to support and disseminate the new paradigm, its assimilation in the education system and reflection in the global and national information networks.

**Fifth**, the synthesis of three revolutions as the prerequisite and an integral part of effective economic transformations can not be implemented based on neo-liberal principles, through the commercialization of science and education, and uncontrolled dominance of TNCs in the global information networks. Transformations in the sphere of spiritual reproduction require an active support of both the state and interstate associations, development of long-range forecasts, transformations of these areas and partnership strategy of states and civilizations in the implementation and use of the revolutions in science, education, and in the information sphere, and their synthesis in the interests of forming the foundations of the integral socio-cultural system. Therefore, the

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<sup>1</sup> *Yakovets Yu.V.* Rent, Anti-Rent, Quasi-Rent in a Global Civilizational Dimension. M.: Akademkniga, 2003.

<sup>2</sup> *Ossipov G.V., Kuzyk B.N., Yakovets Yu.V.* The Prospects for Socio-Cultural Dynamics of Partnership of Civilizations. M.: INES, 2007.

contribution of states and interstate associations in the implementation of these reforms should be decisive, and commercialization of science, education and information networks must have its limits and be under the control of national and global society.

A number of steps have already been taken in this direction. The P. Sorokin – N. Kondratieff International Institute and St. Petersburg State University have proposed to develop within the framework of UNESCO the program "World Scientific Heritage" (in many ways similar to the program of the World Cultural and Natural Heritage) and to create the Internet portal on the sites of which it will be reflected the contribution of outstanding scientists of the past and present to the world of science. As an experiment it has been developed three Internet sites "Nikolai Kondratieff", "Leonid Kantorovich", "Pitirim Sorokin". From 2006, it is operated and expanding gradually the scientific and educational Internet portal "The New Paradigm" launched by the P. Sorokin-

N. Kondratieff Institute and that reflects the foundations underlying the formation of a new paradigm in the social sciences.

### **6.3. TRANSFORMATIONS IN CULTURE, TOURISM AND MASS MEDIA**

#### **6.3.1. Culture in the Spiritual Reproduction Sphere**

Under culture, I understand the sphere of aesthetic perception of the world around and the relationships between people. In this understanding it includes the fine arts (painting, sculpture, architecture), music, theater, fiction literature, as well as radio, television and the Internet (to the extent that they display works of art). It may also be included publishing trade (in part of publishing of fiction literature, albums, and postcards), libraries, museums, clubs, cultural centers, etc.

Culture emerged with the nascence of human and aesthetic evaluation of the surrounding world by him. But as an independent

activity, it emerged as a result of the social division of labor for about 5 millennia ago when together with the first local civilizations specialized areas of activity related to culture emerged, and people engaged in such activity - architects, artists, musicians, singers, dancers etc. With the development of human society the baggage of cultural heritage expanded, new and new technical facilities used in this area came into being, expenses of society for its maintenance and development increased.

In this respect, culture can be regarded as a branch of economic activity associated with the reproduction of different cultural values. It employs a certain number of people specializing in different kinds of creative activities, and considerable funds are allocated for their maintenance. Although culture is usually included in services but its results materialize in the form of temples, palaces, paintings, sculptures, etc. To a greater or lesser extent, the market covers these spheres as items of culture are sold and bought and connected with other activities (e.g., decoration of weapons, jewelry, clothing, in accordance with the requirements of changing fashion, etc.). Therefore it is valid to speak about the economy of culture as a separate industry, type of activity, and on the other hand - the inclusion of culture in the overall process of economic dynamics.

Like other human activities, culture is subject to cyclical-genetic regularities. Big cycles associated with the change of world civilizations and diverse life cycles of local civilizations, their passing through certain phases that are characterized by various artistic styles, etc. manifest themselves here. In changing big - century or millennium - cycles, as well as long-term cycles it is observed the period of crisis in culture that relate to both the decline and decay of prevailing schools of art, and a decrease in funds allocated to culture in the conditions of economic crises. The impact of technological cycles - both civilizational and long-term - manifests itself on technologies used in the sphere of culture. Tools and materials used in culture change, new means of perception, transmission of information about culture emerge. The revolutionary turns in this sphere were the invention of

book printing, radio, television, computer graphics and the Internet - to the extent to which it is used in the field of culture.

In this sphere the regularities of socio-genetics, heredity, variation and selection also operate. Accumulated cultural values are transmitted from generation to generation as one of the basis of the genotype of civilizations. However, they are periodically updated; new schools of art come into being as well as methods for depiction and transmission of cultural values.

### **6.3.2. Prospects for the Renaissance of High Culture**

The end of the 20<sup>th</sup> and the first quarter of the 21<sup>st</sup> century are characterized by a struggle between two opposing tendencies in the dynamics of culture.

On the one hand, the crisis of culture, trend towards the dissemination of the impersonal mass culture, losses of a significant part of cultural values that is supported by the Internet, television and other mass media continues and deepens under the impact of TNCs targeted at generation of excess profits. The younger generation receives less deep education in the field of culture, it is swept by a wave of mass anti-culture oriented at disharmony and ugliness of life filled with scenes of violence, pornography represented by profitable commercial products of low cultural level. This leads to a loss of a significant part of the cultural heritage accumulated by tens of generations in the next change of generations; today's youth is to a greater extent focused on getting information than to the classical forms of transmission of culture - books, theaters. The cultural world of the young people is impoverished, and most importantly - such a culture does not cause a great admiration for the beautiful, ideals of beauty and interest in the base, disharmonious, ugly, disgusting what can be found a lot in the surrounding life. Culture becomes a tool for dissemination of the sexual revolution, leads to a loss of the high ideals of love and beauty.

On the other hand, the aspiration of the older and younger

generations for classical cultural heritage, perception of the beautiful, revival of the ideals of harmony and beauty is growing as a response to these trends. The number of those who visit museums, theaters with staging of classical plays, concert listeners of masters, communicating the beauty of classical music heritage is growing. John Naisbitt and Patricia Aburdene already in the 90s of the 20<sup>th</sup> century called the Renaissance of high culture among the major trends and confirmed their findings by numerous observations and facts.

In a number of his works Pitirim Sorokin has revealed the essence and factors of the contemporary crisis of culture on the basis of its global commercialization and showed the inevitability of the revival of the socio-cultural system based on the harmonious unity of truth (science), goodness(ethics) and beauty (of culture).

The crisis of culture is a sign of the decline of the sensate socio-cultural system that prevailed in the West during the last five centuries. Now this big cycle of culture is coming to an end. The decay of the sensate culture is an impetus for the revival of high culture which relies on the classical heritage, develops it, is aimed at preserving cultural diversity and its assimilation by new generations.

It can be expected that by the end of the first quarter of the 21<sup>st</sup> century it will begin the surmounting of the global crisis of culture and revival of high culture, adequate harmonious integral post-industrial civilization. The process of establishing the fifth, more differentiated generation of local civilizations with the increased focus on the change of civilizational values, comprising also culture contributes to it. Russia and ancient civilizations of the East with their huge cultural heritage may play a large role to play in this process.

### **6.3.3. Civilizational Content of Tourism**

Tourism as a branch of economic activity is inextricably linked with culture. Cultural diversity makes hundreds of millions of people rush into the unknown countries and regions to get acquainted with the cultural heritage, masterpieces of art, architectural and historical

monuments, to go to museums, concerts, and performances.

At the same time, tourism provides means for the restoration of cultural monuments, the contents of museums, theaters, creates jobs for the maintenance of tourist flows. Many countries and regions with rich tourist potential have revenues from tourism - both international and domestic

- as the main source of existence and development. Tourism plays an important role in the education system - both basic and supplementary, replenishing knowledge of people about its own and other nations and civilizations. It should also be noted the geopolitical significance of international tourism: it is one of the mass means of the dialogue of civilizations, helps discovering and learning to respect the values of other civilizations and cultures, and promotes a culture of peace.

The World Bank data indicate the scale of international tourism: in 2007, the number of outbound tourists reached 1,100 million people, income from tourism – 1,028 billion dollars, or 6.5% of world exports. In not a small number of countries tourism is the main source of income of population and national budget.

Requirements for the content of services provided are changing. Interest in the system of civilizational values of countries has sharply increased. It is necessary to develop new, more science-intensive forms of tourism.

At the roundtable on Development Strategy of Culture and Tourism of the St. Petersburg Economic Forum in June 2000 the Pitirim Sorokin - Nikolai Kondratieff International Institute offered such specialized form -*civilizational tourism*. This proposal was endorsed in the recommendations of the St. Petersburg Economic Forum.

The advantage of this form of tourism that meets the spirit of the UN General Assembly resolution of November 11, 2001 "Global Agenda for Dialogue among Civilizations" is that it gives a complete idea about the people, history, culture and value system of the visited civilization, serves as a mass personal form of dialogue among civilizations. At the

same time, it raises the level of tourism, is its science-intensive form, as for the development and implementation of civilizational tours it is required the pooling of efforts of scientists - archaeologists, historians, culture specialists, as well as teachers, museum workers and tourism organizations.

This is an important part of the educational process, supplementing and detailing knowledge of tourists about the history, culture and values of this or that civilization.

The institute and the travel company "Mir" have developed and begun implementing a number of routes of civilization tours around St. Petersburg as a city of dialogue among civilizations, the North-Western Rus, the Great Volga River Route. Proposals on the tourist routes "Hanseatic Partnership", "the Northern Space of Interaction between Civilizations", "The Great Silk Road: North Caucasian Thoroughfares". Together with the St. Petersburg Engineering and Economics University it has been launched training of specialists in civilizational tourism.

It appears that civilization tourism can, with the support of UNESCO and the World Tourism Organization, take a prominent place in the development of the integral socio-cultural system, implementation of the strategy of dialogue and partnership of civilizations and in a new rise of the tourism after the crisis of 2008-2009, its greater integration into the education process. This will require new skills of the employed in the tourism industry and will contribute to expanding the scale and improving the quality of services it provides. However, this will be an additional factor in the rise of economy and culture of countries and civilizations with a rich but still underutilized tourist potential, including Russia, a number of the countries of the East, Latin America and Africa.

#### **6.3.4. Humanization of Mass Media, Television and the Internet**

Media in a modern broadest sense includes not only traditional tools of generalization and transfer of various information

(newspapers, magazines, radio) but also television and the Internet and occupies a prominent place in the sphere of spiritual reproduction. A growing number of people, especially the younger generation, draw scientific knowledge from them, information necessary for education, perceive a variety of information about the world cultural heritage, works of art, cultural events. They have a huge impact - both positive and negative - on the formation of moral ideals of the person, interpret good or evil deeds, not to mention the huge flow of political information and intrusive commercial advertising creating a demand for goods and services. Modern man is immersed in the virtual world, often zombifying him in the interests of certain TNCs or political parties. Classic media (newspapers, magazines, radio) are being ousted by newest, virtual. With the massive proliferation of mobile phones connected to the TV and the Internet, virtual media become pervasive, covering the daily life of each person and determining his behavior.

The decay of the sensate f socio-cultural system, the global crisis of culture tell adversely on the media, they are increasingly commercialized, turned into a tool for generating super-profits (informational quasi-rent) and distribution of mass anti-culture.

But at the same time the opposite trend increases. In the hands of progressive forces the media have become a lever to overcome the crisis of culture, the rise and spread of the masterpieces of art, the world cultural heritage, a new efficient channel for continuing education (it was addressed above the synthesis of the three revolutions - scientific, education and informational). The struggle is going and the movement is increasing for humanization of television, the Internet and other media. To this end, the state and civil society should take control and implement financial support of TV channels and Internet sites of educational and cultural nature.

A good example is the Russian TV channel "Culture" funded by the state. No commercials are shown here, entertaining informative film about the masterpieces of world culture, stages of civilization, mysteries of history, prominent scientists, inventors, cultural figures, classic drama performances, ballets, concerts are reproduced, the

outstanding cultural events in the country and the world are broadcasted live. It would be advisable to restore and develop educational TV channels, a series of programs, portals and Internet sites on a multilingual basis.

Humanization of the media is an important element of the global strategy of becoming an integral socio-cultural system based on the partnership of civilizations in the humanitarian sphere under the leading role of UNESCO in developing and implementing this strategy. However, this is an important lever to the formation of the foundations of an integral economic system, preparation of mass awareness and human resources for its formation and dissemination.

## **6.4. TRANSFORMATIONS OF MORAL FOUNDATIONS OF THE ECONOMIC SYSTEM**

### **6.4.1. Morality and Its Institutions**

Morality is the top of the pyramid of civilization, invisible but very real part of the sphere of spiritual reproduction, the most delicate mechanism of regulation of economic and other social relations. Morality is a set of rules worked out for millennia, and perceived by each person, norms of behavior giving an assessment to each thought of human, and not only human but also social groups (family, industrial or social collective groups, ethnic group, nation): what is good and bad what is allowed and what is forbidden, what is commendable, and what is reprehensible, and even judgment. Morality and law are interrelated but distinct. Morality is the notion more ancient and wide. It emerged with human and society (community), millions of years before the law on a biological basis, peculiar to mammals, and covers the entire scope of human behavior and social relations. The law emerged together with the state and local civilizations just over five thousand years ago, and regulates that part of the rules of behavior (norms of morality) which form the basis of the functioning of society (family, labor, civil law), or pose a threat to its normal functioning (administrative and criminal law) .

Although morality, as many scientists believe, is characteristic only of human and distinguishes him from other living beings, it has a natural, biological basis. Any community of living creatures - ants or bees, wolves or bears - in order to survive and reproduce, needs certain rules of behavior. Sometimes they add them up to the instincts, unconditioned reflexes such as congenital rules of conduct in the community of ants but it is hardly limited to the instincts if it comes to the top of the biological ladder - mammals, especially primates. She-bear within two years teaches a bear cub the norms of behavior. The complex system of norms of behavior exists in a troop of monkeys. Animals tamed by people - cats, dogs, horses, cows - receive a part of rules of behavior from human, although it is hardly worth talking about morality as a part of the genotype of this or that species of animals, wild or domestic. On the basis of training certain norms of behavior are instilled in tigers and lions, elephants and monkeys.

Hence, there is no an impassable boundary between the norms of human behavior and higher or domesticated animals. Sometimes in unexpected situations animal instincts, up to cannibalism awake in human.

What are the institutes of formation, reproduction and maintenance of the moral foundations of human and society?

**1. Family.** The family does not only transmits the genetic basis of biological assumptions of human behavior but also shapes, reproduces the moral model of human behavior, evaluations of his behavior. From the earliest days of infancy, the mother begins to influence the behavior of the infant, based on its biological instincts. Together with knowledge of the surrounding world, and then the child receives a set of basic rules of conduct: what can we do and what not, what is good and bad, what is encouraged and what is punished. All family members impact it - mother and father, grandparents, brothers and sisters, as well as the nurse if any (remember the impact of Arina Rodionovna on the formation of Pushkin). Gradually, this includes external contacts of the family - relatives, friends. As well as the lifestyle, the family code of ethics has the utmost significant impact on the formation of the moral

values.

Over time, with the entry into adolescence and adulthood, particularly the influence of family is weakened, and other institutions come into play - school, church, collective group, state, political parties and social movements. Sometimes on the faults of historical periods the generation gap occurs, the kids rebel against the moral codes of their parents, choose their own path, even though they do not still succeed of getting rid of that moral heritage received in the family, sooner or later the " blood call" will make itself felt.

The basis of economic morality is also formed in the family: the attitude to work (as to the necessity of the implementation of human creativity - or as a burden, necessary evil); to the property (as life and activity purpose - or as needed means of subsistence worthy of respect subject to the higher norms of justice); to other agents of economic activity (as associates, partners in a common cause - or to rivals, competitors who live by the rule *homo homini lupus est*, man is a wolf to man).

In the family the child learns to participate in the labor process - first in home, and then in a private agricultural or handicraft household: either by transiting from playing to an active labor he has an interest in, or as to the labor family compulsory duty that leaves negative consequences in the child for all life.

The family economy is the basis of reproduction, its source and destination. It is in the family provided the reproduction and formation of the main productive forces of society - labor power laying the foundation for an intellectual resource of society. The family consumes the main part of the final product: according to statistics from 50 to 70% of GDP is consumed in family households. A significant part of agricultural products, handicrafts, household services - mainly for own consumption but sometimes with a partial delivery to market, is produced in the family labor households.

Consequently, the family is the most important social institution designed not only for the reproduction of life, continuation of the race but also for the formation of the moral foundations of human and

society, including economic morality.

**2. School.** The school completes the process started in the family of shaping the moral foundations of society, human, worker and citizen. The school (primary, secondary, higher) performs the critical functions in this case:

- supplements the process launched in the family of receiving knowledge and skills accumulated by humanity, making human fit to perform labor functions (both general and specialized, professional) in society, in economic activities;

- Supplements moral education received in the of family by education in the group of equals in age and communications with teachers, fully translates the code of moral rules of human behavior in society, the system moral values and evaluations of actions;

- lays the foundations of human behavior as a citizen, a full-fledged member of the ethnic group, nation and state in the system of geocivilizational and geopolitical relations.

The school makes a decisive step (and sometimes in spite of family upbringing) in the shaping of economic morality, habituating to teamwork and cooperation (the mastery of knowledge is also a creative work, individual and collective) in an atmosphere of friendly competition, or competitive rivalry in the upbringing of a particular attitude to property, market, distribution. Commercialization of vocational education extends the principles of market competition to this area, forms a certain style of behavior and moral evaluations. It remains these or other adjustments for life, the more that one has to learn in the context of the continuing education at all stages of life cycle, and this is also an integral element of the economic morality.

**3. Religion.** Religion is an integral part of the spiritual sphere of reproduction, the most important institution of transmission and preservation of the moral foundations of society. This is the central mission of the church, whatever denomination it belongs.

Unlike the family and school the church relies on the canons elaborated by centuries and millennia (sets of rules expressed in the sacred books - the Bible, Koran, Talmud, etc.), canonized rites (they

may differ, for example, Orthodox, Catholic, Anglican , Lutheran and other churches, the Sunni and the Shias and other branches of the Muslim religion, different branches of the Hindu and Buddhist religions, etc.) and on the church institutions - highly centralized (Catholicism) or decentralized (Islam).

Religion sanctifies and supports the basic stages in human life - birth and baptism, marriage, death and funerals, strictly observes the established norms of conduct and moral assessments of human actions, promotes the transfer from one generation to another the moral foundations of family and society. With all the differences in religious canons, rites and churches they have common moral foundations, which, however, may change and really change, are modified with the change of world civilizations and differentiated by local civilizations, penetrating into the system of civilizational values.

The church plays an important role in developing and maintaining standards of economic morality. Every religion has its own in many respects different models, a set of rules of economic morality. The Catholic, and especially Protestant church, is increasingly focused on the values of a market economy, the revival of private initiative and entrepreneurship, competitive struggle, individual rights and freedoms of economic, state and social life. The Orthodox religion which has the Byzantine roots attaches greater importance to the role of the state and collective actions, market competition basics are less reflected in it. Islam has its own code of economic rules and regulations that significantly limits the role of the market, capital, profits, and is largely focused on the principles of justice.

**4. State.** As an institution for the establishing and maintaining morals the state has its own interests and ways to impact. It is interested in strengthening the moral foundations of society and family.

In its lawmaking activity the State fixes the basic, most important for themselves and society the rules of conduct in the form of norms of law that not only provide regulation of a complex system of economic and other relations but also provide for punishment up to the toughest,

for violating these rules. This is one of the most important functions of the state, the justification of the burden bearing by society of the maintenance of a cumbersome state apparatus. However, sometimes the state forgets about its responsibility to society and turns into all-sufficient Leviathan, an absolute monarchy or a totalitarian state. In this case, the rules of law are often at odds with the norms of morality.

In the area of economic morality the state performs the following functions:

- Legislation fixes all the foundations of the economic system, forms of ownership, principles of distribution, foundations of the market performance, taxation methods, mechanisms to support socially vulnerable strata of society;

- Legislation regulates the entire complex mechanism of market relations - the order of price formation; activity of financial and credit institutions, exchange rates, monetary economy;

- Carries out measures of social support to vulnerable population strata before the market mechanisms - disabled, pensioners, children, the disadvantaged, etc.

- creates a judicial system resolving the inevitable conflicts in economic activity and punishes for crimes committed, for the harm caused to society or the individual, for violation of the rules of law (often coinciding with violations of moral norms).

All the above-mentioned four institutes of reproduction and maintenance of the rules of rational economic behavior, economic morality complement and support each other, each occupying its own niche and being in a relationship of cooperation and partnership to achieve common goals - to strengthen the moral foundations of family, economy, society, although sometimes their interests diverge and there comes a period of confrontation.

At the same time, each of these institutions has its own economic base. It is valid to speak about economy of the family, economy of education, economy of religion (the church in many countries is the largest owner, has tens of thousands of professionals, conducts economic activities), about economy of functioning of the state

concentrating with itself and expending, including for its maintenance, a significant proportion of GDP. In this respect, the functions of institutions for shaping and maintaining morality and their own economic activities are closely intertwined, and sometimes even contradictory.

#### **6.4.2. Regularities and Stages of Evolution of the Moral Foundations of Society**

The sphere of morality is subject to the same cyclical-genetic regularities as the other sectors of economy and society but, naturally, taking into account the features inherent in the this delicate sphere of spiritual reproduction.

In this area, regularities of cyclical dynamics manifested themselves, albeit with greater activity than, for example, in the sphere of technology, economy or political life. It may be distinguished several super-historical cycles in the dynamics of moral systems, and in their composition – super-long, century cycles. The structure of cycles includes the establishment phase of the new moral system (moral revolution) in its historical epicenter; dissemination (diffusion) phase of a new value system in depth, to the whole system of social relations, and in breadth on the territory of ecumene, where several systems of morality concurrently coexist; phase of prevalence, dominance, maturity of the system of morality prevailed; phase of its decay, decline, moral crisis preceding the new moral revolution, a wave of epochal and basic innovations in the system of morality.

At the same time in these areas the regularities of sociogenetics act: heredity, variation and selection. The genotype of the moral system of humanity elaborated by millennia is transmitted from age to age, clearing from obsolete elements and enriched by new in changing eras, internal and external conditions of existence and development of humanity. The selection of new elements is carried out by people, their small, large and very large collective bodies relying on changes in the institutions of morality - family, religion, school, state and system of law. With the emergence of local civilizations and formation of nations

the systems of morality are differentiated by civilizational and national signs, ensuring the ethnical diversity of the value systems. This, however, does not exclude the presence of common features of the systems of morality for a given historical epoch, super-long cycle - what is called a universal human morality, a set of rules, which, however, is updated with the transition from epoch to epoch.

The law of alternation of generations serves as a mechanism of transfer, saving, updating the system of moral values. Nature and mechanism of action of this law are researched into in my book "The Post-War Generation. Scientific-Memoir Outlines"<sup>1</sup>.

Each generation (the period of its active life unlikely exceeded 15-20 years in ancient times, in the modern era it grew up to 30-35 years together with the increasing average life expectancy of human) inherits a system of moral rules, norms of conduct and criteria for evaluating actions, somewhat modifies this system and transmits to the next generations. In one historical era, these modifications are minor, often unnoticed. The inviolability of moral foundations is maintained and protected by existing institutions. But in the change of historical eras internal and external conditions of existence and development of humanity dramatically change, a revolutionary, very painful change of systems of moral values occurs. Within one generation, these changes are practically impossible. The gap occurs in the change of generations, when the active part of the new generation, responding to the demands of time, shapes an updated system of values, which then gets the recognition and dissemination through the next generations. Such turns take tens and hundreds of years and cover two or three (and in the ancient times even more) consecutive generations.

Let us address now the main stages in the development of systems of morality, super-big super-historical and civilizational cycles in the dynamics of moral systems. We will not go into hoary antiquity, into the times of the Lower and Middle Paleolithic. Let us take as a field for

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<sup>1</sup> *Yakovets Yu.V.* The Post-War Generation. Scientific Memoir Outlines. Outline 1. M.: INES, 2008.

review the period of the lifecycle (not yet completed) of the modern human, species *Homo sapiens* - Cro-Magnon man. This period covers, according to archaeologists, about 40 thousand years, when the Cro-Magnons replaced the Neanderthals.

The first super-historical cycle lasted for more than 30 thousand years and covered the period of the primitive communal system. Relatively small, slowly growing in size community of people lived in small groups - communities numbering several dozens of people. The backbone of economy, sources of life were hunting for small, medium and large animals, collecting fruits, berries, roots, fishing, and beekeeping. The existence of a community was wholly dependent on the natural environment but human had already mastered the growing set of stone, bone, wooden tools, bows and arrows, spears and fishing gear. People lived in caves or built primitive temporary shelters. With the depletion of natural sources of subsistence or with a change in climatic conditions communities moved to other areas or died, disbanded.

More or less stable relations between neighboring communities belonging to one and the same genus, more often friendly (especially with regard to intra-community marriage ban) existed, and sometimes hostile; sometimes clashes between communities occurred for the possession of the better natural conditions. The notion "our" extended to members of the community where solidarity relations prevailed as otherwise it was almost impossible to survive outside the community; it was a kind of solidarity economy based on labor in common.

A fairly rigid system of the rules of conduct and taboos that was supported by the elders of the community and meeting of its members existed. This was the community-based democracy and community rules of morality inherited from the ancestors.

However, approximately 9-10 thousand years ago at the epicenters of progress (and the historical time is counted exactly by such epicenters) the Neolithic Revolution began to unfold on relatively densely populated areas near the equator which lasted two or three thousand years and radically changed lives of people. Social division of

labor, the emergence of farming agriculture and animal husbandry closely intertwined with a handicraft industry, construction of large cities according to the scale of that time ("urban revolution") radically changed the conditions of life. Labor productivity increased many times and its differentiation intensified, the economic inequality (stratification) emerged both between communities and within the community among numerous patriarchal families. Surplus of manufactured products began to come in exchange, the market began to form, and the beginnings of commodity economy emerged that further exacerbated income inequality. And although jointly farmed lands, pastures and large herds of animals were still in the community ownership, personal property began to grow into a private family ownership. The tribal system emerged, and the kinship-based unions of tribes, the beginnings of statehood came into being. The chieftains relied on a war-band and tried to secure with himself and his family the riches accumulated and captured as a result of the wars.

All these changes made the contents of the revolution in the moral foundations of society, became the beginning of the second super-historical cycle in the dynamics of morality which covered the period of 3-4 thousand years - until the end of the 4<sup>th</sup> millennium B.C. The notion "own

- someone else" changed and became more clearly defined. The "solidarity circle" expanded as it was termed by P. Sorokin, it included the members of a large patriarchal family, covering three generations who ran the household together, and community members kept a part of the property, and members of the line to which the community belonged, other lines of the tribe and in some respects - union of tribes bound not only by common interests but also common market with the uniform rules on it.

The key institutions to maintain the moral system were family, community and primary religion. Priests and shamans were split-off in the system of labor division as guardians of spiritual values. However, neither the state nor law existed so far, although their elements were matured in the proto-states.

The great moral revolution - the turn in the system of moral values occurred in the next era, in the establishment of the early class world civilization. The emergence of state and law, legalization of private and public property and slavery, division of society into classes, transformation of wars in the prime function of the states, establishment of local civilizations of the first generation in the valleys of the great historical rivers and sea trade routes - all this radically changed the conditions of existence and development of humanity, led to the establishment of moral norms, in many respects opposite to the system of moral values prevailed before. The division into own - someone else received the clear outlines: own - within a given state, someone else - the representatives of hostile states and pre-state tribes. It was viewed moral to kill or capture, sacrifice or turn into a slave - a "talking animal" deprived of all rights someone else. The property of the ruling establishment and private property became sacred and inviolable. The prime norms of morality that meet the interests of the new system were declared the laws, the violation of which was severely punished (the Code of Hammurabi, the laws of ancient Egypt). The laws protected trade, declared minting of coins a state monopoly, regulated a complex network of property relations. The power of the priests in the maintenance and protection of the moral foundations of society strengthened; the state and priests often struggled for power between them.

The system of moral values established in this super-historical cycle began to show signs of crisis already in the 2<sup>nd</sup> millennium B.C., what is known according to Karl Jaspers, as the axial age when the foundations of the new system of values were laid. This is reflected in the emergence of Buddhism, Confucianism, and later Christianity, and Islam at the beginning of the 7<sup>th</sup> century B.C.

It became prerequisites for the next revolution in the system of morality which unfolded in Europe in the middle of the 1<sup>st</sup> millennium A.D. and marked the beginning of the next superhistorical cycle which lasted until the 16<sup>th</sup> century A.D.

Pitirim Sorokin called it the period of the prevalence of the super-sensate socio-cultural system, including a system of morality.

During this period religion became the prevailing institution in the preservation and transmission of the systems of civilizational values (Christian, Hindu, and later Muslim) which at times subdued the state, family and school to it. Religious dogmas and moral commandments played the role of moral codes, and sometimes replaced law (sharia). At the same time, peasants, craftsmen who made up the bulk of the believers began to get more rights and recognition as a person. The institutes of market, free trade cities, great trade routes got larger recognition and protection. The family law was almost entirely in the hands of the church.

The next moral revolution as the basis for the predominance of the sensate moral sociocultural system unfolded in Western Europe from the 16<sup>th</sup> century and spread to most of the planet, accompanied by the relics of the slave morality, destruction of the adherents of a different faith, destruction of ancient American and African civilizations during the conquest of the New World and the revival of slavery. The half-millennium dominance of the sensate socio-cultural system established with a concurrent preservation of the foundations of the ideational system in the East and the Russian Empire. The moral system prevailed in the West was substituted by service to the market-capitalist economic system. Proclaiming the formal equality of all before the law and ousting religion by state-legal regulation of behavior (although religious movements of Protestantism were also focused on the values of the economic system), the new system was penetrated with the spirit of individualism, the supremacy of the private property law, market mechanisms, secular education and the leading role of the state and law, recognition of the legitimacy of division of society into rich and poor, calling the former to charity. On this basis, commercialization of all aspects of society, including the spiritual reproduction was performed.

This value system became the moral basis for the rapid spread of market capitalist relations and the establishment of the industrial

economic system. However, in the 20<sup>th</sup> century it became more and more evident the signs of decaying the sensate socio-cultural system, the most complete and fundamentally disclosed in the works of Pitirim Sorokin<sup>1</sup>. These trends clearly manifested themselves in the two world wars bloodiest in the human history, the establishment of totalitarian regimes in a number of states, a series of deep economic crises in the change of the Kondratieff cycles, growing moral degradation. It is increasingly clear that the moral system prevailed during half a millennium in the West has outlived its historical period and should be replaced with new adequate to conditions of the post-industrial society, that it is coming next, the fifth great moral revolution.

Its content will be the revival and development of humanistically noospheric ethics, the rise of a sense of solidarity and responsibility, strengthening the moral foundations of the family and interaction of generations. The criterion of justice will take its rightful place in both national and global economy.

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<sup>1</sup> *Sorokin P.A. Social and Cultural Dynamics*. M.: Astrel, 2006; *Sorokin P.A. The Crisis of Our Age*. M.: ISPI RAN, 2009; *Sorokin P.A. The Basic Trends of Our Times*. M.: Nauka, 1977; *Sorokin P.A. The American Sex Revolution*. M.: SKII, 2007.

# **CHAPTER 7. ABOUT A NEW GLOBAL STRATEGY FOR SUSTAINABLE DEVELOPED BASED ON PARTNERSHIP OF CIVILIZATIONS**

## **7.1. THE NEW ERA – THE NEW GLOBAL STRATEGY**

### **7.1.1. The Beginning of a New Historical Era**

As the researches published in the six-volume book of B.N. Kuzyk and Yu.V. Yakovets “Civilizations: Theory, History, Dialogue and the Future”<sup>1</sup> and the global forecast “Future of Civilizations” for 2050 (in 10 parts)<sup>2</sup> have demonstrated, the humanity entered the new, watershed period from the end of the 20<sup>th</sup> century. The main contents of this period:

- completion of a two-century cycle of the industrial world civilization, entering the period of its decline inaugurated by a cluster of global crises (energy-ecological, technological, economic, geo-political, and socio-cultural) and the establishment of the new, humanistically noospheric, integral world civilization;
- completion of a five-century cycle of the fourth generation of local civilizations passed under the sign of dominance of the western civilization and the establishment of the fifth generation basing on a multi-polar world order and partnership of civilizations;
- the beginning of the transition from one and a half thousand century second historical supercycle in dynamics of the global civilization comprised of three kindred world civilizations (medieval, early industrial and industrial), to the third historical super-cycle basing on the fundamentally new foundations.

This stage began from a long transitional period to take more than half a century and includes a period of deep global crises at the end of

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<sup>1</sup> Kuzyk B.N. Civilizations: Theory, History, Dialogue and the Future. Vol. II. The Future of Civilizations and Geo-Civilizational Changes. M.: INES, 2006; Vol. IV. The Outlooks for the Establishment of the Integral Civilization. M.: INES, 2009 ([www.kuzyk.ru](http://www.kuzyk.ru))

<sup>2</sup> Global Forecast “Future of Civilizations” for 2050. Part 9. The Future of Civilizations and Strategy for Civilizational Partnership. M.: SKII, 2009.

the 20<sup>th</sup> – the first quarter of the 21<sup>st</sup> century and a wave of epochal innovations of the second quarter of the 21<sup>st</sup> century, first in the vanguard countries and civilizations, and then planetwide.

This is a period of deep upheavals radically changing the picture of the world and requiring the awareness of the essence of occurring changes from the humanity, working out a long-term strategy which would allow passing such period fraught with global risks and threats with the least losses and in the shortest possible historical time.

### **7.1.2. Towards the New Global Strategy**

At the end of the 20<sup>th</sup> – beginning of the 21<sup>st</sup> century certain steps were undertaken to work out a strategy to respond to new challenges. The UN experts group prepared the report “Our Common Future” which had served as a basis for the elaboration and approval of the global strategy for sustainable development at the World Summit on sustainable development in Rio-de-Janeiro in 1992 and restated and developed further at the World Summit on sustainable development in 2002 in Johannesburg. National strategies for sustainable development have been worked out basing on it in most countries. In 2001, at the UN anniversary session millennium development goals by 2015 were determined and measures undertaken to implement them.

However, the realignment of the global geo-political architecture from the end of the 20<sup>th</sup> century and especially the cluster of the global crises of the beginning of the 21<sup>st</sup> century which involved all the sides of functioning and development of the humanity have drastically changed the situation and demanded to elaborate a new long-term global strategy. The global energy-ecological crisis swept from the beginning of the 21<sup>st</sup> century demanded radical joint efforts of the global community towards realignment of the energy balance and reduction of greenhouse gas emissions into the environment and other environmental pollutions as well as the solution of the issues pertaining to the support of the humanity development with all basic

natural resources – mineral, water, land, and forest. The global economic crisis of 2008-2009 vividly demonstrated contradictions and parasitism of the post-industrial economic system and the neo-liberal model of globalization and demanded new guiding landmarks in the establishment of the integral economic system and humanistically noospheric model of globalization. Expanding depopulation and growing flows of international migrants make it necessary the elaboration of a new, differentiated demographic strategy and concerted migration policy. The industrial economic mode of production has significantly used up its potential and resulted in the fall of labor productivity growth rates and required an accelerated transition to the post-industrial technological mode of production, largescale assimilation of the technological order throughout an entire planet as the first stage of such technological mode of production.

All such problems cannot be solved independently by separate countries or civilizations. They require a global solution based on the transition from confrontation and conflicts among civilizations to the global mode of dialogue and partnership, an efficient response to the challenges of the new century. A new, integral socio-cultural system, revolutions in science and education, renaissance of high culture, dissemination of humanistically noospheric ethics underlie such partnership as well as promoting moral statutes in society and family assisted by religions.

All the said determines the need for an urgent elaboration and adoption of a new long-term strategy for sustainable development basing on the partnership of civilizations to respond to the challenges of the 21<sup>st</sup> century, at the World Summit on sustainable development in Brazil, 2012.

### **7.1.3. The Scientific Basis for the Updated Strategy**

It should be noted that a scientific base for the elaboration of a new strategy for sustainable development has been already brought into being in its basic outlines. The foundations of the future integral

society have been defined in the book of Pitirim Sorokin "The Basic Trends of Our Times"<sup>1</sup>. The basic outlines and paths to form the third wave in the history of the global civilization are defined in the writing of US futurologist Alvin Toffler published in 1980 "The Third Wave"<sup>2</sup> and in his further writings.

The writings of Yu.V. Yakovets "The History of Civilization" (1995.), "The Past and the Future of Civilization" (2000), "Globalization and Interaction of Civilizations" (2003), "Epochal Innovations of the 21<sup>st</sup> Century" (2004) and the fundamental six-volume book of B.N. Kuzyk and Yu.V. Yakovets "Civilizations: Theory, History, Dialogue and the Future" (2006-2009) research into the laws and tendencies of dynamics of civilizations, basic outlines of the present-day civilizational crisis and the paths for the establishment of the integral post-industrial civilization, partnership of local civilizations of the fifth generation.

The Global Forecast "Future of Civilizations" for 2050 (in ten parts, 2008-2009) worked out by the Russian and Kazakhstan scientists with the involvement of scientists from other countries validates the methodology for the global integral macroforecasting, determines the tendencies and critical situations in dynamics of local civilizations of the second half of the 20<sup>th</sup> – first half of the 21<sup>st</sup> centuries, basic outlines of the realignment of the six elements of the genotype making civilizations (energy-ecological, socio-demographic, geo-political, socio-cultural, technological, economic) and validates the recommendations on a long-term global strategy for partnership of civilizations. The summary part of such forecast "Future of Civilizations and Strategy for Civilizational Partnership" was discussed and approved at the roundtable meeting within the 64<sup>th</sup> session of the UN General Assembly on 27.10.2009.

A number of writings of Joseph Stiglitz, Immanuel Wallerstein and other scientists with validation of separate directions to form such new

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<sup>1</sup> Sorokin, Pitirim. The Basic Trends of Our Times. M.: Nauka, 1997.

<sup>2</sup> Toffler A. Third Wave. M.: AST, 1999.

strategy, sustainable development and interaction of civilizations were published. Such matters have been discussed at the tens of scientific conferences, forums, and discussions.

Thus, it may be said that the scientists of various countries have currently prepared a scientific base for the elaboration of a new strategy for sustainable development by the global community.

## **7.2. THE MAIN OUTLINES OF THE NEW GLOBAL STRATEGY**

### **7.2.1. A Strategy for Energy-Ecological Partnership of Civilizations**

The utmost severe problem of the first half of the 21<sup>st</sup> century is a drastic change in the trajectory of the energy-ecological dynamics.

The global energy crisis manifests itself in the growing shortage of energy resources related to a gradual depletion of the best deposits of the fossil fuel, overall tendency towards growing prices for it and a fast growth of the sizes of greenhouse gas emissions into the environment that is one of the factors of adverse ecological changes on the earth. This crisis is aggravated by a growing energy-ecological polarization of the countries and civilizations, wasteful energy consumption in the group of the utmost rich developed countries and a sharp lagging in energy saving, a need for a growth in energy consumption for surmounting the lagging in the group of developing countries, validated at the G-8 summit in Italy (2009) in order to reduce double the greenhouse gas emissions by the mid-21<sup>st</sup> century will require a critical change in the structure of the energy balance the developing countries have no necessary resources for. It caused sharp contradictions at the environmental summit in Copenhagen in December 2009.

It is necessary the elaboration of the global strategy for energy-ecological partnership of civilizations to be based on the following principles:

- assimilation, in all sectors of economy in all countries, of

energy-saving technologies so that to reduce a wasteful use of energy and to optimize its consumption in the context of growing demands in energy-support of developing countries;

- efficient use and reduction of losses in production, processing, transportation and consumption of fossil fuel and raw materials in the context of interests of both the present and future generation so that to preserve non-renewable mineral resources for a longer period;

- a wide replacement of non-renewable mineral sources of fuel and raw material with alternative sources varying in environmental friendliness and ensure satisfaction of growing demands under the reduction of the use of fossil fuel and raw materials;

- surmounting of a growing shortage of fresh water based on its more economical use, reduction of losses, dissemination of new efficient technologies reducing a demand in water and reducing hazardous emissions;

- efficient use and increase in the fertility of agricultural lands so that to satisfy growing demands of the population on the earth in foodstuff;

- reduction of deforestation in South America and Africa serving as the “green lungs” of the planet, more efficient use of forest resources, struggling against forest fires and large-scale forest reproduction;

- reduce the existing extreme gap in energy supply and energy consumption by countries and civilizations based on their joint efforts, large-scale assimilation of resource saving technologies throughout an entire planet and alternative sources of energy and materials.

Energy-ecological problems cannot be solved failing to find consensus on mutually acceptable conditions of energy surplus countries and countries experiencing power shortages and civilizations, working out and implementation of large-scale global programs and projects for assimilation of energy-saving and waste-free technologies of the sixth order and their dissemination on the planet. Thus the foundations for the noospheric energy-ecological mode of production and consumption that will ensure the solution of

the most pressing energy and environmental problems the humanity faces, in the near decades will be laid.

### **7.2.2. A New Demographic, Migration and Social Strategy**

At the beginning of the 21<sup>st</sup> century it is observed a polarization of demographic tendencies of development of the humanity. In one group of the countries and civilizations (African, Indian, Moslem, Latin American, and Buddhist) high even though gradually going down growth rates of population persist, an excess of labor resources increases under a low level of consumption and life quality of population, widespread manifestations of poverty and hunger. In other civilizations (Japanese, Eurasian, Eastern European, and in the most part of western European, and from the 40s of the 21<sup>st</sup> century in Chinese) depopulation is growing, reduction of population and a share of working-age population, fast aging.

These demographic processes cause the increase of migration flows from the poor, overpopulated countries and civilizations, into rich causing the aggravation of contradictions in the recipient countries, unequal position of migrants and tendencies towards the change in the civilizational structure in the hosting countries.

The social differentiation between the rich and poor countries is increasing. According to the World Bank, a gap in the level of gross national income per capita in 2007 between the countries with high level of income (1,056 million people) and countries with a low level of development (1,296 million) reached 65.5 times at the current exchange dollar rate and 24.4 times by purchasing power parity. Hunger and illnesses take annually lives of the tens of million people, including children and elderly people in the countries with a low level of income. This causes an aggravation of social, national and civilizational contradictions on a global space, is a breeding ground for international terrorism, conflicts between states and civilizations.

Such changed socio-demographic situation and new tendencies require the elaboration of social and demographic strategy for

partnership of civilizations differentiated by groups of countries with a various level of income and unequal demographic dynamics rates. Such strategy should be targeted at:

- reduction of a demographic gap between countries and civilizations based on the pursuance of policy for encouraging childbearing in the countries in the depopulation state and reduction of the reproduction rates in the countries with the extremely high birth rates (excluding forcible methods for solution of such problem);

- the implementation of joint efforts for promoting the global system of public health, promotion of health and surmounting of dangerous illnesses including newly arisen epidemics, development and use of efficient medicines;

- improvement of population nutrition and optimization of its structure for eliminating hunger on the planet and ensuring rational nutrition and reduction of the number of people suffering from overweight;

- the elaboration of global mechanisms for the regulation of international migration ensuring optimization of migration flows, adaptation of immigrants in the recipient countries subject to the observance of their rights and civilizational features.

The decision of such problems requires the concerted efforts coordinated by the UN, World Health Organization, International Labor Organization, Food and Agriculture Organization and other international organizations in the elaboration of international programs and projects and uniting efforts of various countries and civilizations subject to the lagging country and civilizations cannot decide such problems failing the assistance from the countries and civilizations with a high level of income and all global community.

### **7.2.3. The Global Technological Revolution and Strategy of Innovative Breakthrough**

The problems referred to above of the global energy-ecological and socio-demographic development may be solved only based on the achievements of the global technological revolution of the first half of

the 21<sup>st</sup> century. Its contents are the establishment of the post-industrial technological mode of production, its first stage – sixth technological order. The structure of such technological turn is already taking shape now, its basic lines – nanotechnologies and nanomaterials, biotechnologies based on the gene engineering of plants, animals, and then a human, global information networks, alternative, ecologically-clean energy. On the ground of such basic lines a radical transformation of all spheres of production as well as the sphere of personal consumption will be performed, the growth rates of labor productivity and gross domestic product will be significantly increased.

However, the global technological revolution requires concentration of intellectual resources both on a global and national scale for the implementation of the innovation-based breakthrough strategy, assimilation and dissemination in the compressed historic period of the six technological order. The group of the vanguard civilizations (North American, Western European, Japanese, and Chinese) has the resources for such increased focusing but not the lagging countries. In such countries the pre-industrial or early industrial technologies prevail, the labor capacity is extremely low, there are no human resources for the implementation of innovation and assimilation of the leading-edge technologies, there is no possibility to surmount a technological lagging by own forces which will be growing in the period of the technological revolution. Therefore a concentration of efforts of the global community based on partnership of civilizations is required so that to overcome an extreme technological polarization formed, to provide assistance to the lagging countries and civilizations in an accelerated modernization of economy, training of the human resources and reduction in lagging from the vanguard countries.

This should become the contents of the strategy of innovation-technological partnership of civilizations targeted at the elaboration and implementation of the innovation-breakthrough scenario, large-scale shaping and dissemination of the new generation of the sixth

technological order on the scale of the planet and narrowing of the technology gap.

#### **7.2.4. The Establishment of the Integral Economic System and Transformation of Globalization**

The global finance-economic crisis of 2008-2009 has clearly demonstrated that the lateindustrial economic system described by the fall in efficiency, strengthening of the elements of parasitism, the gap between the real and virtual capital, a widening gulf between the rich and poor countries has mainly depleted its development potential. The same refers to the neo-liberal model of globalization prevailing now, redistributing resources and wealth for the benefit of MNF and the rich countries.

Capitalism largely succeeded in the 19<sup>th</sup>-20<sup>th</sup> centuries in the development of production forces and multiplying the riches, has outlived its historical period and subject to replacement with the new, integral economic system of the post-industrial period. The key elements of the new economic system already exist in practice and are underway in the economic systems of the “market socialism” of China, socio-economic economy of Germany, “Swedish socialism”, etc. As our researches have shown<sup>1</sup>, in the first half of the 21<sup>st</sup> century the establishment of the integral economic system evolves. Its main features:

- mixed economy combining market-oriented major private business and petty commodity orders with government regulation relying on the strategic government order, and preservation and development of natural-household order in family and personal subsidiary economies of the population;
- optimization of relation between market and non-market sectors of economy the latter powered by the government and under

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<sup>1</sup> *Kuzyk B.N., Yakovets Yu.V.* The Establishment of the Integral Economic System as a Global Transformation of the 21<sup>st</sup> Century. M.: INES, 2008; The Forecast of the Economic Future of Civilizations and Transformation of Globalization. Part 6 of the Global Forecast “Future of Civilizations” for 2050. M.: SKII, 2009.

strengthening of the strategically innovative sector combining the efforts of the government and market in the implementation of the innovation-based breakthrough strategy;

- formation, along with macroeconomy, microeconomy and family economy, supergovernment floor in the hierarchical arrangement of economy at civilizational (European Union like) and global levels, creation of the system of intergovernmental regulation of supranational economy;

- transformation of international economic institutes and mechanisms orienting at the partnership of civilizations, development of anti-monopoly control on a global scale for curbing the mercenary interests of TNC;

- establishment of the system of global funds and global taxation for solution of the utmost significant matters the humanity faces;

- transition to the humanistically-noospheric model of globalization based on partnership of civilizations and promotion of the equal economic cooperation of countries and civilizations.

As experience of response to the global economic crisis of 2008-2009 shows, such transformation of the global economic system will cause significant difficulties and resistance from the rich countries and TNC. It is observed the confrontation of two strategies: to preserve the moribund industrial economic system under its some improvement, keeping the dictate of the rich countries and TNC or make their radical transformation on the principles of the integral economic system based on partnership of civilizations. The first strategy prevails now. A lot of efforts will be required from the global community and its leading-edge forces so that to implement the strategy for a radical transformation of the global economic system.

#### **7.2.5. Shaping the Multi-Polar World Order Based on Partnership of Civilizations**

From the end of the 19th century radical transformations occur in the geo-political architecture. The post-war bipolar structure based on the confrontation of two world socioeconomic systems headed by the

USA and the USSR and their struggle for influence in the “third world” passed. The attempt to build the one polar world order under the dominance of one superpower – the USA relying on the military-political bloc – NATO, has failed. The multi-polar world under several centers of force becomes a reality, the relation changes fast between them. In addition to the traditional “triad” – the USA, Western Europe and Japan – a geopolitical influence of China, India, and Brazil is growing, and Russia is restoring its influence, the countries of the Moslem civilization actively participate in the geopolitical activity. The discussion arisen at the turn of the centuries on whether or not civilizations clash, has ended up with a general acknowledgement of their dialogue, preservation and strengthening of the multi-polar world with a transition to a new form of interaction – global partnership in response to the challenges of the new century. Such prospect is validated in the Global Forecast “Future of Civilizations” for 2050<sup>1</sup>, also in the writings of Joseph Stiglitz, Immanuel Wallerstein, Maurice Emar and others. The matter in question is to choose the efficient institutes and mechanisms for the formation and functioning of the multi-polar world order based on the partnership of civilizations. It should find its expression both in the general strategy of sustainable development based on partnership of civilizations and reforming of existing institutes and establishment of new institutes and mechanisms for partnership of civilizations. In our view such institute may include:

- a gradual transformation of the UN and its specialized agencies into the World Confederation of states and civilizations<sup>2</sup> as the main institute of their partnership. If this occurs, it is anticipated that the Security Council would transform into the Chamber of Civilizations (with the admission of Japan, India, Brazil, R.S.A as permanent members), and the General Assembly into the Chamber of States with equitable representation of all the states, the UN members and

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<sup>1</sup> The Forecast of Geopolitical Dynamics and Interaction of Civilizations. Part 7 of the Global Forecast “Future of Civilizations” for 2050. M.: SKII, 2009.

<sup>2</sup> *Kuzyk B.N., Yakovets Yu.V.* Civilizations: Theory, History, Dialogue, and the Future. Vol. 2. The Future of Civilizations and Geocivilizational Dimension. M.: INES, 2006.

attaching certain legislative functions to it, and also the empowerment of specialized agencies with certain functions of global ministries and departments by separate lines of activity; a half-century experience of the shaping of the European Union as the confederations of the western European, and then eastern European civilizations may serve as an example in it. It does not envisage a refusal of sovereignty of national states but a voluntary delegation of certain functions of super-government bodies to them to solve shared problems (as it is the case in the European Union);

- formation of global law (separate elements of which already exist) regulating economic and geo-political relations on a global scale together with the institutions for the enforcement of such rules of law;
- legitimization of existing currently regional unions the European Union, African Union, SCO, APEC like and other as regional organizations of partnership of civilizations where the borders between them maybe partially overlapped;
- formation of financial-economic mechanisms for partnership of civilizations as a system of global taxation, supranational currency, credit mechanisms, attaching a democratic nature to such institutes as IMF, World Bank, etc.

#### **7.2.6. A Strategy of Socio-Cultural Partnership of Civilizations**

The prime importance line of the new strategy for sustainable development based on partnership of civilizations is the development and implementation of partnership in the humanitarian area – in the areas of science and education, culture, tourism, ethics and religion. As Pitirim Sorokin showed<sup>1</sup> whose ideas were expounded by the Russian scientists<sup>2</sup> in part 8 of the Global Forecast “Future of Civilizations” for 2050<sup>3</sup>, under present-day conditions the centuries-long period of the

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<sup>1</sup> Sorokin P.A. Social and Cultural Dynamics.M.: ACT, 2005. Sorokin P.A. The Basic Trends of Our Times. M.: Nauka 1997.

<sup>2</sup> Ossipov G.V., Kuzyk B.N., Yakovets Yu.V. The Prospects of Socio-Cultural Dynamics and Partnership of Civilizations. M.: INES, 2007

<sup>3</sup> Socio-Cultural Future of Civilizations. Part 8 Global Forecast “Future of Civilizations” for 2050. M.: SKII, 2009.

dominance of the sensate socio-cultural system ends and transition to the integral socio-cultural system begins. It finds its expression in the following global processes:

- the scientific revolution of the 21<sup>st</sup> century is evolving where the contents are the establishment of the post-industrial scientific paradigm, the new picture of the world meeting the realities of the 21<sup>st</sup> century;

- it is coming the most recent revolution in education so that to reflect the achievements in the contemporary information revolution and to form the system of continuing education throughout the human life cycle;

- the signs of surmounting a wave of mass anti-culture and revival of high culture targeted the preservation and transmission of the heritage to next generation using modern information technologies, appeared;

- the tendency of decaying the morals of society is being surmounted, humanistically noospheric ethics revives;

- the role of religion is increasing in strengthening morals of society and family based on dialogue and partnership of various confessions.

All these main features of the realignment of the system of spiritual reproduction, civilizational values will lead to significant changes in spiritual life of human and society, partnership of generations in the implementation of main lines of the strategy of civilizations. The cult of war should give way to the cult of peace, tolerance, and understanding. The system of education, mass media, and development of civilizational tourism as a mass form of dialogue of civilizations should be aimed at it.

The establishment of the integral socio-cultural system means also the surmounting of tendencies to unification of the system of civilizational values according to the western model (a wide spreading of Internet and television contributes to it now), preservation of civilizational and cultural diversity, rivalry of various scientific schools,

cultural trends, art styles, all the diversity of interests and creative abilities of the peoples of the world.

These are the main features of the deep transformations of the global community coming in the first half (and possibly involving the second half) of the 21<sup>st</sup> century, based on the strategy for partnership of civilizations. The movement by the inertia-based path, rejection of transformations is fraught with the intensifying contradictions and crises, increase of threats of ecological, man-made and social catastrophes, threats of geo-political conflicts and clashes of civilizations that might finally lead to the degeneration and death of the humanity.

## **7. 3. A THORNY PATH TO A NEW STRATEGY**

### **7.3.1. Lessons of Crises: Dethroning the Myths**

In order to work out a new global strategy for sustainable development adequate to the realities of the new historical period one should first of all say farewell to many stereotypes and myths in the minds of scientists, politicians, businessmen in the late industrial period.

A barrage of global crises descended upon concerned humanity from the end of the 20<sup>th</sup> century have dethroned many myths taken over the world and put an uneasy task before the national and world leaders to choose a new strategy adequate to challenges, risks and threats of deep transformations of the new century. What are these myths and how to get rid of them in the elaboration of a new long-term global strategy?

**Myth One: *information society, society of services.*** The information revolution of the second half of the 21<sup>st</sup> century, the outrunning growth of information, commercial and other services has given rise to the illusion that the future society will be released of the dominance of material production and become the society based on a self-sustaining development of the service sector. The first world

information crisis of 2001-2002 and energy-ecological, food, financial-economic crises followed after it dethroned such illusion, bared parasitism and uncontrol of the “economy of soap bubbles”. The world faces the prospect of shortage of food, energy, water, and housing for the generality of humanity. The new long-term strategy faces the need to surmount the disbalance formed, hypertrophy of the service sector and ensure material life conditions and development for all the population on the planet.

**Myth Two: *a threat of overpopulation.*** A vigorous growth the population number of the earth in the second half of the 20<sup>th</sup> century gave rise to the imminent demographic catastrophe because of overpopulation and depletion of resources, and the need to reduce the number of the earthmen to the “golden billion” (“ecogaiaism”). But humanity itself copes with such threat: the growth rates of population decrease, and a new demographic threat – depopulation and aging of population of more and more number of countries and civilizations, shortage of labor resources, has emerged on the horizon. The ignoring of such threat in a long term might lead to degeneration of Homo Sapiens species. It is necessary a new, differentiated global demographic strategy surmounting both threats – overpopulation in the poorest civilizations (especially, African) and depopulation in the growing number of countries restricting the economic growth by a shortage of labor resources.

**Myth Three: *non-depletion of natural resources.*** A vigorous growth of the industrial economy was ensured by the enormous flow of natural resources involved in production and was accompanied by an increasing pollution of the environment. The global energy-ecological crisis of the first quarter of the 21<sup>st</sup> century has demonstrated that the illusions about a non-depletion of natural resources and self-cleaning of the environment come to their end. A growing shortage and increase in prices of energy, mineral, water, land resources, ecological accidents and catastrophes becomes ever significant restrictor of the economic growth and social development,

the bone of contention in the geopolitical arena. It is necessary a new long-term global strategy targeted at the establishment of noospheric energy-ecological mode of production and consumption, replacement of natural sources of energy and materials with alternative, at a significant decrease of hazardous emissions, at the every possible saving of non-reproducible sources subject to interests of future generations.

**Myth Four: *the all-might of science and technologies.*** The scientific-technological revolution of the second quarter of the 20<sup>th</sup> century has given rise to the myth of the all-might of the scientific-technological progress opening boundless spaces for the prosperity. However, a wave of crises of the end of the 20<sup>th</sup> – beginning of the 21<sup>st</sup> centuries has demonstrated that such hopes are delusory. The industrial scientific paradigm and its implementation in the latest technological orders and generations of technologies of the industrial period have shown a declining creative force, a fall in the growth rates of labor productivity. The global technological crisis has become the reality not realized by everybody so far. It has come the time of a new global strategy ensuring the establishment of the post-industrial scientific paradigm and its implementation in the global technological revolution of the second quarter of the 21<sup>st</sup> century, reduction of the unprecedented size of the scientific and technological gulf between the vanguard and lagging countries and civilizations

**Myth Five: *affluent society.*** The record-breaking economic growth rates in the 3<sup>rd</sup> quarter of the 20<sup>th</sup> century (almost 5% of the GDP average annual increase) became the breeding grounds for the origination of the myth that the humanity has entered the period of abundance. However, the economic crises of the first decade of the new century have dethroned such myth. First, the abundance was reached only on the pole of riches, in the countries of the “golden billion” for account of the ruthless exploitation of the resources of all the world and a deepening gulf between the rich and poor countries and civilizations (the gap between the “golden” and poor billions

reached 65.5 times in 2007 by GDP per capita at the current rate and 24.4 times by PPP). Second, it emerges with grim obviousness that the countries of the “golden billion” live beyond income, taking “Roses a Credit”. It has been convincingly demonstrated by the mortgage crisis in the USA and UK, credit crisis in Greece, Spain, Iceland and other countries. The unprecedented injection of the budgetary funds into the “economy of soap bubbles” in 2008-2010 just delayed the monetary catastrophe of the industrial economic system; neoliberal model of globalization outlived its historical period and more and more parasitizing. It is necessary a strategy for the establishment of the integral economic system with healthy and transparent sources of growth and prosperity, fairer distribution of the riches between countries, civilizations and social systems.

**Myth Six: *sustainable crisis development.*** High growth rates of the post-war economy under little tangible crises gave rise to the illusion about the possibility of sustainable crisis development. The world economic crises of the 70s and beginning of the 80s at the down stage of the fourth Kondratieff cycle carried an attack on such myth. It was finally dethroned in the first decade of the 21<sup>st</sup> century exposed to the cluster of global crises. It appears to be that no crisis sustainable development exists. Periodic crises were, are and will be; the matter is just in their depth, destructive consequences and generation of stimuli for innovative renovation of economy and society. No endless crises also exist – they serve the starting point for a wave of basic and epochal innovations changing the face of society, the structure of economy. Hence, it is necessary a new long-term global strategy taking into account an indissoluble connection of cycles, crises and innovations and ensuring the surmounting of the cluster of global crises of the first quarter of the 21<sup>st</sup> century based on a high wave of basic and epochal innovations of the second quarter of the century already in.

**Myth Seven: *the unipolar world order.*** Disintegration of the USSR, world system of socialism and the Warsaw Pact as a result of the

end of the “Cold War” gave rise to the illusion of the possibility of the unipolar world order under the dominance of the only superpower left. However, this myth exposed to the crises was fast dethroned. The world order was, is and will be multipolar. The question is on what principles such multi-polar world order may be built on: the principles of confrontation and adversarial position of states and civilizations or their dialogue and partnership allowing consolidating the forces to respond the challenges of the new century.

Such dilemma is realized by national and international politicians and leaders not readily. The faster it will be realized and a long-term strategy for partnership of civilizations will be worked out, the faster and less painful the series of crises will be passed and the path of efficient global transformation will be taken.

The Global Forecast “Future of Civilizations” for 2050 worked out by the Russian and Kazakhstan scientists, in the six volume writing of B.N. Kuzyk and Yu.V. Yakovets “Civilizations: Theory, History, Dialogue, and the Future” and this book disclose the deep roots of crises shaking the world and determines the main outlines of the global strategy for partnership of civilizations on the path of building the foundations of the integral post-industrial society. These findings and recommendations may be disputed or new offered but the one is indisputable: the time has come to say farewell to the myths and illusions and to elaborate a realistic long-term strategy for partnership of civilizations ensuring an efficient transition to the new whorl of the historical spiral. And the faster it will be realized and implemented – the less sufferings and losses the countries, civilizations, all people will have to experience on such long and difficult path.

### **7.3.2. The Elaboration of the Innovation-based Breakthrough Strategy**

Formation of scientifically validated concept considered in practice of the future integral society and paths to move it, parting with the habitual stereotypes and myths of the late-industrial period is just the first step on a thorny path to a new strategy. The second not less

significant and responsible step should follow after it that is the elaboration of the global innovation-based breakthrough strategy of movement on such path based on partnership of civilizations, states, peoples, and social forces.

Three main prerequisites are necessary to this end.

**First**, the elaboration of a scientifically validated and system-based concept for the establishment of future society by progressive scientists got free of the myths of the late industrial period, mastered a theory of foresight and methodology of integral macro forecasting, the acknowledgement of such concept by scientific community and vanguard forces of society. A significant portion of such efforts have already been performed, basic outlines of the concept are already formulated, and found its expression in the Global Forecast “Future of Civilizations” for 2050 made by Russian and Kazakhstan scientists and approved at the roundtable within the 64<sup>th</sup> session of the UN General Assembly on 27.10.2009, in the writings of a number of Russian and foreign scientists. But this concept has not yet received an adequate wide recognition and dissemination, and its fine-tuning and update will be required so far as advancing to the stated objective.

**Second**, and this is the main and most difficult – based on the concept it is necessary to elaborate and adopt at a global level (at the World Summit on sustainable development) a new long-term strategy for sustainable development based on partnership of civilizations. Having imbibed all main principles and approaches of the former strategy adopted at the Summit in Rio-de-Janeiro (1992), fined-tuned and developed in Johannesburg (2002), it should differ from it in all three respects: take account of contradictions and realities of the new historical period, to learn lessons from the cluster of global crises at the beginning of the 21<sup>st</sup> century and be guided by the establishment of the post-industrial integral civilizations; relying on partnership of civilizations as the main institute; to be more particular by lines and performance period, i.e. in actual fact to become the action plan, long-term strategic plan for the global society, the UN and other

international organizations.

**Third**, that the new strategy worked out and adopted at the World Summit would not remain a beautiful air-castle, effective and efficient institutes and mechanisms for the implementation of such strategy are required, consolidation of progressive moving forces around it which are able to surmount an unpreventable resistance of conservative forces prevailing so far in the international arena. The head institute for the implementation of a long-term global strategy should become the United Nations Organization – organization operating on the democratic principles and representing the interests of all humanity. But the UN will have to take a difficult path of innovative transformation and modernization, and the numerous establishment of international officials will have to learn the skills of strategic thinking and action. It will be necessary specialized institutes for separate lines of the implementation of the global strategy (socio-demographic, energy-ecological, technological, economic, geopolitical, and socio-cultural). It will be necessary to work out efficient national and regional mechanisms ensuring the operation of the institutes, performance of global programs and projects. And the most difficult – surmounting the accumulated backlog of contradictions between states and civilizations, resistance of so far prevailing forces – to consolidate progressive forces which are able to put into practice the implementation of the new strategy, necessary updates and changes will be made as it is implemented. A terrible force of inertia will obstruct it. The leaders of the next generation, generation of the 20s years of the 21<sup>st</sup> century will have to solve such task of enormous challenge.

### **7.3.3. Milestones on the Thorny Path**

Subject to baffling complexity and a reverse in the trajectory of global dynamics – and that is exactly the essence of the new strategy of the global development – the following milestones on such path of elaboration and implementation of such strategy may be distinguished:

**The first stage – preparatory.** As a matter of fact it began so far

from 2006 when the scientists of Russia at the roundtable meeting at the permanent mission of Russia to the UN on 12.10.2006 proposed to renew a long-term global forecasting efforts within the UN. Such initiative was endorsed by the RF Ministry of Foreign Affairs S.V. Lavrov, and then by President of the Republic of Kazakhstan N.A. Nazarbaev. In 2007-2009 the scientists of Russia and Kazakhstan with the involvement of scientists from other countries (totally more than 70 scientists of 10 countries) worked out and published in 10 parts the Global Forecast “Future of Civilizations” for 2050 with recommendations for a long-term strategy of partnership of civilizations. Concurrently President of Kazakhstan N.A. Nazarbaev prepared and published the writing “Strategy of Radical Renovation of the Global Community and Partnership of Civilizations”. The ideas of the Forecast and the monograph were endorse at the roundtable meeting at the UN headquarters on 27.10.2009 “The Future of Civilizations and a Strategy for Partnership of Civilizations”.

Now it comes to the promotion of our ideas and their implementation in the design of the new global strategy for sustainable developed based on partnership of civilizations. The following landmarks on such path are seen.

In May 2010 – discussion of the basic ideas of the global forecast and new strategy at the 2<sup>nd</sup> Nobel Economic Forum in Dnepropetrovsk (where it is anticipated the attendance of the Nobel Laureates, Presidents of Ukraine and Poland).

In July 2010 discussion of the strategy for energy-ecological partnership of civilizations at the Roundtable meeting of the Astana Economic Forum:

- A scientific validation of the strategy for energy-ecological partnership of civilizations to be discussed at the Global energy-ecological forum in Astana in September 2011;
- Formulation of proposals for a new strategy for sustainable development based on partnership of civilizations and delivery to Brazil and the UN, publication and posting of the writing on such topic

on the internet in Russian and English 2011;

- Preparation and holding within the World Summit for sustainable development in Brazil in 2012 the Civilization Forum on the new strategy for sustainable development based on partnership of civilizations.

However, it is important that the proposals of scientists would be heard and received by the Organization of the World Summit UN and Brazil and reflected in the draft documents to be submitted for discussion of the Summit. There is no confidence that the task will be completely solved, although the sharpness of global crises impels to radical solutions and new strategy.

**The second stage – *adoption and implementation of the new strategy.*** The start of such stage will be given during the World Summit on sustainable development RIO-20 – in Brazil (2012). This is a long and difficult procedure of searching for new solutions and compromises under an obvious distinction of interests of various countries and civilizations under a strong pressure from the rich powers, MNF and international financial centers. It is unclear so far what the resultant of such confrontation of forces will be like. In any case the result like the Copenhagen Environmental Summit in December 2009 should be avoided.

It would be ideal to adopt the general declaration which includes the principle and action plan of the new strategy for sustainable development based on partnership of civilizations, and main lines to implement such strategy in the areas of energy-ecological, migration, food, technological and economic policy, and also recommendations on the development of national and interstate strategies elaborating on the conditions for the implementation of the global strategy. At the same time it is necessary to undertake efforts to form the institutes and mechanisms for the implementation of the new strategy. It will require 4-5 years more.

**The third stage – *the beginning of the implementation of the new strategy.*** This is the stage of the practical implementation of the new strategy adopted at RIO-20 will take 5-7 years more and will

identify new problems requiring the updates of the strategy adopted. Therefore, in 2020-2022 it will be required the summing up of accumulated experience and introducing updates and amendments to the global strategy at the World Summit for sustainable development RIO-30 in 2022. The World Summit on sustainable development gathered each decade will thus become as a matter of fact representing the interests of all the humanity, the supreme body for the elaboration for the long-term strategy for sustainable development, and the United Nations with a network of specialized and regional agencies will become a new institute to implement such strategy.

It will be useful to set up under the UNESCO or under its aegis the World Research Council for long-term forecasting and strategy for sustainable development comprising of the leading scientists of all 12 local civilizations of the fifth generation and leading powers. Such council could coordinate a regular elaboration of long-term global forecasts, validate recommendations on the global strategy of partnership of civilizations and perform a scientific monitoring over progress and results of the implementation of such strategy.

## **CHAPTER 8. PREMISES, DRIVING FORCES AND RESULTS OF RADICAL ECONOMIC TRANSFORMATIONS**

Thus, humanity (global civilization) from the end of the 20th century entered into an era of global transformations which will probably cover the entire first half of the 21st century. What conclusions based on the above can be done on the premises, driving forces and possible outcome of these transformations?

### **8.1. THE PREMISES FOR RADICAL TRANSFORMATIONS**

#### **8.1.1. The Scientific Premises**

To go with the stream, there is no need to have extensive knowledge and spend a lot of efforts; the inertial path is always easier. But to swim against the stream of the prevailing course of events or, especially, to change it, you need to choose the right goals and benchmarks, direction and means of movement. This requires deep knowledge, strategic thinking and course of action. Therefore, for the implementation of global transformations - and people do them, and people only

- it is necessary a reliable scientific basis and its mastery of not only by the helmsman but all the major participants in the movement. The prevailing current research base - industrial scientific paradigm reflects the conditions of functioning and development of the leaving era and, as experience of recent decades show can not serve as a reliable basis for the predicting of the future and elaboration of long-term targets. However, this does not mean the end of the century of science, bankruptcy of scientific knowledge. Just time has come of changing one scientific paradigm with another, and this is the essence of the scientific revolution of the first half of the 21<sup>st</sup> century, new scientific paradigm that is adequate to the conditions of the 21<sup>st</sup>

century, post-industrial, integral world civilization. There is no need to build this paradigm from scratch – its foundations were already laid in the 20<sup>th</sup> twentieth century.

**First**, it absorbs and transforms with respect to the new conditions the amount of knowledge accumulated by many generations of scholars over the centuries and millennia. **Second**, the cornerstones of the new paradigm, its foundations were laid in the 20<sup>th</sup> century by many Russian and foreign scientists who were far ahead of their time. These are Pitirim Sorokin, Nikolai Kondratieff, Vladimir Vernadsky and Nikita Moissejev, Joseph Shumpeter and Fernand Braudel, Albert Einstein and Arnold Toynbee, and many others. **Third**, on this classical heritage in the past two decades there are actively developing new scientific schools forming a new paradigm of social sciences, primarily in Russia where it can be attributed a modern school of Russian cyclicism, integral macroforecasting, civilizational, noospheric, etc. The basics of the new picture of the world are set forth on the scientific and educational portal "The New Paradigm", in the six-volume fundamental work "Civilizations: Theory, History, Dialogue and Future", in the Global Outlook "The Future of Civilizations for the Period" for 2050 with recommendations for partnership strategy of civilizations prepared by the Russian and Kazakhstan scientists, published in 10 parts, and delivered at the roundtable within the 64<sup>th</sup> session of the UN General Assembly. A network of research institutions developing the new paradigm has been established.

It may be said that the foundations of the post-industrial paradigm of social sciences have already been created (under the leadership of the Russian scientists) and now the key point is in their development, dissemination and assimilation by a new generation. Several textbooks have been published to this end, the Internet portal referred to above develops, the global innovation online university is underway.

The effectiveness of the ongoing global transformations now depends on the extent and speed of the assimilation of new ideas by

persons that prepare strategic decisions and taking them as well as civil society, especially the new generation (generation of the 20s of the 21<sup>st</sup> century to whom the center of gravity to take and implement strategic decisions will pass for three decades). This will be a specific form of creating a new knowledge-based society.

A successful solution of this fundamental problem will require, as mentioned above, an efficient synthesis of the three revolutions of the 21<sup>st</sup> century - scientific, education and information - both nationally and globally. This will help to overcome the current widening gap between the complexity and speed of changes in society and their awareness by people and their adaptation to conditions radically changed.

### **8.1.2. The Social-Political Premises**

Ambitious and long-term transformations in the coming decades can not be successfully and effectively implemented without the creation of adequate social and political background - both within nation-states, and in the geopolitical world order.

The main line of changes in this area is a transition to the foundational *principle of dialogue and partnership of social forces, states and civilizations* in response to new, extremely dangerous challenges and crises of the 21<sup>st</sup> century discussed above.

For millennia, society was torn by class and political struggle, interstate and world wars causing enormous damage to economy and society accompanied by the loss of millions of people.

At the end of the 20<sup>th</sup> century the situation began to change. In many countries, the institute of social partnership was formed as classes and social forces can not exist without each other, have common interests. Europe which was constantly the scene of bloody wars, has turned into a zone of peace and partnership, it was put an end to the cold war, although the flash points of military conflicts still rankle and flare up from time to time in the Middle East and on the African continent. It happens what Pitirim Sorokin called the extension

of a range of joint and several liability covering the whole world now.

Nothing unites so as awareness of a common mortal danger. Threats hanging over humanity are so large that they can be overcome only through joint efforts of all states and civilizations. This means that conditions are being created for the formation of a new model of world order based on dialogue and partnership of civilizations.

The formation and expansion of the European Union, EurAsEC, SCO and the African Union and other unions, the creation of the "G-20", the search for ways to overcome the energy-ecological and food crises are the steps in this direction. Albeit these steps are timid and unsure, the intensification of contradictions is periodically observed but the logic of life forces to move in this direction. Therefore, we have completed our long-term forecast "The Future of Civilizations" with the recommendations to form a global partnership strategy of civilizations as the main task of the upcoming 2012 World Summit on Sustainable Development. It will have to be done sooner or later by humanity who has become aware of the danger of the deadlock inertial path of humanity, its vanguard part.

### **8.1.3. The Economic Problems**

Transformations occurring in the world have the economic basis and in turn affect the economic system, production and distribution of wealth in society. The neo-liberal model of globalization, the absolute power of TNCs, "soap bubbles" of virtual economy, exorbitant polarization of the levels of economic development, growth of parasitism of the industrial economic system outliving its age are the basis of a wide range of contradictions and crises of modern lateindustrial civilization and require its deep transformation.

Therefore, a necessary prerequisite and condition of a radical transformation of the global community found itself on the verge of the historical gulf are drastic transformations of the global economic system, the content of which was discussed above in chapter 6 of this book, formation of social, noospheric, innovation-focused economy.

But this is the hardest part of transformations. It is easy to give up

the dream of what you have not yet but it is many times more difficult - of what already have, can dispose of without control, concentrating in your power millions fortune and controlling the multibillion-dollar cash flows. It is especially hard on the global space almost uncontrolled and found largely outside the legal field as the global economy emerged much earlier than the global civil community just forming could create legal and other institutions that restrict the predatory appetites and uncontrolled actions of selfinterested TNCs. Describing the transnationalization of capitalism, the world of TNCs, Nikita Moisseyev has rightly concluded that "a diabolical pump has started to operate", and while the established order exists, this is a common irreversible process. It will continue to pump out capitals, resources, talents from the backward countries"<sup>1</sup>.

However, this "established order" has given the deep rift and staggered under the blows of the world financial crisis of 2008-2009. It is becoming increasingly clear that it leads economy and the entire civilization to the abyss. Capitalism in its late-industrial economically parasitic globalized shape is doomed to leave the historical arena. However, it is not clear for the majority what will come to replace it. Obviously, the return back to a pre-globalized society is impossible. But the aspirations for building society without a market, or private property or in the form of state socialism of the Soviet- type are utopian; it has already been demonstrated by historical experiences. However, there is no need to dream and devise something unusual. It is just needed to take an attentive closer view on the colorful society bustling with changes and to choose the one that has already passed and withstood the test of time and crises, and have the future prospects. For example, the experience of "market socialism" in China or experience of "Swedish socialism", a half a century experience in the construction of the confederation in the European Union. This does not mean that it is needed to redo the whole economy and society in each country and the local civilization according to the Chinese, Swedish, or

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<sup>1</sup> *Moisseyev N.N. The Fate of Civilizations. The Path of Reason. M. MNEU, 1998. P. 151.*

Western European model, standard. Just a wise will see in these life-proven examples and experiments the features which unite and form, in two or three decades in the vanguard countries, the face of the economy and the order that we have termed integral after P. Sorokin and validated it in our books<sup>1</sup>. It will be created thereby a strong economic and civilizational framework for effective global economic transformations in the 21<sup>st</sup> century.

## **8.2. THE STRATEGY OF TRANSFORMATIONS AND DRIVING FORCES FOR ITS IMPLEMENTATION**

### **8.2.1. The Strategy of Transformation**

To know why and where to go, what is the ultimate goal of the movement and ways to achieve it is very important but it is half the battle yet. It is equally important to have a long-term, science-based strategy of movement toward this objective, reliable tools and mechanisms to implement this strategy and to rely on social forces that can implement the movement by a given trajectory.

If it is a significantly moved forward (although these goals are not yet universally accepted) with the scientific basis (definition of the aims of the movement - creation of the integral civilization and integral economic system), then the situation is very bad with the global strategy. And it is not a lack of strategic documents. Already in the early 90s it was finalized and approved at the World Summit in Rio de Janeiro (1992) the Global Strategy for Sustainable Development which was later restated and developed during the Summit on Sustainable Development in Johannesburg (2002). In most countries national sustainable development strategies have been adopted on this basis. At the jubilee session of the UN the Millennium Goals were defined - specific guidelines for 2015. Each Summit of the G-8 and G-20 meeting ends with the adoption of strategic documents on various issues.

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<sup>1</sup> *Kuzyk B.N., Yakovets Yu.V.* The Establishment of the Integral Economic System as a Global Transformation of the 21<sup>st</sup> Century. M.: INES, 2006; *Yakovets Yu.V., Kuzyk B.N.* The Establishment of the Integral Civilization as a Response to the Challenges of the 21<sup>st</sup> Century. M.: INES, 2009.

Consequently, there is no shortage in strategic documents of the global level. There is another trouble. Most of them remain unfulfilled or marginally implemented, and the major trends often move in the opposite direction. Indeed, there is no effective mechanism for the implementation of the most of these trends as well as an adequately reliable scientific basis. It means we need to act according to the rule "the less-the-better."

Our researches have led to the following conclusions and recommendations on the global strategic planning.

*First*, the development of any strategy should be preceded by a long-term scientific forecast made by independent scientists, using a reliable methodology. It is exactly such forecast based on the methodology of integral macro-forecasting – the Global Forecast "The Future of Civilizations" for 2050 with recommendations for a global partnership strategy of civilizations was developed by scientists of Russia and Kazakhstan and delivered at the roundtable within the 64<sup>th</sup> session of the UN General Assembly on 27 October 2009. Not a few long-term forecasts in individual areas - demographic, ecological, food - with the same horizon – have been developed and published by the UN specialized agencies.

*Second*, the previously adopted global strategic documents are largely outdated and do not correspond to real conditions and challenges of the first quarter of the 21<sup>st</sup> century, a cluster of global crises broken out at the beginning of the century and can not serve as a reliable tool for overcoming them and achieving the trajectory of sustained development, movement to the integral civilization. A new long-term strategic document is necessary that meets the realities and challenges of the new century -**Partnership Strategy of Civilizations** for the period of at least until 2030. The World Summit on Sustainable Development "Rio-20, which is scheduled for 2012 in Brazil appears to be dedicated to the creation of such document. In preparations for this summit it was held the 4<sup>th</sup> Civilization Forum "Prospects for Development and Partnership Strategy of Civilizations" at the World

Universal Exhibition in Shanghai Expo 2010 in October 2010

Certainly, there are no guarantees that it will be succeeded to develop and adopt a new strategy for sustainable development based on partnership of civilizations. The inertness of international organizations and states are too large which are not accustomed to a long-term strategic course of action, especially on a global scale, the clash of interests of participants of the global community (that is clearly demonstrated by the Copenhagen Environmental Summit in December 2009) is too strong. But experience of the European Union shows that under certain prerequisites concerted policy actions of different countries are possible representing the two civilizations (western European and Eastern European). Admittedly, there is a higher level of political and economic integration of the confederal type. The crisis situations that occurred in the global dynamics force to seek ways and means of agreed strategic actions of the global community. The foundations of the new global strategy, its nodal lines are formulated in the monograph of Kazakhstan President Nursultan Nazarbaev<sup>1</sup>. They could be the starting points for developing a global strategy.

### **8.2.2. The Institutes and Mechanisms for the Implementation of the Strategy**

However, any, even the most scientifically validated long-term strategy verified in practice will remain on paper unless there are credible, coherent, functioning institutions and mechanisms for its implementation.

It would seem that there is no shortage in such global institutions. Once a decade it gathers the World Summit that determines the overall strategy for the long term. Summits on various issues (food, environmental, etc.) are gathered more often. The central institute of the global community and partnership among civilizations is the UN uniting the current 192 member states. The UN has an extensive

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<sup>1</sup> *Nazarbaev N.A. The Strategy of Radical Renewal of the Global Community and Partnership of Civilizations. Astana: Arko, 2009.*

network of specialized (UNESCO, UNEP, UNDP, FAO, etc.) and regional organizations, an extensive staff of international experts. In addition, there is a considerable network of international organizations outside the UN system and operating on different principles: the International Monetary Fund, World Bank, International Labor Organization, etc., with their own staff and own strategy.

All this huge staff of international officials serving in this or that role the global processes have no skills in the development and implementation of the long-term strategy. It will be required their training so that they can effectively deal with these matters. Furthermore, there is no international rules of law that would regulate the process of developing and implementing long term strategies, as well as a specialized organization within the UN which would be responsible for this activity (in the 70s there was an office responsible for long-term forecasting and strategic planning in the UN Secretariat). Such institutes are necessary, mechanisms for developing and implementing long-term strategies, programs and projects to implement it fixed in the rules of international law. This applies primarily to the financial support of such programs and projects. Experience of the European Union shows the need to move in this direction.

### **8.2.3. The Driving Forces for Radical Transformations**

Radical transformations, al the more so of the global nature expressed in the waves of the epochal and basic innovations, violate the established temporary equilibrium of forces, habitual patterns of thought and actions and exacerbate the confrontation and fight of the three differentlydirected forces: *progressive*, forward-looking and willing to implement radical innovations; *conservative* seeking to maintain the existing order, its institutes and mechanisms, only a little updating them on the basis of pseudo-innovations, *reactionary* trying to use the imbalance so that to return back to the past, to implement anti-innovations. The nature, intensity, and the result of transformations depends on the level of consolidation and the relation

of these forces whether it ensures the creation of the foundations of the post-industrial, humanistically noospheric world civilization in the vanguard countries in the shortest historical term or the agony of the postindustrial system outlived its period continues, or a utopian attempt prevails to return to the order of the previous centuries that have already left the historical arena, as it happened in the post-Soviet countries as a result of neo-liberal reforms of the 90s.

Let us address the composition and the likelihood of consolidation of the progressive forces for radical global transformations of the first half of the 21<sup>st</sup> century.

**Forces of science and education.** In the historical process scientists and teachers (often in one person) are the lookouts, pioneers of innovations and transformations and whose primary functions are to anticipate future changes, evaluate them and transmit the knowledge to the active part of present and future generations encouraging them to actions. However, scientists and teachers represent *three colors of times*: *red* - shaping and disseminating a new paradigm, a new picture of the world, and on the basis of a long-term forecast developing a strategy of progressive radical transformation; *green* - defending and transmitting to a new generation the foundations of the prevailing paradigm in somewhat improved and idealized form so that to preserve the prevailing distribution of forces; *black* - suddenly the scientists and teachers become active who carry the followers and students in the past paradigms, long bygone times instigating the forces of reaction and obscurantism, seeking to turn the course of history back in spite of Ilya Prigozhin's alert that the arrow of time has no reverse motion.

The speed and efficiency of transformations depends on how progressive the figures of science and education, directing a new paradigm, whether they succeed in consolidation, overcoming the resistance of conservative forces and carrying the other progressive social forces.

## **8.3. SCENARIOS AND CONSEQUENCES OF GLOBAL TRANSFORMATIONS**

### **8.3.1. A Choice of Scenario**

It is already clearly taking shape two main possible scenarios of transformations of the first half of the 21<sup>st</sup> century. Under the *inertia-based* scenario the dominance of conservative forces will continue for a long time, the risks of transformations will be increasing, they will be fighting their way slowly and extremely painfully for the most of the population on the Earth. Under the *innovation-breakthrough* scenario the progressive forces will consolidate, make use of a new scientific paradigm, develop and implement a long-term strategy of balanced global and national transformations and in the relatively short historical period – by the middle of the 21<sup>st</sup> century - will be basically able to build an integral civilization with all its main attributes in most parts of the world.

We do not discuss the medium, intermediate scenario because it will be reduced sooner or later to one of the two above mentioned scenarios. There are also excluded catastrophic scenarios in one form or another from discussion since the catastrophe is still impossible to predict and a superoptimistic variant of a suddenly built paradise on the Earth in view of an obvious utopia of such a scenario.

### **8.3.2. The Inertia-based Scenario and Its Consequences**

In the development of the global community it is clearly prevailing so far the inertia-based scenario as the background and driving forces for the innovation-breakthrough have not yet matured. Partial alterations in existing orders (pseudo-innovations) do not change the general trend.

Under this scenario the trunk motion vector remains the same – towards the post-industrial, humanistically noospheric civilization and integral economic system but the path to it becomes much more lengthy and painful for the most of the world population, with the risk

to shift to a catastrophic scenario as a result of the clash of civilizations, ecological or technogenic disaster. The price of global transformations will turn out to be extremely high. A threat of movement to global depopulation will intensify in the long run, to a loss of a creative innovation potential, the deepening divide of the world into two poles and ousting Homo sapiens from the Earth in the long view.

### **8.3.3. The Innovation-Breakthrough Scenario and Conditions for Its Implementation**

A different prospect is taking shape in the implementation of the innovation-breakthrough scenario of the future of humanity - if its healthy and active forces are aware of a deadly motion by the inertia-based path, be able to develop and consistently implement a strategy for effective radical transformations on the crest of the wave of epochal and basic innovations. This will require mobilization of intellectual and economic forces, political will and energy of enthusiasts carrying the general public for the implementation of the system of radical transformations balanced with each other, strictly focused on the motion vector to the humanistically noospheric civilization and the integral economic system. This will require the consolidation of the progressive forces around this strategy and the powerful onslaught so that to overcome the resistance of conservative and reactionary forces.

This path will be difficult, require a fundamental modernization of technologies, economy and society as a whole, major investments, and the ultimate exertion of forces. And most importantly - transition from adversarial relationship, competitive confrontation of social forces, states and civilizations on the national and global scales to the foundational principle of their *partnership* in the face of increasing threats, risks, and mortal dangers. The very type of thinking, moral environment should change being guided by the principle of *solidarity*, mutual support as one can not survive alone in opposition to the new world.

This radical change from the spontaneous play of historical forces to the conscious, knowledge-based management of its development and movement to the future will become, in this case, an epochal innovation on the historical path of human evolution.

If humanity is able to choose and implement the strategy of the innovation breakthrough, then it will succeed to go the main part of the path to a new society, integral civilization in more compressed period of time - mostly by the middle of the 21<sup>st</sup> century ensuring a reliable base for sustainable development for future generations. And the losses under this scenario will be far less. Humanity will become more consolidated, while maintaining the national and civilizational diversity and under the convergence of technological and economic development levels, levels and quality of life for population in different states and civilizations.

## **AFTERWORD. THE FATES OF CIVILIZATIONS ARE IN THE HANDS OF THE NEW GENERATION**

The following principal conclusions may be made from foregoing.

1. The end of the 20<sup>th</sup> and the first quarter of the 21<sup>st</sup> century is a period of global crises shaking up economy and society – financial-economic, demographic, energy-ecological, food, technological, socio-cultural, and geo-political. The two-century industrial society with economic and technological modes of products adequate to it completes its lifecycle, the political system based on the confrontation of states and civilizations accompanied by two the utmost bloody world wars in the history, sensate socio-cultural system prevailing in the West throughout five centuries.

However, such cluster of crises is not a sign of the end of the history, a closing stage of lifecycle of Homo Sapiens species. The cluster of crises serves as an impulse and gives energy for the decuman wave of grandiose transformations, including the waves of epochal and basic innovations likely to take all the space of the second quarter of the 21<sup>st</sup> century, and might even more.

2. The basic outlines of the future society which under a favorable scenario speeds up by the middle of the century in the vanguard countries begin to break through a dense curtain of chaos and uncertainty, and then it will undertake a victorious procession throughout the entire planet. These are the outlines of the post-industrial, humanistically noospheric civilization, noospheric energyecological mode of production and consumption, integral economic and socio-cultural system, multi-polar world order based on dialogue and partnership of civilizations.

In order not to make an error in the choosing a strategic course, avoid pseudo-innovations and anti-innovations in the course of transformations at the national and global levels the following orienting points should be stuck to.

3. The global economic transformations of the 21<sup>st</sup> century come

from the growing scarcity of natural-ecological and labor resources and as a counter to them an increasing significance of innovative-technological and economic factors relying on the synthesis of three revolutions (scientific, education, and information), rising high culture and morality, global synergetic effect of partnership of civilizations. Only a system-based approach, taking account of cyclical-genetic laws allow passing a crisis course of tests and efficiently perform the well-aimed building of the foundations of new society.

4. Implementing global economic transformations it is necessary to:

- be guided by the prospects for the replacement of the industrial economic system outlived its life and loosing its creative potential and increasing its parasitic features with the new more efficient integral economic system;

- take into account a change in the factors of economic dynamics, growing restrictions from the primary factors (natural and labor) and increasing significance of the transforming force of innovative-technological, economic and socio-cultural factors;

- remove the extremes and deformation in structural dynamics, to raise the role of material production, consumer and innovative-investment sectors under diminishing the role and influence of parasitically swollen sector of infrastructure, surmounting the economy of “soap bubbles”;

- in the implementation of the institutional transformation it should be geared to the multiorder balanced economy, combination of market-innovative entrepreneurship with the governmental regulation of economy and market in interests of society, present and future of generations;

- make a transition from the neo-liberal model of globalization, intensifying the polarization in the world economy, to the humanistically-noospheric model oriented at the comprehensive partnership of civilizations in respond to the challenges of the 21<sup>st</sup>

century, under efficient control of the global civil society and its institutes.

5. In the first quarter of the 21<sup>st</sup> century the background for the innovation-based breakthrough scenario of the coming global transformations matures. But so that to implement them successfully it is necessary to consolidate progressive forces of transformation of society so that to ensure their preponderance over conservative forces of reaction.

6. Now when the outlines of the future society and paths to move it are mainly determined, the fate of the humanity is in the hands of the generation of the 20s of the 21<sup>st</sup> century to which a burden and responsibility for taking strategic decisions passes for three decades, the implementation of radical global transformations. One of the aims of this book is to help the leaders of this generation to orientate itself correctly in the sophisticated interlacement of global trends and transformations so that to choose a reliable strategic course and lead successfully people and humanity as a whole. The fate of humanity is in the minds and hands of this generation. Thus, our generation of the 60s of the last century leaving the historical arena will accomplish its mission - to pass the baton to the next generation of creative scientific knowledge and foresight.

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# **SUPPLEMENT. PARADOXES AND PROSPECTS OF CIVILIZATIONAL DYNAMICS**

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## **Paradoxes and Prospects of Civilizational Dynamics**

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## Four Paradoxes of Global Dynamics

At the beginning of the new century the world of civilizations has suddenly faced with four paradoxes that call into question the continued existence of this world, the future of humanity.

**1. Unidentified global object.** From the end of the 20<sup>th</sup> century the planet is hit with the decuman wave of crises rapidly changing each other that did not fit into the usual understanding of the crisis phases of medium- (approximately ten) and long-term Kondratieff (approximately half a century) cycles.

In the 1990s, unprecedented in its length and depth the crisis hit the Eurasian (USSR) and Eastern European civilizations; in 1998 it spread to the "Asian tigers" - the new industrialized countries of South-East Asia.

In 2000-2001, a new world information crisis broke out mainly hit the developed countries. In 2008-2009, the global financial and economic crisis combusted and also became the first (but not last) crisis of neoliberal globalization under the control of transnational corporations. The ratio of world trade in goods and services to the global GDP fell from 65.3% in 2008 to 54%. It is burst a considerable number of "bubbles", so that the ratio of market capitalization of firms to global GDP fell from 121.3% in 2007 to 85.2% in 2009. It was the collapse of the late industrial economic system. Simultaneously with the tragedy of September 11, 2001 it is unfolding a geopolitical crisis, the global core of which is the conflict of civilizations.

No sooner had the world recover from the crisis of 2008-2009, as in 2012-2013 a new wave of the crisis unfolded, the epicenter of which at this time are the Western European and Eastern European civilization, united in the European Union.

Such an acceleration and deepening of the crises stumped not only national and international policymakers and business leaders, but also scientists, based on the industrial paradigm of social sciences. There is no well-founded diagnosis of the global disease; therefore, there cannot be trusted recipes for its healing. International organizations and governments are struggling with the consequences of the crisis,

not understanding and healing its roots. Some leaders began to say about the fundamental unpredictability of crises that afflict the planet like earthquakes or volcanic eruptions, although the scientific basis for predicting crises is known since N.I. Tugan-Baranovsky - for 100 years.

There is nothing more dangerous than the position of a rabbit in front of a boa, admission of own helplessness in front of the wave of crises.

**2. Blind leaders and dangerous healers.** The second paradox follows from the first. In the book of the Serbian satirist of the late 19<sup>th</sup> century Domanovic "Stradija" (Land of Tribulation) it is published the story "Leader". Its essence briefly is in the following. In a state of disaster people gather in the square to find the way-out. The eloquent leader is convincing them that he knows the way to salvation. The crowd believes him and follows him. Thickets are ahead, the leader confidently powers through them, and the people suffering make their way through the wild forest. They come to the edge of the cliff - and the leader boldly steps to the abyss. It is followed by a part of the crowd, and the survivors discover: and the leader is blind!

Such blind leaders who do not understand the essence and implications of all ongoing crises, but offer to follow them, are many multiplied. And each of them is gaining adherents and followers, heading in one direction and then the other of the main road of progress.

This becomes particularly threatening, when dangerous healers prevail: the decision-makers at national and international level become bold leaders. A striking example is the policy of the "Three" - the International Monetary Fund, the European Union and the European Bank during the current European crisis. Having forgotten the lessons of Marx that the periodic renewal of fixed capital (technology factor) lies at the heart of crises, the lessons of Roosevelt, summarized by Keynes, on the need first of all to deal with unemployment, mass impoverishment and decline in domestic demand, not stopping at deficit financing - these dangerous healers advocating the priority of reducing the national debt and the reduction of inflation, with a

perseverance worthy of a better application, pursue the anti-Keynesian policy, moving the burden of the crisis made by them to the most of the population and especially young people. They are persistently preparing a social explosion, destroying over half a century ripen idea of European integration, the European confederation, because it will die, unless supported by the majority of the population. Such dangerous healers also prevail in the economic block of the Russian government. The Chinese leadership holds the opposite positions, in fact the Keynesian.

**3. Kingdom of crooked mirrors and the kingdom of "soap bubbles".** Overcoming the crisis is complicated by the fact that late industrial modern economic system is both the kingdom of crooked mirrors and "soap bubbles" that does not give the possibility to evaluate adequately the crisis processes and means for overcoming them. World prices have ceased to reflect the ratios and dynamics of resource spending and serve as criteria for the effectiveness of decision-taken and economic activity. An example may be the dance of the oil prices, which seems insane, but quite manageable. Market competition has long been replaced by the dictatorship of the monopolies and multinationals. Generally accepted performance indicators - GDP and GNI (gross national income and gross domestic product) are a distorting mirror, a share of parasitic market services is bloated there and a share of material production and social services are understated.

In this kingdom of crooked mirrors the dynasty of "soap bubbles" reigns - especially transnational corporations and international financial centers that suck the capital out of the process of reproduction and accumulation for speculative actions in the stock markets, bursting on a periodic basis in times of crisis with global foul-smelling and disasters for hundreds of millions of people. In 2007, the ratio of market capitalization of firms to global GDP reached a record level - 121.3% (against 48% in 1990), but as a result of the crisis fell to 85.2% in 2009 (30%), in 2010 was up to 88.7%. It is formed a kind of virtual global "shadow theater", where it is played enthusiastically

about 30 thousand of listed companies with an average size of capital 910 million dollars (2011). However, behind this game it is a speculative redistribution of wealth between countries and social strata, following the fluctuations of the exchange situation. This is a global club of billionaires, who rules the fate of the world economy. It has little in common with the world of market competition of unequal producers, the rules for which are derived by Smith and Ricardo. It is rotten right through a parasitic system of the late industrial economic system which has outlived its time, has become a fetter on the path of the economic growth and science and technology progress, it is doomed to descent from the historical stage in the birth pangs of the new, integral economic system - socially, environmentally and innovatively-oriented.

**4. Total professional incompetence.** Its way to the society of knowledge, of which so much is said and written, humanity began with entering the society of ignorance, with the phenomenon of total professional incompetence. The point is not that knowledge is not enough - the number and percentage of employed with secondary and higher education is widely increasing, especially in Russia: graduates with higher education per 10,000 employed from 1980 to 2009 increased from 53 to 215 - four times (while the training of skilled workers over the same period decreased from 191 to 80 to 10 thousand employed - in 2.4 times) because the new generation is armed with knowledge that meet the conditions of the 20<sup>th</sup> century, and it is necessary to live and work in a radically changing world of the 21<sup>st</sup> century. Hence the unique phenomenon as the spread of professional incompetence: workers, especially the DM (decision makers) - Government officials, political leaders, top managers - do not understand the essence, direction and implications of the ongoing changes and often take the wrong strategic decisions or do not take long-term strategic decisions at all in fear of the future (a phenomenon that Alvin Toffler called future shock). Power - political, governmental, and economic - is more and more detached from the advanced science and willingly accepts the neo-liberal position: let all goes as it goes, it is

not worth for the state to interfere in market processes. This is the position of a rabbit in front of a boa, which aggravates the painful crisis processes and makes it difficult to exit from them.

### **Four Rays of Light at the End of the Tunnel**

However, all is not so bleak and hopeless as it may seem. Modern Russian scientific schools forming a new scientific paradigm that meets the realities of the 21<sup>st</sup> century, relying on the strong shoulders of their great predecessors (Vladimir Vernadsky and Nikita Moiseev, Pitirm Sorokin and Nikolai Kondratieff, Alexander Bogdanov and Nikolai Berdyaev), in alliance with like-minded people from other countries – offer their vision of regularities of changes in the nature and society, their vision of the future of society and the ways of movement to it. What are the distinguishing features of this new vision?

1. **Crisis open the way to the renewal of society**, a new turn in the history spiral. Joseph Schumpeter described the crisis as creative destruction: breaking predominant, but obsolete, doomed - they open the way for the creation of new, progressive. Crises are never endless: completing one historical cycle, they open the way for a new turn of the spiral. Performing the destructive function of breaking obsolete, braking the development of society, at the same time they open the way for the emergence and spread of the new already conceived, renew and enrich the genotype - the heritable core - economic, technological, social, and political systems of any level. Moreover, we can talk about the **energy of crisis**: a crisis frees society from complacent inertance and short-sightedness and awakens in progressive scientists, inventors, politicians, and businessmen desire to find a way out of the crisis, ingenuity and willingness to radical strategic decisions and actions. As the Russian proverb says: a pike lives in the lake to keep all fish awake.

The decuman wave of global crises beginning of the 21<sup>st</sup> century, evokes the great energy of the implementation of new strategic decisions, is the impetus to a radical renovation and improvement of all the systems that make up the complex structure, the initial stage of a wave of global transformations, opening the way for a new turn in

the history spiral. That is the approach of modern Russian scientific schools (Russian cyclicism, civilization, noosphere, innovative, integral macro-forecasting), standing on the position of a mongoose before a cobra position: knowing the essence of impending disaster – boldly and ably to strive for their awakening, to overcome crises.

**2. The civilizational nature of the crisis.** But for the success of such position it must first make a science-based diagnosis of the crisis, determine its historical place. And the answer to the fundamental question about the nature of the crisis is unambiguous, though not simple: it is a **crisis of civilization**. It has a complex structure that can be seen in three dimensions.

*First*, it is a crisis phase of super-long civilizational cycles - to replace the industrial world civilization that has done its historical period and exhausted its development potential (the beginning of which was laid by the industrial revolution of the end of the 18<sup>th</sup> – beginning of the 19<sup>th</sup> century) it comes next, seventh (if you start counting from the Neolithic Revolution of the 8<sup>th</sup> millennium B.C.), world civilization. We do not call it the post-industrial (this is an inaccurate description), but integral humanistically noospheric civilization whose contours are still being formed.

*Second*, it means a radical realignment in the world of local civilizations. In place of the fourth generation (16-20<sup>th</sup> centuries) with the dominance of the Western civilization it has actually come a more differentiated and active fifth generation, comprising of three civilizations of Europe (Western European, Eastern European, and Eurasian), three recently split from the Western civilization of America and Oceania (North American, Latin American, and oceanic) and six ancient civilizations of Asia and Africa (Japanese, Chinese, Indian, Buddhist, Muslim, and African). It comes true the foresight of Pitirim Sorokin and Arnold Toynbee on the movement of the center of creative activity from the West to the East. One can add - and to the South, referring to the Latin American civilization. At the forefront of the evolving integral civilization it comes China, India, and Brazil; in the rear guard - the U.S., Western Europe, and Japan (the so-called triad of

modern world leaders).

**Third**, it follows from the civilizational nature of the global crisis, the need of balanced and synchronized transformation of all six components making the genotype (the heritable core) of global and local civilizations: natural-ecological and demographic, technological and economic, geopolitical and socio-cultural. All of them are now hit by deep crises: energy-ecological and food, demographic and migration, technical and economic, socio-political and geo-political, crisis in the socio-cultural area (science and education, culture and morality). Hence it follows the need for a long-term strategy of concerted transformation of all the components of the genotype of civilization across all global and local civilizations.

**3. Noospheric crisis.** The third feature of the diagnosis of the current global crisis is that this is a noospheric crisis, realignment of the interaction, foundations of co-evolution of nature and society.

Civilization was born ten thousand years ago with a purposeful human use of natural resources to his advantage - with the emergence of farming, cattle husbandry, and construction. Each new step in the history of civilization was characterized by the involvement in the process of reproduction, development of new natural productive forces: the steel industry and irrigated agriculture, the forces of wind and water, steam energy, liquid and gaseous fuels, electricity, and nuclear energy. And it was a natural basis for a new stage in development. Now the situation is changing radically: the world is approaching to exhaustion of certain natural resources and environmental catastrophe.

**4. The crisis of the global community.** The world is inexorably globalizing. And the matter is not only in the economic, technical, information, and migration globalization. The main thing is different: the crisis has spread to all the sides and components of the global civilization and can be successfully surmounted only on the basis of a concerted and effective global strategy, concerted actions of the global community relied on scientific thought as a planetary phenomenon as a historical, biological, geological force.

It is not realized so far. Tendencies that rather dangerous for future, prevail. The tragedy is in a growing gap between the pace of the changes taking place and their awareness and appropriate response to them on the part of both national and world elites - both political and economic. The competence of the existing global institutions and their response to the ongoing and upcoming changes are inadequate. At the Summit, 1992, at the decline of the previous historical period the strategy for global sustainable development, supplemented at the Summit RIO+10 in Johannesburg and Conference RIO +20 in Rio de Janeiro, in many ways does not meet new conditions of world development that have drastically changed. The efforts of the leaders of "G-8" and "G-20" are mainly aimed at the partial improvement of outdated world orders rather than at the development of a long-term strategy that meets the realities of the 21<sup>st</sup> century.

However, the situation is beginning to change here. Through the efforts of scientists from Russia and other countries forming a new paradigm, it is developed and represented at the UN headquarters on 27.10.2009 a new vision of the future world - Global Outlook "The Future of Civilizations" for 2050. Based on this forecast it is prepared and represented at the United Nations (28.06.2011) and at the 4<sup>th</sup> Forum of the UN Alliance of Civilizations (11.12.2011) and at the 6<sup>th</sup> Forum of Civilizations within the UN Conference RIO+20 (12-17.06.2012) the scientific foundations for a long-term strategy for global sustainable development based on partnership among civilizations. In 2013, it will be finalized the report of the International team of scientists to the Summit "G-20" (Saint Petersburg, 5-7.09.2013) "Scientific Foundations of the Strategy for Surmounting the Crisis of Civilization and Entering the Path of Global Sustainable Development" (discussed at the 7<sup>th</sup> Civilization Forum in Moscow 10.04.2013).

The ruling and business community has not responded so far to the vision of scientists (with a few exceptions - Russian Foreign Ministry and President of Kazakhstan support their initiatives). But the crisis quickly teaches even most sluggish. And most importantly - a

process of change of generation has begun, in the coming years the gravity and responsibility of the adoption and implementation of strategic decisions in the national and global scale will pass to the leaders of generation of the 2020s. Let us hope that they will be more receptive to the vision of scientists.

### **Six Steps to the Future**

To successfully overcome the crisis of civilization, and entering a new turn of the history spiral appears it is necessary six inter-related consecutive steps. Three of them have already been passed in the last two decades (from 1992), three more are to go within at best the coming decade, by RIO+30 (2022).

**Step one** can be dated to 1984, with the publication of the monograph "The Regularities of Science and Technology Progress and Its Planned Use", my report "The Establishment of a Post-industrial Civilization" at the International Scientific Conference dedicated to the 100<sup>th</sup> birth anniversary of N.D. Kondratieff (at the discussion "Kondratieff Cycles and the Future") and publication in Russian and English the monograph "At the Origins of a New Civilization" (1993). The report and monograph formulate the foundations of a civilization-based approach to the past and to the future of humanity, determine the content and prospects of the establishment of a new world civilization.

These provisions have been further developed (including with the use of geo-civilizational, reproductive-cyclical macro-model) in the monographs "The History of Civilizations" (1995, 1997), "Cycles. Crises. Forecasts" (1999), "The Past and the Future of Civilizations" (2000), "Globalization and the Interaction of Civilizations" (2001, 2003), and six-volume book "Civilizations: Theory, History, Dialogue and Future" (2006, 2008, 2009).

Thus, it is created a fundamental basis for a new branch of scientific knowledge - *civiliography*, finding the regularities and outlooks of the dynamics and interaction of civilizations, developed a methodology of diagnosis and prediction of crises and ways out of them, defined the content of modern civilization crisis and prospects

for its overcoming.

**Step two.** On the basis of established fundamental backlog in 2008-2009 it was developed, published in 10 parts, and reported at the United Nations headquarters in October 2009 and at the World Expo 2010 (in Shanghai) Global Outlook "Future of Civilizations" for 2050. This forecast reflects a methodology for integral global macroeconomic forecasting, the results of the situation analysis of the dynamics of civilizations and the identification of critical situations, a long-term forecast for six components of the genotype of civilizations - energy-ecological, demographic, technological, economic, geo-political, and socio-cultural. The cumulated volume - "The Future of Civilizations and the Partnership Strategy of Civilizations" – is reported at the round table within the 64<sup>th</sup> session of the UN General Assembly on 27.10.2009 and at the 4<sup>th</sup> Civilization Forum at the World Expo 2010 in Shanghai.

**Step three** was to develop on the basis of a long-range vision a long-term strategy to overcome the crisis of civilizations on the basis of a wave of epochal and basic innovations. This step was validated in the monographs "The Epochal Innovations of the 21<sup>st</sup> Century" (2004), "Russia-2050: a Strategy of a Innovation Breakthrough" (2004, 2005), "Russia-China 2050: a Strategy of Co-development" (2007), "The Strategy of the Faster Growth of Russia in the Global Crisis" (2010), "Global Economic Transformations of the 21<sup>st</sup> Century" (2011) and the reports of the international team of scientists "Foundations of the Strategy for Global Sustainable Development based on Partnership of Civilizations" (2011), which were presented at the Round Table within the 65<sup>th</sup> session of the UN General Assembly (28.06.2011), at the 4<sup>th</sup> Forum of the UN Alliance of Civilizations (11.12.2011), at the 6<sup>th</sup> Forum of Civilizations at the UN Conference on Sustainable Development 13-17.06.2012.

As a result of such step a long-term strategy for global sustainable development on the basis of civilizational and noospheric approach, dialogue and partnership of civilizations received scientific development and discussion.

It should be noted that the proposed strategy by scientists was supported in the writings of the President of Kazakhstan N. Nazarbayev - the monographs "The Strategy of Radical Renewal of the Global Community and Partnership of Civilizations" (2009) and "Global Energy-Ecological Strategy for Sustainable Development in the 21<sup>st</sup> Century" (2011).

**Step four.** Now it is time to make the next, fourth step - bringing the vision of scientists to the world leaders, the embodiment of their ideas in international documents.

To the Summit of "G-20" in St. Petersburg it is presented the draft report of the International team of scientists "Strategy for Surmounting the Global Crisis of Civilizations and Entering the Path of Global Sustainable Development "(2013). The draft report will be finalized taking into account the deliberations and suggestions of the team members, translated into English, published, posted on the Internet and distributed among the participants of the Summit.

The Organization for Promoting Global Civilization (permanent chairman - Chinese scientist Zhang Shaohua) has prepared a draft plan for environmental enhancement. It will be discussed at the 4<sup>th</sup> World Congress of Global Civilization "On the Way to the Noospheric Civilization" (Moscow, December 2013), finalized, published in Russian, English and Chinese languages and submitted to the United Nations, the leaders of "G-20", the governments of the countries of the world. Let us hope that the proposals of scientists will find understanding and support from world leaders.

**Step five.** However, the practical implementation of scientific recommendations for overcoming the crisis of civilizations on the basis of a wave of epochal innovations and entering the path of global sustainable development based on partnership between civilizations will begin when these recommendations will begin to be embodied in international instruments of "G-8", the UN system, international associations of states and civilizations. This will require, along with the development and approval at RIO +25 summit (possibly as part of the World Exhibition EXPO 2017 in Astana) of the global strategy for

sustainable development, the implementation in long-term strategies by components of sustainable development.

Making and adoption of such strategies, programs and projects for their implementation, as well as similar strategies on international and inter-country associations and unions (CIS, Eurasian Economic Community, the European Union, SCO, BRICS, etc.) will require a longer period of time - at the best case by RIO +30 summit in 2022.

**Step six.** A condition for the implementation of the long-term strategy proposed by scientists is its perception by global civil society, and, first of all, by the leaders of the 2020s generation. And for this it is necessary to break the information blockade of new ideas and recommendations, to make them available to millions of people of different ages and in different countries. It is necessary to remember the point of Karl Marx: ideas become a material force as soon as it grips the masses.

To implement this step it is proposed two main ways.

One is the spread of new ideas through the information channels - not only the publication of monographs and brochures in different languages, but the substantive content of modern information networks. To do this, it is used a variety of ways:

**First**, publication and posting on the Internet of monographs and brochures in different languages - both on paper and in electronic form, SKII together with INES prepared and published several e-anthologies "The Establishment of Post-industrial Paradigm of Social Sciences" (2010), "The Long-term strategy for Partnership of Civilizations" (2011), "Theory, History and Future of Civilizations. Their Dialogue and Partnership" (2012).

**Second**, the use of the Internet and Social networking, posting of video-lectures (not only monographs, textbooks and reports), presentations of scientific reports on various websites of institutions (SKII, INES)<sup>1</sup> and their partners.

**Third**, publication from 2011 of the international research and

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<sup>1</sup> <http://misk.inesnet.ru>  
<http://www.inesnet.ru>

education magazine "Partnership of Civilizations" in Russian, English, some issues - in Arabic.

Another way - to implement new ideas through the system of education. To do this, it is established the Open University for Dialogue of Civilizations, published or prepared course-books for it - "Civilization: Past and Future" (published in Russian, English and Arabic), "Dialogue and Partnership of Civilizations", "Strategy for Global Sustainable Development Based on Partnership of Civilizations" . Organization together with leading universities in Russia and other countries of classes in a variety of forms in the subjects of the University will contribute to the development of new ideas and recommendations by the leaders of the next generation.

Therefore, the prerequisites for these six steps of a total duration of about half a century are real. The matter is now how to adequately go this historic path, the remaining three steps.